

Social Indicators Research Series 48

Filomena Maggino  
Giampaolo Nuvolati *Editors*

# Quality of Life in Italy

Research and Reflections

 Springer

# Quality of Life in Italy

# Social Indicators Research Series

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## Volume 48

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Filomena Maggino • Giampaolo Nuvolati  
Editors

# Quality of Life in Italy

Research and Reflections

 Springer

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# Chapter 1

## Introduction

Filomena Maggino and Giampaolo Nuvolati

In the past, alongside the international network development, the theoretical reflection and the applied research on quality of life found it hard to take shape in Italy, especially in the academic field.

However, it should be pointed out that several local administrations promoted numberless studies and researches on liveability of cities and regions. In fact, many pioneer territorial experiences were accomplished during the 1970s, promoted by cities, provinces and regional administrations (e.g. the Bilanci Sociali d'Area, Regional Social Balance, in Milan) and testified a wide interest in quality-of-life studies at local level.

Other experiences have to be added, even though their nature is typically journalistic, like the annual report on quality of life in Italian provinces realized by *Sole 24*, national daily business newspaper.

More recently, a campaign (*Sbilanciamoci!*) involving almost 50 associations, NGOs and networks working on globalization, peace, human rights, environment, fair trade, ethical finance urged the development of an alternative index for analysing quality of life, of development and of public action to be used by local authorities. The *QUARS* is a synthetic index that takes into account different dimensions of development at regional level (quality of production and consumption, environmental sustainability, democratic participation and so on).

In the end, all those experiences were fragmentary, with low comparability and theoretical and methodological reflections.

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At the same time, official statistics have been developing important experiences in quality-of-life research, like the Multipurpose Survey project, introduced by the Italian National Institute of Statistics (ISTAT) during the 1990s and still carried on.

By considering the depicted frame, organizing a national conference on quality of life seemed to be a precious occasion in order to evaluate the state of the art and to take stock of the development of quality-of-life studies in Italy, by comparing different experiences, also referable to different scientific disciplines, and trying to reconsider and reassemble them in a single and joint frame.

This book represents the output of that conference, organized in Florence by the Italian Association for Quality-of-Life Studies (AIQUAV) in September 2010.

At the same time, the book makes an interesting analysis of well-being and quality-of-life topics, paying attention to specific group of populations and themes. In particular, it focuses on some classical quality-of-life concerns: health problems, economic unbalances, employment, democracy and public knowledge, participation. It is very useful not only for scholars but also for users, practitioners, public administrators dealing with quality-of-life issues at different level.

The book is interesting in particular for Italian readers having chapters specifically devoted to the Italian experiences. Some other articles regard the European countries and make possible some comparative analysis. The chapters could be also very useful in order to address economic, social and health policies oriented to improve living conditions, some others to identify a general framework to look at in order to increase democratic and participative processes in the contemporary society. As a matter of fact, quality of life is a multidimensional concept including all these dimensions.

The book is organized in four parts.

The *first part* includes articles concerning conceptual and methodological aspects involved in quality-of-life measurement and promotion.

In their chapter, Enrico Giovannini (President, Italian National Institute of Statistics, ISTAT) and Tommaso Rondinella (ISTAT) illustrate the activities started in Italy aimed at strengthening the ability of official statistics to measure specific dimensions of well-being and the ongoing national consultation, involving the Italian National Institute of Statistics and the National Council for Economics and Labor (CNEL). This process is aimed at identifying a set of indicators showing a strong methodological soundness and grounded on a conceptual framework conceived through a democratic process able to grant legitimacy to the selected key indicators.

Matteo Mazziotta and Adriano Pareto (ISTAT) propose an interesting solution aimed at overcoming the problems yielded by non-compensatory approaches to composite indicators construction. In particular, the solution normalizes the indicators through a traditional 'standardization' and summarizes the indices of the sub-dimensions of the composite indicator using a penalty function to be applied to cases showing 'unbalanced' values of the indicators. They compare the proposed approach with traditional ones by using data collected by 'Il Sole 24ore' on quality of life in Italian provinces.

The chapter prepared by Marco Fattore (University of Milano-Bicocca), Filomena Maggino (University of Florence) and Emilio Colombo (University of Milano-Bicocca) illustrates, through real examples pertaining to material deprivation, an alternative to composite indicators, a new methodology allowing statistical evaluation of ordinal data related to socio-economic phenomena, by overcoming the problems of the classical aggregative approach. Traditionally, in evaluation studies, ordinal scores are turned into numerical values, inconsistently with the real nature of the phenomena at hand. The proposed innovative approach allows this inconsistency to be overcome by employing a benchmark approach founded on partially ordered set (POSET) theory, a branch of discrete mathematics providing tools for dealing with multidimensional systems of ordinal data. This approach allows the problem of ‘weighting’ evaluation dimensions to be handled in pure ordinal terms.

Enrica Chiappero and Nadia von Jacobi (University of Pavia) discuss the impact on the construction of multidimensional indexes of poverty and well-being of three methodological assumptions – namely, the transformation function, the aggregation procedure and the chosen weighting system. They conducted a robustness analysis aimed at quantifying the relative and global impact of different combinations of the three methodological choices on poverty estimates both at national and sub-national level.

The chapters of the *second part* are introduced by Linda Laura Sabbadini (ISTAT), who gives an inspiring picture of the social change in Italy through official statistics.

The authors of subsequent chapters, all researchers at ISTAT, focus on particular aspects of quality of life.

Silvia Montecolle and Sante Orsini investigate the structure and dynamics of the satisfaction by exploiting the wide set of information provided by the multipurpose household survey ‘Aspects of daily life’ (1993–2009). The survey project gathers annually information on satisfaction of the Italian population aged 14 and over (every year the sample included about 40,000 individuals). Results, obtained by analysing data through a multiway approach, show a strong and stable structure over time.

Alessandra Federici, Maria Giuseppina Muratore and Daria Squillante explored, in their well-documented chapter, the relationship between quality of life and security. Their contribution allows the reader to realize how difficult it is to study ‘security’ for many reasons, starting from its definition (involving other concepts, like ‘worry’ and ‘risk’, and different aspects, mainly objective and subjective, and their relationship), its measurement, its data creation and its analytical approach (which should take into account the complex relationship between the different aspects).

The role of working time in individual quality of life is explored in Maria Clelia Romano and Daniele Spizzichino’s chapter. The illustrated analysis allows the authors to investigate the subjective perception of the quality of working time (component of multidimensional concept of quality of working life and measured in terms of level of satisfaction with time devoted to work) and its relationship with the cognitive dimension of subjective well-being and the worker’s and job’s characteristics.

The chapters of the *third part* reflect on the relationship between quality of life and other significant aspects, such as democracy, statistics and public knowledge, security policies and working conditions.

Civic evaluation has been defined as a comparative action research performed by citizens in order to assert their own point of view through the use of established and verifiable methods to issue reasoned judgements on realities that are significant for the protection of rights and quality of life. The chapter of Angelo Tanese and Alessio Terzi regards these topics and in particular the activities performed by *Cittadinanzattiva*: the first organization in Italy aimed at promoting and developing civic evaluation projects and methodologies in different public sectors of intervention.

According to Maurizio Sajevo (University of Turku, Finland Futures Research Centre), security, quality of life and development are concepts to be considered by adopting a holistic approach. In his chapter, the author presents a set of theoretical issues, shows the Finnish approach to these topics and concludes underlying the importance of governance for a secure and sustainable socio-economic development. Security, hardly achievable individually, is the result of a more holistic thinking. Individual security and freedom implies the security and freedom of all.

The relationship between statistics, democracy and public knowledge is the topic analysed by Paolo Parra Saiani (University of East Piedmont). In particular, his analysis regards the success of quantification in the administration of the State and the contextual conditions that interfere with the transformation of information into knowledge. As a matter of fact, we have arrived till today, with a large amount of data available, but with little support to effective citizen's knowledge.

Federica Origo (University of Bergamo) and Laura Pagani (University of Milano-Bicocca) present a paper regarding the linkages between flexicurity and workers' well-being in Europe. Using micro-data from the Eurobarometer survey, authors estimate the effect of a micro-level measure of flexicurity on overall job satisfaction by gender, age and education. Results confirm that job stability offered by the type of labour contract and perceived security are quite different things, and that the duration of the contract may be hardly important for job satisfaction if the worker perceives that he/she is not at risk of losing his/her job.

The chapters contained in the *fourth part* deal with topics which can be included in the traditional field of health-related quality-of-life research.

The methodological paper of Lisa Gnaulati, Francesca Ierardi, Stefania Rodella and Elena Ruviglioni concerns a specific tool aimed at reading and evaluating published and validated measures of health-related quality of life (HRQoL). This tool was created by the Quality and Equity Unit of Regional Agency for Healthcare services of Tuscany Region, in collaboration with the University of Florence. The application of the tool to a set of questionnaires, among the most utilized at international level, is oriented to underline positive aspects and critical areas in HRQoL measures.

While many studies showed that the perceived health represents one of the best predictors of future mortality, the Italian National Institute of Statistics established since the 1980s a particular survey project, aimed at monitoring the perceived health, as part of the more general concept of individual health. The applied questionnaire

includes internationally shared and validated instruments, such as the SF-12 and part of the SF-36. Data allow Lidia Gargiulo, Laura Iannucci and Alessandra Tinto (ISTAT) to investigate Italian population's health with reference to not only physical (such as energy and fatigue) but also mental components (anxiety, depression, loss of behavioural/emotional control, psychological well-being). The performed analysis of the identified indicators allows population's health-related quality of life to be described (also in terms of inequalities) and provide precious information useful for designing national and local health and social policies and services.

The chapter of Marco Bertelli, Annamaria Bianco, Daniela Scuticchio and Ivan Brown is aimed at studying the correlation between quality of life of individuals with intellectual disability and members of their families. To such a purpose, the chapter presents the results of an Italian research based on international survey tools. The study underscores the importance of recognizing variability among families and assessing all dimensions before intervening in an effort to improve quality of life.

At the end, we can say that this book (as well as the Florentine meeting) represents a proof of the great liveliness of quality-of-life research and researchers in Italy (not only in the Academic ambit) and demonstrates also how this issue came out from the academic research field and got firmly in policy agendas and among policy goals also in Italy.

**Part I**  
**Quality of Life: Methodological Aspects**

# Chapter 2

## Measuring Equitable and Sustainable Well-Being in Italy

Enrico Giovannini and Tommaso Rondinella

### 1 Introduction

Throughout history, various notions of well-being have been discussed depending on cultural influences and prevailing political regimes. In the twentieth century, well-being was often equated with economic welfare. After the Great Depression and World War II, national accounting, and in particular gross domestic product, came to be seen by many as the main way of measuring development. Although several alternative measures of well-being and societal progress have been developed by researchers during the 1970s and the 1980s (e.g., the ones grouped under the so-called social indicators movement), it is only in the 1990s that initiatives concerned with sustainable development and measuring human development such as the UNDP Human Development Index and the Millennium Development Goals, have captured the attention of media and have played a role in political debates. More recently, thanks to initiatives carried out by (some) national and local political authorities, to the research on the measurement of quality of life and happiness, and to initiatives undertaken by the OECD on measuring and fostering societal progress, a new movement aiming at measuring well-being is emerging.

In this context, measuring national well-being and societal progress in Italy is one of the challenges that the Italian National Institute of Statistics (Istat) is called to face. In recent years, Istat's attention toward this issue has taken the form of a number of activities aimed at strengthening the ability of official statistics to measure specific dimensions of well-being. Such initiatives include objective and subjective measures of individual well-being, the strengthening of environmental measures and accounts, and the adaptation of macroeconomic aggregates to provide distributional information and to overcome GDP limitations in general.

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During the last 2 years, a further improvement has been made by publishing the annual report “Noi Italia” which provides a brief presentation of the most relevant, according to Istat, statistical information for describing the state of the country and by including in the Multipurpose Survey (Indagine Multiscopo) an internationally comparable single question on overall life satisfaction as well as a question on how relevant the different dimensions of well-being are for citizens. Finally, in 2011, Istat together with the National Council for Economics and Labor (CNEL) started a national consultation to identify a shared set of indicators of the progress of Italian society, therefore honoring the recommendations by the OECD and the Stiglitz Commission.

This initiative needs to take into account, at least, two major challenges. First, a sufficient and robust statistical production able to cover all relevant dimensions of progress must be made available. Second, the starting up of a democratic process is needed to grant public legitimacy to the selected key indicators. Only if the latter condition is satisfied, the set may (have the chance to) become a tool recognized by different social components for assessing the state of the country and for effectively supporting policy decisions toward progress.

This paper initially describes the international context in which the Istat initiative moves. Then, it presents the current statistical production by Istat with respect to the measurement of well-being and societal progress assessing its ability to answer to Stiglitz Commission’s recommendations. Finally, it illustrates the Istat-CNEL initiative aiming at the identification of a set of key indicators for measuring progress in Italy.

## 2 The Context

Measuring the well-being of individuals and societies has been a concern of statisticians for some time, but over recent years, the discussion on how to measure progress is gathering momentum worldwide. It is being discussed by policy makers at all levels and has increasingly attracted media attention. A consensus has not emerged yet on the best way to go, but in June 2007 the European Commission, the OECD, the Organization of the Islamic Conference, the United Nations, the United Nations Development Programme and the World Bank adopted the “*Istanbul Declaration*” (OECD 2007) which highlighted an international consensus on the need to “undertake the measurement of societal progress in every country, going beyond conventional economic measures such as GDP per capita” and launched the *Global Project on Measuring the Progress of Societies*, as the worldwide reference point for those who wish to measure and assess the progress of their societies.

The most influential work in this area has been the one by the Commission on the Measurement of Economic Performance and Social Progress (“*The Stiglitz Commission*,” Stiglitz et al. 2009), set up by French President Nicolas Sarkozy in January 2008. The Commission produced a final report in September 2009 calling for a “shift [of] emphasis from measuring economic production to measuring people’s well-being.” The Commission’s aim has been to identify the limits of GDP as an

indicator of economic performance and societal progress, to consider what additional information might be required for the production of more relevant indicators of social progress, to assess the feasibility of alternative measurement tools, and to discuss how to present the statistical information in an appropriate way.

The issue was a theme for discussion even at the 2009 Pittsburgh Summit, where the G20 Leaders asked for work on measurement methods that “better take into account the social and environmental dimensions of economic development” as an inherent part of the implementation of the new Framework for a Strong, Sustainable and Balanced Growth (G20 2009). An important development has also come with the *European Commission Communication “GDP and beyond: Measuring progress in a changing world”* (European Commission 2009) which fulfills the commitment made at the “*Beyond GDP conference*,” where it was clearly stated that “... It’s time to go beyond GDP” (Barroso 2007). The communication has molded the ideas presented at the conference into a EU roadmap for action committing itself to work in several areas to improve existing measures and to report on the implementation and outcomes of the listed actions by 2012.

It is against this background that within the European Statistical System (ESS) the *Sponsorship Group*<sup>1</sup> “Measuring Progress, well-being and sustainable development” has been established with the mandate of coordinating activities on the issue and building on the recommendations from the above-mentioned Stiglitz report and Commission Communication, taking also in consideration the objectives of the European Commission Europe 2020 Strategy.<sup>2</sup> The key challenge, within the ESS, is to implement the recommendations arising from these converging initiatives, in order to deliver richer statistical information and further enhance harmonization at the international level, in particular in Europe.

Meanwhile, on September 30, 2010, the 96th Conference of Directors General of the National Statistical Institutes (DGINS) produced the “*Sofia memorandum*” recognizing the validity of the Stiglitz Commission’s recommendations, listing a number of improvements that NSIs should adopt (such as to reconcile national accounts aggregates with household survey data, to give more attention to the household perspective, to capture distributional aspects, to harmonize environmental measures and improve timeliness of quality-of-life statistics) (DGINS ESSC 2010).

Finally, in February 2010, the Franco-German Ministerial Council decided to ask the French *Conseil d’Analyse Économique* (CAE) and the German Council of Economic Experts (GCEE) to follow up the Stiglitz’s outcomes. The CAE and GCEE have recently published a report on “Monitoring economic performance, quality of life and sustainability” (CAE and GCEE 2011) which, starting from the domains

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<sup>1</sup>Sponsorship group cochaired by the Eurostat and FR-INSEE (National Statistical Institute of France) directors general, with the participation of 16 member states (presidents/directors general of NSIs: AT, BG, CH, DE, DK, ES, FR, IT, LU, NL, NO, PL, SE, SI, SK, UK) as well as OECD and UNECE.

<sup>2</sup>The activities on the GDP and beyond communication and the Stiglitz report in the European Commission and in the European Statistical System (ESS) are also coordinated by the interdepartmental coordination group cochaired by Eurostat and DG Environment directors general, with the participation of 11 commission DGs and 3 agencies.

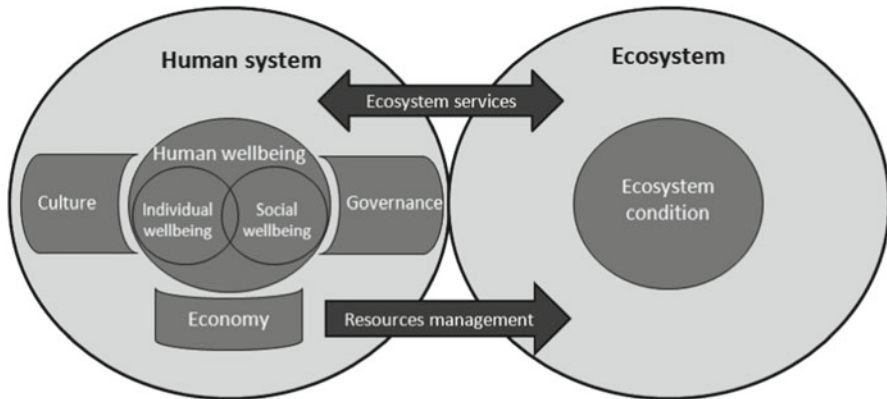


and indicators of the Stiglitz Commission, discusses how comprehensiveness and accuracy of an indicator set might be traded off optimally with parsimony and cost to provide a reliable basis for regular, timely, and digestible reporting on three key issues: economic performance, quality of life, and sustainability.

### 3 A Framework to Measure Equitable and Sustainable Well-Being

The Stiglitz Commission's recommendations for the measurement of progress reduce the emphasis toward economic indicators in favor of a multidimensional approach that considers social and environmental well-being as important as the economic well-being. Hall et al. (2009) have developed a framework that aims at measuring societal progress defined as an increase in "equitable and sustainable well-being." In particular, building on the model described in Fig. 2.1, they propose to consider final and intermediate goals, as well as the relationships between them and two crosscutting dimensions, as follows:

Final goals	Intermediate goals
<i>Ecosystem condition: outcomes for the environment</i> <ul style="list-style-type: none"> <li>• Land (geosphere)</li> <li>• Freshwater, oceans, and seas (hydrosphere)</li> <li>• Biodiversity (biosphere)</li> <li>• Air (atmosphere)</li> </ul>	<i>Economy</i> <ul style="list-style-type: none"> <li>• National income</li> <li>• National wealth</li> </ul>
<i>Human well-being: outcomes for people, individual aspects</i> <ul style="list-style-type: none"> <li>• Physical and mental health</li> <li>• Knowledge and understanding</li> <li>• Work</li> <li>• Material well-being</li> <li>• Freedom and self-determination</li> </ul>	<i>Governance</i> <ul style="list-style-type: none"> <li>• Human rights</li> <li>• Civic and political engagement</li> <li>• Security and violence</li> <li>• Institutional trust</li> <li>• Access to services</li> </ul>
<i>Human well-being: outcomes for people, social aspects</i> <ul style="list-style-type: none"> <li>• Social connections</li> <li>• Social participation</li> <li>• Interpersonal trust</li> </ul>	<i>Culture</i> <ul style="list-style-type: none"> <li>• Cultural heritage</li> <li>• Arts and leisure</li> </ul>
Links between the two sets of goals	Crosscutting perspectives
<i>Resource management, use, development, and protection</i> <ul style="list-style-type: none"> <li>• Resource extraction and consumption</li> <li>• Pollution</li> <li>• Protection and conservation of economic and environmental assets</li> </ul>	<ul style="list-style-type: none"> <li>• Intragenerational aspects: equity/inequality</li> <li>• Intergenerational aspects: sustainability/vulnerability/resilience</li> </ul>
<i>Ecosystem services</i> <ul style="list-style-type: none"> <li>• Resources and processes provided</li> <li>• Impact of natural events</li> </ul>	



**Fig. 2.1** The framework of the progress of societies (Source: Hall et al. 2009)

Italy is strongly committed to following the approach toward progress defined at international level, and a widespread consensus exists over the need to widen the observation of key indicators for the evaluation of progress and citizens' well-being in our country. Yet, the definition of a shared set of key national progress indicators needs to be broadly legitimated if it has to become a tool for monitoring a shared vision of progress for the country (Rondinella et al. 2011).

A recent OECD working paper by Scrivens and Iasiello (2010) well identifies the challenges that the definition of a set of societal progress indicators has to face in order to be used and applied in decision-making processes. The first challenge is in fact granting legitimacy to the tools, which means that “the issues highlighted by the indicators are considered important” and that selected indicators “provide meaningful measures of those issues.” The general answer to this is that “indicators must be developed with the participation of those who will use – and learn from – them.”

The other two challenges identified by Scrivens and Iasiello lie in the choice of the wider information system in which progress indicators are used (*fit-for-purpose information*) and in the ability to produce policy incentives. The former implies the assessment of the opportunity to use either composite indexes, a restricted set of headline indicators, or a broader and more comprehensive set, facing the trade-off between communication needs and avoiding simplistic views of the issue. The latter is less straightforward since in order to define a policy-relevant set of indicators, it is not enough to “produce academically certified data and handling it to policy makers” (Innes 1990, p. 8), and it is politically very difficult to fix binding conditions for the fulfillment of objectives implicitly or explicitly set by progress indicators. In order to guide policy decisions, progress indicators need to be accompanied by sufficient incentives for policy makers to enact change which can be fostered either by including politicians in the selection process, identifying an independent watchdog

or by keeping public attention around the selected issues high. This is why Istat has proposed to CNEL to launch a joint initiative to measure societal progress involving all components of society through a consultation process as described in Chap. 5. Before entering into such a presentation, it is useful to briefly describe the available official statistics relative to the dimensions of well-being as selected by the Stiglitz Commission's report and by the OECD. Therefore, the next section, following the current structure of the report, presents the most relevant advancements within Istat statistical production concerning (a) economic performance, (b) quality of life, and (c) environmental sustainability.

## 4 Istat Current Production

### 4.1 *Measuring Economic Performance*

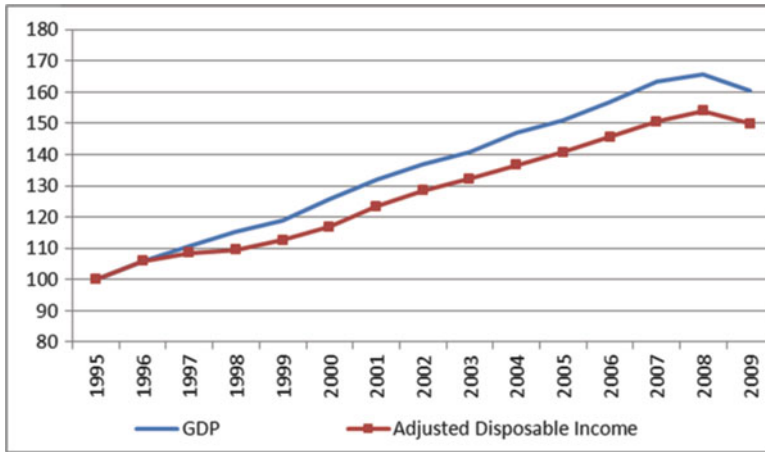
#### 4.1.1 GDP

Economic performance is classically represented by production growth. Istat currently produces GDP estimates at both annual and quarterly frequency. However, this indicator can be expanded in order to include a number of neglected components. Much has already been done in recent years within European official statistics, namely, the development of supply and use tables, the estimates of the underground economy, the inclusion of all productive units' activity within national accounts (exhaustiveness), the deflation of public services aggregates embedding quality changes. With respect to the nonobserved economy, it has to be highlighted that within Istat (Calzaroni 2000) a pioneering work has been carried out which has subsequently led to the definition of international standards as presented in OECD guidelines (OECD 2002).

Another challenge is the estimation of public services' values, which should be based on actual production (output), rather than on the cost of production (input). Hopefully, it will be possible to overcome these limitations in a relatively short time. Relying on Time Use Survey Data, a preliminary estimate (Baldassarini and Romano 2006) of nonmarket activities of households has also been produced, but being still at an early stage, it cannot be included yet in the formation of GDP.

According to the Stiglitz report, *net domestic product* (NDP), i.e., net of depreciation, should be used rather than *gross domestic product*. Of course, Istat produces the net aggregate, even though the measurement of depreciation presents some difficulties. For example, in recent years, technological innovation has grown fast and that makes it harder to estimate the depreciation rate of capital assets and depreciation of capital even without taking into account environmental degradation.

One of the criticisms in considering GDP as the only indicator of welfare is that the market prices used in its calculation do not reflect the use value of goods and services, nor they reflect the environmental damage that production and consumption generate. Moreover, markets are not perfectly competitive and consumers do not



**Fig. 2.2** Adjusted disposable income and GDP, Italy 1995–2009, 1995 = 100 (Source: Istat)

always possess the information essential for their choices. On this front, the estimation of national accounts in real terms is guaranteed by the treatment of quality change through the use of price deflators as well as a variable weighting system for production and consumption price indexes which, following international standards, take into account the changes in products' quality.

#### 4.1.2 Income and Consumption

The Stiglitz-Sen-Fitoussi Commission suggests increasing attention in the observation of income whose key measure should be disposable income, i.e., the amount of current resources available to households for final use, consumption, and saving, less depreciation. Including all the transactions affecting consumption capacity of the beneficiaries means extending the concept of disposable income. It should also include the use of goods and services freely provided by the government and nonprofit institutions, such as medical care, hospital stays, housing allowance, crèches, and similar. This leads us to the definition of the *adjusted households' disposable income* aggregate that can bring a sharper focus on the role of government in the process of income redistribution and, more generally, the actual redistributive capacity of welfare systems. This is a neutral indicator with respect to differences in coverage of social protection systems across countries and to the public/private mix. Istat already produces this measure, whose evolution (compared to GDP) is shown in Fig. 2.2.

In addition, disposable income is sided by the *replacement rate* for maintaining the standard of living guaranteed by the public pension system, i.e., the ratio between the first pension and the last pay from work. Apart from being an indicator of extreme relevance to pension system's financial sustainability, this rate provides basic information on the adequacy of the benefits it guarantees.

With regards to consumption, Istat Division for National Accounts produces quarterly and annually the aggregate of *Actual Household Final Consumption*. It also includes, in the final consumption of households, the expenses arising from private social institutions and public social transfers in kind.

### **4.1.3 The Extension of National Accounts**

National accounts are an essential tool to guide decisions of economic agents and to evaluate policy results. Yet, their theoretical and conceptual framework was not specifically designed to analyze individual and societal well-being, but to analyze the economic system of a country and some sheer economic dimensions of well-being. In addition, the process of maintenance of the system, which depends on international definition of the aggregates, may lag behind the changes in economic and social reality, showing certain stickiness in timely adaptation. Nevertheless, the Italian system of national accounts has gradually opened to integrate information on the distribution and variability of stocks, such as wealth – in addition to the flows – and on social and environmental phenomena, in addition to the traditional economic and financial dimensions. This is possible through satellite accounts.

For some time, in fact, Istat Division for National Accounts has worked to develop new projects that meet the new perspectives of well-being analysis, including quarterly accounts by institutional sector, studies on globalization, estimates for total and partial factor productivity, the first prototype estimates of the stock of real assets for institutional sectors, in order to produce a complete system of balance sheets, and national estimates of adjusted disposable income and actual household consumption. In addition, an experimental work aimed at building a satellite account for households includes data on unpaid work and nonmarket activities, as well as human and social capital. Within environmental satellite accounts, pilot studies have been carried out, among others, on physical and monetary environmental assets accounts, on supply/use tables in physical terms, and physical accounts for waters.

## **4.2 Measuring Quality of Life**

Over the past 20 years, social statistics in Italy have seen a continuous progress, with the production of large amounts of data and indicators for the measurement of quality of life. Istat has developed a strong set of information through the development of the Multipurpose Survey and other household surveys, which today are widely used for designing and evaluating social policies. Work, family life and relationship, the economic conditions of families, leisure, political participation, social lifestyles, the relationship with services, cultural enjoyment, security, health conditions are investigated taking into account people's actual behavior as well as individual subjective dimensions. The Multipurpose Survey is one of the most advanced and ambitious

social surveys systems at international level: it is structured as an annual survey named “Aspects of daily life,” integrated by five in-depth surveys on family, health, leisure, security, and time use carried out every 5 years and a survey over travel and holidays carried out every 3 months.

The Stiglitz report suggests considering measures that relate to the subjective experience in addition to objective measures of quality of life. The Multipurpose Surveys integrate subjective measures in all different areas of investigation: from health, family, work, leisure, and relationships with friends, to citizens’ security, poverty, or economic conditions, just to name a few. In addition, in the latest edition of the survey, Istat added an indicator on individual’s perception of “life as a whole” on an internationally comparable scale from 0 to 10 and a question about the degree of trust toward others.

Of course, the measurement of perceptions, opinions, and attitudes of people do not replace events or behaviors measured in objective terms, but it manages to capture information on issues and events of reality under investigation that could not be otherwise obtained. The inclusion of subjective questions in official surveys has not been a shift in focus from one level to another, but rather an extension of the usual procedures of statistical collection and production of social data, an enrichment of the spectrum of information that allows a better reading of the phenomena, putting citizens at the center of official statistics.

In this way, Istat is able to produce most of the information needed for a multi-dimensional measurement of well-being. Below is the description of such a wealth of information according to the eight areas of well-being identified by the Stiglitz Commission.

#### **4.2.1 Material Living Standards**

The measures of material well-being are fundamentally based on two surveys: the European Survey on Income and Living Conditions (EU-SILC) and the national survey on households’ consumption. The European survey gathers different measures of individual and household income, as well as indicators of deprivation and social exclusion. It includes a number of aspects of particular importance for a multidimensional analysis of quality of life, such as participation in the labor market, health, education, characteristics of the house and the area of human habitation, expenditures on rent or mortgage, as well as the main economic problems of families in a perspective of deprivation. In the Italian case, the size of the sample is enlarged with respect (Eurostat 2010) to the European standards, so as to allow a regional disaggregation of data.

The national survey on households’ consumption covers the different models of household spending and highlights the subjective assessment of families with respect to changes in their purchasing behavior. The results are also used for the calculation of relative and absolute poverty indicators. Thanks to this survey, Italy is one of the few countries in the world that produces a measure of absolute poverty. For both

measures on income and consumption, Istat produces median values, deciles, and Gini index, thus applying Stiglitz report's recommendations for an enhanced attention toward distributional issues.

#### **4.2.2 Health**

The Multipurpose Survey "Health conditions and use of health services" investigates aspects typically found in this area (acute and chronic diseases, some types of disabilities, conditions of disability, use of drugs) along with health-related quality-of-life indicators. These are tools used at international level that enable the identification of two synthetic indices of health status: the Physical Component Summary measure (PCS) and the Mental Component Summary measure (MCS). Using the data from this 5-year survey, it is possible to build one of the main indicators of quality of life – the life expectancy free of disability – while an annual survey permits to estimate the life expectancy in good health.

#### **4.2.3 Education**

A number of different sources provide a composite picture of human capital in Italy. Apart from traditional statistics on formal education which are prepared by the Ministry of Education, Istat annually tracks the number of early school leavers and NEETs (Not in Employment, Education, or Training) through the Labour Force Survey and provides information on school attendance, tuition fee, and English and computer science classes through the Multipurpose Survey. Harmonized indicators on lifelong learning, one of the key issues of the Lisbon strategy, will be produced by 2011, thanks to a European survey.

The skill levels of a population are an important piece of information for measuring human capital that is currently not included in Istat's output, but should soon be covered by the OECD "Programme for the International Assessment of Adult Competencies," which joins the already existing International Adult Literacy Survey (IALS) and the OECD survey PISA (Programme for International Student Assessment) for 15-year-old students. Finally, the information framework on human capital will be complemented by an education satellite account on which Istat has already started to work.

#### **4.2.4 Personal Activities and Work**

The Time use survey measures in detail the number of hours devoted to different types of activities during the day. This is a key source to analyze leisure, housework, care activities, and work allowing to assess the weight they have in citizens' life. Following the Stiglitz report, the survey may be strengthened by including the feelings felt at certain times of the day. Using additional tools, an in-depth analysis

could be performed to take into account the quality of working conditions. The Labour Force Survey measures nonstandard employment, underemployment, underutilization of human capital, and the gender gap. Moreover, the structural survey data on wages allows indicators to be developed on the sectoral and territorial pay differentials.

Labor indicators include also subjective measures such as a single question on job satisfaction (which is also asked to housewives), while surveys on “critical aspects of women’s career paths” and “family and social subjects” collect data on satisfaction in relation to several job characteristics (content, salary, relationship with superiors, relationships with colleagues, etc.) and expectations of individuals on family and children, job opportunities, career progression, stabilization, and change of employment.

#### **4.2.5 Political Voice and Governance**

A fundamental element to exercise the right to self-determination is the presence of a flourishing and functioning democracy, universal suffrage, free press, a judicial system that guarantees the right to justice, and lively civil society organizations. The measurement of these dimensions is particularly difficult using the indicators traditionally produced by Istat. Today, data are available on the duration of civil and criminal trials, allowing the efficiency of the judicial system to be evaluated, or data on citizens’ fear of being victim of criminal acts or of going out at night alone in the dark.

In terms of political participation, since 1993 Istat has produced indicators of invisible political participation (speaking and being informed about politics by frequency, channel information, reasons for not participating) and visible political participation (participation in demonstrations, rallies, or party meetings). The availability of these indicators may allow the construction of composite indicators of civic and political engagement. Nevertheless, it would be useful to have indicators on press freedom similar to those published by nongovernmental agencies.

#### **4.2.6 Social Connections and Relationships**

Interpersonal relationships influence quality of life in various ways. People with stronger social relationships show a higher life satisfaction, better health, a higher probability of finding a job. Istat produces quite an important set of information on this issue including indicators about friendship, kinship, the frequency with which people meet their relatives and friends, and informal support networks. Through the Multipurpose Survey, it is possible to estimate the fundamental characteristics of social networks of solidarity (caregivers and family helpers), the type of help offered, any sharing of it with others, the number of hours dedicated to it, all fundamental elements to help measure social capital. This is also characterized by the relations one has with his/her neighbors and by the perception that



people have of whom they can really rely on in case of need. Subjective indicators on the satisfaction of family and friends relationships have been collected every year since 1993.

#### **4.2.7 Insecurity**

Indicators on safety and violence have been developed in recent years by Istat. Next to security information from the objective point of view (crime suffered), subjective opinions are enquired in a specific survey that investigates such issues as the sense of insecurity at home or out in the street at night and the risk of crime and social decay in the area where the family lives. Another important survey from the standpoint of security and safety concerns women and has been specifically conducted to detect physical and sexual violence, inside and outside the family.

Economic security is then covered by objective and subjective information related to living and working conditions.

### **4.3 Environmental Statistics and Accounts**

From the standpoint of environmental statistics, Italy has seen a remarkable growth in the availability of objective and subjective statistical information. The information set on environmental issues has increased continuously.

Indeed, environmental statistics have been covering more and more issues recently, thanks to the development of a survey on water and urban environment and the implementation of agri-environmental indicators. Alongside *pressure* indicators, which measure what is taken from the environment (withdrawal of natural resources, energy consumption from different sources, soil use or urban sprawl) and released into it (emissions, pollution, and waste production), and measures of *impact*, which describe the ultimate effects of environmental changes and human activities, Istat produces *response* indicators that describe and quantify the society's efforts to solve environmental problems (protected areas, water softening, or green agricultural practices of firms). These performance indicators are directly related to the implementation of policies or strategies that have the reduction of impacts on nature as their ultimate goal. Moreover, through surveys, Istat covers also the views that people have over environmental conditions.

Istat has also been involved in the collection of indicators for the analysis of sustainable development from the list of 140 indicators proposed by Eurostat.

In the last decade, a regular production on the side of environmental accounting has emerged in response to a request expressed at both national and international level. Istat already includes in its production a number of environmental accounts which will soon become compulsory at European level. Time series for economy-wide material flows are published regularly covering extraction of different materials and weights of imports and exports by product along with supply-use and input-output tables and time series since 1980 for the material flows indicators requested at international level: domestic material input (DMI), domestic material consumption

(DMC), total material requirement (TMR), total material consumption (TMC), physical trade balance (PTB).

National accounts include also aggregates of emissions associated with production activities (NAMEA) available also at regional level for 10 pollutants.

In relation to the economic effort borne by the country to protect the natural system, Istat records activities and financial transactions related to the environment, such as costs for environmental protection, environmental taxes, as well as the main economic aggregates for the field of eco-industries, for which Istat is carrying out a reconnaissance of available sources. The conceptual framework and methodology of initiatives to protect the environment are given by SERIEE (*Système Européen de Rassemblement de l'Information Economique sur l'Environnement*), which defines two separate satellite accounts: the satellite account of the costs of “environmental protection” (EPEA – Environmental Protection Expenditure Account) and the satellite account of the costs of the “use and management of natural resources” (RUMEA – Resource Use and Management Expenditure Account). These accounts can also be used to determine unit costs to be applied for the quantification of interventions needed against ecosystem degradation, an effort which started with the Italian contribution to CICES, the Common International Classification of *Ecosystem Services*.

Further elements of assessment of natural resources are provided by the accounts for monitoring fossil energy resources, in physical and monetary terms, and the economic accounts for forestry (EAF). A feasibility study has been done for the implementation of the European Framework for Integrated Environmental and Economic Accounting for Forests (IEEAF).

Istat is therefore aligned with the most advanced standards in terms of environmental monitoring.

## 5 The Launch of a National Consultation

The wealth of data described so far supports an interinstitutional initiative promoted by the National Council for Economics and Labor (CNEL) and Istat for the identification of a set of indicators of societal progress and well-being which was launched in December 2010. The initiative aims at carrying out a process which will involve all major representatives of Italian civil society in the definition of the dimensions of progress and their related indicators (see [www.misuredelbenessere.it](http://www.misuredelbenessere.it)).

CNEL leadership of the process is a guarantee for its legitimacy: CNEL is in fact a council established by the Italian Constitution and composed by representatives of all major working categories, including representatives of entrepreneurs, unions, and of the third sector, for a total of more than 100 counselors representing different citizens groups. CNEL working groups and assembly will also serve as places for deliberation over controversial issues and trade-offs. The initiative sets up a steering committee jointly coordinated by CNEL and Istat including 20 participants from CNEL, nongovernmental organizations and public institutions and establishes of a scientific committee hosted by Istat and composed by experts in the subject. A public consultation has been organized for a broader citizens' inclusion.

The CNEL-ISTAT initiative adds Italy to the group of countries (France, Germany, the United Kingdom, Canada, the United States, Australia, Ireland, Luxembourg, Mexico, Switzerland, and the Netherlands) that decided to measure societal well-being by using a selected set of statistical indicators identified through the joint efforts of union/management representatives and civil society. As recommended by the OECD and by the Stiglitz Commission, this approach will give the country a shared perspective on the evolution of primary economic, social, and environmental dimensions. In particular, the initiative's objectives are to:

- Develop a shared definition of progress in Italian society, by defining the most relevant economic, social, and environmental dimensions.
- Select a set of high-quality statistical indicators that are representative of the different domains.
- Communicate the results of this process, informing citizens of indicator values in the most thorough possible way. The set of indicators defined is in fact intended for a broad public audience as well as for policy users.

The process will be divided into three phases fulfilling the objectives:

1. During the first phase, the steering committee defined the dimensions to be taken into account which are then discussed by CNEL thematic working groups and finally approved by CNEL assembly. In November 2011, the committee published a first proposal of 12 dimensions. These are environment, health, economic well-being, education and training, work and reconciliation of life times, social relationships, security, subjective well-being, landscape and cultural heritage, research and innovation, quality of services, and politics and institutions. Meanwhile, Italian citizens have been able to express their priorities on the dimensions of well-being that are most relevant for individuals and society both through an ad hoc open online consultation and by answering a specific question which has been included in the Multipurpose Survey since 2011.
2. The second phase is devoted to the analysis of the available indicators which could be used to represent the various dimensions, stressing their technical features, and the opportunity of using them. Istat will be responsible for this part of the work and will be supported by a scientific committee composed by internal and external experts in the use and building of indicators. On this basis, a first set of indicators will be identified in order to be utterly discussed by CNEL work-groups and approved by the assembly.
3. The last phase will be dedicated to the drafting of a final report and the development of different tools for dissemination/communication.

Politics will be formally excluded from the process. Nevertheless after each phase of the initiative, the Parliament will be informed about the major results emerging from the consultation process.

As discussed in the second section, one of the critical aspects of this kind of processes is how to guarantee a solid legitimacy to the final output. In order to produce a set of indicators which effectively represents people priorities for the progress of the nation, such a set has to be widely discussed and recognized as

valid by most national actors: it is a one-shot opportunity for the creation of a tool able to guide national policies. This will allow policy makers and public opinion to (hopefully) always refer to a shared national vision of progress, even if it may change over time.

The stakeholder discussion within CNEL will be sided by a public consultation which will be conducted in two parallel streams. The first one is an online consultation in which experts, practitioners, and anyone interested in the issue will be asked to define relevant dimensions to monitor progress and well-being in Italy. This tool is similar to the one proposed by ONS in the United Kingdom. The second consultation stream is the inclusion of a specific question in the Multipurpose Survey “Aspects of daily life,” which is submitted annually to 24,000 families (54,000 individuals). In the 2011 edition of the Multipurpose Survey, Istat Tried to assess the importance citizens attribute to different dimensions of well-being. Citizens are asked to assign a score from 0 to 10 according to the increasing “importance for well-being and life” people give to the aspects presented in Box 2.1. Such a tool will allow not only to add a robust assessment of people’s priorities to the debate which will take place in 2011–2012 but also to continuously monitor changes over time so to alert over the need to modify the set of indicators. The high scores of all the selected dimensions shows clearly the multidimensionality of wellbeing. Almost no differences emerge among age, gender, level of education and territory. Major variability is shown by the percentage of people assigning a score of ten to the different domains.

### Box 2.1

Aspects on which Italians will be asked to assess the importance for life and individual wellbeing (0-10)	Average score	Percentage of 10s
Being in good health	9,7	79,9
Guarantee the future of you children socially and economically	9,3	66,1
Have a decent work of which being satisfied	9,2	59,5
Have an adequate income	9,1	56,0
Good relationships with friends and relatives	9,1	53,2
Feeling safe with respect to criminality	9,0	53,6
Be happy in love	9,0	56,3
Live in a society in which you can trust others	8,9	48,8
Good education	8,9	48,3
Present and future environmental conditions	8,9	48,8
Good governance	8,8	46,6
Good quality accessible services	8,7	43,9
Good quality and adequate time for leisure	8,5	37,4
Be able to influence local and national policies	7,8	30,6
Participation to community life through political and associative structures	7,1	18,7

Source: Istat

Finally, the steering committee of the initiative will be also in charge of solving two key issues: to define the most appropriate information, by deciding which degree of detail the set of indicators has to reach and to study the opportunity to develop a tool explicitly designed for policy-making and in that case to define the strategies for maximizing political commitment in following indications emerging from progress measurement.

## 6 Conclusions

Italian official statistics appear fully capable of meeting the demand coming from society and from international debate for the multidimensional measurement of well-being and societal progress. Most of the issues raised by the Stiglitz report, in fact, are already satisfied by the information system developed by Istat in terms of economic performance, objective, and subjective quality-of-life and environmental measures. Italy is therefore ready to face the challenge of building a shared measure of progress which may become a constant reference for citizens, media, and policy makers.

To this end, Istat and CNEL launched an 18-month initiative for the measurement of “equitable and sustainable well-being.” The process aims at producing a set of indicators able to provide a shared vision of progress for Italy which will be legitimated by a consultation of experts, relevant stakeholders, and citizens through dedicated meetings and workgroups, an online consultation, and the inclusion of a question – in one of Istat major social surveys – that allows to identify people’s priorities when dealing with individual and national well-being. The appointment is for the end of 2012, when the publication of the first joint Istat-CNEL report is scheduled.

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## Websites

[www.misuredelbenessere.it](http://www.misuredelbenessere.it)  
[www.oecd.org/progress](http://www.oecd.org/progress)  
[www.ons.gov.uk/well-being](http://www.ons.gov.uk/well-being)

# Chapter 3

## A Non-compensatory Approach for the Measurement of the Quality of Life

Matteo Mazziotta and Adriano Pareto

### 1 Introduction<sup>1</sup>

It has long been accepted that material well-being, as measured by GDP per capita, cannot alone explain the broader QoL in a geographical area. Several have been the attempts to construct alternative, non-monetary indices of social and economic well-being by combining in a single statistic a variety of different factors (dimensions) that are thought to influence (represent) QoL. The main problem in all these measures is arbitrariness in choosing the factors and the variables to assess QoL and, even more seriously, in normalizing, weighting and summarizing different indicators to come up with a single composite index.

The idea of summarizing complex phenomena into single numbers is not straightforward. It involves both theoretical and methodological assumptions which need to be assessed carefully to avoid producing results of dubious analytic rigour (Saisana et al. 2005). For example, additive methods assume a full substitutability among the different indicators (e.g. a good living standard may offset any environmental deficit and vice versa), but a complete compensability among the main dimensions of QoL is not desirable.

Therefore, it is necessary to consistently combine both the selection of variables representing the phenomenon and the choice of the ‘best’ aggregation function in order not to lose much statistical information.

In this chapter, we propose a non-compensatory composite index, denoted as MPI (Mazziotta-Pareto Index), which, starting from a linear aggregation, introduces penalties for the units with ‘unbalanced’ indicators’ values.

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<sup>1</sup>This chapter is the result of combined work of the authors: M. Mazziotta has written Sects. 2.1, 3.1, 3.2, and 5; A. Pareto has written Sects. 1, 2.2, 3.3, and 4.

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As an example of application, we consider the report on the QoL in the 107 Italian provinces, published by the Italian economic newspaper *Il Sole 24ore* in 2010. In particular, we use 36 indicators equally divided into six dimensions and present a comparison between *Il Sole 24ore* method and the proposed index.

The main aim of the work is not as much to ‘assess’ QoL, but rather to ‘rank’ the Italian provinces by QoL.

## 2 Measuring Quality of Life

### 2.1 General Aspects

QoL is nowadays a priority issue for many countries since its measurement is very important for economic and social assessment, public policy, social legislation and community programmes.

In the scientific literature, there are many studies concerning the use of composite indices in order to measure QoL both from an objective and a subjective point of view.

In general, the steps for constructing a composite index can be summarized as follows:

- (a) Defining the phenomenon to be measured. The definition of the concept should give a clear sense of what is being measured by the composite index. It should refer to a theoretical framework, linking various subgroups and underlying indicators.
- (b) Selecting a group of individual indicators, usually expressed in different units of measurement. Ideally, indicators should be selected according to their relevance, analytical soundness, timeliness, accessibility, etc. (OECD 2008). The selection step is the result of a trade-off between possible redundancies caused by overlapping information and the risk of losing information.
- (c) Normalizing individual indicators to make them comparable. Normalization is required prior to any data aggregation as the indicators in a data set often have different measurement units. Therefore, it is necessary to bring the indicators to the same standard, by transforming them into pure, dimensionless numbers. There are various methods of normalization, such as ranking, rescaling, standardization (or *Z* scores) and ‘distance to a reference’.
- (d) Aggregating the normalized indicators by composite indices (mathematical functions). Different aggregation methods are possible. The most used are additive methods that range from summing up unit ranking in each indicator to aggregating weighted transformations of the original indicators. Multivariate techniques as principal component analysis (Dunteman 1989) are also often used.

For this approach, obviously, there are several problems such as finding data, losing information and researcher arbitrariness for (i) selection of indicators, (ii) normalization and (iii) aggregation and weighting. In spite of these problems,



the advantages are clear, and they can be summarized in (a) unidimensional measurement of the phenomenon, (b) immediate availability and (c) simplification of the geographical data analysis.

Many works and analysis have won over the critics, and the scientific community concluded that it is impossible to obtain a 'perfect method' where the results are universally efficient. On the contrary, data and specific targets of the work must, time by time, individuate the 'best method' in terms of robustness, reliability and consistency of solutions.

## 2.2 *Source of Data*

In QoL research, we often distinguish between subjective and objective QoL. Subjective QoL is about feeling good and being satisfied with reference to different ambits and for life as a whole. Objective QoL is about fulfilling the societal and cultural demands for material wealth, social status and physical well-being (Susniene and Jurkauskas 2009). Accordingly, objective indicators exist in the society, and they can be monitored and assessed by their amount and frequency rate.

In *Il Sole 24ore* report, six dimensions of QoL are considered (living standard, job and business, environment and health, public order, population and free time), measured only by objective indicators.

The set of indicators selected to rank the 107 Italian provinces in 2010 is showed in Table 3.1. Each of the 36 indicators is interpreted as 'positive' or 'negative' with respect to QoL (polarity).<sup>2</sup> This classification is highly subjective and very difficult to judge. For instance, in the case of the variable 'Divorces/Separations' (negative polarity), it is arguable if a low value has to be considered 'good' or 'bad'. For the variable 'Population density' (negative polarity), one could even claim that both a high as well as a low value have to be regarded 'bad', whereas a value in the middle could be considered 'good' (Lun et al. 2006).

Dimensions have a descriptive meaning, beyond the final goal of generating a ranking: they guide the choice of the indicators and make easier the assessment of strengths and weaknesses of each province. However, the individual indicators have been selected through a logical rather than statistical choice, as it is independent from the values of the correlations among the variables. Besides, the selection of six indicators for each dimension seems to be due more to a kind of 'symmetry' criterion than to a thorough preliminary analysis of their real informative content (Gismondi and Russo 2008).

In this work, we do not go deeply into the delicate step of selection and interpretation of indicators. Nevertheless, let us note that it is not easy to determinate how many and what indicators should be taken into account to measure QoL.

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<sup>2</sup>The polarity is 'positive' if increasing values of the indicator correspond to positive variations of QoL, and it is 'negative' if increasing values of the indicator correspond to negative variations of QoL.

**Table 3.1** Dimensions and individual indicators of QoL

N.	Indicator	Polarity	N.	Indicator	Polarity
Living standard					
1	Bank deposits (average per capita)	+	19	Housebreakings (per 100,000 people)	-
2	Monthly pension (average)	+	20	Car thefts (per 100,000 people)	-
3	Inflation 'Foi' index	-	21	Extortions (per 100,000 people)	-
4	Gross domestic product (trend)	+	22	Robberies (per 100,000 people)	-
5	House price (average per m <sup>2</sup> )	-	23	Cheating cases (per 100,000 people)	-
6	Consumption (average per capita)	+	24	Murders (trend)	-
Job and business					
7	Defaulting firms (per 1,000 new firms)	-	25	Population density (people per km <sup>2</sup> )	-
8	New economy firms (per 100 people)	+	26	Proportion of regular foreign citizens	+
9	New/dead companies	+	27	Graduates (per 1,000 people aged 25-30)	+
10	Protests (average per capita)	-	28	Birth rate	+
11	Aged 25-34 employment rate	+	29	Old-age dependency ratio	-
12	Female employment rate	+	30	Divorces/separations (per 10,000 families)	-
Environment and health					
13	Public nursery schools	+	31	Index of sold books	+
14	'Tagliacarne' infrastructure index	+	32	Bars and restaurants (per 100,000 people)	+
15	Hospital emigration	-	33	Concerts and shows (per 100,000 people)	+
16	Climate (thermal excursion)	-	34	Sporting index	+
17	'Legambiente' urban ecosystem index	+	35	Voluntary associations (per 100,000 people)	+
18	Civil actions speed index	+	36	Cinemas (per 100,000 people)	+

### 3 Methods for Constructing Composite Indices

In this section, we consider the methodological aspects related to the *Il Sole 24ore* and the non-compensatory approach.

#### 3.1 The *Il Sole 24ore* Approach

The steps in the construction of the composite index used by the Italian economic newspaper *Il Sole 24ore* are the following: (i) normalization of the individual indicators through ‘distance to a reference’ approach<sup>3</sup> and (ii) aggregation of the normalized indicators by arithmetic mean.

##### (i) Normalization

Let  $X = \{x_{ij}\}$  be the matrix with  $n=107$  rows (Italian provinces) and  $m=36$  columns (QoL indicators). The normalized matrix  $Y = \{y_{ij}\}$  is computed as follows:

$$y_{ij} = \frac{x_{ij}}{\max_i(x_{ij})} 1000 \quad \text{if the } j\text{-th indicator is 'positive';}$$

$$y_{ij} = \frac{\min_i(x_{ij})}{x_{ij}} 1000 \quad \text{if the } j\text{-th indicator is 'negative';}$$

where  $\min_i(x_{ij})$  and  $\max_i(x_{ij})$  are the minimum and the maximum values for the  $j$ -th indicator.

##### (ii) Aggregation

The partial composite index, for the  $h$ -th dimension, is given by:

$$\bar{y}_{ih} = \frac{\sum_{j=1}^6 y_{i,6(h-1)+j}}{6}, \quad (h = 1, \dots, 6)$$

and the composite index of QoL is expressed as:

$$M_{y_i} = \frac{\sum_{h=1}^6 \bar{y}_{ih}}{6}.$$

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<sup>3</sup>Normalization consists in transforming the original indicators so that they are compatible and comparable with each other. The ‘distance to a reference’ criterion measures the relative position of a given indicator to a reference point. In this case, the ‘distance from the best performer, is used, and the reference is the maximum value if the individual indicator is considered ‘positive’ for the QoL and the minimum otherwise.

The main characteristic of this approach lies in the use of a linear transformation for ‘positive’ indicators and a nonlinear transformation for ‘negative’ indicators (Bernardi et al. 2004). However, the second transformation is not ‘dual’ compared to the first one, i.e. given two provinces, the difference between transformed values by the first formula is different than the difference between transformed values by the second one. Moreover, normalizing by ‘distance from the best performer’ can lead to a bias if minimum and maximum are quite different from the other values (*outliers*).

Finally, as regards the aggregation function, we note that the composite index of QoL can be written as a simple arithmetic mean of 36 individual indicators.

### 3.2 A Non-compensatory Approach

The method proposed by the authors for constructing a composite index of QoL is based on the assumption of ‘non-substitutability’ of the dimensions, i.e. they have all the same importance and a compensation among them is not allowed (Munda and Nardo 2005). Therefore, we can aggregate the indicators of each dimension by arithmetic mean and summarize the partial composite indices by MPI.

The steps in the construction of the MPI are the following: (i) normalization of the individual indicators by ‘standardization’ and (ii) aggregation of the standardized indicators by arithmetic mean with penalty function based on ‘horizontal variability’ (variability of standardized values for each unit).

In case of *Il Sole 24ore* data, we have an intermediate step aimed at aggregating the indicators inside each dimension using the simple arithmetic mean.

#### (i) Normalization

Being  $X = \{x_{ij}\}$  the original data matrix, we compute the standardized matrix  $Z = \{z_{ij}\}$  as follows:

$$z_{ij} = 100 + \frac{(x_{ij} - M_{x_j})}{S_{x_j}} 10 \quad \text{if the } j\text{-th indicator is 'positive';}$$

$$z_{ij} = 100 - \frac{(x_{ij} - M_{x_j})}{S_{x_j}} 10 \quad \text{if the } j\text{-th indicator is 'negative';}$$

where:

$$M_{x_j} = \frac{\sum_{i=1}^n x_{ij}}{n}; \quad S_{x_j} = \sqrt{\frac{\sum_{i=1}^n (x_{ij} - M_{x_j})^2}{n}}.$$

(ii) *Aggregation*

The partial composite index, for the  $h$ -th dimension, is given by:

$$\bar{z}_{ih} = \frac{\sum_{j=1}^6 z_{i,6(h-1)+j}}{6} \quad (h = 1, \dots, 6)$$

and the MPI of QoL is obtained as:

$$\text{MPI}_i = M_{\bar{z}_i} - S_{\bar{z}_i} \text{cv}_{\bar{z}_i}$$

where

$$M_{\bar{z}_i} = \frac{\sum_{h=1}^6 \bar{z}_{ih}}{6}; \quad S_{\bar{z}_i} = \sqrt{\frac{\sum_{h=1}^6 (\bar{z}_{ih} - M_{\bar{z}_i})^2}{6}}; \quad \text{cv}_{\bar{z}_i} = \frac{S_{\bar{z}_i}}{M_{\bar{z}_i}}.$$

The proposed approach is characterized by the use of a function (the product  $S_{\bar{z}_i}, \text{cv}_{\bar{z}_i}$ ) to penalize the units with ‘unbalanced’ values of the partial composite indices. The penalty is based on the coefficient of variation and is zero if all the values are equal.<sup>4</sup> The purpose is to favour the provinces that, mean being equal, have a greater balance among the different dimensions of QoL.

Moreover, the ‘standardization’ rule is ‘dual’ and converts all indicators to a common scale where the mean is 100 and the standard deviation is 10 (Aiello and Attanasio 2004).

### 3.3 Comparisons and Differences

In this section, we present the main differences between the two methods. Table 3.2 provides an example of normalizing indicators by ‘distance from the best performer’ ( $Y$  scores) and ‘standardization’ ( $Z$  scores). The table provides also the mean of  $Y$  scores, the mean of  $Z$  scores and the MPI. With reference to indicators’ polarity,  $X1$  and  $X3$  are considered ‘positive’, whereas  $X2$  is ‘negative’.

There are a number of points of interest in Table 3.2. First, a difference can be pointed out in the coefficient of variation (CV) between  $X2$  and  $Y2$ , mainly due to the nonlinear transformation used by *Il Sole 24ore* method for ‘negative’ indicators (if  $X2$  was a ‘positive’ indicator, the CV did not change). Moreover,  $Y$  scores show different ranges between the two approaches, since, while the maximum is always fixed to 1,000, the minimum is not defined (e.g. 750–1,000 for  $Y2$  vs. 200–1,000 for  $Y3$ ).

<sup>4</sup>Note that the penalty can be added or subtracted depending on the nature of the index (De Muro et al. 2010).

**Table 3.2** A comparison of normalization rules and aggregation schemes

Unit	Indicators			Y scores			Z scores			Mean	MPI	
	X1	X2	X3	Y1	Y2	Y3	Z1	Z2	Z3			
1	3	80	1,000	272.7	750.0	1,000.0	674.2	85.9	84.2	114.1	94.7	92.7
2	5	70	800	454.5	857.1	800.0	703.9	92.9	100.0	107.1	100.0	99.7
3	7	70	600	636.4	857.1	600.0	697.8	100.0	100.0	100.0	100.0	100.0
4	9	70	400	818.2	857.1	400.0	691.8	107.1	100.0	92.9	100.0	99.7
5	11	60	200	1,000.0	1,000.0	200.0	733.3	114.1	115.8	85.9	105.3	103.5
Mean	7.0	70.0	600.0	636.4	864.3	600.0		100.0	100.0	100.0		
Std. dev.	2.8	6.3	282.8	257.1	79.5	282.8		10.0	10.0	10.0		
CV (%)	40.4	9.0	47.1	40.4	9.2	47.1		10.0	10.0	10.0		

The main difference between  $Y$  and  $Z$  scores is that the  $Y$  scores computation makes indicators independent of the unit of measurement, but not of their variability. The higher the CV, the greater the weight, in terms of normalized values, on the mean. Therefore, using  $Y$  scores,  $X3$  has a greater weight than  $X1$  in the computation of the mean, and unit 2 obtains a greater score than unit 4 (703.9 vs. 691.8), whereas with regard to  $Z$  scores, the two units have the same score (100).

Then, in order to assign the same ‘importance’ to each variable, it is possible to apply a transformation rule that makes the indicators independent of both unit of measurement and variability.

Finally, let us consider the effect on indicators aggregation through the two approaches (simple arithmetic mean and arithmetic mean with penalty, MPI).

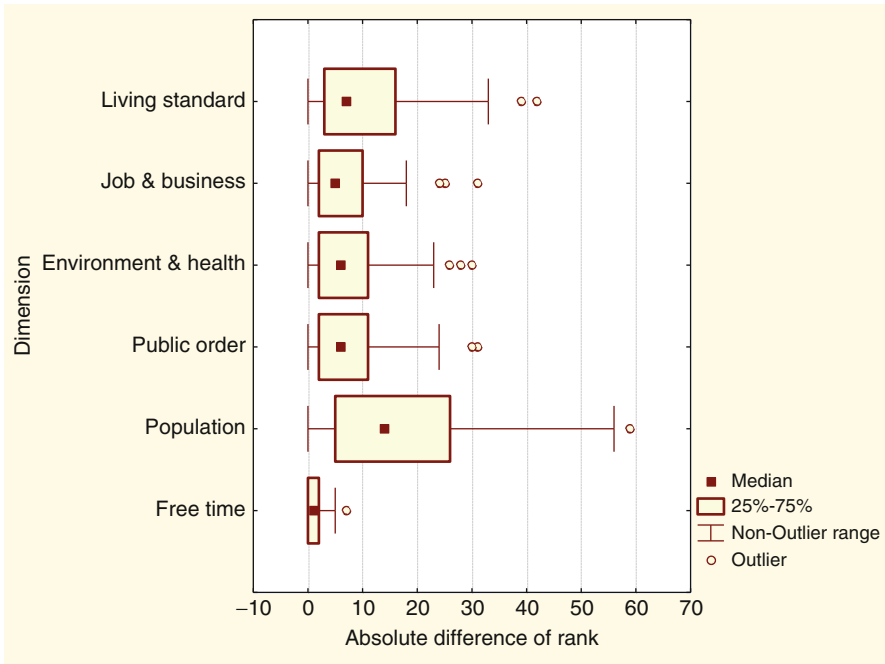
Units 2, 3 and 4 have the same mean of  $Z$  scores, but units 2 and 4 have an unbalanced distribution of the values, so they rank lower according to the MPI (the rank changes from the second to the third position). This is justified in the case of non-substitutability of the indicators, as a low value of an indicator cannot be compensated by a high value of another indicator. So, if the mean is the same, the units with unbalanced values assume a lower final score.

## 4 An Application to Italian Provinces

Many analyses were performed on the basis of available data in order to compare the different approaches. First, let us consider the partial rankings based on  $Y$  scores and  $Z$  scores on the six QoL dimensions. Figure 3.1 shows the distributions of absolute ranking differences. Note that such differences are due to the normalization criterion since, in this case, the aggregation function (mean) is the same.

For each dimension (except ‘Free time’), the mean absolute difference of rank is relevant; in particular, for ‘Population’, the mean is 16.5, and this result is combined with a high standard deviation value (13.7). In this dimension, there is a province that moves by 59 positions changing normalization rule! Also in the ‘Living standard’ dimension, a high value of the mean (10.0) corresponds to a high value of standard deviation (8.9). In these two dimensions, the Spearman’s rank correlation coefficient is lower than the other groups. On the contrary, in the ‘Free time’ dimension, the absolute differences of rank are very low (mean of 1.4 and standard deviation of 1.5) and the Spearman’s coefficient is close to one.

Table 3.3 shows the comparison of final rankings derived from different aggregation methods. The mean absolute difference of rank between  $Z$  bar ( $M_{\bar{z}}$ ) and MPI is very small (1.1), and it is due to the penalty function. This closeness is confirmed by the value produced by Spearman’s coefficient ( $\rho=0.998$ ). On the contrary, the ‘distance’ between  $Z$  bar and *Il Sole 24ore* ( $M_{\bar{v}}$ ) is greater (6.1) and depends on the normalization criterion ( $\rho=0.759$ ). Finally, the mean absolute difference of rank between *Il Sole 24ore* and MPI is 6.8, i.e. the rank of each province changes, on average, by 6.8 positions between the two methods. This result is due to both normalization criterion and aggregation function.



**Fig. 3.1** Comparing partial rankings based on *Y* scores and *Z* scores

**Table 3.3** A comparison of final rankings by different aggregation methods

Statistics	Sole 24ore – Z bar	Z bar – MPI	MPI – Sole 24ore
Absolute difference of rank			
Mean	6.1	1.1	6.8
Std. dev.	7.3	1.3	7.9
Minimum	0.0	0.0	0.0
Maximum	51.0	6.0	55.0
Median	5.0	1.0	5.0
Rank correlation			
Spearman’s rho	0.759	0.998	0.944

Figure 3.2 shows a multiple scatter plot representing the relations between *Il Sole 24ore* ranking (horizontal axis) and Z bar/MPI ranking (vertical axis). The coordinates determining the location of each province correspond to its specific ranks on the composite indices. Final rankings are reported in Table 3.4, where the provinces are ordered according to *Il Sole 24ore* method.

The divergence between *Il Sole 24ore* and Z bar is due to the different normalization rule and, as explained before, some cases are evident (see, in particular, Oristano and Milano). The difference between Z bar and MPI is very small and lies in the



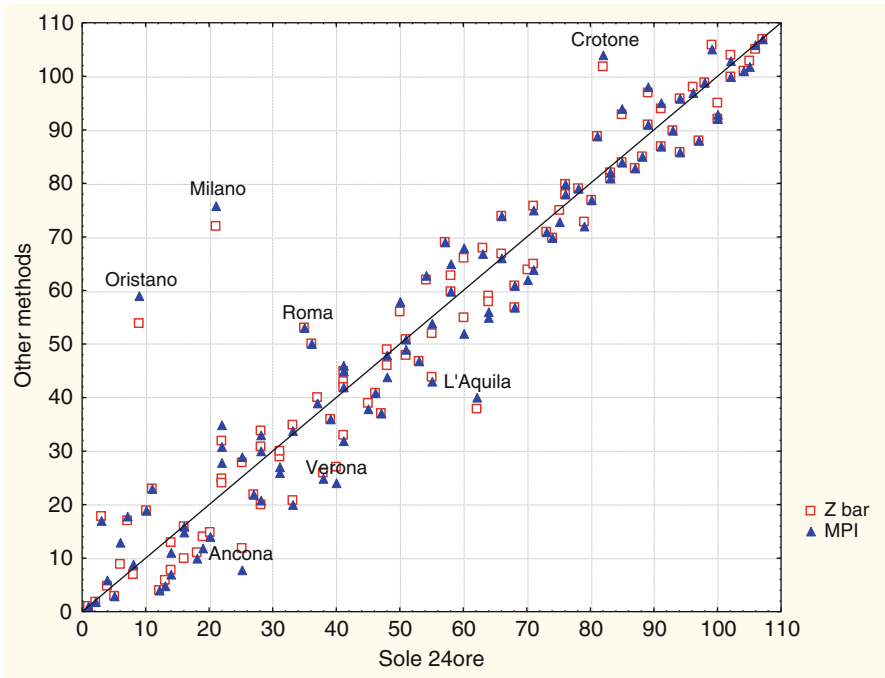


Fig. 3.2 Comparing final rankings of QoL

Table 3.4 Final ranking of QoL by aggregation method

Province	Sole 24ore	Z bar	MPI	Province	Sole 24ore	Z bar	MPI
Bolzano	1	1	1	Savona	55	52	54
Trento	2	2	2	Terni	55	44	43
Sondrio	3	18	17	La Spezia	57	69	69
Trieste	4	5	6	Asti	58	63	65
Siena	5	3	3	Rovigo	58	60	60
Aosta	6	9	13	Cagliari	60	55	52
Gorizia	7	17	18	Lucca	60	66	68
Bologna	8	7	9	L'Aquila	62	38	40
Oristano	9	54	59	Rieti	63	68	67
Belluno	10	19	19	Lodi	64	59	56
Cuneo	11	23	23	Massa Carrara	64	58	55
Macerata	12	4	4	Matera	66	74	74
Parma	13	6	5	Viterbo	66	67	66
Ravenna	14	13	11	Imperia	68	57	57
Udine	14	8	7	Prato	68	61	61
Firenze	16	16	15	Pavia	70	64	62
Rimini	16	10	16	Alessandria	71	76	75

(continued)

**Table 3.4** (continued)

Province	Sole 24ore	Z bar	MPI	Province	Sole 24ore	Z bar	MPI
Piacenza	18	11	10	Pistoia	71	65	64
Forlì	19	14	12	Teramo	73	71	71
Livorno	20	15	14	Ascoli P.	74	70	70
Milano	21	72	76	Chieti	75	75	73
Genova	22	25	31	Carbonia-Iglesias	76	78	78
Grosseto	22	24	28	Potenza	76	80	80
Verbano-Cusio-Oss.	22	32	35	Medio Campidano	78	79	79
Ancona	25	12	8	Pescara	79	73	72
Ogliastra	25	28	29	Campobasso	80	77	77
Ferrara	27	22	22	Isernia	81	89	89
Nuoro	28	20	21	Crotone	82	102	104
Olbia-Tempio	28	34	33	Frosinone	83	82	81
Pesaro Urbino	28	31	30	Lecce	83	81	82
Modena	31	29	26	Brindisi	85	84	84
Reggio E.	31	30	27	Enna	85	93	94
Mantova	33	35	34	Latina	87	83	83
Padova	33	21	20	Cosenza	88	85	85
Roma	35	53	53	Catanzaro	89	97	98
Bergamo	36	50	50	Ragusa	89	91	91
Cremona	37	40	39	Avellino	91	87	87
Treviso	38	26	25	Vibo Valentia	91	94	95
Como	39	36	36	Bari	93	90	90
Verona	40	27	24	Benevento	94	86	86
Brescia	41	43	42	Salerno	94	96	96
Pisa	41	42	46	Siracusa	96	98	97
Pordenone	41	45	45	Messina	97	88	88
Sassari	41	33	32	Agrigento	98	99	99
Arezzo	45	39	38	Catania	99	106	105
Venezia	46	41	41	Palermo	100	95	93
Vicenza	47	37	37	Taranto	100	92	92
Novara	48	49	48	Caltanissetta	102	104	103
Perugia	48	46	44	Reggio Calabria	102	100	100
Biella	50	56	58	Trapani	104	101	101
Lecco	51	51	51	Caserta	105	103	102
Vercelli	51	48	49	Foggia	106	105	106
Varese	53	47	47	Napoli	107	107	107
Torino	54	62	63				

penalty function: the provinces that have the greatest penalization are Rimini and Genova, which lose six positions. The comparison between *Il Sole 24ore* and MPI shows large differences in many provinces, especially, on the top of the ranking (the province of Milano, e.g. drop from position 21 down to position 76). On the other hand, the provinces showing low values of normalized indicators seem to be more stable (no large differences between the two approaches).

On the whole, the greater differences among the methods are in the high part of the ranking where, probably, the provinces have high values of normalized indicators and high ‘horizontal variability’ too.

## 5 Concluding Remarks

The study of appropriate indicators to measure the QoL is in continuous evolution. The composite index used by *Il Sole 24ore* is based on a simple arithmetic mean of 36 normalized indicators related to six main dimensions and assumes a full substitutability among the various indicators. However, as asserted by the literature, a complete compensability among the principal dimensions of QoL is not desirable. For this reason, an alternative composite index (MPI) that penalizes the provinces with ‘unbalanced’ values of the partial indices is proposed.

A comparison between the two methods shows that the main factor affecting the results is the normalization criterion: in fact, the ‘standardization’ entails an equal weighting of the indicators while the ‘distance from the best performer’ implies different weights. As a consequence of this, the provinces with high values in indicators with greater weights obtain higher scores with *Il Sole 24ore* method as compared to MPI. Moreover, if we consider two provinces with equal mean of normalized values, but different ‘horizontal variability’, they obtain different scores using the MPI.

Therefore, the use of a ‘penalty’ for ‘unbalanced’ values of the indicators allows us to distinguish the provinces with uneven achievement across different dimensions of QoL.

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# Chapter 4

## From Composite Indicators to Partial Orders: Evaluating Socio-Economic Phenomena Through Ordinal Data

Marco Fattore, Filomena Maggino, and Emilio Colombo

### 1 Introduction

The present debate on well-being measurement is clearly pointing out that a valuable evaluation process has to take into account many different and complementary aspects, in order to get a comprehensive picture of the problem and to effectively support decision-making. Assessing well-being requires sharing a conceptual framework about its determinants and about society and needs the identification of the most consistent and effective methodologies for building indicators and for communicating purposes. From a statistical perspective, one of the critical points concerns the preservation of the true nature of the socio-economic phenomena to be analysed. This calls for an adequate methodological approach. Several socio-economic phenomena have an intrinsic ordinal nature (e.g. material deprivation, democratic development, employment status), and correspondingly, there has been an increasing availability of ordinal datasets. Nevertheless, ordinal data have been often conceived as just a rough approximation of truly numerical and precise, yet non-observable, features, as if a numerical latent structure would exist under ordinal appearances. As a result, the search for alternative statistical procedures has been slowed down, and many epistemological, methodological and statistical problems regarding ordinal data treatment are still open and unsolved:

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1. *Methodological approaches: between objectivity, subjectivity and arbitrariness.* The epistemological research of the last century has focused on the role of the subject in knowledge production and has clearly showed how pure objectivism cannot account for the knowledge process, even in scientific disciplines. This is particularly evident when observing and analysing socio-economic phenomena. Given the complexity and the nuances of socio-economic issues, data can often be considered as a (fragmented) “text” to be “read” by the researcher, in search for a “sense” and a structure in it. This “sense structuring” process is not an arbitrary one, but necessarily involves some subjectivity. To make an example, think about the issue of defining poverty thresholds in deprivation studies, both in a monetary and in a multidimensional setting, with the consequences that different choices have in the final picture. Admittedly, in many applied studies, subjectivity is generally felt as an issue to be removed, and many evaluation procedures are designed to accomplish this task. Ironically, removing subjectivity is not an objective process and often produces arbitrary results. Thus, it is important to distinguish between a necessary “objectivity” of the research methodology (e.g. observation and data collection procedures) and an unavoidable “subjectivity” related, for instance, to the definition and choice of the conceptual framework and the analytical approaches. The real methodological issue is not removing subjectivity; rather, it is building a sound statistical process, where subjective choices are clearly stated and their consequences can be clearly worked out in a formal and unambiguous way.
2. *Ordinal data: between accuracy and ambiguity.* A great part of the methodological and statistical efforts has been dedicated to the issue of making measures quantitatively more precise. In practice, this has often been turned into applying multivariate statistical tools to ordinal data, after transforming, or interpreting, them in cardinal terms, through more or less sophisticated scaling procedures. These procedures may sometimes lead to useful results, but they are often quite questionable, not being consistent with the intrinsic nature of data. De facto, the efforts for getting more precise measures have the effect of frequently forcing the true nature of socio-economic phenomena. On the contrary, it could be wise to realize that the great part of socio-economic phenomena is characterized by nuances and “ambiguities”, which are not obstacles to be removed, but often represent what really matters.
3. *Ordinal data: technical issues.* Transformed or not in quantitative terms, ordinal data are generally submitted to traditional statistical tools, typically designed for quantitative data analysis and usually based on the analysis of linear structures. The results are quite arbitrary and questionable, since the data are forced into a conceptual and technical framework which is ultimately poorly consistent. Although these problems are well known, and new methodologies are continuously being developed, they are still unsolved. Basically, it can be asserted that the issue of ranking and evaluation in an ordinal setting is still an open problem, even from a pure data treatment point of view.

Motivated by these issues and by the relevance of the topic, in this chapter we introduce new tools for ranking and evaluation of ordinal data, with the aim to overcome the main problems of the classical methodologies and, particularly, of the composite indicator approach. We address the evaluation problem through a benchmark approach. Each statistical unit in the population is described in terms of its profile, that is, in terms of the sequence of its scores on the evaluation dimensions; profiles are then assessed against some reference sequences, chosen as benchmarks, to get the evaluation scores. We address the comparison of profiles to benchmarks in a multidimensional setting by using tools and results from *partially ordered set theory* (*poset* theory, for short). Indeed, through poset tools, sequences of scores can be assessed without involving any aggregation of the underlying variables since the evaluation is performed by exploiting the relational structure of the data, which involves solely the partial ordering of the profiles. The remainder of this chapter is organized as follows. Section 2 gives a brief account of the composite indicator approach, highlighting its main criticalities, particularly in the ordinal case. Section 3 introduces a few basic concepts from poset theory. Section 4 describes the basic evaluation strategy and the procedure to compute the evaluation scores. Section 5 tackles the problem of “weighting” evaluation dimensions. Section 6 specializes the methodology to the fundamental case of binary variables. Section 7 concludes. The aim of this chapter is primarily methodological, leaving to future works the systematic application of the evaluation procedure to real data. Nevertheless, for sake of clarity, all the basic concepts and the key ideas behind the methodology are introduced by examples, all of which pertain to material deprivation and multidimensional poverty.

## 2 The Composite Indicator Approach and Its Critical Issues

Addressing the complexity of socio-economic phenomena for evaluation aims is a complex task, often requiring the definition of large systems of indicators. Frequently, the complexity of the indicator system itself leads to the need of computing composite indicators in order to (Noll 2009):

- Answer the call by “policy makers” for condensed information.
- Improve the chance to get into the media.
- Allow multidimensional phenomena to be synthesized.
- Allow easier time comparisons.
- Compare cases (e.g. nations, cities, social groups) in a transitive way (e.g. through rankings).

Despite its spreading, the composite indicator approach is currently being deeply criticized as inappropriate and often inconsistent (Freudenberg 2003). Critics point out conceptual, methodological and technical issues, especially concerning the difficulty of conveying into unidimensional measures, all the relevant information

pertaining to phenomena which are complex, dynamic, multidimensional and full of ambiguities and nuances. The methodology aimed at constructing composite indicators is very often presented as a process needing specific training, to be performed in a scientific and objective way. Actually the construction procedure, even though scientifically defined, is far from being objective and aseptic. Generally, it comprises different stages (Nardo et al. 2005; Sharpe and Salzman 2004), each introducing some degree of arbitrariness to make decisions concerning:

- The analytical approach to determine the underlying dimensionality of the available elementary indicators and the selection of those to be used in the evaluation process.
- The choice of the weights used to define the importance of each elementary indicator.
- The aggregation technique adopted to synthesize the elementary indicators into composite indicators.

*Indicator selection.* Selecting the indicators to be included in the composite represents a fundamental stage in the construction process since it does operationally define the latent concept that the composite is supposed to measure. Selection criteria should consider (Nardo et al. 2005) the issues of reducing redundancies, allowing both comparability among statistical units and over time and should be oriented to obtaining politically relevant results. From a statistical point of view, indicator selection often involves a principal component analysis or a factor analysis, to reveal correlations and associations among evaluation variables and to perform some dimensionality reduction. Irrespective of the statistical tool adopted, dimensionality reduction raises some relevant questions, concerning its consequences on the composite indicator construction. If the concept to be measured turns out to be actually unidimensional, computing a single composite indicator could be justifiable. But when concepts are truly multidimensional, then singling out just one, albeit composite, indicator is very questionable. The nuances and ambiguities of the data would in fact be forced into a conceptual model where all the features conflicting with unidimensionality are considered as noise to be removed. Moreover, synthetic scores could be biased towards a small subset of elementary indicators, failing to give a faithful representation of the data.

*Weighting variables.* When constructing composite indicators, particular attention is paid to the weighting process, which gives different importance to the elementary indicators forming the composite. The necessity of choosing weights based on objective principles is frequently asserted (Nardo et al. 2005; Ray 2008; Sharpe and Salzman 2004), leading to a preference for statistical tools like correlation analysis, principal component analysis or data envelopment analysis, to mention a few. However, adopting purely statistical methods in the weighting process must be carefully considered. Removing any control over the weighting procedure from the analyst gives a possibly false appearance of objectivity that is actually difficult to



achieve in social measurement (Sharpe and Salzman 2004). Moreover, since defining weights is often interpreted in the perspective of identifying personal and social values, the procedure should necessarily involve individuals' judgments. If indicators concern societal well-being, their construction turns out to be not just a technical problem, being part of a larger debate aimed at obtaining a larger legitimacy. In this perspective, the weighting issue can be even considered as a leverage of democratic participation to decisions. For example, Hagerty and Land (2007) stresses that building composite indicators should take into account and maximize the agreement among citizens concerning the importance of each elementary indicator. Choosing consistent weighting criteria is thus a critical issue, largely subjective and possibly data independent.

*Aggregating indicators.* Further criticisms concern the aggregation process (Munda and Nardo 2009), needed to get unidimensional scores out of multidimensional data, and which raises methodological difficulties when dealing with ordinal data. The process is in fact quite controversial since:

- The indicators to be aggregated are rarely homogeneous and need not share common antecedents (Howell et al. 2007).
- The aggregation technique might introduce implicitly meaningless compensations and trade-offs among evaluation dimensions.
- It is not clear how to combine ordinal variables, using numerical weights.

Even using scaling tools, turning ordinal scores into numerical values is not satisfactory; it forces the nature of the data and is not definitely a clear process, since different choices of the scaling tools may imply very different final results.

Composite indicators represent the mainstream approach to socio-economic evaluation, yet the discussion above shows how many critical issues affect their computation. The difficulties are even greater when ordinal variables are dealt with since statistical tools based on linear metric structures can be hardly applied to non-numeric data. In a sense, socio-economic analysis faces an *impasse*: (1) implicitly or not, it is generally taken for granted that “evaluation implies aggregation”; thus (2) ordinal data must be scaled to numerical values, to be aggregated and processed in a (formally) effective way; unfortunately (3) this often proves inconsistent with the nature of the phenomena and produces results that may be largely arbitrary, poorly meaningful and hardly interpretable. Realizing the weakness of the outcomes based on composite indicator computations, statistical research has focused on developing alternative and more sophisticated analytic procedures, but almost always assuming the existence of a cardinal latent structure behind ordinal data. The resulting models are often very complicated and still affected by the epistemological and technical issues discussed above. The way out to this *impasse* can instead be found realizing that evaluation need not imply aggregation and that it can be performed in purely ordinal terms. This is exactly what poset theory allows to do.

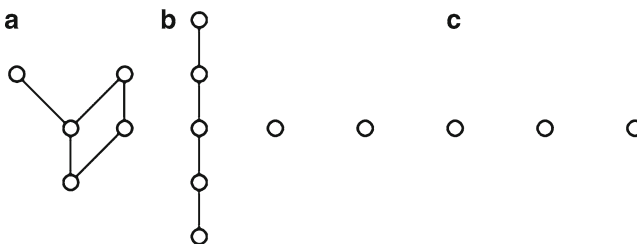
### 3 Basic Elements of Partial Order Theory

In this section, we introduce some basic definitions pertaining to partially ordered sets. In order to avoid collecting too much technicalities in a single paragraph, other results, needed in subsequent developments, will be presented along this chapter.

A partially ordered set (or a *poset*)  $P = (X, \leq)$  is a set  $X$  (called the *ground set*) equipped with a partial order relation  $\leq$ , that is, a binary relation satisfying the properties of *reflexivity*, *antisymmetry* and *transitivity* (Davey and Priestley 2002):

1.  $x \leq x$  for all  $x \in X$  (reflexivity).
2. If  $x \leq y$  and  $y \leq x$ , then  $x = y$ ,  $x, y \in X$  (antisymmetry).
3. If  $x \leq y$  and  $y \leq z$ , then  $x \leq z$ ,  $x, y, z \in X$  (transitivity).

If  $x \leq y$  or  $y \leq x$ , then  $x$  and  $y$  are called *comparable*; otherwise, they are said *incomparable* (written  $x \parallel y$ ). A partial order  $P$  where any two elements are comparable is called a *chain* or a *linear order*. On the contrary, if any two elements of  $P$  are incomparable, then  $P$  is called an *antichain*. A finite poset  $P$  (i.e. a poset over a finite ground set) can be easily depicted by means of a *Hasse diagram*, which is a particular kind of directed graph, drawn according to the following two rules: (1) if  $s \leq t$ , then node  $t$  is placed above node  $s$ ; (2) if  $s \leq t$  and there is no other element  $w$  such that  $s \leq w \leq t$  (i.e. if  $t$  covers  $s$ ), then an edge is inserted linking node  $t$  to node  $s$ . By transitivity,  $s \leq t$  (or  $t \leq s$ ) in  $P$ , if and only if in the Hasse diagram there is a descending path linking the corresponding nodes; otherwise,  $s$  and  $t$  are incomparable. Examples of Hasse diagrams are reported in Fig. 4.1. As any binary relation, a partial order  $(X, \leq)$  can be regarded as a subset of the Cartesian product  $X^2$ ; we will write  $(x, y) \in \leq$  if and only if  $x \leq y$  in  $P$ . With this notation, the poset axioms read: (1)  $(x, x) \in \leq$ , for all  $x \in X$ ; (2) if  $(x, y) \in \leq$  and  $(y, x) \in \leq$ , then  $y = x$ ; and (3) if  $(x, y) \in \leq$  and  $(y, z) \in \leq$ , then  $(x, z) \in \leq$ , for  $x, y, z \in X$ . It is then meaningful to consider expressions like “a subset of partial order” or “the intersection of a family of partial orders” or similar since they reduce just to ordinary set operations.



**Fig. 4.1** Hasse diagrams of a poset (a), a chain (b) and an antichain (c)

## 4 Evaluating Multidimensional Ordinal Phenomena Through Poset Theory

### 4.1 Representing Ordinal Data as Posets

In this paragraph, we use poset theory to give a simple and effective representation of multidimensional ordinal data which proves essential for the development of the evaluation procedure. The presentation follows mainly Fattore et al. (2011), generalizing and extending it in many directions.

Let  $v_1, \dots, v_k$  be  $k$  ordinal evaluation variables. Each possible sequence  $s$  of scores on  $v_1, \dots, v_k$  defines a different *profile*. Profiles can be (partially) ordered in a natural way, by the dominance criterion given in the following definition:

**Definition 1.** Let  $s$  and  $t$  be two profiles over  $v_1, \dots, v_k$ ; we say that  $t$  dominates  $s$  (written  $s \leq t$ ) if and only if  $v_i(s) \leq v_i(t) \quad \forall i = 1, \dots, k$ , where  $v_i(s)$  and  $v_i(t)$  are the scores of  $s$  and  $t$  on  $v_i$ .

Clearly, not all the profiles can be ordered based on the previous definition; as a result, the set of profiles gives rise to a poset (in the following, called the *profile poset*).

*Example 1 (Material deprivation).* Let us consider the following three deprivation dimensions from the Italian EU-SILC survey:

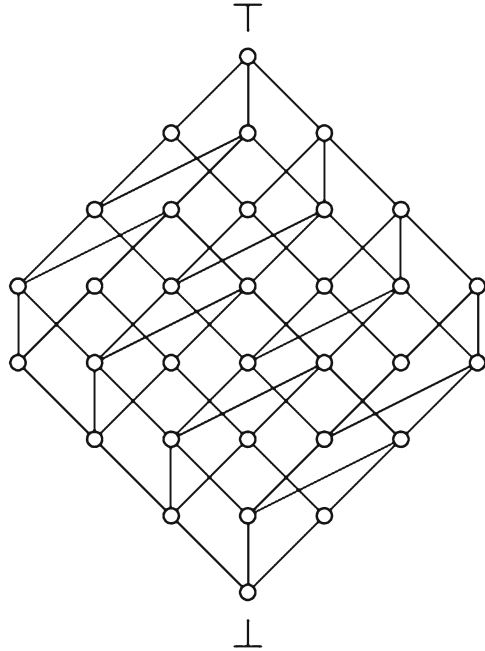
1. HS120 – *The household makes ends meet with difficulty.*
2. DIFCIB – *The household has received food donations over the last year.*
3. DIFDEN – *The household has received money donations over the last year.*

Variable HS120 is coded in binary form<sup>1</sup> (“0 – No”, “1 – Yes”). Variables DIFCIB and DIFDEN are recorded on a four-grade scale, (“0 – Never”, “1 – Seldom”, “2 – Sometimes”, “3 – Often”). The 32 profiles resulting from considering all the sequences of scores over HS120, DIFCIB and DIFDEN can be partially ordered according to Definition 1. The Hasse diagram of the resulting poset is shown in Fig. 4.2. The top node ( $\top$ ) represents the *completely deprived* profile (133); correspondingly, the bottom node ( $\perp$ ) represents the *completely non-deprived* profile (000).

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<sup>1</sup> In the original dataset, variable HS120 is recorded on a six grade scale; to reduce the number of profiles, in this example it has been recorded in a dichotomous form. Original grades 1–3 have been collapsed into “1 – Yes” and original grades 4–6 have been collapsed into “0 – No”.

**Fig. 4.2** Hasse diagram for the poset of material deprivation profiles



## 4.2 The Evaluation Strategy

Since ordinal phenomena cannot be measured against an absolute scale, the evaluation scores of the statistical units are computed comparing them against some reference units, assumed as benchmarks.<sup>2</sup> In operative terms, the procedure is organized in three steps:

1. Given the evaluation dimensions, reference profiles are selected, identifying benchmarks in the profile poset.
2. Given the benchmarks, the evaluation function is computed assigning a score to each profile in the poset. This score depends upon the “position” of the profile with respect to the benchmarks and is computed analysing the partial order structure.
3. Once the scores of the profiles are computed, each statistical unit is assigned the score corresponding to its profile. This way, the evaluation is extended from the poset to the population.

<sup>2</sup> In this chapter, we do not deal with the problem of the identification of such benchmarks and assume them as given. In practice, however, reference units should be determined through some preliminary analysis based on both the socio-economic context and the goals pursued by the decision-makers interested in the evaluation process.

In this chapter, we focus on assessing the elements of the profile poset. It is worth noticing that the computation of the evaluation scores depends only upon the benchmarks and the structure of the profile poset, but not upon the statistical distributions of the evaluation variables on the population. Thus, our procedure is in a sense halfway between an absolute and a relative approach to evaluation and can be tuned in one direction or the other, with a convenient choice of the benchmarks.

### 4.3 The Evaluation Function

The evaluation function  $\eta(\cdot)$  assigns a score to each element in the profile poset  $P$ . Formally, it is an *order-preserving* map from  $P$  to  $[0, M]$ , that is, a map

$$\begin{aligned} \eta : P &\mapsto [0, M] \\ &: s \rightarrow \eta(s) \end{aligned} \quad (4.1)$$

such that

$$s \trianglelefteq t \Rightarrow \eta(s) \leq \eta(t), \quad (4.2)$$

where  $M > 0$  represents the maximum evaluation score and can be seen as a scaling factor.

Condition (4.2) states the minimal consistency requirement that the score computed through  $\eta(\cdot)$  increases as we move towards the top of the profile poset.

Given  $\eta(\cdot)$ , the profile poset  $P$  is naturally partitioned into the union of the following disjoint subsets:

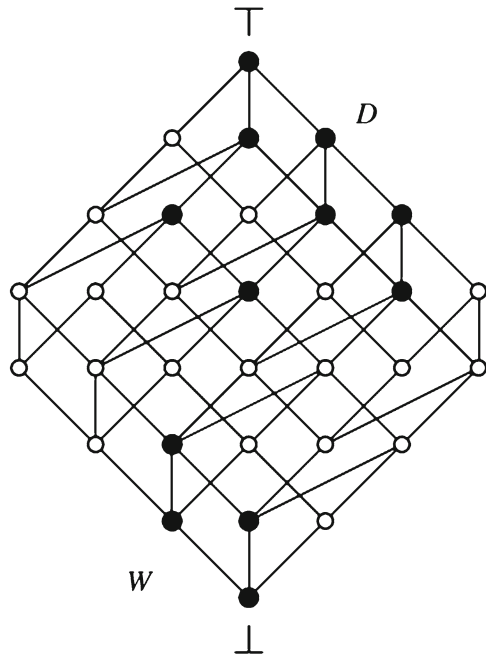
- The set  $D$  of profiles such that  $\eta(s) = M$
- The set  $W$  of profiles such that  $\eta(s) = 0$
- The set  $A$  of profiles such that  $0 < \eta(s) < M$

Sets  $D$  and  $W$  have the following useful property: if  $s \in D$  and  $s \trianglelefteq t$ , then, according to (4.2),  $\eta(t) = M$ , that is,  $t \in D$ ; similarly, if  $s \in W$  and  $t \trianglelefteq s$ , then  $\eta(t) = 0$  and  $t \in W$ . In poset theoretical terms, sets like  $D$  and  $W$  are called *up-sets* and *down-sets*, respectively.

### 4.4 Benchmarks and Poset Thresholds

To pursue a benchmark approach to evaluation, the concept of evaluation threshold, typical of quantitative evaluation studies, must be extended to the ordinal case. To this goal, we draw upon the following nice property of up-sets and down-sets. Given the up-set  $D$ , there is a unique subset  $\underline{d} \subseteq D$  of mutually incomparable elements (i.e. an antichain), such that  $s \in D$  if and only if  $d \trianglelefteq s$  for some  $d \in \underline{d}$  (Davey and Priestley 2002). The up-set  $D$  is said to be generated by  $\underline{d}$  (in formulas,  $D = \uparrow \underline{d}$ ).

**Fig. 4.3** Thresholds for the deprivation poset and corresponding sets  $D$  and  $W$  (black nodes)



Excluding trivial cases, any element of the generating antichain is below only elements of  $D$  and is above only elements of  $P \setminus D$ , so that it shares, in the profile poset, the same role of a numerical threshold in the quantitative case. Thus,  $\underline{d}$  will be called the *superior threshold*. The same result can be dually stated for the down-set  $W$ : an antichain  $\underline{w} \subseteq W$  can be found such that  $s \in W$  if and only if  $s \leq \underline{w}$  for some  $w \in \underline{w}$ .  $W$  is said to be generated by  $\underline{w}$  (in formulas,  $W = \downarrow \underline{w}$ ), and  $\underline{w}$  will be called the *inferior threshold*.

*Example 1 (continuation).* Given the deprivation poset, at a pure illustrative level we can identify the superior (deprivation) threshold and the inferior (non-deprivation) threshold as

$$\underline{d} = (121, 112), \tag{4.3}$$

$$\underline{w} = (011). \tag{4.4}$$

In other words, we state that any statistical unit having profile 121 or 112 is considered as completely deprived and will be assigned a deprivation score equal to  $M$ . Similarly, any statistical unit having profile 011 will be assigned a deprivation score equal to 0. The sets  $D$  of completely deprived profiles and  $W$  of completely non-deprived profiles are represented by the black nodes in Fig. 4.3. Note that for logical consistency any element of  $\underline{d}$  is unambiguously more deprived than the element of  $\underline{w}$ .

## 4.5 Computation of the Evaluation Function

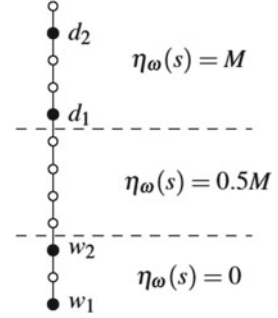
In the socio-economic literature, evaluation is often performed according to a “response from a population” approach (Cerioli and Zani 1990). In the language of social choice, this means that a set of judges is identified, each assigning an evaluation score to the statistical units. Judges’ scores are then averaged in the final evaluation scores. Usually, judges coincide with the evaluation dimensions, leading to the definition of a composite indicator (Alkire and Foster 2007). In the ordinal case, this choice is unsatisfactory since it is unclear how to aggregate ordinal scores. Although also our methodology follows a “response from a population” approach, it overcomes the problem of ordinal score aggregation selecting the set of judges in a different way. The key idea behind judge selection can be explained as follows. Judges produce rankings of profiles out of the poset  $P$ ; when accomplishing this task, they are free to order incomparable pairs as preferred (no ties are allowed), but they cannot violate the constraints given by the profile poset, that is, if  $s \leq t$  in  $P$ , then any judge must rank  $t$  above  $s$  in his own ranking. Thus, the set of all possible different judges (i.e. judges not producing the same rankings) coincides with the set of all the *linear extensions* of  $P$ . A linear extension of a poset  $P$  is a linear ordering of the elements of  $P$  which is consistent with the constraints given by the partial order relation. For example, if  $P$  is composed of three elements  $x$ ,  $y$  and  $z$ , with  $y \leq x$ ,  $z \leq x$  and  $y \parallel z$ , only two linear extensions are possible, namely,  $z \leq y \leq x$  and  $y \leq z \leq x$ , since  $x$  is greater than both  $y$  and  $z$  in  $P$ . The set of all the linear extensions of a poset  $P$  is denoted by  $\Omega(P)$ ; it comprises all the linear orders compatible with  $P$  and identifies uniquely the partial order structure (Neggers and Kim 1998; Schroeder 2003). Thus, considering the set of linear extensions of  $P$  is just a different way to consider the whole poset; in other words, the set of judges *exploits all the information contained in the original partial order*.

In view of the definition of the evaluation function, it must be determined (1) how each linear extension (i.e. each “judge”)  $\omega \in \Omega(P)$  assigns a score  $\eta_\omega(s)$  to each profile  $s \in P$  and (2) how such scores are aggregated into the final evaluation score  $\eta(s)$ . The two steps are described in sequence.

Let  $\underline{d}$  be the superior threshold. If in  $\omega$  a profile  $t$  is ranked above a profile  $d \in \underline{d}$ , that judge (i.e.  $\omega$ ) must assign a score  $M$  to  $t$ , consistently with (4.2). Similarly, for the inferior threshold, judge  $\omega$  will assign evaluation score equal to 0 to any profile ranked, in  $\omega$ , below a profile  $w \in \underline{w}$ . On the contrary, if in  $\omega$  a profile  $s$  falls below any element of  $\underline{d}$  and above any element of  $\underline{w}$ , then it can receive neither a score equal to  $M$  nor a score equal to 0. As a consequence, it will be assigned an evaluation score equal to<sup>3</sup>  $0.5M$ , to reflect the uncertainty in the evaluation. This way, elements of  $D$  and  $W$  are assigned scores equal to  $M$  and 0, respectively, by any judge  $\omega$ . On the contrary, elements of  $A$  are assigned scores equal to  $M$ , 0, or  $0.5M$ .

<sup>3</sup>The choice of the value  $0.5M$  can be justified according to a fuzzy approach, as the simplest way to represent numerically the judges’ uncertainty.

**Fig. 4.4** Exemplificative linear extension  $\omega$  of a poset with 12 elements and corresponding evaluation function  $\eta_\omega(\cdot)$ , when  $\underline{d} = (d_1, d_2)$  and  $\underline{w} = (w_1, w_2)$



by  $\omega$  according to whether they are ranked, in the linear extension  $\omega$ , over elements of  $\underline{d}$ , below elements of  $\underline{w}$  or in between (Fig. 4.4).

Formally, let  $\omega \in \Omega(P)$  and let us define the following sets:

$$D_\omega = \{s \in \omega : d \preceq s \text{ in } \omega, \text{ for at least one } d \in \underline{d}\}; \quad (4.5)$$

$$W_\omega = \{s \in \omega : s \preceq w \text{ in } \omega, \text{ for at least one } w \in \underline{w}\}; \quad (4.6)$$

$$A_\omega = \{s \in \omega : s \notin D_\omega \cup W_\omega\}. \quad (4.7)$$

Then the evaluation function  $\eta_\omega(\cdot)$  associated to judge  $\omega$  is defined by

$$\eta_\omega(s) = \begin{cases} M & s \in D_\omega, \\ 0.5M & s \in A_\omega, \\ 0 & s \in W_\omega. \end{cases} \quad (4.8)$$

Given  $\eta_\omega(\cdot)$  for each single judge  $\omega \in \Omega(P)$ , an aggregation function  $g(\cdot, \dots, \cdot)$  is to be selected in order to define the evaluation function  $\eta(\cdot)$  as

$$\eta(s) = g(\eta_{\omega_1}(s), \dots, \eta_{\omega_n}(s)), \quad (4.9)$$

where  $n$  is the number of linear extensions of the profile poset  $P$ .

To restrict the possible forms of the aggregation function, we impose the following list of axioms on  $g(\cdot, \dots, \cdot)$ :

1.  $g(x, \dots, x) = x$ ,
2.  $g(k \cdot x_1, \dots, k \cdot x_n) = k \cdot g(x_1, \dots, x_n)$ .
3. Other things being equal, if  $x_i < \hat{x}_i$ , then  $g(x_1, \dots, x_i, \dots, x_n) \leq g(x_1, \dots, \hat{x}_i, \dots, x_n)$ .
4.  $g(\cdot, \dots, \cdot)$  must be quasi-linear.
5.  $g(z - x_1, \dots, z - x_n) = z - g(x_1, \dots, x_n)$ .

The first three axioms are self-evident; quasi-linearity means that the computation of the evaluation function is consistent with grouping judges into disjoint



classes. The fifth axiom requires a deeper explanation. Consider the complement to  $M$  of the evaluation function  $\eta(\cdot)$ :

$$\theta(\cdot) = M - \eta(\cdot) = M - g(\eta_{\omega_1}(\cdot), \dots, \eta_{\omega_n}(\cdot)). \quad (4.10)$$

If  $\eta(\cdot)$  measures (say) the deprivation degree,  $\theta(\cdot)$  consistently measures the non-deprivation degree. Alternatively, the non-deprivation degree could also be obtained as

$$\theta(\cdot)^* = g(M - \eta_{\omega_1}(\cdot), \dots, M - \eta_{\omega_n}(\cdot)) \quad (4.11)$$

since  $M - \eta_{\omega_i}(\cdot)$  is the complement to  $M$  of  $\eta_{\omega_i}(\cdot)$ . Axiom 5 requires  $\theta(\cdot)$  and  $\theta(\cdot)^*$  to coincide, which is a logical consistency requirement. Using a theorem by de Finetti (1931), the only functions satisfying axioms (1)–(5) turn out to belong to the class of the weighted arithmetic means, so that the following proposition can be stated:

**Proposition 1.** *The evaluation function  $\eta(\cdot)$  must be computed as a weighted arithmetic mean of the evaluation functions  $\eta_{\omega}(\cdot)$ ,  $\omega$  in  $\Omega(P)$ .*

Since there is no reason to treat judges asymmetrically (i.e. judges are *anonymous*), we adopt a uniform weighting scheme and compute the evaluation function<sup>4</sup> for profile  $s$  as

$$\eta(s \mid \underline{d}, \underline{w}) = \frac{1}{|\Omega(P)|} \sum_{\omega \in \Omega(P)} \eta_{\omega}(s \mid \underline{d}, \underline{w}). \quad (4.12)$$

In the following, we set  $M = 1$ , so that  $\eta(s) \in [0, 1]$ .

In principle, to compute the evaluation function, it would be necessary to list all the linear extension of  $P$ , assigning the corresponding score to any profile of the poset. In practice, listing all the linear extensions of real posets is computationally unfeasible, so that the evaluation function must be estimated, based on a sample of linear extensions. Many algorithms exist to perform this task, but the most efficient is known to be the Bublely-Dyer algorithm (Bublely and Dyer 1999) and all the computations presented in this chapter have been performed using it.

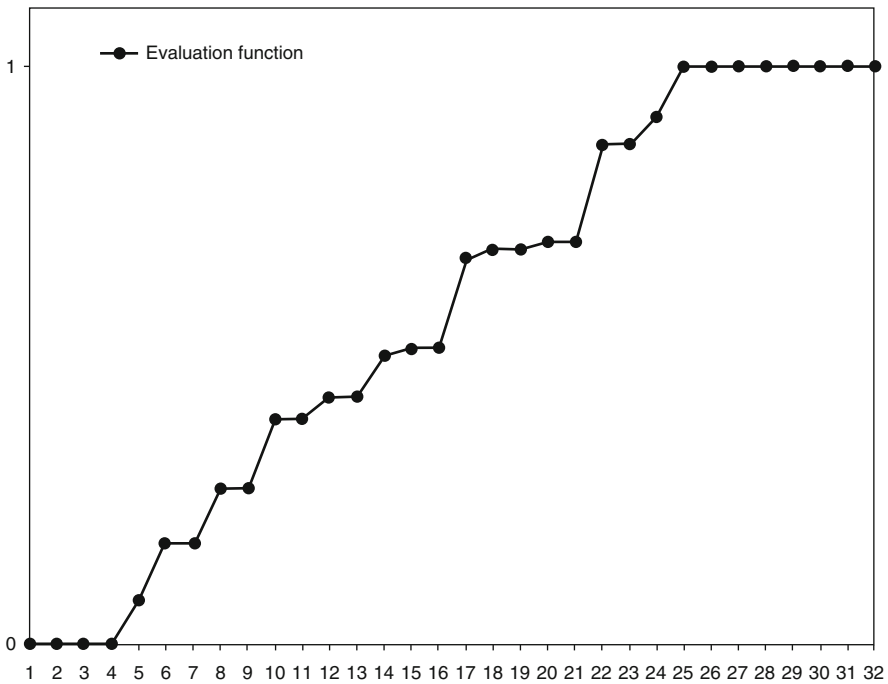
*Example 1 (continuation).* Given the deprivation and non-deprivation thresholds, the evaluation function has been computed sampling  $10^8$  linear extensions out of the deprivation profile poset. Results are reported in Table 4.1 and depicted in Fig. 4.5. As expected, profiles in  $D$  and profiles in  $W$  are assigned deprivation scores equal to 1 and 0, respectively. All other profiles have deprivation scores in  $(0, 1)$ . It is worth noticing that (1) the evaluation function increases gradually over the deprivation poset and (2) profiles sharing the same level in the Hasse diagram may receive different scores. This shows how the evaluation procedure is effective in extracting

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<sup>4</sup> We write the evaluation functions explicating the thresholds, to recall that they depend upon them.

**Table 4.1** Evaluation function  $\eta(s \mid 121, 112; 011)$  for the deprivation poset

$s$	000	001	010	100	011	020	002	110
$\eta(s)$	0.000	0.000	0.000	0.073	0.000	0.174	0.174	0.269
$s$	101	030	003	120	111	102	012	021
$\eta(s)$	0.269	0.390	0.390	0.427	0.5	0.427	0.512	0.512
$s$	022	121	112	130	103	031	013	131
$\eta(s)$	0.668	1.000	1.000	0.682	0.683	0.696	0.696	1.000
$s$	113	122	032	023	033	123	132	133
$\eta(s)$	1.000	1.000	0.864	0.864	0.912	1.000	1.000	1.000



**Fig. 4.5** Graph of  $\eta(s \mid 121, 112; 011)$  (deprivation profiles are listed on the  $x$  axis according to increasing deprivation scores)

information out of the data structure, reproducing the nuances of multidimensional deprivation.

*Remark.* Differently from other approaches, our procedure extracts the evaluation information directly out of the data structure, so that no aggregation of ordinal variables is required. In fact, once the thresholds are identified, the problem of computing evaluation scores is solved assessing the “relational position” of each element of the profile poset, with respect to the benchmarks. Since the structure of the profile poset can be rigorously investigated through poset theory tools, numerical

evaluation scores are obtained without scaling the original ordinal dimensions into cardinal variables.

The effectiveness of poset methodologies is even more clearly revealed when addressing one of the main problems in evaluation studies, namely, how to account for the different relevance of the evaluation dimensions, when computing the evaluation scores. We refer to this issue as the “weighting” problem, and we explore it in the next section.

## 5 The “Weighting” Problem

The methodology introduced in the previous paragraphs assumes the evaluation dimensions to share the same relevance. As a matter of fact, some asymmetry among the dimensions is only implicitly introduced when the thresholds are identified. As a legacy of the composite indicator methodology, the problem of accounting for the relevance of the evaluation dimensions is usually tackled using numerical weights, even in an ordinal setting (Cerioli and Zani 1990; Lemmi and Betti 2006). As we show in the following, an alternative and more consistent solution comes from poset theory. However, before introducing it, the weighting problem must be carefully reconsidered.

### 5.1 Extension of a Poset

Generally, weighting schemes are introduced in order to improve the informative content of the analysis and to reduce ranking ambiguities (often, weights are computed through a principal component analysis, so as to maximize the variance, i.e. the informative power, of the final index). Ambiguity reduction is the key to address the weighting problem also in an ordinal setting. The profile poset  $P$ , built as described in Sect. 4, comprises only those comparabilities which are implied by the purely logical ordering criterion stated in Definition 1. Still, many ambiguities, that is, incomparabilities, remain in  $P$ , since the ordering criterion is not enough informative to “resolve” all of them. Adding information to the evaluation procedure should therefore yield a reduction of the set of incomparabilities in the profile poset. This idea can be formally stated, through the concept of *extension* of a partial order.

**Definition 2.** Let  $P_1 = (X, \leq_1)$  and  $P_2 = (X, \leq_2)$  be two posets over the same ground set  $X$ . If  $a \leq_1 b$  implies  $a \leq_2 b$ , for any  $a, b \in X$ , then  $P_2$  is called an *extension* of  $P_1$ .

In set terms,  $P_2$  is an extension of  $P_1$  if and only if  $P_1 \subseteq P_2$  as subsets of  $X^2$ . In general, a poset  $P$  has many extensions, and clearly, if  $P_1$  and  $P_2$  are extensions of  $P$ , then also is  $P_1 \cap P_2$ .

*Example 2.* Let  $X = \{a, b, c\}$  and let  $P = \{a \leq a; b \leq b; c \leq c; b \leq a\}$ .  $P$  admits five extensions, as reported in Fig. 4.6.

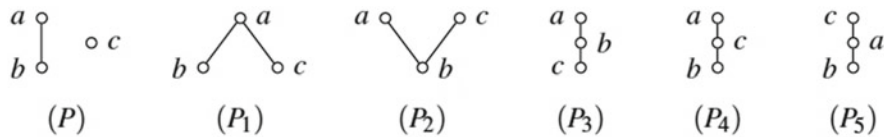


Fig. 4.6 Poset  $P$  and its five extensions  $P_1, \dots, P_5$

### 5.2 The Weighting Procedure

We are now in the position to outline how new ordinal information can be added to the profile poset; for sake of clarity, we introduce the “weighting” procedure through a simple example.

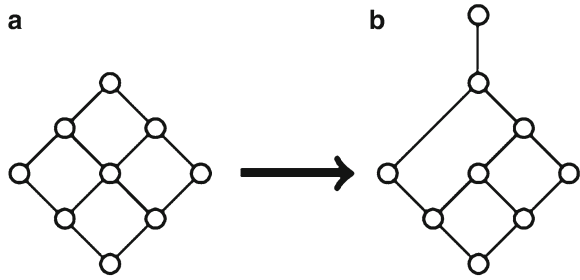
*Example 3.* Consider two variables  $v_1, v_2$  each recorded on a three-grade scale: 0, 1 and 2. The corresponding profile poset is depicted in Fig. 4.7a. Suppose that, based on some exogenous considerations, profile 12 is regarded as more deprived than profile 21. Poset  $P$  is then enlarged, with the addition of a new comparability, namely,  $(21, 12)$ , (i.e.  $21 \preceq 12$ ). Unfortunately,  $P \cup (21, 12)$  is not a poset, since it does not satisfy the transitivity axiom. In fact, since  $20 \preceq 21$  in  $P$ , from  $21 \preceq 12$  it follows that also  $20 \preceq 12$  must be added to  $P$ , so as to restore transitivity and to get a partial order  $P$  which is an extension of  $P$ . Technically, considering  $P^* = P \cup (12, 21) \cup (20, 12)$  defines  $P^*$  as the *transitive closure*  $\overline{P \cup (12, 21)}$  of  $P \cup (12, 21)$ , that is, as the *smallest* extension of  $P$ , comprising  $21 \preceq 12$ . The extension is depicted in Fig. 4.7b. It is important to realize that there are other extensions of  $P$  comprising  $21 \preceq 12$ , but each of them would also comprise comparabilities not directly implied by it. Therefore, choosing an extension different from the transitive closure would be arbitrary.

The procedure outlined in the example can be generalized allowing more comparabilities at a time. If  $C$  is the set of new comparabilities to be added, it is in fact sufficient to consider  $P \cup C$  and to compute the transitive closure  $\overline{P \cup C}$ , so as to get the desired extension.<sup>5</sup>

After extending the profile poset to the transitive closure, the evaluation process may proceed as before, with the selection of the benchmarks and the computation of the scores. As  $P$  is turned into  $P$ , the number of incomparabilities reduces and the partial order structure changes. Correspondently, the number of linear extensions decreases, modifying the ranking distribution of the profiles and the evaluation scores of the statistical units.

<sup>5</sup> It is worth noticing that in extending the partial order, care must be taken not to add conflicting comparabilities; otherwise,  $P$  would contain loops and would not be a poset. Therefore, the comparabilities to add cannot be chosen arbitrarily, since the partial order structure imposes logical constraints to the extension procedure.

**Fig. 4.7** Addition of comparabilities to a poset (a) and Hasse diagram of the transitive closure (b)



*Example 1 (continuation).* Let us consider the deprivation poset introduced in the previous sections. Suppose to consider difficulties to make ends meet to be more relevant than seldom receiving both food and money donations. Correspondently, profile 100 is ranked as more deprived than profile 011, and  $011 \leq 100$  is added to the poset  $P$ . By transitivity, also  $010 \leq 100$  and  $001 \leq 100$  are added to  $P$ , so as to get the transitive closure  $P^* = P \cup (011 \leq 100)$ , whose Hasse diagram is depicted in Fig. 4.8. As it can be seen, the symmetric structure of the original profile poset is broken by the addition of the new comparabilities and the evaluation function, given the same thresholds, is slightly more polarized, being steeper in the left part (Table 4.2 and Fig. 4.9).

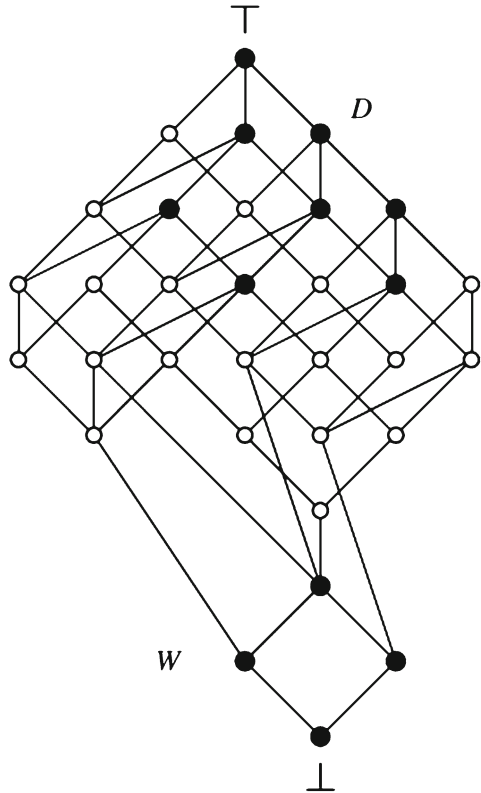
*Remark.* In real cases, posets consist of more profiles than those discussed in these examples. In such cases, transitive closures cannot be computed by inspection, as done in this chapter. However, the computations involved in the weighting procedure are very easily accomplished, drawing on the matrix representation of a poset. Let  $P = (X, \leq)$  be a poset over a set of  $n$  profiles  $s_1, \dots, s_n$ . To  $P$ , it is associated an  $n \times n$  binary matrix  $Z$ , defined by  $Z_{ij} = 1$  if  $s_i \leq s_j$  and  $Z_{ij} = 0$  otherwise. When a new comparability  $s_h \leq s_k$  is added to  $P$ ,  $Z_{hk}$  is set to 1. If  $C$  is the set of new comparabilities added to  $P$ , and  $\widehat{Z}$  is the matrix corresponding to  $P \cup C$ , the matrix  $Z^*$  associated to the transitive closure  $P^* = \overline{P \cup C}$  is obtained as

$$Z^* = Bin \left( \sum_{\ell=0}^{n-1} \widehat{Z}^\ell \right), \tag{4.13}$$

where  $Bin(\cdot)$  is the operator that sets to 1 all the non-null elements of its argument (Patil and Taillie 2004).

*Remark.* The weighting procedure described above is based on a subjective judgment, pertaining to the ordering of incomparable profiles. The identification of the comparabilities to be added to the profile poset should be performed based on some kind of socio-economic analysis; nevertheless, it necessarily involves values judgment and includes individuals' contribution in attributing importance to different domains. Such a subjectivity should not be an issue: it is in fact

**Fig. 4.8** Extension of the deprivation poset and corresponding sets  $D$  and  $W$  (black nodes)

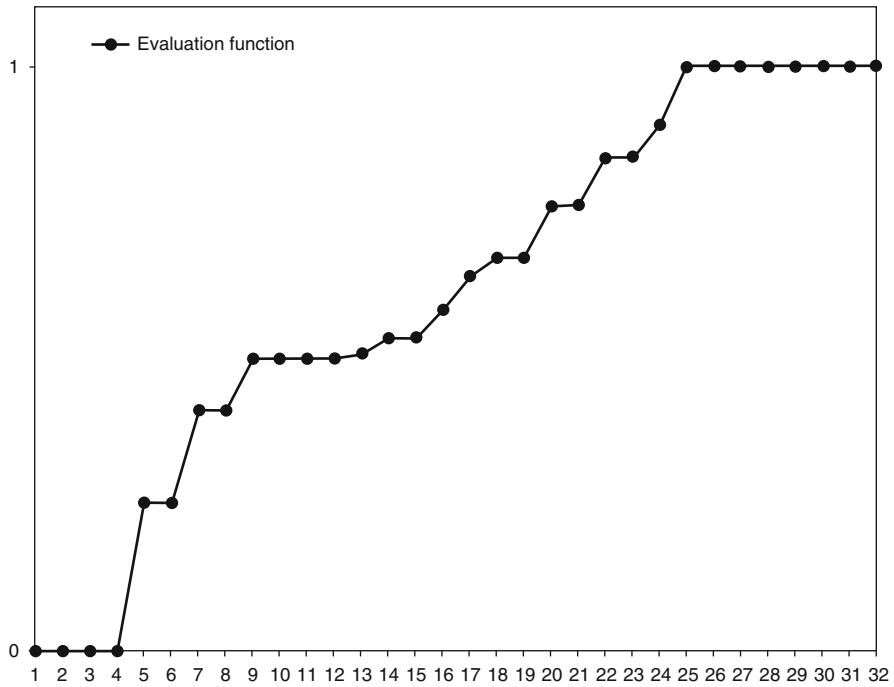


**Table 4.2** Evaluation function  $\eta(s \mid 121, 112; 011)$  for the extended deprivation poset

$s$	000	001	010	100	011	020	002	110
$\eta(s)$	0.000	0.000	0.000	0.500	0.000	0.254	0.254	0.500
$s$	101	030	003	120	111	102	012	021
$\eta(s)$	0.500	0.412	0.412	0.536	0.500	0.536	0.584	0.509
$s$	022	121	112	130	103	031	013	131
$\eta(s)$	0.642	1.000	1.000	0.762	0.763	0.672	0.672	1.000
$s$	113	122	032	023	033	123	132	133
$\eta(s)$	1.000	1.000	0.845	0.845	0.901	1.000	1.000	1.000

responsibility of the decision-maker to make a stand on these aspects turning a “pre-policy” profile poset into a “policy-oriented” profile poset, useful as an evaluation tool.

Checking the incomparabilities of a partial order to decide how and whether to extend, it is not any easy task, particularly when the number of profiles is large. Moreover, socio-economic scientists are likely to tackle the weighting



**Fig. 4.9** Graph of  $\eta(s | 121, 112; 011)$  for the extended deprivation poset (deprivation profiles are listed on the x axis according to increasing deprivation scores)

problem at the evaluation variable level, rather than at the profile level. Therefore, it would be desirable to have a procedure capable to extend the profile poset  $P$  directly based on the assessment of the relative importance of the evaluation dimensions. In the following section, we build such a procedure in the fundamental case of binary data.

## 6 Binary Variables

In many socio-economic studies, the evaluation dimensions have a simple binary form. Typical examples can be found in surveys about material deprivation, where information pertaining to the ownership of goods (e.g. car, telephone, television) are collected as dichotomous data. All the concepts and tools described in the previous paragraphs apply to binary variables as well, but the simpler structure of the binary case makes it possible to further develop the methodology, particularly concerning the weighting problem.

## 6.1 The Structure of the Hasse Diagram for Binary Data

When the  $k$  variables  $v_1, \dots, v_k$  are binary, the set  $X$  of possible profiles has cardinality  $2^k$  and becomes a poset  $P = (X, \leq)$  under the usual order relation defined by

$$u \leq w \Leftrightarrow v_i(u) \leq v_i(w), \quad \forall i = 1, \dots, k. \quad (4.14)$$

The Hasse diagram of  $P$  has a simple and symmetrical structure since each level of the graph comprises profiles with the same number of 0s and 1s, so that two profiles  $u$  and  $w$  share the same level in the diagram if and only if one is a permutation of the other.

*Example 4 (Binary material deprivation).* Let us consider the following set of five deprivation variables, from the EU-SILC survey for Italy:

1. HS160 – *Problems with the dwelling: too dark, not enough light*
2. HS170 – *Noise from neighbours or from the street*
3. HS180 – *Pollution, grime or other environmental problems*
4. HS190 – *Crime, violence or vandalism in the area*
5. UMID – *Dampness in walls, floor, ceiling or foundations*

All five variables are coded in a binary form: 0 if the household does not report the issue and 1 if it does. The set  $X$  comprises  $2^5 = 32$  profiles. The Hasse diagram of the profile poset  $P$  is depicted in Fig. 4.10. For future reference, we have computed the degree of deprivation of each profile, when the superior (deprivation) threshold is set to  $\underline{d} = (01110, 11001)$  and the inferior (non-deprivation) threshold to  $\underline{w} = 01000$ . The result is reported in Table 4.3 and depicted in Fig. 4.11.

Clearly, the variables considered in the example have different relevance. For instance, dampness in the house may be considered as less relevant than living in an area affected by crime or pollution, and the profile poset should be extended accordingly. In the next paragraph, we show how this extension can be accomplished, directly based on the existence of (partial) hierarchies among binary evaluation dimensions.

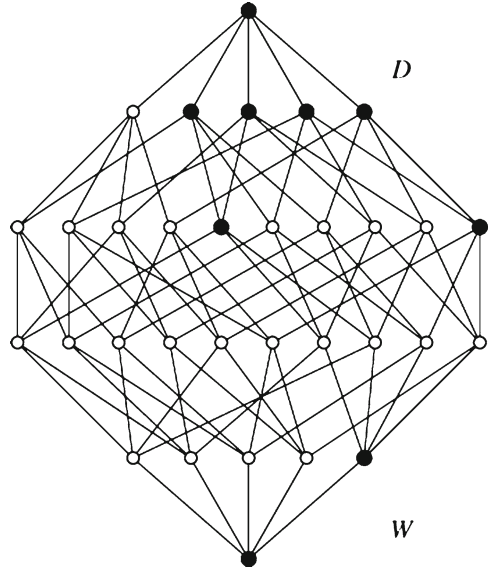
## 6.2 The Weighting Procedure in the Binary Case: The Connection Rule

Let  $V = \{v_1, \dots, v_k\}$  be the set of binary evaluation variables. The set  $V$  can be turned into a poset  $\Pi = (V, \prec)$  (in the following, called the *relevance poset*), defining the strict partial order  $\prec$  through

$$v_j \prec v_i \Leftrightarrow v_j \text{ is less relevant than } v_i \quad (4.15)$$



**Fig. 4.10** Hasse diagram of deprivation profiles, built on five binary deprivation variables



**Table 4.3** Evaluation function  $\eta(s \mid 01110, 11001; 01000)$  for the deprivation poset built on five binary variables

$s$	00000	00001	00010	00011	00100	00101	00110	00111
$\eta(s)$	0.000	0.222	0.223	0.462	0.223	0.463	0.447	0.742
$s$	01000	01001	01010	01011	01100	01101	01110	01111
$\eta(s)$	0.000	0.526	0.526	0.800	0.526	0.800	1.000	1.000
$s$	10000	10001	10010	10011	10100	10101	10110	10111
$\eta(s)$	0.222	0.446	0.463	0.741	0.464	0.741	0.742	0.881
$s$	11000	11001	11010	11011	11100	11101	11110	11111
$\eta(s)$	0.526	1.000	0.800	1.000	0.800	1.000	1.000	1.000

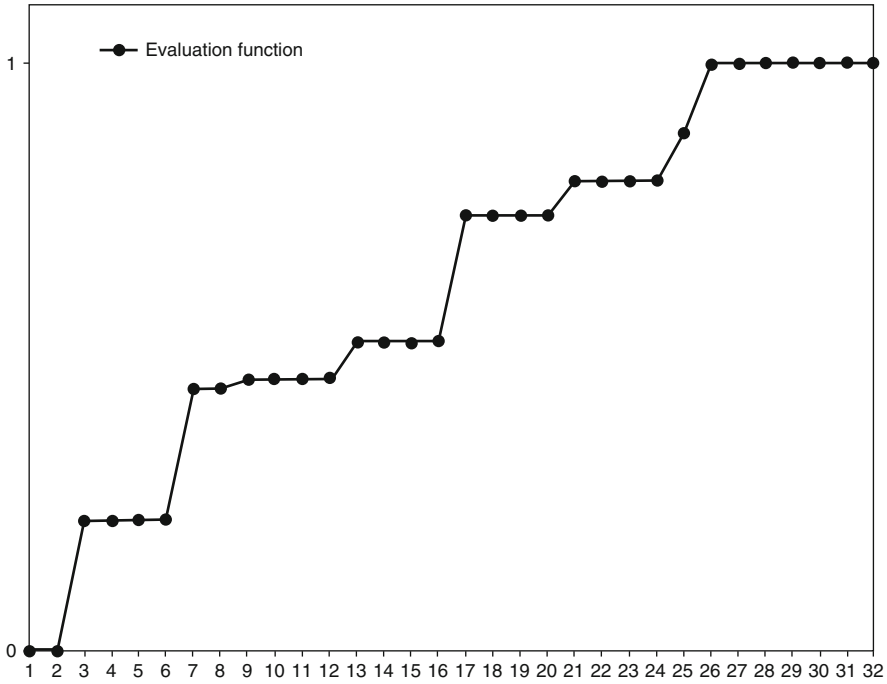
Given the relevance poset, the next step is to define a way to link its structure to the extension of the profile poset. This is done introducing the following *connection rule* that we present in three steps.

Step 1. For  $v_i \in V$ , let us consider the set  $L_i$ , defined as

$$L_i = \{v_j \in V : v_j \prec v_i\}, \tag{4.16}$$

that is, the set of variables less relevant than  $v_i$  (in the following,  $v_i$  is called the *pivot*). An incomparable pair  $s \parallel t$  such that

1.  $v_i(s) < v_i(t)$
2.  $v_j(t) < v_j(s)$ , for  $v_j \in L_i$
3.  $v_j(s) = v_j(t)$  for  $v_j \neq v_i, v_j \notin L_i$



**Fig. 4.11** Graph of  $\eta(s \mid 01110, 11001; 01000)$  for the deprivation poset built on five binary variables (deprivation profiles are listed on the x axis according to increasing deprivation scores)

is turned into the comparability  $s \trianglelefteq t$  and added to  $P$ . Let us denote by  $CR_{\Pi}(P, v_i)$  the set of comparabilities added to  $P$ , when  $v_i$  is selected as the pivot. It can be easily checked that  $CR_{\Pi}(P, v_i)$  can be defined in a more compact way as

$$CR_{\Pi}(P, v_i) = \{(u, w) \in X^2 : v_j(u) < v_j(w) \Leftrightarrow j = i$$

$$\text{and } v_j(w) < v_j(u) \Rightarrow v_j \in L_i\}.$$

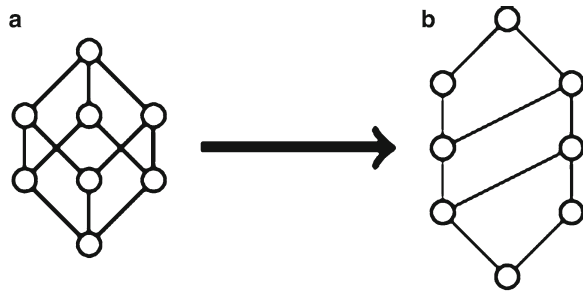
Step 2. The procedure described in Step 1 is repeated, selecting each variable in  $\Pi$  as the pivot. This way, the set  $CR_{\Pi}(P)$ , comprising all of the new comparabilities directly implied by  $\Pi$ , is obtained as

$$CR_{\Pi}(P) = \cup_{i=1}^k CR_{\Pi}(P, v_i). \tag{4.17}$$

Step 3. The set  $CR_{\Pi}(P)$  is then added to  $P$ , getting  $P \cup CR_{\Pi}(P)$ , that is, enriching the profile poset with the comparabilities derived by  $\Pi$ . In general,  $P \cup CR_{\Pi}(P)$  is not a partial order, since the transitivity properties need not be fulfilled. Therefore, we finally compute the transitive closure

$$\overline{CR_{\Pi}}(P) = \overline{P \cup CR_{\Pi}(P)}. \tag{4.18}$$

**Fig. 4.12** Hasse diagrams of  $P$  and its extension  $P$ , when  $v_2 \prec v_1$



The set  $\overline{CR_{\Pi}}(P)$  is the desired extension of the original profile poset  $P$  and includes all the comparabilities comprised in  $CR_{\Pi}(P)$  and all those implied by transitivity.

We are now in the position to state the *connection rule* formally.

**Definition 3.** Connection rule. Let  $\Pi = (V, \prec)$  be the relevance poset over a set  $V = \{v_1, \dots, v_k\}$  of binary variables and let  $P = (X, \leq)$  be the original profile poset. Then the information contained in  $\Pi$  is added to  $P$  extending  $P$  to  $CR_{\Pi}(P)$ .

We now give some examples to show how the connection rule works in practice.

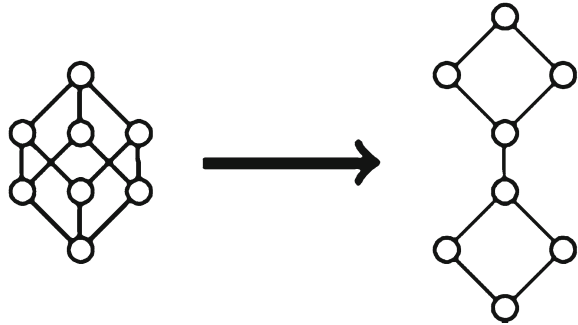
*Example 5.* Consider a set of three binary variables  $v_1, v_2$  and  $v_3$  and consider the corresponding profile poset  $P$ , whose Hasse diagram is reported in Fig. 4.12a. Suppose to consider variable  $v_1$  as more relevant than variable  $v_2$  (in symbols,  $v_2 \prec v_1$ ), while no criterion to order  $v_3$  with respect to  $v_1$  or  $v_2$  is provided. Quite naturally, any incomparability in  $P$ , due to a “disagreement” between  $v_1$  and  $v_2$  only, can be eventually turned into a comparability since  $v_1$  “prevails” on  $v_2$ . Explicitly, the incomparabilities  $101 \parallel 011$  and  $100 \parallel 010$  turn into  $011 \leq 101$  and  $010 \leq 100$ , respectively. Adding these new comparabilities to  $P$  and taking the transitive closure, a new poset  $P$  is produced, as the smaller extension of  $P$  consistent with the additional information conveyed by  $v_2 \prec v_1$  (Fig. 4.12b).

*Example 6.* Example 5 can be easily generalized considering, for instance,  $v_2 \prec v_1$  and  $v_3 \prec v_1$ . In this case, the incomparability  $100 \parallel 011$  is turned into  $011 \leq 100$  since  $v_1$  “prevails” on both  $v_2$  and  $v_3$ . Adding this comparability to  $P$  and taking the transitive closure, six other comparabilities are added to  $P$ , namely,  $011 \leq 110$ ,  $011 \leq 101$ ,  $010 \leq 100$ ,  $011 \leq 100$ ,  $001 \leq 110$  and  $010 \leq 101$ . The Hasse diagrams of the profile poset and the resulting extension  $P$  are depicted in Fig. 4.13.

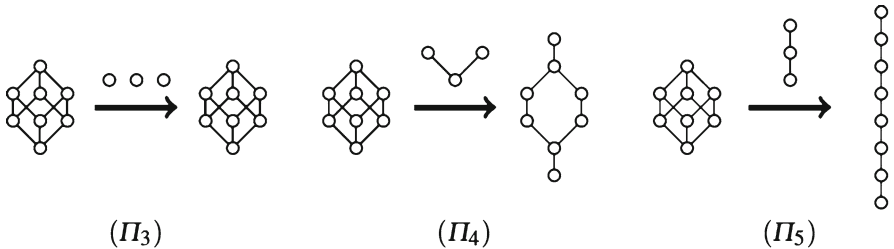
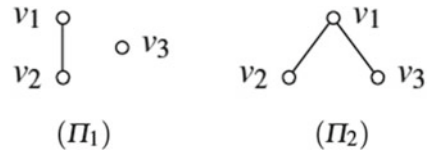
Figure 4.14 reproduces the Hasse diagrams for the relevance posets  $\Pi_1$  and  $\Pi_2$ , implicitly defined in Examples 5 and 6.

*Example 7.* Let  $V = \{v_1, v_2, v_3\}$  be the set of three binary variables of Examples 5 and 6. In addition to the posets of Fig. 4.14, three other posets can be defined on  $V$  (a part from label permutations), namely, the antichain  $\Pi_3 = (v_1 \parallel v_2 \parallel v_3)$ , the poset

**Fig. 4.13** Hasse diagrams of  $P$  and its extension  $\overline{P}$ , when both  $v_2 \prec v_1$  and  $v_3 \prec v_1$



**Fig. 4.14** Hasse diagrams of the relevance posets  $\Pi_1$  and  $\Pi_2$



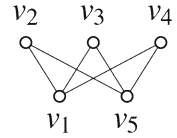
**Fig. 4.15** Extensions of  $P$  through  $\Pi_3$ ,  $\Pi_4$  and  $\Pi_5$

$\Pi_4$  given by  $(v_3 \prec v_1, v_3 \prec v_2)$  and the chain  $\Pi_5 = (v_3 \prec v_2 \prec v_1)$ . The corresponding extensions  $\overline{CR}_{\Pi}(P)$  for each case are represented in Fig. 4.15.

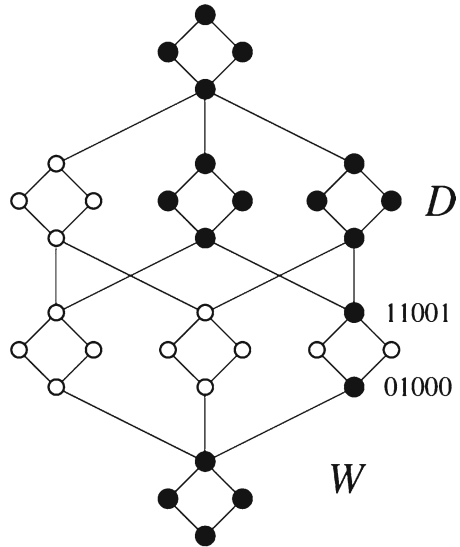
As these examples make clear, when the relevance poset is an antichain (i.e. when no information on the relative importance of the evaluation variables is available), the transformation  $\overline{CR}_{\Pi}(\cdot)$  has no effect and leaves the profile poset unchanged. At the opposite, when  $\Pi$  is a chain (i.e. when the evaluation variables are ranked in a complete hierarchy), then  $\overline{CR}_{\Pi}(\cdot)$  transforms  $P$  in a linear order.

*Remark.* Comparing the transformations  $\overline{CR}_{\Pi_i}(\cdot)$  described in Examples 5–7, it can be directly checked that if  $\Pi_1 \subseteq \Pi_2$ , then  $\overline{CR}_{\Pi_1}(P) \subseteq \overline{CR}_{\Pi_2}(P)$ . Since any poset  $\Pi$  can be extended to a linear order, from the discussion above it follows that  $\overline{CR}_{\Pi}(P)$  is always comprised in some linear extension of  $P$ . This ensures that applying the connection rule, no loops are accidentally introduced in the profile poset.

**Fig. 4.16** Relevance poset for the deprivation example



**Fig. 4.17** Extension of the binary deprivation poset



We end this section applying the connection rule to the data of Example 4.

*Example 4 (continuation).* Suppose to (partially) order the five evaluation variables according to the poset  $\Pi$  depicted in Fig. 4.16.

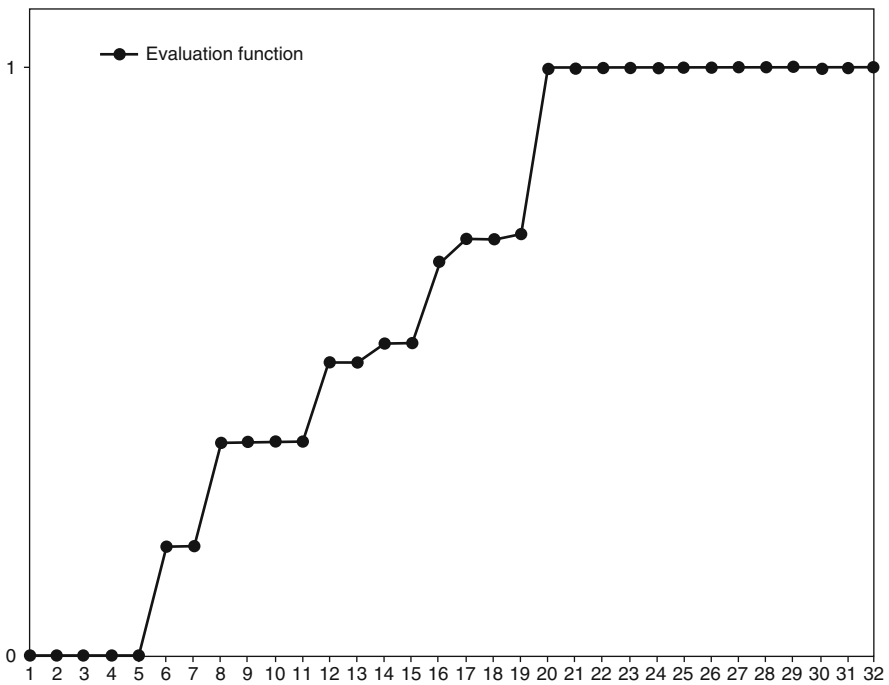
The relevance poset comprises two levels, and all the variables in the upper level dominate each variable in the lower.<sup>6</sup> An application of the connection rule directly gives the extension presented in Fig. 4.17. As can be directly seen, the extended poset  $P^*$  has far less incomparabilities than the original profile poset. In particular, it is worth noticing that, in  $P^*$ ,  $11001 \leq 01110$ , so that the deprivation threshold reduces to just a single profile, namely, 11001.

Table 4.4 reports the deprivation scores computed on the extended poset. As it can be easily checked (Fig. 4.18), the scores are more polarized towards the extreme values 0 or 1, than in the case of the original profile poset. As expected, the added information has reduced the ambiguity of the original partial order, resulting in a much steeper evaluation function.

<sup>6</sup>We recall that the aim of this chapter is mainly methodological and that the relevance poset introduced in the text has just an exemplificative purpose.

**Table 4.4** Evaluation function  $\eta(s \mid 01110, 11001; 01000)$  for the extended deprivation poset, built on five binary variables

$s$	00000	00001	00010	00011	00100	00101	00110	00111
$\eta(s)$	0.000	0.000	0.186	0.364	0.186	0.364	0.670	0.709
$s$	01000	01001	01010	01011	01100	01101	01110	01111
$\eta(s)$	0.000	0.500	1.000	1.000	1.000	1.000	1.000	1.000
$s$	10000	10001	10010	10011	10100	10101	10110	10111
$\eta(s)$	0.000	0.000	0.365	0.533	0.364	0.533	0.709	0.717
$s$	11000	11001	11010	11011	11100	11101	11110	11111
$\eta(s)$	0.500	1.000	1.000	1.000	1.000	1.000	1.000	1.000



**Fig. 4.18** Graph of  $\eta(s \mid 01110, 11001; 01000)$  for the extended deprivation poset, built on five binary variables (deprivation profiles are listed on the x axis according to increasing deprivation scores)

## 7 Conclusions and Perspectives

In this chapter, we have introduced a new methodology for evaluation purposes in multidimensional systems of ordinal data. The methodology is based on a benchmark approach and draws upon poset theory, so as to overcome the conceptual and computational drawbacks of the standard aggregative procedures, which involve

composite indicators. Poset tools allow to describe and to exploit the relational structure of the data, so as to compute evaluation scores in purely ordinal terms, avoiding any aggregation of variables. The effectiveness of the partial order approach is particularly evident in the way the “weighting” problem is addressed and solved. Exogenous information pertaining to the relevance of the evaluation dimensions is in fact taken into account modifying the structure of the profile poset, through the transitive closure device, avoiding the introduction of numerical weights in the computations. Although simplified, the examples discussed in this chapter show how the methodology can be applied in practice and to real datasets. The software routines needed for the computations can also be easily implemented through standard programming languages. As any novel proposal, our methodology can be improved in many respects and extended in many directions, both at theoretical and applied level. These are interesting avenues for future research.

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# Chapter 5

## Light and Shade of Multidimensional Indexes

### How Methodological Choices Impact on Empirical Results

Enrica Chiappero-Martinetti and Nadia von Jacobi

#### 1 Introduction

In the last decade, the predominant role of income-based metric of social welfare and development has progressively been more questioned, generating an extensive debate about the need to consider the multifaceted nature of individual and collective well-being. The academic literature provides now a wide range of holistic concepts of human well-being, including the human development and capability approach (Alkire 2002; Burchardt 2008; Fukuda-Parr and Kumar 2003; Nussbaum 2000; Sen 1999; Nussbaum and Sen 1993) or the happiness literature (Bruni and Porta 2005; Di Tella and MacCulloch 2006; Easterlin 2000; Frey and Stutzer 2000; Layard 2005; Kahneman 2000; Kahneman et al. 1999; Kahneman and Krueger 2006; Veenhoven 2000), and multiple indicators are increasingly and extensively taken into consideration for measuring progress and development as well as poverty and social exclusion in current societies.<sup>1</sup>

While there is wide agreement on the necessity to go beyond unidimensional money metric of development and well-being, it is still an open issue how to measure such multifaceted and complex phenomena. Broadly speaking, two main directions

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<sup>1</sup>An intensive debate has developed at the European institutional level in the last 2 years on how to measure progress and well-being, and many national and international initiatives have been promoted with this regard. See, in particular, the Equality of Human Rights Commission's work in Britain and its recent report on developing a set of indicators for measuring equality (EHRC 2009), the 2009 French Report of the Stiglitz-Sen-Fitoussi Commission (2009) (<http://www.stiglitz-sen-fitoussi.fr>) and the initiative "Beyond GDP" promoted by the European Commission and OECD countries ([www.beyond-gdp.eu](http://www.beyond-gdp.eu)). See also UNDP and the new series of indexes of human development introduced in the 2010 Human Development Report (UNDP 2010).

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are followed. On one hand, to gather an ordered set of indicators, a “dashboard” is considered an appropriate manner for monitoring the trends of development or socio-economic process. Examples are the Millennium Development Goals, the World Bank Indicators or the overarching portfolio of EU social indicators.<sup>2</sup> On the other hand, composite indexes of poverty and well-being are often formulated with the aim to facilitate comparisons over time or across countries, to simplify interpretation and communication and to support decision-makers. They also encourage a more parsimonious choice of the relevant information to be included in the overall index reducing the excessive richness that often characterizes any dashboard.<sup>3</sup>

While the arguments for developing composite indicators are rather evident and often emphasized, the arguments against are sometimes not sufficiently acknowledged and only recently some concerns have been raised suggesting more cautiousness in the use of multidimensional indexes. The Stiglitz-Sen-Fitoussi Report remarks that “what we measure affects what we do and if our measurements are flawed, decisions may be distorted” (Stiglitz et al. 2009, p. 7). Ravallion (2010a) outlines that most of the “mashup indices”<sup>4</sup> of development and poverty currently available are rarely rooted into a prevailing theory or grounded on robust methodological assumptions. They are generally driven or substantially affected by the availability of statistical data and composed without providing a satisfactory justification of the full range of measurement problems implied in their construction. Implications of methodological choices (e.g. functional form chosen, the trade-off among indicators and their weights) can strongly affect the country performance. Similarly, contextual factors matter but they also do not seem to be sufficiently discussed, especially in international comparisons where institutional, structural and regional differences are generally neglected. This can lead to misinterpretation and potential manipulation of results and may have important policy implications.

The main aim of our paper is to discuss the impact on empirical results of different methodological assumptions regarding the transformation function of elementary indicators and their aggregation into a composite index, including the choice of weighting systems. Our empirical analysis is conducted on DHS (Demographic

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<sup>2</sup>On Millennium Development Goals, see the most recent Global Monitoring Report (World Bank 2010), while about EU indicators see Atkinson et al. (2002) and European Commission (2008). A most recent list of indicators has been adopted by the European Union at the end of 2009 for monitoring what is defined as the social Open Method of Coordination (OMC). For a general discussion on indicators of poverty and social exclusion at a global level, see also Marlier and Atkinson (2010).

<sup>3</sup>For a wide, even if non-exhaustive, overview of some of the most widespread well-being indices, see <http://composite-indicators.jrc.ec.europa.eu>. See also Ravallion (2010a, b, 2011) for a critical discussion of some prominent composite indexes.

<sup>4</sup>These are defined by Ravallion as “a composite index for which the producer is only constrained by the availability of data in choosing what variables to include and their weights” (Ravallion 2010a, p. 3).

Health Survey) micro-data (2002 and 2007) related to Jordan, a country for which very little empirical evidence on multidimensional poverty is available.<sup>5</sup> We apply both arbitrary – even if rather conventional and common – choices in terms of functional forms, aggregation criteria and weights as well as a frequency-based approach which is data driven and reflects the current reality. A quantification of the impact of each of these methodological aspects on poverty estimates is provided with the aim to highlight the relative sensitiveness of multidimensional indexes regarding these choices. A further element of novelty of our contribution is that in testing different weighing systems, we also refer to a fieldwork we have conducted in Jordan on a sample of students and development experts for eliciting information related to the relative weights attached to five main well-being domains. The empirical analysis is not restricted to the national level but is also shaped to investigate how Jordan regions (governorates) rank according to their performance in terms of multidimensional poverty indexes. Generally speaking, comparisons at sub-national level are relatively less problematic than at the international scale as they refer to a more homogeneous, and in our case also relatively small, context. Nonetheless, an accurate sensitivity analysis is conducted for testing the robustness of our results at regional level providing information that might be relevant for designing and orienting policies aimed at reducing regional gaps.

We structure the chapter as follows: Sect. 2 introduces the main methodological issues involved in the construction of any multidimensional index; Sect. 3 presents the data used, while Sect. 4 focuses on the methodology adopted in our empirical analysis. Section 5 shows how these choices influence final results, and the last section briefly concludes.

## 2 On Multidimensional Indexes and Some Related Methodological Choices

The construction of a composite index implies a series number of essential steps ranging from the choice of variables and indicators to their transformation, combination and the specification of a set of weights. Each of these steps regards what is valuable, how it is valued and what priority – if any – exists among different valuable dimensions of well-being. All these steps are in some way associated to normative judgments; therefore, they all require a careful assessment of the impact they can produce in terms of rankings and results and the subsequent policy recommendations

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<sup>5</sup>At the best of our knowledge, there are no recent or regular empirical analyses on multidimensional deprivation in Jordan (at least, not in English) even if National Development Plans include poverty reduction and improvement in human development in their political agenda. See also the National Human Development Report (2004). A recent contribution aimed to investigate horizontal inequalities in Jordan with a special attention to Palestinian Refugees is Nimeh (2012).

(see OECD-JRC 2008; Jacobs et al. 2004). We briefly discuss these methodological choices referring to the flexible index of well-being suggested by Decancq and Lugo (2010):

$$I(x) = \begin{cases} \left[ w_1 I_1(x_1)^\beta + \dots + w_m I_m(x_m)^\beta \right]^{\frac{1}{\beta}} & \text{for } \beta \neq 0 \\ I_1(x_1)^{w_1} * \dots * I_m(x_m)^{w_m} & \text{for } \beta = 0 \end{cases} \quad (5.1)$$

The index is defined as a  $\beta$ -ordered mean of the transformed achievement or shortfall  $I_j(x_j)$  of individual (or country)  $i$  ( $i = 1, \dots, n$ ) in the dimension  $j$  ( $j = 1, \dots, m$ ) while  $w$  are non-negative weights ( $\sum w_j = 1$ ).

Transformation or normalization of the indicators is commonly required in order to avoid problems related to different units of measurement as well as to the presence of outliers or extreme values in the data. Different methods are commonly applied for transforming and normalizing indicators used in constructing a composite index, including – among others – rescaling, the computation of  $z$ -scores, min-max transformation (as in the case of the Human Development Index), logarithmic transformation or the use of categorical scores.

The value of the parameter  $\beta$  in Eq. 5.1 can be interpreted in terms of a generalized  $\beta$ -mean. It characterizes the type of aggregation among attributes or dimensions and therefore defines their trade-off. Two are the most commonly used aggregation methods: (1) the linear additive method, which is equivalent to a  $\beta$  value equal to 1 (arithmetic mean) and implies a full compensation among dimensions. This means that a poor performance in one dimension can be rebalanced by a good performance in any other domain (dimensions are perfect substitutes); (2) the multiplicative method allows for an imperfect substitutability and corresponds to a value of the  $\beta$  parameter equal to 0 (geometric mean). In this case, an increase in the most deprived dimension will have a higher impact on the composite indicator.<sup>6</sup> Thus, a multidimensional index that aggregates dimensions with a geometric mean implicitly penalizes performances where *any* of the dimensions presents very low values. The consequences for a poverty index are that those dimensions in which people perform worst have greater influence on the overall performance than those dimensions in which people perform best. Such a choice is advisable whenever a reasonable achievement in any of the dimensions is considered to be crucial for overall performance.

Finally, there is the choice of the weights  $w_j$  that represents a central concern for the construction of any composite index. The most recurrent option is still to set weights arbitrarily, often by assigning the same weight to every single component

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<sup>6</sup>Other aggregation methods that do not allow compensability at all, such as the multi-criteria approach (MCA), are discussed in the OECD-JRC Handbook (2008). One of the innovations of the Human Development Index in the last 2010 Report is the switch from an arithmetic to a geometric mean. Critical comments on the current HDI structure have been raised by Ravallion (2010a, b); for an intensive debate on this, see also the HDR forum “Let’s talk HD” <http://hdr.undp.org/en/humandev/lets-talk-hd/>

of well-being and by taking the simple arithmetic mean of the component indicators (which corresponds to setting a value of  $\beta=1$ ). The implicit assumption being that in absence of any objective mechanism for determining the relative importance of the considered dimensions, the most neutral method is assigning an equal weight to each of them.<sup>7</sup> However, this choice – just as every other – can have a non-trivial impact on results and should be carefully considered and motivated on the basis of some robust theory or grounded methodological arguments.

Decancq and Lugo (2010) provide an accurate review of the main approaches adopted for setting weights. They classify them in two categories: the data-driven and the normative approaches. Other methods can be classified within both categories but, generally speaking, while the former depend on the actual distribution of achievements or shortfalls (how the situation “is”), the latter are entirely based on value judgments (how the situation “ought to be”). A third intermediate category which combines the two approaches is also identified and labelled by Decancq and Lugo as hybrid approach.

As Ravallion (2010a) remarks, conceptually, there are countless possibilities for forming composite indices by a different combination of these three main elements – the transformation function  $I_j(x_j)$ , the parameter  $\beta$  and the weights  $w_j$  – and most of them are adopted by some ad hoc assumption.<sup>8</sup> For instance, the Human Development Index, probably one of the best known composite indicator at a global level, adopts a linear transformation for the elementary indicators with equal weight among dimensions, and in its most recent formulation, it shifts the functional form from an arithmetic to a geometric mean (changing the corresponding value for the  $\beta$  parameter from one to zero) (UNDP 2010). The Index of Individual Living Conditions included in the European System of Social Indicators adopts a categorical scale for normalizing seven sub-indexes ranging from 1 (worst) to 5 (best) and aggregates them with a simple average with equal weights.<sup>9</sup>

One merit of the index specification (5.1) is that it allows the interpretation of  $(x_j)$  both in terms of attainment and shortfall from it. This is very much in spirit with the concept of achievements or functionings suggested by the capability approach as it allows interpreting the index  $I_j(x_j)$  both as a multidimensional well-being and as a deprivation measure in the functioning space. Functionings are defined as “the various things a person may value doing or being” (Sen 1999, p. 75) and represent the constitutive elements of a person’s well-being. They include aspects such as being

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<sup>7</sup>It has been outlined, however, that an unbalanced structure in the composite index can arise if equal weights are given to each single variable when a different number of variables is being considered and subsequently grouped into different dimensions. See, among others, OECD-JRC (2008).

<sup>8</sup>There are other preliminary and fundamental choices in the construction of a composite index, such as the selection of a set of dimensions and related variables that we do not discuss in detail here for space reasons (but see Sect. 3 about the selection criteria adopted in our empirical analysis). Some theoretical frameworks, such as the capability approach, devote special attention to the selection of relevant domains to be considered (Robeyns 2003; Nussbaum 2003; Sen 2004), but as a matter of fact, in most cases, these choices are largely constrained by the availability of data.

<sup>9</sup>See [www.gesis.org/en/social\\_monitoring/social\\_indicators/index](http://www.gesis.org/en/social_monitoring/social_indicators/index)

educated, having a good job, being able to participate effectively in social and political life, having the social bases of self-respect and non-humiliation and being able to be treated with dignity and without discrimination (Nussbaum 2000). All these functionings can rarely be expressed in a dichotomous and antithetical manner (achieved or not achieved); more realistically, they can be better represented in a gradual manner ranging from the best circumstance of full fulfilment to a poorest condition while also allowing any other intermediate and partial situation (Chiappero-Martinetti 2000, 2006). In this chapter, we will conceptually refer to the capability approach to measure multidimensional poverty as a gradually distributed condition in the evaluative space of functionings.

### 3 Data

Our empirical analysis relies on both, large representative household data for measuring well-being in a set of relevant domains as well as on a fieldwork conducted in Jordan: we have collected information regarding weights and priority people assign to the same set of well-being dimensions.

With respect to secondary data, we refer to two recent waves of the Demographic Health Surveys (2002 and 2007),<sup>10,11</sup> In both datasets, the distribution of the Jordanian population in terms of demographic and geographical structure (governorates)<sup>12</sup> is very similar even if the sample size increased in the 2 years: overall, 7,545 households (46,755 individuals) were interviewed in 2002, while for 2007 the sample size almost doubled (14,044 households and 82,471 individuals).<sup>13</sup>

According to the ethically individualistic perspective suggested by the capability literature (see Robeyns 2005), the unit of analysis here adopted for the construction

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<sup>10</sup>The analysis presented here is part of a broader research project aimed to investigate multidimensional poverty at national and regional level from a jointly human rights and human development perspective. For that project, we referred to both national household surveys (1996, 2003) as well as to DHS micro-data (1997, 2002, 2007). Although coming from different sources, the design of a composite indicator for a large span of time has been possible because of the relatively good comparability of these five datasets.

<sup>11</sup>A Jordan 2009 DHS has recently been released but reports a smaller set of variables not sufficient to cover in an appropriate manner our chosen dimensions, while for the 2 years here considered, the datasets are more complete and perfectly comparable in terms of variables definition and sampling.

<sup>12</sup>Governorates are first-level sub-national administrative units. There are 12 governorates in Jordan equally distributed in the Northern, Central and Southern regions of the country.

<sup>13</sup>The distribution of observations among the 12 governorates is consistent throughout the 2 years even if a slight over-representation of rural areas occurs in 2007. In general, the surveys design in the last 15 years registered an increase of the number of households interviewed and a higher representation of rural areas.

of the multidimensional index is the single individual whose well-being however is not independent from household conditions.<sup>14</sup> Therefore, individual characteristics are combined with household information when this is proven to be conceptually helpful or empirically required by the nature of the variables used.

The selection of well-being domains and the corresponding variables still remains one of the most relevant and delicate steps in the construction of a multidimensional index (OECD-JRC 2008). For this research, we have chosen five dimensions of well-being: education, employment, health, housing and personal security. These are rather recurrent dimensions in many multidimensional analyses, constitute major fields of intervention for international development programmes and are relevant for the policy agenda in Jordan.

In selecting the components of the composite measure and its sub-indicators, we give great care to certain features of variables. Variables entering into the composite indexes have been screened to meet the following general criteria: *variability* (no indicator with a very skewed distribution has been included), *representation* (only indicators with a sufficient amount of observations have been used), *generality* (only variables that refer to aspects of well-being that are generally recognized as relevant have been included) and *significance* (as multidimensional poverty measurements try to go beyond the income factor, we have avoided variables that are clear indicators of economic wealth<sup>15</sup>).

The initial selection of variables has led to a reduced number of sub-indicators for which the following characteristics hold: (1) indicators measure poverty in a gradual manner, avoiding a more standard “switch-on, switch-off” approach to poverty measurement while trying to keep a continuum between two opposite (fully positive and totally negative) conditions; (2) indicators are normalized, assuming values from 0 (best condition with lack of poverty) to 1 (worst condition of extreme deprivation); and (3) indicators are monotonic: an increase in their value means an increase in poverty.

Hereafter, we briefly summarize some main aspects related to the construction of the five sub-indicators. Tables A.1, A.2, A.3, A.4 and A.5 in the Annex describe their definition in detail. For the measurement of education, one of the main challenges has been accounting for the generational gap due to significant educational reforms and changes occurred in Jordan during the last decades. By constructing different indicators for different age groups, we pay attention to these intergenerational differences while maintaining an ordinal coherence: for example, the same type of deprivation (not more than completed primary) has a higher poverty value for the younger generations compared to the older ones.

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<sup>14</sup>There are different reasons that require making a direct connection between individual and household well-being. On one hand, the household remains the major source of social relations, decision-making and risk pooling. Moreover, some variables, like for instance those related to housing conditions, are collected at the household level.

<sup>15</sup>For similar reasons, we have not included asset indexes in the construction of our composite measures.

We derive the employment indicator according to the position of each adult family member in the labour market.<sup>16</sup> On one hand, we consider occupation not just for its effect on earnings but also for the well-being effects produced in terms of independence and self-esteem. On the other hand, occupation of adults can also stand as proxy for economic status of the family. Therefore, we apply the aggregated occupational score of the family to all its other members subsequently.<sup>17</sup>

The indicator measuring health deprivation draws on three types of information: insurance coverage, incidence of any disease in the previous 2 weeks and effective treatment in case of disease. For this indicator, we consider data on under-5-year-old children within the family due to the higher health vulnerability of young children. As for the employment indicator above discussed, we have applied the final family score to all its members.

In the construction of the composite housing indicator, we calculate an overcrowding index and we consider health-promoting house facilities such as water, toilet and sewage system while other non-essential or status-related aspects of housing have been excluded.<sup>18</sup>

Finally, personal security has been the most challenging dimension to define and to measure. This remains an aspect of well-being which is deemed highly important but is not very frequently included in household surveys. However, within the DHS, a section is devoted to collecting women opinions about domestic violence and its justification: the self-consciousness of women to protect themselves from any violence plays a major role. Therefore, this variable is used as proxy for personal security. Figure A.1 in the Annex summarizes the final structure of the composite indicator, its dimensions and variables.

### ***3.1 A Fieldwork for Collecting Weights***

While most of the available household surveys provide a large range of information on aspects related to material living conditions and individuals' perception of

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<sup>16</sup>For employment and health indicators, we refer to the narrow concept of family because for these indicators only parents and children are considered as unit of analysis.

<sup>17</sup>According to the high level of preoccupation that concerns unemployment in Jordan, our assumption is that a higher participation to the labour market contributes to a higher well-being. The participation of women to the labour market is very low in Jordan, around 15–20%. The woman usually does not work due to higher fertility rates and also because of cultural reasons. Therefore, a situation where only the woman works could represent a very extreme situation of poverty, when her participation to the labour market goes against cultural beliefs. Indeed, one could argue that this situation is worse than one where no one works. However, data confirm that women working enjoy more decisional power in the family, and one source of earning guarantees more protection against poverty than no source at all. Thus, we consider those families where no one is working as those with maximum deprivation.

<sup>18</sup>The two elementary indicators HOU1 and HOU5 have been aggregated using an arithmetic mean, but results are robust against other aggregation methods tested. See Table A.4 in the Annex for details.



satisfaction about their lives, they rarely include information related to relevance or priorities people attach to these aspects.<sup>19</sup>

With the aim to fill this gap, we have implemented a fieldwork in Jordan collecting expert views of 11 national or international organizations and subjective opinions for a sample of 987 students of the University of Jordan in Amman.<sup>20</sup> In choosing the experts, attention has been paid to covering different types of organizations working in the field of human rights and human development in that country, including researchers, national civil society organizations, international aid agencies and the national government.<sup>21</sup> The five dimensions of well-being we use in the analysis of secondary data have also been considered in the questionnaire: conforming to a Budget Allocation Technique,<sup>22</sup> each respondent has been asked to assign a budget of points from 1 to 100 to each dimension with more points allocated to the higher valued dimension and making sure that the sum of points corresponds to 100.<sup>23</sup> The results collected allow us to determine weights to be attributed to these dimensions of well-being within a composite index and to observe how people rank these dimensions. Some interesting differences between experts and students emerge, as summarized in Fig. 5.1.<sup>24</sup>

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<sup>19</sup>Among the few exceptions – according to our knowledge – there are the Vulnerability and Poverty Assessments surveys run in the Maldives Republic in 1997 and 2004 by the Minister of Planning and National Development (MPND) with the UNDP collaboration. These surveys provide a wide range of information regarding living conditions and socio-economic characteristics at both household and individual level, allowing the performance of multidimensional poverty and well-being assessments. Moreover, the surveys gather information on the importance attached to a predefined list of living standard dimensions by both individuals and the Island Communities – the latter being represented by Island Development Committees and Women’s Development Committees. These datasets are freely downloadable on the MPND website ([www.frdp-maldives.gov.mv/hies/VPA.htm](http://www.frdp-maldives.gov.mv/hies/VPA.htm)). See also de Kruijk and Rutten (2007).

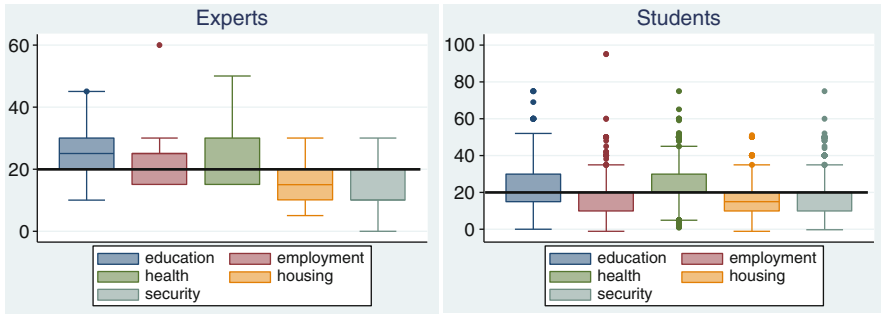
<sup>20</sup>In order to facilitate the complete freedom of expression of the students, the questionnaire has been translated and submitted in Arabic. The total sample of 987 units included students, coming from the faculties of law (197), business (256), medicine (129), education (198) and architecture (207). The questionnaires have been distributed by a team of four people during the week of 21st–25th of February 2010. Arabic speakers have introduced the aim of the research to each class that has been visited and have given important support in explaining the questionnaire to the students and in replying to questions and doubts. Although the sample of interviewed citizens is not representative of the Jordan population, the significance of the collected opinions may be considered equally relevant, as current university students are likely to be part of the “leading group” of Jordan’s future.

<sup>21</sup>The sample included: the Jordanian Government (Ministry of Planning, Ministry of Social Affairs, National Aid Fund), Jordanian NGOs, semi-governmental organizations such as the Higher Council for Human Rights, International and Bilateral Organizations (UNDP, UNICEF, USAID) and academic experts of the University of Jordan. The importance of involving policy-makers or citizens for determining weights has been outlined by many scholars, including McGillivray and Noorbakhsh (2006) and Ravallion (2010a).

<sup>22</sup>See OECD-JRC (2008), Mascherini and Hoskins (2008).

<sup>23</sup>We follow here Esposito et al.’s methodology adopted for measuring different aspects related to literacy in Mozambique (see Esposito et al. 2011).

<sup>24</sup>Despite the fact that experts’ and students’ samples are not directly comparable, this exercise highlights major differences in perception and preference for weights assignment among the different dimensions.



**Fig. 5.1** Weights’ distribution: a comparison between experts and students (Source: Author’s elaboration on collected data)

In general, the three dimensions that seem to be valued as most important for well-being are education, employment and health. For students, the two most important dimensions are education and health, whereas for experts, employment is also relevant; however, the importance of employment grows steadily with increasing age of students.<sup>25</sup> A second noticeable divergence lies in the importance assigned to personal security. While experts tend to give less importance to it, students on average attribute almost 20% within a total of 100; both groups give less importance to the dimension of housing.

Results have also been analyzed for differences in replying patterns due to individual conditions and personal experience of respondents. The academic background does not have too much influence on the overall distribution of weights. This is particularly true for the value attributed to employment and housing, which have the lowest variance. In the other three dimensions, variance is higher and somehow reflects the specializations of students. The weights allocation among dimensions does not seem to be affected by personal experience, either. When checking against the educational background of parents of the individual, the value attributed to education does not increase with the parents’ level of education. Similarly, students do only marginally give greater value to employment when someone close to them, such as parents, siblings, relatives or friends is unemployed: the mean value attributed to employment rises from 17.9 to 18.4 out of 100. Similarly, negligible changes are also observed for health when checking if anyone close to the student is suffering from serious illness. Housing is given slightly more weight when the student’s family does not own the house (mean value rises from 15.7 to 16.3). Personal security is also slightly influenced by personal experience: where the student declares that he/she or his/her family have been victim of any crime, the mean value attributed to the dimension of personal security rises from 18.1 to 19.4.

<sup>25</sup>There are also some slight gender differences: male students give more importance to housing and personal security while female students worry more about health.

How different are the results obtained by the fieldwork from an equal weights hypothesis? Fig. 5.1 shows that education and health are clearly above the 20% benchmark while housing seems to be consistently below this threshold. A similar behaviour characterizes the dimension of personal security even if its range of variation and the presence of outliers make this evaluation less precise. A divergent pattern characterizes the weight assigned to employment by experts and students where the former allocate more than 20 percentage points to this dimension while the latter assign a value below this threshold.

Finally, the questionnaire also asks the respondents to select *one* dimension among the five considered for which a minimum achievement should be considered as a right for human beings. The dimension which grows most in importance is personal security, followed by health and education, whereas employment and housing do both lose importance. Table A.6 in the Appendix synthesizes different rankings among dimensions.

The availability of information related to relevance and priority people assign to different spheres of well-being is interesting per se and produces remarkable results that can inform decision-makers of social and poverty policies. For our analysis in particular, it allows testing different weighting systems – equal, expert’s and student’s weights – for evaluating to which extent they can affect the overall multidimensional poverty results.

## 4 Methodology

As mentioned, one of our aims is to focus on the three main methodological components of any multidimensional index of well-being, namely, the transformation function  $I_j(x_j)$ , the parameter  $\beta$  and the weights  $w_j$  and to verify the impact of different choices on the empirical results.

The transformation function  $I_j(x_j)$  has the purpose to normalize indicators with different measurement units to allow for their comparison and aggregation. In this paper, following a fuzzy sets methodology<sup>26</sup> we assume that deprivation is not a dichotomous condition but a gradual transition within two extreme (worst and best) situations. In brief, the fuzzy set theory assigns a membership degree through a generalized characteristic function (called membership function) which varies between 0 and 1. Larger values denote higher degrees of membership. In formal terms, if  $X$  denotes a universal set, then the membership function  $\mu_A$ , by which a fuzzy set  $A$  is usually defined, can be written as  $\mu_A: X \rightarrow [0,1]$  where  $[0,1]$  is the interval of real numbers from 0 to 1. Hence,  $\mu_A(x) = 0$  if the element  $x \in X$  does not

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<sup>26</sup>The application of this methodology to the measurement of multidimensional poverty and well-being is not new even though it probably remains not sufficiently exploited. See, among other, Cerioli and Zani (1990), Cheli and Lemmi (1995), Chiappero-Martinetti (1996, 2000), Addabbo et al. (2004), Baliaoune (2004), Berenger and Verider-Chouchane (2007), Lelli (2001), Roche (2008).

belong to the subset of poor people  $A$  ( $x$  is not poor),  $\mu A(x) = 1$  if  $x$  completely belongs to  $A$  ( $x$  is totally poor) and  $0 < \mu A(x) < 1$  if  $x$  partially belongs to  $A$ .<sup>27</sup>

We consider this methodology as particularly appropriate for multidimensional analysis for two main reasons. First, because it is perfectly coherent with the above transformation function expressed in terms of achievement or shortfall in a specific domain of well-being. Being healthy or being educated or having an adequate housing is usually not a “yes or no” condition but rather a circumstance that can be fully, partially or not achieved at all. Second, because when we consider quantitative variables or qualitative variables measured on an ordinal scale or expressed with linguistic attributes (as in the case of health/physical condition or subjective opinions/perception on one’s own condition), intermediate values between 0 and 1 describing gradual positions within this arrangement can be adequately represented by appropriate membership functions. A further advantage is that it does not require to make use of poverty lines, avoiding to dichotomize people into poor and not poor.

The definition of a transformation function requires three main steps: first, to define an appropriate set of modalities (or values) associated to degrees of hardship; second, to identify the two extreme conditions in such a way that  $\mu A(x) = 1$  in case of full membership, whereas  $\mu A(x) = 0$  in case of non-membership; and third, to specify the membership functions for all the other intermediate positions.

As far as steps one and two are concerned, Tables A.1, A.2, A.3, A.4 and A.5 in the Annex show how indicators have been defined to reflect an increasing order of poverty. With regard to the membership functions, we choose to adopt two different modalities: a linear function that assumes equally distributed modalities along an ordinal scale and a cumulative membership function as suggested by Cheli and Lemmi (1995):

$$\mu(x^k) = \begin{cases} 0 & \text{if } k = 1 \\ \mu(x_{k-1}) + \frac{F(x_k) - F(x_{k-1})}{1 - F(x_1)} & \text{if } k > 1 \end{cases} \quad (5.2)$$

where  $F(x)$  is the sampling distribution function of the indicator  $x$  arranged in an increasing order of deprivation according to  $k$ . For each indicator related to a given domain, membership grades equal to zero and one are respectively associated to the two opposite cases of no deprivation or extreme deprivation while intermediate values are assigned according to the empirical distribution of  $x$  in the given context. This specification circumvents any a priori choice in the membership function, indeed reflecting how a given phenomenon is distributed in a given society.<sup>28</sup>

<sup>27</sup>With this specification, the membership degree can also be seen as the individual poverty gap with respect to each specific domain.

<sup>28</sup>In this sense, Cheli and Lemmi (1995) define their method as a totally fuzzy and relative approach (TFR). For other possible transformation functions, see the OECD-JRC (2008) and Jacobs et al. (2004).

Different hypotheses and value judgements can be associated to each membership function. A linear function states that shifts from any degree of membership to the subsequent one are equal in value for reducing/increasing poverty.<sup>29</sup> On the contrary, cumulative functions work as “relative adjustment” by deriving the individual membership degree from the sample distribution of the character in the examined context. For any individual, the degree of deprivation with regard to a specific indicator will depend on his position in the sample distribution of that indicator in the society.<sup>30</sup> If an individual is deprived to some extent, and the majority of the population is in a better situation, the cumulative membership will be higher than the linear one. Conversely, if an individual is deprived to some extent, but the majority of the population is in the same – or in a worse – situation, the cumulative membership degree will be inferior to the linear one. Therefore, cumulative functions used for poverty measurement are purely relative. This can be desirable in some cases, and less in others. As can be seen from Fig. 5.2, there are cases where the assumption underlying the linear membership function corresponds roughly to the actual distribution of conditions within the analyzed context. In our example, the Jordan performance in the overcrowding index is similarly distributed to the linear membership assumption (black straight line) in both years. However, in other cases this does not hold: for instance, in terms of employment and security the actual distribution is quite far from the linear membership assumption. We note that in employment, cumulative membership functions return higher values, implying that individuals in conditions of deprivations are worse off than most of the population. For the justification of violence index, cumulative functions return lower values than the linear function, because this is a very widespread phenomenon in Jordan. By choosing a cumulative membership function, individual levels of deprivation are “adjusted” to the context: the greater the distance between cumulative and linear functions, the greater this “contextual adjustment”. This gap is also depending on the nature of the variable considered: in general, continuous variables are more smoothly distributed and more easily approximated by a linear function compared to categorical variables. Hence, it seems to be worth to test and compare both options, checking how the data fit.

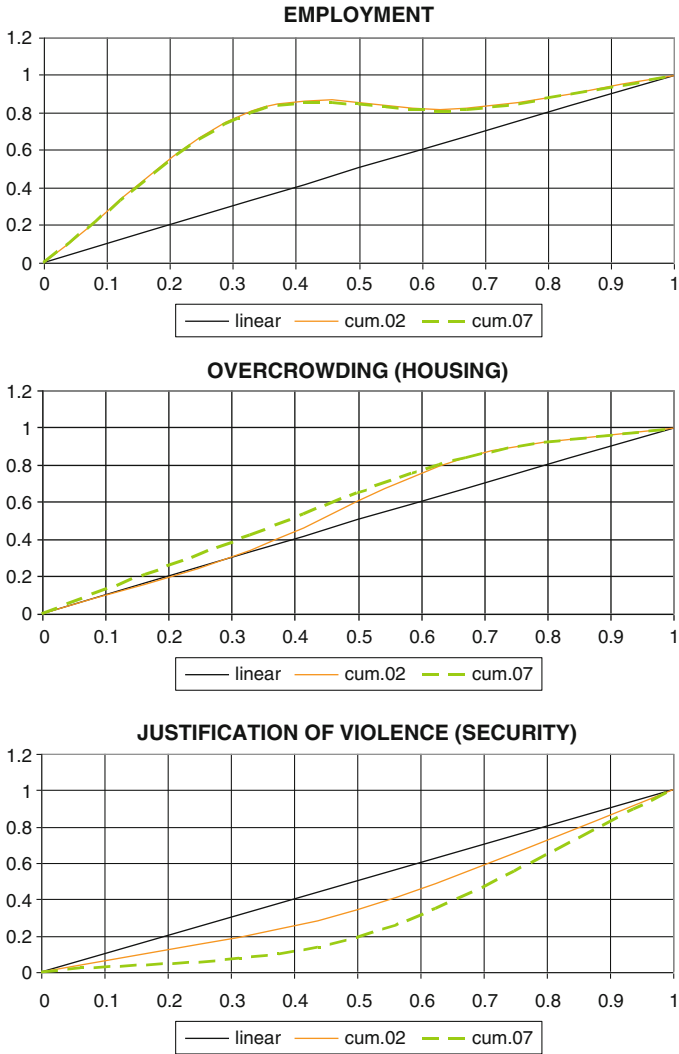
The next step deals with the aggregation between the single dimensions. Again, different methodological pathways are possible. For our empirical analysis, both arithmetic and geometric means are tested. In addition and accordance with the fuzzy methodologies applied for the transformation function, we also test two fuzzy aggregation operators – the fuzzy intersection and the fuzzy union – which in the simplest case of two dimensions, A and B, can be written as follows:

$$\text{fuzzy (standard or strong) intersection: } \mu A \cap B = \min[\mu A, \mu B] \quad (5.3)$$

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<sup>29</sup>In case of qualitative variables, the implicit assumption is that there is equidistance between modalities of the variables. For example, passing from illiteracy to primary schooling has exactly the same value as passing from a bachelor degree to a master degree.

<sup>30</sup>See Cheli and Lemmi (1995).



**Fig. 5.2** Difference between linear and cumulative membership functions, employment, housing and personal security indicators for the years 2002 and 2007 (Source: Elaboration by the authors)

which corresponds to the logical conjunction “and”. This operator takes on the value of the minimum of the membership degrees of the elementary indicators considering the most favourable conditions in the two domains:

$$\text{fuzzy (standard or strong) union: } \mu A \cup B = \max[\mu A, \mu B] \tag{5.4}$$

which corresponds to the logical disjunction “or” and takes the highest membership degrees (i.e. it considers any of the worst conditions in the two domains). Both operators implicitly exclude that there may be any sort of compensation between

**Table 5.1** Alternative weighting systems applied for the construction of the multidimensional index

Type of weights		Education	Employment	Health	Housing	Personal security	Total sum of weights
Equal		0.200	0.200	0.200	0.200	0.200	1.00
Frequency-based	2002	0.078	0.338	0.093	0.208	0.283	1.00
	2007	0.065	0.318	0.068	0.195	0.335	1.00
Experts' weights		0.240	0.242	0.230	0.146	0.142	1.00
Students' weights		0.228	0.182	0.244	0.159	0.187	1.00

Elaboration by the authors

indicators. This might be an appropriate aggregation method in case of positive correlation between sub-indicators.<sup>31</sup>

Finally, we adopt and test for different weighing schemes in our empirical analysis, namely, (1) equal weights, (2) frequency-based weights, (3) expert weights and (4) eliciting weights, summarized in Table 5.1.

While we have already mentioned the rationale behind the choice of equal weights and eliciting weights, we apply the frequency-based method in accordance with the above specification (5.2) and following Cheli and Lemmi (1995), by setting the weights as mean of the membership degrees in each dimension as follows:

$$w_i = \ln \left[ \frac{1}{n} \sum_i \mu_{ij}(x) \right] \quad (5.5)$$

This weighting system is coherent with a relative conception of poverty/well-being and is sensitive to the distribution of each specific attribute or dimension in the society; the choice of the logarithm is justified by the aim of not giving too much importance to any very low frequency.

## 5 Results

In this section, we present the results of our investigation and the implications of the methodological choices in terms of membership functions, beta-order mean and weighting systems.<sup>32</sup> This comparison allows checking the robustness of our results and showing how sensitive poverty measures are to changes in some crucial methodological aspects.

<sup>31</sup>On the properties of this class of operators and more generally on fuzzy set operations, see Klir and Yuan (1995), Calvo et al. (2002). For their application to poverty and well-being analysis, see Chiappero-Martinetti (2000, 2006).

<sup>32</sup>See Table A.7 in the Annex for a glossary of the multidimensional indexes corresponding to the different methodological choices.

**Table 5.2** PGI and SPG estimates for 2002 and 2007, absolute values at the national level

Index abbreviation	2002		2007	
	PGI	SPG	PGI	SPG
lnaA	0.406	0.183	0.417	0.190
lngA	0.602	0.412	0.657	0.469
lnaSS	0.383	0.165	0.393	0.171
lngSS	0.584	0.391	0.637	0.443
lnaSE	0.366	0.152	0.371	0.155
lngSE	0.554	0.354	0.596	0.392
lnFIA	0.073	0.021	0.109	0.041
lnFUA	0.839	0.753	0.820	0.742
cmaA	0.520	0.296	0.527	0.303
cmgA	0.716	0.548	0.750	0.592
cmaR	0.623	0.418	0.670	0.482
cmgR	0.779	0.642	0.835	0.730
cmFIA	0.104	0.046	0.139	0.075
cmFUA	0.923	0.868	0.878	0.820

Source: DHS 2002, 2007. Elaboration by the authors

For a glossary of the multidimensional indexes' abbreviations, please see Table A.7 in the Annex

Table 5.2 reports the poverty estimates for Jordan as measured by two main poverty indexes belonging to the FGT class of measure: the Poverty Gap Index (PGI) and the Squared Poverty Gap (SPG).<sup>33</sup> In general, we notice that poverty estimates range between rather low values (e.g. as measured by the fuzzy intersection with cumulative membership functions – cmFIA) and quite high ones (e.g. as measured by the fuzzy union with cumulative membership functions – lnFUA or in general by those indexes aggregating with a geometric mean).<sup>34</sup> In the next sessions, we analyze in detail the impact of each methodological choice on the level of poverty estimates.

### 5.1 The Impact of Membership Function Choices

As already introduced in Sect. 4, there are cases where linear and cumulative functions do not behave in the same way. In our data, linear functions approximate quite well cumulative distribution functions in case of health and housing, while they present a rather different behaviour in case of education, employment and security.

<sup>33</sup>The FGT parametric class of poverty measures, formulated by Foster et al. (1984) may be written as follows:  $FGT = \frac{1}{n} \left( \frac{z - y_j}{z} \right)^\alpha$  with  $\alpha \geq 0$ ;  $\alpha = 0$  corresponds to the head-count ratio,  $\alpha = 1$  to

the Poverty Gap Index and  $\alpha = 2$  to the Squared Poverty Gap.

<sup>34</sup>Poverty measure at governorate level are reported in the Annex (Tables A.8, A.9, A.10 and A.11).



**Table 5.3** The impact of membership function choices (cumulative vs. linear functions) on PGI and SPG (values in % change of the poverty estimates)

	$\beta=1$ and EW	$\beta=0$ and EW	Fuzzy intersection	Fuzzy union
PGI 2002	[25.2–31.1]	[14.7–21.9]	[29.2–61.6]	[5.8–13.5]
Worst performers	[25.5–26.8]	[15.0–17.7]	[45.7–61.6]	[5.8–9.8]
Best performers	[26.3–31.1]	[14.7–21.9]	[29.2–48.8]	[6.6–13.5]
<b>JORDAN</b>	<b>28.1</b>	<b>18.9</b>	<b>42.5</b>	<b>10.0</b>
SPG 2002	[55.7–68.2]	[26.5–39.4]	[90.0–172.7]	[9.1–20.9]
Worst performers	[56.1–59.3]	[26.9–31.2]	[116.0–172.7]	[9.1–14.9]
Best performers	[58.6–68.2]	[26.5–37.1]	[90.0–138.5]	[9.2–20.9]
<b>JORDAN</b>	<b>61.7</b>	<b>33.0</b>	<b>119.0</b>	<b>15.3</b>
PGI 2007	[23.8–29.3]	[12.2–17.5]	[20.0–33.6]	[4.8–11.0]
Worst performers	[23.8–26.0]	[12.2–13.2]	[29.3–33.6]	[4.8–6.9]
Best performers	[24.0–29.3]	[14.5–17.5]	[20.0–26.9]	[7.3–11.0]
<b>JORDAN</b>	<b>26.4</b>	<b>14.2</b>	<b>27.5</b>	<b>7.1</b>
SPG 2007	[52.7–65.1]	[23.4–31.0]	[60.6–92.9]	[7.1–17.0]
Worst performers	[52.7–58.2]	[23.4–25.5]	[81.0–92.3]	[7.1–10.7]
Best performers	[52.9–65.1]	[26.3–31.0]	[60.6–87.1]	[11.4–17.0]
<b>JORDAN</b>	<b>59.5</b>	<b>26.2</b>	<b>82.9</b>	<b>10.5</b>

Source: DHS 2002, 2007. Elaboration by the authors

EW equal weights; Best performers are Balqa, Zarqa, Madaba and Amman; worst performers are Mafraq, Ma'an, Karak and Ajloun

In this differentiated behaviour, the nature of the variables used for constructing the indicators plays a role, too. While continuous or quasi-continuous variables almost behave like linear functions, categorical variables tend to perform differently.

Table 5.3 compares the results obtained in terms of the PGI and SPG indexes, when linear and cumulative membership functions are applied. Our benchmark is represented by the linear function, and thus bold figures in Table 5.3 show the difference in poverty estimates in percentage terms when a cumulative membership function is chosen instead of a linear one, while other methodological choices (aggregation and weights) are held constant. In brackets, the range of variations among the 12 governorates in general and for the worst and best performers.<sup>35</sup>

The positive values in each cell of Table 5.3 show that cumulative membership functions always return higher poverty estimates for any multidimensional indicator in both years. In particular, the impact is more intensive for the SPG compared to the PGI, but differences are smaller whenever the multidimensional indicator has been constructed with a geometric mean instead of the arithmetic mean. For our analysis, this means that especially the deprivations in education and employment trigger this effect, as these are the two dimensions where the cumulative membership function most clearly lies above the linear one. The most striking difference between

<sup>35</sup>Worst and best performers are identified by the average ranking deriving from all ranking positions calculated by different multidimensional indexes for the PGI Index 2007 (values reported in Table A.9 in the Annex). Best and worst performers are held constant for all methodological comparisons.

linear and cumulative membership functions occurs when we use a fuzzy intersection operator, implying that the multidimensional poverty index considers the most favourable condition in the five dimensions. Differences are smaller when we use fuzzy union operators which consider the least favourable value of all individuals' conditions.

Table 5.3 further highlights that differences between linear and cumulative membership functions are not insensitive to the regional disparities: those governorates that have consistently lower levels of poverty are more susceptible to high variation in poverty estimates when cumulative membership functions are used. This holds for all indicators except for the fuzzy indicators for which the opposite is true: the worst performing governorates tend to return higher poverty estimates when cumulative membership functions are used.

## 5.2 The Impact of Beta-Order Means

As Table 5.4 summarizes, the use of a geometric mean instead of an arithmetic one (representing our benchmark) increases poverty estimates when all other methodological choices are held constant. In 2002, for instance, the PGI index calculated using linear membership functions is more than 48% higher when

**Table 5.4** The impact of beta-order mean choices on PGI and SPG (values in % change of the poverty estimates)

	Linear function and EW	Cumulative function and EW	Linear function and students' weights	Linear function and experts' weights	Cumulative function and relative weights
PGI 2002	[45.7–52.2]	[34.7–39.9]	[49.9–56.8]	[48.8–55.6]	[22.4–27.2]
Worst performers	[45.8–50.0]	[34.7–39.2]	[50.1–55.0]	[49.6–54.6]	[22.4–25.3]
Best performers	[49.0–52.2]	[37.9–39.9]	[51.7–56.8]	[50.0–55.6]	[24.9–27.2]
<b>JORDAN</b>	<b>48.3</b>	<b>37.7</b>	<b>52.5</b>	<b>51.4</b>	<b>25.0</b>
SPG 2002	[115.5–135.1]	[76.4–90.9]	[127.7–147.0]	[124.7–143.4]	[46.5–59.8]
Worst performers	[115.5–130.8]	[76.4–90.0]	[127.7–145.3]	[124.7–139.3]	[46.5–53.3]
Best performers	[130.5–135.1]	[85.1–90.9]	[138.8–147.0]	[133.3–143.4]	[53.2–59.8]
<b>JORDAN</b>	<b>125.1</b>	<b>85.1</b>	<b>137.0</b>	<b>132.9</b>	<b>53.6</b>
PGI 2007	[54.0–61.7]	[37.3–49.4]	[58.7–67.9]	[57.3–66.2]	[20.7–28.3]
Worst performers	[54.1–58.4]	[37.3–42.0]	[59.0–62.9]	[57.3–61.3]	[20.7–24.4]
Best performers	[54.0–61.7]	[41.6–49.4]	[58.7–67.9]	[57.3–66.2]	[25.3–28.3]
<b>JORDAN</b>	<b>57.6</b>	<b>42.3</b>	<b>62.1</b>	<b>60.6</b>	<b>24.6</b>
SPG 2007	[132.3–167.1]	[83.8–116.2]	[145.7–181.5]	[139.8–172.3]	[43.0–61.0]
Worst performers	[132.3–145.6]	[83.8–94.3]	[145.7–158.4]	[139.8–152.1]	[43.0–50.6]
Best performers	[146.6–167.1]	[94.8–116.2]	[158.6–181.5]	[150.0–172.3]	[53.1–61.0]
<b>JORDAN</b>	<b>146.8</b>	<b>95.4</b>	<b>159.1</b>	<b>152.9</b>	<b>51.5</b>

Source: DHS 2002, 2007. Elaboration by the authors

EW equal weights; Best performers are Balqa, Zarqa, Madaba and Amman; worst performers are Mafrq, Ma'an, Karak and Ajloun

dimensions are aggregated making use of a geometric instead of an arithmetic mean. The intuition behind this systematic increase in poverty indexes lies in the fact that geometric means give “more importance” to dimensions in which the deprivation is higher; hence, the more multidimensional indicators increase when a geometric mean is used, the more the situation underneath them reveals greater severity in particular deprivations.

The difference between indicators aggregated by geometric means and those that are combined by a simple mean is even greater when the poverty index itself pays more attention to poverty severity: in fact, the SPG registers an increase of more than 100%. Interesting exceptions are the multidimensional poverty indexes obtained when data-driven weights are applied: in this case, results are more robust whether arithmetic or geometric aggregation is used. Results are relatively stable for both worst and best performers while the range of variation for the poverty indexes is generally bigger for severity indexes than for poverty gap indexes.

### ***5.3 The Impact of Weighting System Choices***

Finally, Table 5.5 describes the impact on our results determined by different sets of weights used. The benchmark case is represented by the equal weights hypothesis – with other methodological choices held constant. For the first four columns (eliciting weights), linear transformation functions are considered, while in case of relative weights, cumulative functions apply. The overall picture is now more ambiguous compared to the two previous cases. The choice of different weighting systems can determine increase as well as decrease in the poverty indexes even if, in terms of absolute size, these changes are now smaller.

Eliciting weights determine a systematic lower value of poverty indexes compared to the equal weights hypothesis, and the decrease is more evident when students’ weights are used instead of experts’ weights. No clear distinction between best and worst performers is detectable in this case.

On the contrary, the impact on poverty measure is positive when relative or frequency-based weights are used and once again relatively bigger for the severity index SPG compared to PGI: in this case, again, poverty estimates for best performers seem to be less robust.

### ***5.4 Which Methodological Choices Matter Most?***

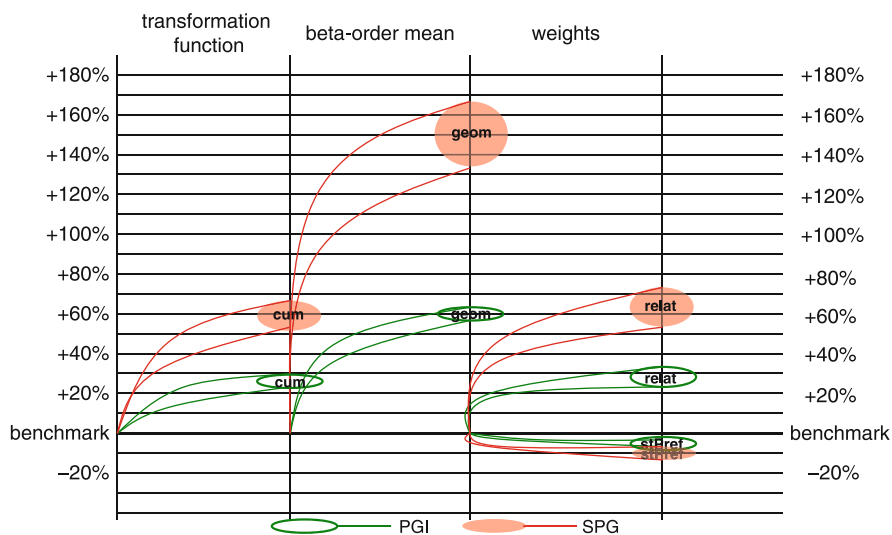
In the above sub-sessions, we have discussed the robustness of our poverty results according to each single methodological choice. Figure 5.3 summarizes these findings showing which of these choices has a greater impact on the absolute value of estimates of PGI and SPG indexes. The benchmark case is represented by the

Table 5.5 The impact of weight choices on PGI and SPG (values in % change of the poverty estimates)

	$\beta=1$ and students' weights	$\beta=0$ and students' weights	$\beta=1$ and experts' weights	$\beta=0$ and experts' weights	$\beta=1$ and relative weights	$\beta=0$ and relative weights
PGI 2002	[-6.4 to -4.6]	[-3.4 to -2.6]	[-10.9 to -8.1]	[-9.3 to -7.1]	[17.9-22.1]	[7.1-10.6]
Worst performers	[-6.4 to -5.4]	[-3.4 to -2.7]	[-10.9 to -9.4]	[-8.2 to -7.1]	[17.9-22.1]	[7.1-9.6]
Best performers	[-6.1 to -4.6]	[-3.2 to -2.6]	[-10.4 to -8.1]	[-8.5 to -7.2]	[19.7-21.0]	[8.4-10.6]
<b>JORDAN</b>	<b>-5.7</b>	<b>-3.0</b>	<b>-9.9</b>	<b>-8.0</b>	<b>19.8</b>	<b>8.8</b>
SPG 2002	[-11.5 to -7.9]	[-6.0 to -4.5]	[-18.1 to -14.0]	[-16.5 to -12.0]	[37.1-46.9]	[13.8-20.8]
Worst performers	[-11.5 to -9.4]	[-6.0 to -4.5]	[-18.1 to -15.7]	[-14.5 to -12.0]	[37.1-46.9]	[13.8-18.5]
Best performers	[-10.3 to -7.9]	[-5.7 to -4.5]	[-17.8 to -14.0]	[-15.7 to -13.0]	[40.7-43.8]	[16.4-20.8]
<b>JORDAN</b>	<b>-9.8</b>	<b>-5.1</b>	<b>-16.9</b>	<b>-14.1</b>	<b>41.2</b>	<b>17.2</b>
PGI 2007	[-6.7 to -5.1]	[-3.6 to -2.7]	[-12.4 to -9.9]	[-10.1 to -8.6]	[24.2-31.6]	[9.8-14.2]
Worst performers	[-5.9 to -5.7]	[-3.0 to -2.8]	[-11.7 to -10.5]	[-9.6 to -8.6]	[24.2-27.4]	[9.8-10.9]
Best performers	[-7.1 to -5.2]	[-3.6 to -2.7]	[-11.7 to -10.5]	[-9.9 to -9.1]	[25.9-31.6]	[11.4-14.2]
<b>JORDAN</b>	<b>-5.8</b>	<b>-3.0</b>	<b>-11.0</b>	<b>-9.3</b>	<b>27.1</b>	<b>11.3</b>
SPG 2007	[-12.9 to -8.9]	[-6.0 to -4.9]	[-20.4 to -16.7]	[-18.5 to -15.0]	[52.8-71.8]	[20.3-29.4]
Worst performers	[-10.5 to -10.2]	[-5.5 to -5.2]	[-19.7 to -17.7]	[-18.0 to -15.0]	[52.8-56.9]	[20.3-22.5]
Best performers	[-12.9 to -9.0]	[-6.5 to -5.0]	[-19.4 to -18.0]	[-18.5 to -16.2]	[57.2-71.8]	[23.5-29.4]
<b>JORDAN</b>	<b>-10.0</b>	<b>-5.5</b>	<b>-18.4</b>	<b>-16.4</b>	<b>59.1</b>	<b>23.3</b>

Source: DHS 2002, 2007. Elaboration by the authors

Best performers are Balqa, Zarqa, Madaba and Amman. Worst performers are Mafraq, Ma'an, Karak and Ajloun



**Fig. 5.3** Effects on multidimensional poverty estimates of different methodological choices, PGI and SPG indexes for Jordan, 2007 (Source: DHS 2007. Elaboration by the authors)

most recurrent option in literature, which combines linear membership function, equal weights and an arithmetic mean.

Generally speaking, the transformation function has a relatively lower impact on the poverty results, followed by the weighting systems and the mean aggregator which has the most sizeable effect. In line with the above discussion, the most remarkable change in the poverty indexes is produced by the choice of using a geometric mean: compared to the benchmark case, the PGI increases by approximately 60% while the SPG grows by up to 1.5 times. The size of the circles reflects the variability of this change. It can be noted that the effects produced on PGI indexes are systematically smaller compared to those on SPG indexes.

Concerning the weighting system, we can see that the eliciting preferences lead to a reduction of poverty estimates<sup>36</sup> – this can be explained by the fact that those dimensions where people in Jordan appear to be performing worse have been given less importance by the interviewed – while again, relative weights which are “data-driven” return higher estimates of poverty.

Similarly, Fig. 5.4 shows a general picture of all multidimensional indexes that have been constructed and their relative position in terms of the impact size of methodological choices on the final estimates. The figure distinguishes the impact

<sup>36</sup>For reason of simplicity, we do not distinguish here between students’ and experts’ weights that however, as discussed in Sect. 3 are not so remarkably different.

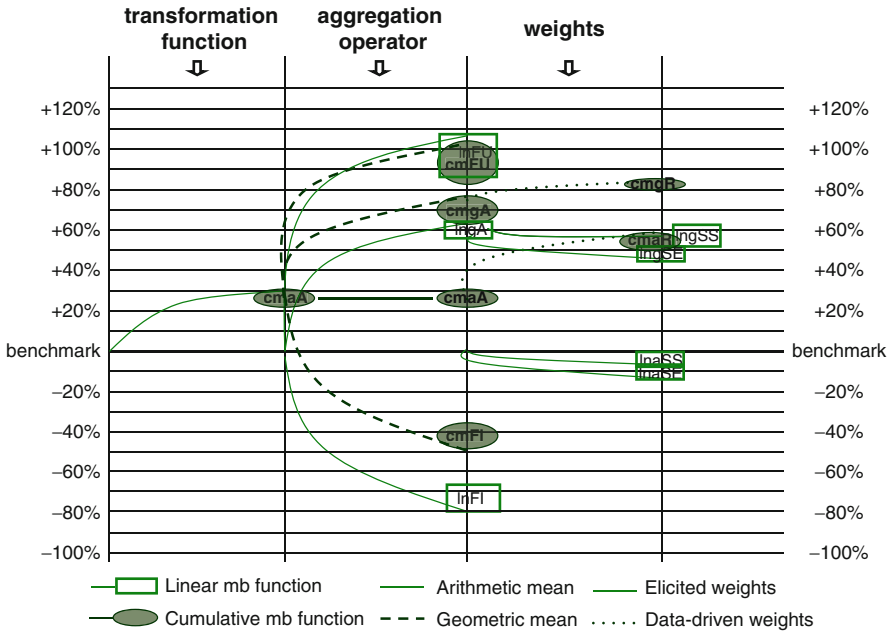


Fig. 5.4 Relative position of different multidimensional indexes in terms of over-/underestimation of poverty in Jvordan, PGI indexes, 2007 (Source: DHS 2002, 2007. Elaboration by the authors)

of the three methodological steps and summarizes the change in estimates measured as difference in percentage points with respect to the benchmark, namely, the most common solution that combines linear membership functions, equal weights and arithmetic mean as aggregation operator.

Some interesting findings can be deduced from this synthetic analysis. First, fuzzy aggregators build the “outer” margins of the estimates: logically, fuzzy union indexes return higher estimates of poverty (by up to 100%), while fuzzy intersection indexes underestimate it (by 60–80%). Second, when different methodological choices are combined, the size of their single effect might change, while the direction of the effect remains constant. For example, cumulative membership functions combined with a geometric aggregation (cmgA) deliver similar results as linear membership functions aggregated with a geometric mean (lngA), hinting that the underestimation effect of using linear membership functions levels off when a geometric mean is used. Similarly, the effect of choosing frequency-based (or data-driven) weights is greater when associated to the arithmetic mean compared to the when associated to a geometric mean. Last but not least, the figure confirms that each of the analyzed methodological choices has relevant implications for the results obtained through the multidimensional index and that the benchmark solution is likely to underestimate poverty.

**Table 5.6** Variations of multidimensional poverty estimates in Jordan, 2002–2007 (% of variation)

Index name	%Δ PGI	%Δ SPG
lnaA	2.71	3.83
lngA	9.14	13.83
lnaSS	2.61	3.64
lngSS	9.08	13.30
lnaSE	1.37	1.97
lngSE	7.58	10.73
lnFIA	49.32	95.24
lnFUA	-2.26	-1.46
cmaA	1.35	2.36
cmgA	4.75	8.03
cmaR	7.54	15.31
cmgR	7.19	13.71
cmFIA	33.65	63.04
cmFUA	-4.88	-5.53

Source: DHS 2002, 2007. Elaboration by the authors

## 5.5 *Multidimensional Poverty Trends in Jordan*

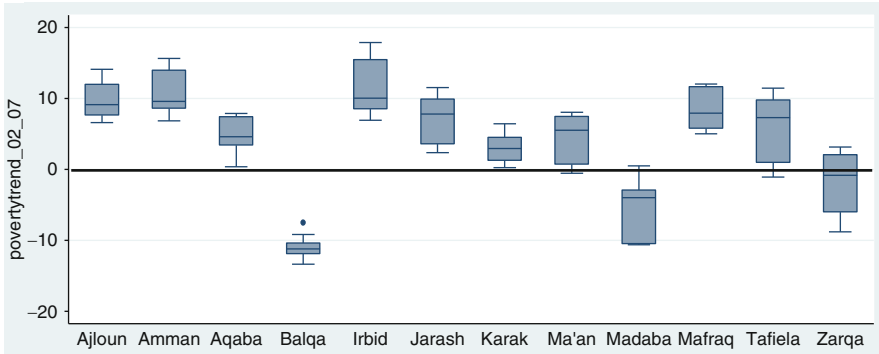
We conclude the discussion of our empirical findings by briefly discussing the trends of multidimensional poverty in Jordan and its governorates. Table 5.6 reports the percentage of variation of poverty estimates between 2002 and 2007 as measured by different multidimensional indexes. When focussing on the period between 2002 and 2007, our results consistently report an increase in poverty in Jordan<sup>37</sup> apart from the fuzzy union indexes (FUA) for which a slight decrease occurs.<sup>38</sup>

All indexes in Table 5.6 describe the average national trends of multidimensional poverty in Jordan, information that is doubtlessly helpful for monitoring progress or drawbacks in eliminating poverty across time. Equally interesting and helpful for policy purposes is the performance in each single governorate. Indeed, the picture provided by a geographical disaggregation highlights some relevant sub-national differences in poverty trends summarized in Fig. 5.5.

There seem to be some clear geographic differences in terms of poverty trends within Jordan. In Balqa, Madaba and Zarqa, poverty appears to have decreased, but only for Balqa this result is completely robust. For a second group of governorates, poverty has clearly increased across time (Ajloun, Amman, Aqaba, Irbid, Jerash, Karak, Mafraq).

<sup>37</sup>However, looking at a wider span time, such as from 1996 to 2007 (see footnote 9), poverty in Jordan has in overall decreased in a rather substantial manner. Improvements have mainly occurred in education and health while for employment and housing the Jordan performance appears to be rather stagnant. Security is a dimension where poverty appears to have increased, yet.

<sup>38</sup>It has already been remarked that the FUA indicators assume the value of the least favourable of the five considered dimensions while FIA indicators assume the value of the most favourable of the considered dimensions.



**Fig. 5.5** Trends in multidimensional poverty in Jordan 2002–2007, by governorates, in percentage points as measured by different indexes (Source: DHS 2002, 2007. Elaboration by the authors)

The trends are not as clear for Ma'an and Tafila, where poverty seems to have increased, but the box plot graph crosses the line marking 0% of poverty growth between 2002 and 2007.<sup>39</sup> Balqa, Madaba and Zarqa therefore confirm themselves as best performers within Jordan, not only because of the lowest levels of poverty, but also in terms of the most positive trends. More preoccupying is a poverty increase of about 10% in Amman and Irbid, the two most urbanized governorates where the population density is very high. The fact that relatively “poor” governorates also report a poverty increase hints that the regional divide is currently not being closed.

## 6 Conclusions

The necessity to go beyond the traditional money metric in poverty and well-being analyses and to consider the manifold aspects which determine individual living conditions is today extensively acknowledged. How to summarize these multiple dimensions into a single number still remains a controversial issue. The construction of a composite indicator requires a large set of assumptions and methodological choices which are rarely justified or critically scrutinized despite the large impact they may have on the results and the policy implications they can produce.

In this chapter, we have tested different combinations of three main methodological components of multidimensional indexes – namely, the transformation and

<sup>39</sup>For Fig. 5.5, all poverty estimates except those deriving from fuzzy indicators have been used. Results do not change in substance if fuzzy indicators are included, however: they tend to enter as outliers for each governorate and therefore just make the distributional analysis of poverty estimates less clear.



normalization of each single indicator into a common and comparable metric, the aggregation procedure and the weighting system chosen – and we have quantified their impact on FGT class of poverty measures in Jordan. For our analysis, we have applied both standard methodological choices, such as linear transformation functions, arbitrary weights and common mean aggregators, as well as less common approaches such as fuzzy methodologies and eliciting weights gathered through a fieldwork conducted in Jordan on a sample of undergraduate students and of development experts. In particular, through questionnaires and direct interviews, information about the relative weights attached to five different dimensions of well-being has been collected.

Our results show that methodological choices matter. By testing the robustness of poverty indexes according to each single methodological choice, we have observed that frequency-based transformation functions have a larger impact on poverty estimates compared to linear transformations, and these variations are more sizeable when severity instead of the intensity of poverty is considered. Similar results are also observed when a geometric mean instead of an arithmetic one is used, and once again the Squared Poverty Gap seems to be more sensitive to these variations compared to the Poverty Gap Index. The effect on poverty of different weighting systems is more ambiguous: eliciting and frequency-based weights can determine increase as well as decrease in the poverty indexes even if, in terms of absolute size, these changes are smaller. These findings are confirmed when poverty estimates obtained through different combination of the three methodological choices are compared to the standard “HDI-type index” (pre-2010) based on linear membership function, equal weights and an arithmetic mean. Overall, the transformation function has a relatively lower impact on the poverty results, followed by the weighting systems and the mean aggregator which has the most sizeable effect.

In terms of poverty trends in Jordan, our analysis suggests that the positive evolution of the last decade has come to a halt, recently. Indeed, poverty has increased at the national level between 2002 and 2007. Meanwhile, regional disparities are not closing: while few already well-performing governorates (Balqa, Zarqa and Madaba) report poverty decreases or constant levels, those areas where poverty is structurally higher report poverty increases. A further worry might be the increase in poverty in very urbanized and densely populated areas as Irbid and Amman.

To sum up, the construction of a composite index is not straightforward. It involves assumptions and decisions which are rarely made explicit or insufficiently scrutinized but are neither marginal on the outcomes nor neutral in terms of policy implications. The consistency of these indexes largely relies on the appropriateness of these choices that should be defended on a theoretical ground or empirically checked for by analyzing the sensitivity of results to changes in the way in which indicators are normalized, combined or weighted. To recognize the limits and the difficulties associated to the construction of a composite index does not mean to renounce on the advantages they can offer but rather to support methodological decisions with a critical scrutiny of underlying choices as we tried to do in this chapter.

Furthermore, the relevance of these choices is not confined to the “technical” sphere. Most of (probably all) these methodological choices involve or are directly

affected by value judgements. Choosing indicators, aggregating dimensions or setting weights is not just a statistical matter but reflects individuals', researchers', policymakers' or prevailing values of a given society. In this regard, we think it might be appropriate to give more voice to individuals' opinions, to better know the relevance attached to different aspects of their own life or the priorities for the community wherein they live. Our fieldwork provided some interesting insights about the values and the relevance people assign to different aspects of their life. It would be extremely worthy and not significantly expensive to include such kind of questions in national or international representative surveys on living conditions in a regular and systematic manner.

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## 7 Annexes

**Table A.1** Educational attainment indicator at individual level

Age	Indicator	Values	Detailed information
6–15	Net enrolment compulsory school EDU1	0	Currently attending school
		0.5	Not enrolled, completed primary
13–15		1	Not enrolled, incomplete primary
16–18	Net enrolment secondary school EDU2	0	Currently attending school
		0.33	Not enrolled, completed basic
		0.67	Not enrolled, completed primary
		1	Not enrolled, incomplete primary
19–24	Net enrolment tertiary education EDU3	0	Currently attending university
		0.25	Not enrolled, completed secondary
		0.5	Not enrolled, completed basic
		0.75	Not enrolled, completed primary
		1	Not enrolled, incomplete primary
25+	Educational attainment of adults EDU4	0	Some tertiary, more than 12 years of schooling
		0.2	Completed secondary, 12 years of schooling
		0.4	Incomplete secondary, 9/10 years of schooling
		0.6	Completed primary, 6 years of schooling
		0.8	Less than primary, <6 years of schooling
		1	Illiterate, never attended any school

Elaboration by the authors

**Table A.2** Indicator for employment condition at family level

Indicator	Values	Detailed information
Presence of employment among parents of the family – EMP1	0	Both parents work
	0.33	Only man works
	0.67	Only woman works
	1	No one works

Elaboration by the authors

**Table A.3** Health condition indicator for children (0–4 years) at family level

Indicator	Values	Detailed information
Health condition of under-5-year-olds HEA3	0	No disease, insurance coverage
	0.2	No disease, no insurance coverage
	0.4	Disease, coverage, gets treatment
	0.6	Disease, no coverage, gets treatment
	0.8	Disease, coverage, no treatment
	1	Disease, no coverage, no treatment

Elaboration by the authors

**Table A.4** Housing conditions indicator at family level

Indicator	Values	Detailed information
Overcrowding index HOU1	0	No overcrowding
	0.33	Overcrowding below average
	0.67	Overcrowding above average
	1	High overcrowding
Quality of housing infrastructure HOU5	0	All infrastructures: HH has water, flush toilet and sewage system
	0.33	2 infrastructures: HH has any two of water, flush toilet or sewage
	0.67	1 infrastructure: HH has only 1 out of 3
	1	No infrastructure: HH has no water, no flush toilet, no sewage

Elaboration by the authors

**Table A.5** Personal security indicator at individual level

Indicator	Values	Detailed information
Justification of domestic violence by women SEC3	0	Never justifies violence on behalf of the husband
	0.5	Justifies violence on behalf of husband only in one case
	1	Justifies violence on behalf of husband in more than one case

Elaboration by the authors

**Table A.6** Synthesis of ranks between dimensions, according to the ranking criterion adopted

Experts					
Dimension	Mean	Median	Mode	Minimum achievement	Final ranking
Education	2	1	1	1	1
Employment	1	1	1	3	2
Health	3	2	2	2	3
Housing	4	3	3	3	4
Personal security	5	4	3	2	5
Students					
Education	2	1	1	3	2
Employment	4	1	1	4	3
Health	1	1	1	1	1
Housing	5	2	2	5	4
Personal security	3	1	1	2	2

Elaboration by the authors

**Table A.7** Glossary of multidimensional indexes and abbreviations

Index abbreviation	Membership function	Aggregation operator	Weights
lnaA	Linear	Arithmetic mean ( $\beta=1$ )	Equal weights
lngA	Linear	Geometric mean ( $\beta=0$ )	Equal weights
lnaSS	Linear	Arithmetic mean ( $\beta=1$ )	Students' weights
lngSS	Linear	Geometric mean ( $\beta=0$ )	Students' weights
lnaSE	Linear	Arithmetic mean ( $\beta=1$ )	Experts' weights
lngSE	Linear	Geometric mean ( $\beta=0$ )	Experts' weights
lnFIA	Linear	Fuzzy intersection	–
lnFUA	Linear	Fuzzy union	–
cmaA	Cumulative	Arithmetic mean ( $\beta=1$ )	Equal weights
cmgA	Cumulative	Geometric mean ( $\beta=0$ )	Equal weights
cmaR	Cumulative	Arithmetic mean ( $\beta=1$ )	Relative weights
cmgR	Cumulative	Geometric mean ( $\beta=0$ )	Relative weights
cmFIA	Cumulative	Fuzzy intersection	–
cmFUA	Cumulative	Fuzzy union	–

**Table A.8** Poverty estimates, PGI by governorate, 2002

	InaA	IngA	InaSS	IngSS	InaSE	IngSE	InFIA	lnFUA	cmA	cmgA	cmAR	cmgR	cmFIA	cmFUA	Mean
<i>Amman</i>	0.367	0.547	0.350	0.531	0.334	0.501	0.072	0.795	0.481	0.667	0.580	0.738	0.093	0.902	0.497
<i>Balqa</i>	0.412	0.627	0.387	0.607	0.369	0.574	0.074	0.864	0.524	0.733	0.634	0.799	0.104	0.931	0.546
<i>Zarqa</i>	0.384	0.572	0.366	0.557	0.353	0.531	0.067	0.805	0.498	0.690	0.599	0.758	0.090	0.907	0.513
<i>Madaba</i>	0.430	0.653	0.407	0.634	0.387	0.601	0.084	0.879	0.543	0.749	0.650	0.812	0.125	0.937	0.564
<i>Irbid</i>	0.400	0.584	0.377	0.565	0.360	0.536	0.073	0.836	0.519	0.712	0.622	0.777	0.101	0.929	0.528
<i>Ma'raq</i>	0.441	0.643	0.415	0.623	0.397	0.594	0.073	0.875	0.555	0.756	0.657	0.811	0.118	0.945	0.565
<i>Jarash</i>	0.418	0.609	0.393	0.589	0.379	0.564	0.071	0.828	0.535	0.727	0.635	0.786	0.104	0.912	0.539
<i>Ajloun</i>	0.406	0.609	0.380	0.588	0.364	0.559	0.064	0.840	0.515	0.717	0.629	0.786	0.090	0.922	0.534
<i>Karak</i>	0.440	0.660	0.413	0.640	0.392	0.606	0.081	0.896	0.552	0.759	0.652	0.817	0.118	0.948	0.570
<i>Tafila</i>	0.416	0.613	0.390	0.593	0.372	0.563	0.070	0.857	0.521	0.715	0.621	0.767	0.109	0.925	0.538
<i>Ma'an</i>	0.448	0.658	0.424	0.640	0.406	0.611	0.088	0.870	0.565	0.761	0.666	0.815	0.137	0.938	0.573
<i>Aqaba</i>	0.391	0.591	0.369	0.572	0.350	0.536	0.064	0.838	0.510	0.703	0.614	0.771	0.101	0.919	0.524

Source: DHS (2002). Elaboration by the authors

**Table A.9** Poverty estimates, PGI by governorate, 2007

	InaA	IngA	InaSS	IngSS	InaSE	IngSE	InFIA	lnFUA	cmaA	cmgA	cmaR	cmgR	cmFIA	cmFUA	Mean
<i>Amman</i>	0.401	0.631	0.380	0.614	0.359	0.571	0.093	0.783	0.514	0.728	0.647	0.811	0.118	0.845	0.535
<i>Balqa</i>	0.363	0.559	0.341	0.541	0.323	0.508	0.085	0.746	0.454	0.657	0.576	0.739	0.102	0.828	0.487
<i>Zarqa</i>	0.362	0.584	0.339	0.564	0.322	0.526	0.079	0.775	0.468	0.685	0.616	0.782	0.095	0.855	0.504
<i>Madaba</i>	0.392	0.634	0.364	0.611	0.346	0.575	0.083	0.807	0.486	0.726	0.636	0.816	0.101	0.866	0.532
<i>Irbid</i>	0.434	0.686	0.412	0.666	0.385	0.619	0.117	0.845	0.555	0.774	0.700	0.861	0.153	0.895	0.579
<i>Ma'raq</i>	0.466	0.718	0.439	0.698	0.417	0.656	0.134	0.875	0.587	0.806	0.734	0.886	0.179	0.918	0.608
<i>Jarash</i>	0.435	0.679	0.407	0.657	0.388	0.620	0.114	0.836	0.548	0.773	0.698	0.859	0.149	0.889	0.575
<i>Ajloun</i>	0.437	0.692	0.412	0.671	0.388	0.626	0.118	0.860	0.550	0.778	0.694	0.863	0.157	0.901	0.582
<i>Karak</i>	0.445	0.690	0.419	0.669	0.393	0.624	0.140	0.830	0.559	0.781	0.694	0.858	0.181	0.887	0.584
<i>Tafila</i>	0.420	0.673	0.392	0.651	0.368	0.605	0.118	0.844	0.537	0.766	0.690	0.855	0.154	0.898	0.569
<i>Ma'an</i>	0.454	0.711	0.427	0.691	0.404	0.650	0.129	0.852	0.562	0.798	0.707	0.876	0.168	0.899	0.595
<i>Aqaba</i>	0.403	0.635	0.382	0.617	0.363	0.578	0.100	0.799	0.512	0.727	0.648	0.815	0.123	0.866	0.541

Source: DHS (2007). Elaboration by the authors

Table A.10 Poverty estimates, SPG by governorate, 2002

	lnaA	lnaG	lnaSS	lnaSE	lnaSE	lnaSE	lnFUA	lnFUA	lnFUA	cmgA	cmgA	cmgR	cmFIA	cmFUA	Mean
<i>Amman</i>	0.151	0.350	0.139	0.332	0.126	0.295	0.688	0.020	0.254	0.480	0.580	0.038	0.832	0.332	
<i>Balqa</i>	0.185	0.435	0.166	0.410	0.152	0.370	0.789	0.021	0.297	0.567	0.668	0.045	0.882	0.387	
<i>Zarqa</i>	0.164	0.378	0.151	0.361	0.141	0.329	0.707	0.018	0.270	0.509	0.606	0.036	0.842	0.350	
<i>Madaba</i>	0.203	0.471	0.184	0.447	0.168	0.404	0.817	0.026	0.322	0.596	0.694	0.062	0.892	0.410	
<i>Irbid</i>	0.176	0.386	0.160	0.365	0.147	0.329	0.743	0.022	0.293	0.538	0.632	0.046	0.876	0.366	
<i>Mafraq</i>	0.213	0.459	0.191	0.435	0.178	0.400	0.801	0.022	0.334	0.602	0.687	0.060	0.903	0.411	
<i>Jarash</i>	0.195	0.426	0.175	0.402	0.164	0.371	0.734	0.019	0.312	0.568	0.658	0.046	0.855	0.383	
<i>Ajloun</i>	0.182	0.420	0.161	0.395	0.150	0.359	0.754	0.018	0.290	0.551	0.653	0.039	0.866	0.376	
<i>Karak</i>	0.210	0.474	0.188	0.448	0.172	0.406	0.835	0.025	0.329	0.605	0.697	0.054	0.911	0.415	
<i>Tafila</i>	0.194	0.431	0.172	0.406	0.160	0.371	0.777	0.019	0.302	0.557	0.641	0.051	0.872	0.384	
<i>Ma'an</i>	0.223	0.484	0.202	0.462	0.188	0.426	0.797	0.025	0.348	0.614	0.699	0.064	0.893	0.422	
<i>Aqaba</i>	0.172	0.399	0.156	0.378	0.141	0.333	0.754	0.017	0.287	0.533	0.633	0.042	0.864	0.366	

Source: DHS (2002). Elaboration by the authors

Table A.11 Poverty estimates, SPG by governorate, 2007

	InaA	IngA	InaSS	IngSS	InaSE	IngSE	InFIA	lnFUA	cmA	cmaR	cmgR	cmFIA	cmFUA	Mean
<i>Amman</i>	0.178	0.441	0.162	0.419	0.146	0.365	0.031	0.702	0.290	0.565	0.698	0.058	0.782	0.378
<i>Balqa</i>	0.148	0.365	0.133	0.344	0.121	0.305	0.033	0.642	0.233	0.478	0.599	0.053	0.751	0.327
<i>Zarqa</i>	0.146	0.390	0.130	0.366	0.118	0.318	0.026	0.683	0.241	0.507	0.656	0.045	0.785	0.345
<i>Madaba</i>	0.170	0.445	0.148	0.416	0.137	0.373	0.031	0.725	0.260	0.562	0.705	0.054	0.808	0.377
<i>Irbid</i>	0.202	0.496	0.184	0.471	0.163	0.409	0.042	0.776	0.330	0.623	0.766	0.081	0.842	0.422
<i>Ma'raq</i>	0.232	0.539	0.208	0.511	0.191	0.458	0.052	0.815	0.363	0.666	0.801	0.100	0.873	0.455
<i>Jarash</i>	0.204	0.495	0.181	0.466	0.166	0.419	0.043	0.763	0.324	0.623	0.762	0.082	0.835	0.420
<i>Ajloun</i>	0.206	0.506	0.185	0.478	0.167	0.421	0.045	0.795	0.325	0.627	0.510	0.086	0.852	0.427
<i>Karak</i>	0.213	0.505	0.191	0.477	0.171	0.420	0.058	0.749	0.337	0.634	0.765	0.105	0.829	0.426
<i>Tafila</i>	0.190	0.484	0.168	0.455	0.151	0.397	0.047	0.772	0.310	0.611	0.505	0.088	0.845	0.413
<i>Ma'an</i>	0.220	0.529	0.197	0.501	0.180	0.449	0.052	0.783	0.336	0.653	0.786	0.096	0.848	0.440
<i>Aqaba</i>	0.180	0.445	0.164	0.423	0.150	0.374	0.034	0.716	0.285	0.560	0.699	0.059	0.801	0.382

Source: DHS (2007). Elaboration by the authors



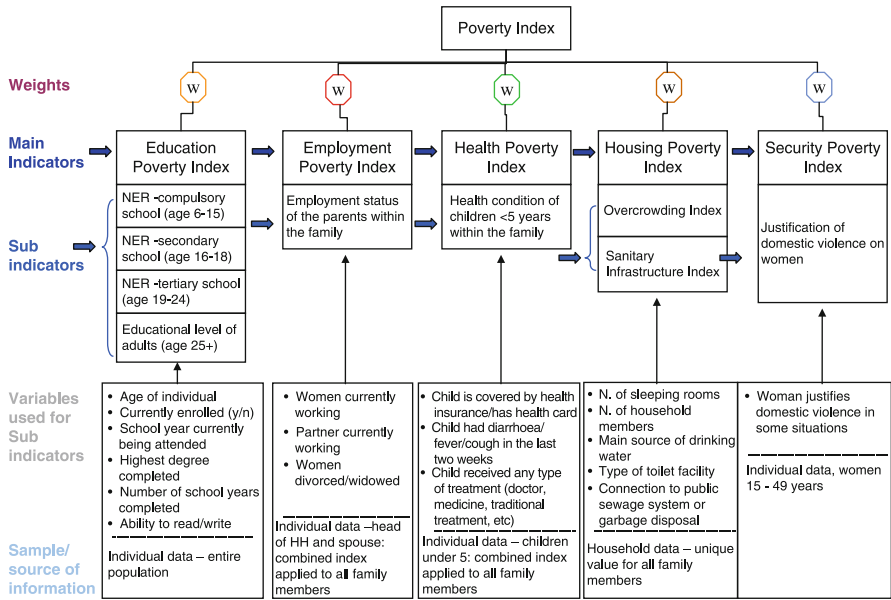


Fig. A.1 Variable map for the composite multidimensional poverty index

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**Part II**  
**Quality of Life and Social Change**  
**Through Italian Official Statistics**

## Chapter 6

# Social and Demographic Change in Italy

Linda Laura Sabbadini

Italy is endowed with an official statistical information system for reading the social transformations under way in this highly advanced country. Its work offers critical insights into ongoing transformations by means of a few significant numbers and other snapshots of change.

Clearly, only a few of the most important social transformations that are under way will be taken into consideration.

Longer life spans represent a fundamental change that affects social life by shifting life cycle events forward in time.

It changes the life of subjects at every stage in life. These are the findings of the multipurpose survey, which by now is being conducted on a regular basis: young people are staying in school longer, moving out of their parents' home later, and having fewer children at an older age.

Adults are living with "full nests" for longer periods of time and are sharing longer and longer existences together, thanks to the gradual extension of average life spans.

The threshold of old age slips forward in time, and the classic stereotypes of the elderly as being relatively inactive and in poor health are becoming less typical, although disability and fragility are still widespread among the very old.

The multipurpose surveys enable us to monitor this process and understand its qualitative characteristics.

This transformation in day-to-day living is accompanied by other changes in the motivations and methods for leaving home. Couples are living together longer before getting married, and the postponement of weddings is witnessing a variety of intermediate steps for establishing a family.

Living together as man and wife, as a sort of test period for the union in anticipation of eventual marriage, is becoming more and more common relative to the recent past.

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The children of mothers and fathers who lived through the great cultural upheaval of the 1970s are entering adulthood, and unlike previous generations, their parents do not stigmatize cohabitation, providing a less disapproving context for alternative family foundations.

While marriage used to represent the final milestone of maturing into adulthood in the past, it is now being reconfigured as the possible but not inevitable conclusion of an itinerary for which living together is becoming a more and more socially acceptable form of family life. Furthermore, the number of young people who are uncomfortable staying with their families of origin is on the rise. "Choose to stay" is no longer the prevailing model. In spite of the crisis in 2009, there was still an increase in the percentage of young people who would prefer to leave their family of origin, i.e., those who want to live on their own but are unable to.

*Transformations are under way in the health status of the population as well.*

Life expectancy has never looked so promising for the population of Italy. By virtue of a marked decline in the mortality rates for adults and the elderly, average life spans continue to register significant increases.

The findings are also significant in terms of the quality of survival. Over a 10-year time span (1994–2004), significant gains were registered in life expectancy free of disabilities, with higher gains for men than for women.

At 65 years of age, a man can still count on 15 years of life free from disability (compared to 12.7 in 1994), while the value climbed to 16 for women (a decade ago, it was 14.2).

The female advantage is gradually decreasing, overall, because the greater longevity of women has not been accompanied by comparable improvements in the quality of survival as measured by the multipurpose surveys on health.

Relative to men, as a matter of fact, women are more frequently afflicted by less lethal illnesses (arthritis, arthrosis, osteoporosis, hypertension, and diabetes) at an earlier age, but that tend to degenerate into situations of invalidity.

The promotion of healthier lifestyles has made a fundamental contribution to the results that have been achieved in terms of survival. Consider the decreases in smoking and the decreases in the neoplasias correlated with habitual smoking, but it should still be remembered that lifestyle changes in certain population segments can make new problems even more apparent. Such is the case for young women and the population of the South. The women of younger generations smoke more and drink more than the women in older age groups. We need to ask ourselves what will happen if this lifestyle is sustained over the years and how the risks entailed by this new pattern of behavior evolve.

New eating habits are emerging in the South due to the introduction and diffusion of processed foods that are rich in sugars and fats. The South is losing the advantage embodied in the "Mediterranean diet," which is considered preventive for several types of tumors.

*It should be emphasized that the improvements witnessed in health status and survival have come hand in hand with serious social inequalities in health.*

People in higher social positions with higher education levels and respectable, well-paid jobs tend to be in better health. They get sick less often, are less afflicted

by disabilities, and are more knowledgeable about staying healthy than those who find themselves lower down on the social scale.

The less educated present worse health conditions in terms of both chronic morbidity and disabilities.

Across all age ranges among those with at most an elementary school certificate, the percentage of people who claim to be sick or very sick doubles or even triples relative to people with higher levels of education (degrees and diplomas).

Similar differences are witnessed for morbidity: among adults of age 45–64, 11.1% of those with a degree or diploma are suffering a serious chronic pathology. The same percentage nearly doubles (20.9%) for those with at most an elementary certificate, and a similar trend was detected for multiple chronic illnesses and disability, although a decline in the social disadvantage is being witnessed among disabled senior citizens.

The same holds true for territorial differences – the South is more disadvantaged in health-related terms, and the poor in the South are worse off than the poor in the North. These data are meaningful and significant because they demonstrate how policies for reducing social inequality are fundamental for improving health conditions.

*Growth, feminization, and greater rootedness were registered for the immigrant population, but so was the high risk of poverty.*

Nearly four million foreign citizens were residents in our country as of January 1, 2009. The resident population has experienced noteworthy growth: in 1998, fewer than one million immigrants were living in Italy.

Italy has become a normal immigration country in every respect. In 2009, the percentage of immigrants in our country was around 6.5% (6.4% is the EU average).

The growth in the foreign population registered on January 1, 2009, was mostly attributable to the Rumanian community (+190,000) and immigrants from East European countries in the Union (+101,000).

With nearly 800,000 residents, Rumanian citizens represent the largest foreign community (20.5%). The Albanian community (441,000) ranks second, followed by Moroccan citizens (404,000), Chinese (170,000), and Ukrainians (156,000). The female component of the migratory phenomenon has been growing.

The gender structure is gradually normalizing, and this fact is not attributable to family reunifications alone. About 42% of these women hold residency permits for work reasons. While lower than for men, this figure is substantial nonetheless and testifies to the fact that this is not a new phenomenon but has characterized several specific communities for quite some time now.

Citizens from Ukraine, Poland, Ecuador, Peru, and the Philippines, for example, exhibit a gender ratio that is heavily imbalanced in favor of women, and many of these nationalities already showed this imbalance in the past. Women, in fact, often play an “opener” role by leaving their own family of origin to immigrate first for work reasons and then – after establishing a foothold – bringing along family members they had left behind in their country of origin. While the situation of migrant women is already complex and variegated, immigrant women also

experience the worst difficulties with reconciling work and family. Lacking a family support network, the women of couples with children exhibit very low employment rates that are lower than for Italian women. The collection of more and more information allows us to study many different aspects of the lives of immigrant women. Immigrants, in other words, are no longer invisible in the official statistics. The labor force is a precious resource: a EUSILC survey was conducted on a sample of immigrants, and a multipurpose survey is about to examine the social integration of migrants.

Signs of immigrant stabilization are readily apparent, and family reunifications, mixed marriages, and births by foreign parents are on the rise. There is a growing presence of minors, and a more normalized gender and age structure is emerging with the growth of in the presence of women and their spouses.

In particular, the presence of foreign minors has risen to 858,000 units, or 22% of the resident foreign population, which is 97,000 more than the last available year. More than 74.2% of this increase is attributable to new births. The signs of economic difficulty, however, are clear: the workforce data reveal families with lower numbers of jobholders who need to support higher numbers of family members (relative to the proportion for Italians).

With respect to poverty, the relative versus absolute incidence has been fairly stable in Italy over the last few years, affecting 10–11% (13% of individuals) and 4–5% of families (4.5% of individuals), respectively.

Significant changes were observed in several population segments. In terms of relative poverty, an increase in poverty (relative to 1997) was registered for larger families with four or more members, with minor children, and with aggregate members; the situation for families with at least one jobseeker has worsened, especially in the presence of two or more unemployed workers or when the head of the family has a low profile job (the so-called working poor); an improvement was witnessed in the condition of families with only one member, families of the elderly or headed by a retiree, especially in the North, following the inclusion of generations of elderly with stable and better-paid work histories.

The high incidences of both relative (22.7%) and absolute (7.7%) poverty reached in the South in 2008 were reconfirmed, with 2009 revealing an increase in the intensity of absolute poverty (from 17.3% to 18.8%) and a worsening in the conditions of the poor.

Poverty did not increase during the year of the crisis because 80% of the decline in employment struck young people (in particular those living with their family of origin). Young people who lost their jobs were protected by their families, and the temporary state layoff funds protected parents from losses of work. This kept the decline in employment from being as devastating from a poverty-oriented perspective, opening a big question for the future of young people.

In terms of fertility rates, it should be noted that Italy has had low fertility for 20 years now, with an average of less than 1.4 children per woman and a 2008 value of 1.42 (2.31 for foreign women; 1.32 for resident women).

Only 40 years ago, the total number of births was 1 million 35,000 in 1964, and in 2008, we count in at 570,179.



Our country, in other words, has a consistently low fertility rate that, furthermore, has witnessed a reduction of the territorial divide due to a decrease in the average number of children in the South (from 1.39 to 1.35 in 2008), as contrasted with increases in the North (from 1.04 to 1.46 in 2008) and Center (from 1.07 to 1.41 in 2008).

Low fertility levels are associated with the only-child model in the Center North and with at least two children in the South, but there is no sign of any disenchantment with maternity and paternity.

For men and women of all ages, the ideal number of children continues to be 2.1, which is a much higher number than what couples are actually having.

This is mostly a consequence of an environment that is less favorable for maternity and paternity, along with many other elements that concur to generate the findings documented by social surveys.

The division of roles within the family remains rigid, and men's contribution to family work continues to be very superficial relative to the contribution of women.

The network of social services falls short, especially for early infancy. It fails to meet the needs of working women and is also very expensive.

The working world is very inflexible when it comes to meeting the family needs of male and female workers (only one-third of women and men have used the flexibility of entry/exit, which occurs mostly in public administration).

Parental leaves of absence are used mostly by women because a number of obstacles discourage their use by men.

We continue to see cases of work interruptions and dismissals/firings of pregnant women (just as in the past, one woman in five quits working after childbirth).

Unemployment rates continue to feel the burden of the family and decrease as the number of children increases.

Informal support networks, especially the family, continue to be essential for working women, with grandparents as the primary resource. This network is more and more overloaded, however, because the crisis has reached structural proportions. Women who play the role of primary caregivers have less and less time to dedicate to themselves and more and more people to help.

These are the findings of the multipurpose surveys, which unfortunately show no signs of improvement: structural rigidities that make it difficult for women to enter into and remain in the working world.

*With reference to work dimension, it should be noted that the participation model for working women has changed nonetheless.*

Work begins at a later age (around the same time when previous generations were leaving the working world) with higher aspirations and education and with no plans for abandoning work in the future.

This means that more women are participating in the labor market, but it has also created a number of "fence-sitters," especially in the South. These are women who have no intention to exit completely from the working world but who find themselves on hold in a "gray zone," somewhere between active participation and compete extraneousness in the labor market.

*Ever since the mid-1990s, however, female employment has been on the rise.*

In 2009, there were 1 million 870,000 more working women than in 1993. The year 2009 was the first year that female employment registered an actual decline.

Women were hit less than men because men work much more in industry, although the 2009 crisis struck women in industry (−7.5%) much more than men (−3%).

In any case, almost all of jobs added since 1993 have been female (83%), and the majority of this increase has occurred in the Center North (1 million 675,000). The South was left with the crumbs (195,000) of the increase in female employment. This widens the gap between women in the North and women in the South since there are fewer opportunities in the South than in the North.

The multipurpose family survey on the use of time found that women still bear too much of the burden for caregiving work.

The growth in female employment happened regardless of the heavy family work load of women. In the Nordic countries, the mass mobilization of women was accompanied by effective conciliation policies. In Italy, in contrast, this mobilization has lacked for any policies designed to lighten the burden on women through the societal redistribution of caregiving work.

The strong rigidity of gender roles, which is easily revealed by the daily time balance, remains a salient feature of Italian family life.

Nearly three-quarters (73.8%) of the total time that couples dedicate to family life continues to fall on the shoulders of working women.

This imbalance was even greater in 1988–1989: working women with a single child spent 78.8% of their time on the family, climbing to 86.6% for mothers with three or more children. The improvement that was registered, however, is more attributable to the new strategies adopted by women than the increased involvement of men.

Women managed to reduce the amount of time spent on family work more than men managed to increase it. Fathers increased their contribution by a total of 16 min over 14 years, an average of only 1 min per year.

Women also reduced the time devoted to family work by redistributing it internally, allotting less time for housework and more for the caretaking of children.

Lastly, a few glimpses at trends in satisfaction levels for various dimensions of daily life. Degree of satisfaction with family relations, friends, health, and free time has been surveyed each year since 1993, providing us with a fairly extended historical series to reflect on.

Citizen satisfaction with family relations has traditionally been very high in our country. About 90.1% claim to be “satisfied” and 35.6% “very satisfied.” “Not at all” registers less than 1.3%. No other dimension of life has approached these levels. There is both a territorial and social gap: residents of the North are more satisfied than those in the South, and people with higher social status are more satisfied. Among the elderly (both males and females), the “very satisfied” vary extensively, ranging from degree holders to the less educated.

If we examine the results over time, however, we see that the number who are “very satisfied” with family relations has fallen by 20% since 1993. This particular

phenomenon is focused on the 45–59 age group, which has tended to experience more separations and divorces in recent years, which accounts for some of the lower satisfaction during this particular phase of life.

After family relations, friends are in second place (82.4%), with “very” reaching 25.5%. The values are very high among young people and decrease with age, and the gender gap is very evident to the disadvantage of women.

Similar to family relations, relations with friends experience a similar drop (–17.5%) that is steeper for men, in this case, although men are still more satisfied than women (33.1% and 28.9%).

The social and territorial gradient is upheld in this case as well.

Free time registers the worst situation with only 63.9% “satisfied” and 14.5% “very satisfied.” The most heavily penalized are women, who have insufficient time due to the sheer number of female work hours.

It is less a question of quality than quantity, in other words, and the time-use data testify to this serious problem.

An important analytical element that is worth highlighting is how important it is to isolate the age effect for that generation. The initial efforts have generated some noteworthy results.

If we examine the younger generation, which was aged 15–24 in 1999 and 25–34 in 2009, what we find is that the same % of “very satisfied” with family relations was sustained for 10 years, whereas relations with friends fell by 10 points (25%), with free time and health suffering as well. The years of transition to adulthood and entry into the labor market are what compress overall time and time for friends, with more negative satisfaction levels as a consequence.

The situation for the elderly turns out to be opposite in various aspects of daily life.

This group shows less of a decline for friends and families while satisfaction with free time tends to increase because a little more time tends to be available. Satisfaction with health status, however, is cut in half.

The transition to adulthood, therefore, corresponds with a lower satisfaction with free time and relations with friends.

The transition into very old age, alternatively, corresponds with lower satisfaction with health status.

While the worsening of health can already be witnessed in younger generations, it is enormously accentuated for those who were 45–54 years old in 1999. Satisfaction levels were cut in half over 10 years.

Last of all, we take a quick look at a question that was pioneered by Istat, in particular the Central Department for Surveys on Conditions and Quality of Life, in a survey on a phenomenon that had been invisible for ages – violence against women. The survey was very complex in methodological terms (it took 4 years to design), but it has proven to be of incredible value, having provided a great service to our country by making explicit the number of women who fall victim to family violence. The datum on the mistreated was and will remain of enduring value for future policymaking, and a number of significant subjective aspects were detected as well. Female victims of violence tend not to acknowledge the violence – this is a critical

obstacle for combating the issue itself, and this cultural behavior needs to be changed. Only a minority sees their partner's violence as a crime, although they understand that the act is serious and that it occurs all over the world. In addition, there is a sizeable percentage that claims to fear for their life, and this is an extremely important indicator for the escalation of violence. It is essential for prevention and counter-action policies to monitor whether and how female understanding of the issue changes over time, perhaps through awareness raising campaigns.

To conclude, the production of social statistics in these years has striven to meet the growing demand for national statistical information. The leap in quality of Istat is readily apparent – official actions are capable of giving us detailed pictures of dynamics that were previously invisible. This has been a genuine revolution in its own right.

# Chapter 7

## Satisfied or Dissatisfied? An Analysis of the Results of ‘Aspects of Daily Life’ Italian Survey on Households

Silvia Montecolle and Sante Orsini

### 1 Introduction

Life satisfaction is among the key indicators of well-being used to assess the welfare of societies.

This aspect was recently raised by the Commission on the ‘Measurement of economic performance and social progress’ instituted by the French President Sarkozy and chaired by Professor J. Stiglitz (Stiglitz et al. 2009). In particular, one of the working groups of the Commission had the task of proposing new indicators for measuring the quality of life, taking subjective aspects into account. In addition, the Organization for Economic Cooperation and Development (OECD) is working on the relevance of subjective measures of well-being to political decisions, in the context of a joint project with the European Commission.

The Italian National Institute of Statistics (Istat) has invested a great deal in the collection of subjective data beside objective data for measuring quality of life.

Since 1993, the multipurpose household survey ‘Aspects of Daily Life’ has been gathering annually information concerning the satisfaction of the Italian population aged 14 and over with five aspects: finances, health, family relationships, friend relationships and leisure time (Istat 1993–1996, 2005–2009; Istat 1997–2000).

The aim of this chapter is to study the structure and the dynamics of the subjective satisfaction in Italy, exploiting the rich set of information provided by the survey over time.

Life satisfaction represents a significant component of subjective well-being, which is a central concept in quality of life framework. Subjective well-being is seen as a construct made up of two distinct, yet interrelated, components, cognitive

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and affective (Diener 1984). The former component refers to a process of retrospective assessment of one's own life, while the latter indicates the (positive or negative) emotions that people experience during their daily life and is tied to their current situation.

Veenhoven defines life satisfaction as 'the degree to which an individual judges the overall quality of his life-as-a-whole favourable' (Veenhoven 1991). While general life satisfaction is defined as an assessment of one's life overall, life satisfaction can also be measured in specific life domains such as family, health and finances (Christoph and Noll 2003).

As known, life satisfaction can be conceptualised and measured through two major approaches: the so-called top-down and bottom-up approaches. The top-down approach assumes that global life satisfaction is a predispositional or personality trait which influences one's evaluation of satisfaction with specific domains, while the bottom-up approach maintains that global life satisfaction can be regarded as the sum of satisfaction with various domains (Diener 1984).

There are other models which reconcile the two approaches, sustaining that subjective well-being depends on both individual disposition and satisfaction achieved in various life spheres (Stones et al. 1995).

Others consider subjective well-being to be a relative concept: this is the case with the theory in which subjective well-being depends on the comparison of one's individual situation with certain standards which may be other people, local realities or previous life conditions (Schifini D'Andrea 1999) or the theory of multiple discrepancies (Michalos 1985), according to which – summarising extremely briefly – satisfaction depends on the discrepancy between desired and actual life conditions.

In short, there is still a great deal of uncertainty regarding what factors cause subjective well-being and what factors are a consequence of it (Heady et al. 1991).

It is precisely the plurality of interpretive models regarding the relation between overall life satisfaction and satisfaction with specific aspects which makes an approach such as the one proposed by the French school *Analyse des Données* of 'exploratory factorial analysis' interesting.

Exploratory analyses are designed to provide, in summary form, a description of information 'in order to highlight the implicit relational structures (*patterns*) that run through it' (Fabbris 1997).<sup>1</sup> These methods are aimed at observing and describing the existing relational structures between the elements in a data matrix. The purpose of such techniques is essentially to reduce the multidimensionality of the matrix by transforming data into new uncorrelated variables (factors).

In addition to observing any relational structures that may exist, it has also been ascertained whether these follow a temporal dynamics or whether they are stable over time.

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<sup>1</sup> An interesting point of view about the inductive value of the exploratory analysis and the reunification of these to probabilistic inference analysis in a broader integrated approach is available in Coppi (1995).

For these objectives, a number of multiway analysis techniques are applicable. They are based on the exploratory factorial methods proposed by the French school, the subject of which is a complex matrix (multiway matrix). This method allows analysing simultaneously the structure and dynamics of quality of life.

## 2 Data and Methods

Data used are from the annual multipurpose survey 'Aspects of Daily Life' carried out annually since 1993, by the Italian National Statistics Institute (Istat – Istituto Nazionale di Statistica). It is a survey based on a sample of about 20,000 households, consisting of upwards of 50,000 individuals and around 40,000 individuals aged 14 and over.

The annual multipurpose survey 'Aspects of Daily Life' is the main survey in Istat's integrated system of multipurpose social surveys. It collects a set of data concerning individuals, households and events related to a wide range of social phenomena.

The survey uses the paper-and-pencil interview (PAPI) technique and is based on a face-to-face interview questionnaire and a self-administered questionnaire.

For individuals aged 14 and over, information about satisfaction is collected about the 12 months preceding the interview regarding aspects such as financial situation, health, relationships with family and friends and leisure time. The level of satisfaction is measured on a four-label scale: very satisfied, fairly satisfied, little satisfied and not at all satisfied. The life domains considered cover the three kinds of basic needs (having, loving and being) considered fundamental to be happy as in the quality-of-life model by Allardt (1973).

A picture of satisfaction in a number of daily life ambits across an extended period is thus available and can be analysed on the basis of the socio-demographic characteristics of the interviewees.

This information is represented through three-way matrices of individuals, variables and occasions, that is a succession of matrices of data, one for each year of the survey (occasions), of the statistical units (individuals) for information collected (variables).

The study took into account as statistical units in two subsequent analyses first individuals identified by crossing 10 age classes (14–17, 18–19, 20–24, 25–34, 35–44, 45–54, 55–59, 60–64, 65–74 and 75 years and over) and gender of respondents and then those constituted by regions of residence, that is, the 20 Italian regions.

As previously said, the variables observed in the various years are data on the satisfaction of individuals aged 14 and over regarding five aspects of daily life: financial situation, health, relationships with family, relationships with friends and leisure time. Satisfaction was expressed through a four-label scale (very, fairly, little and not at all satisfied).

The resulting 16 *contingency tables*

$X_{ink}$ , [ $\mathbf{i} = 1, \dots, 16$  occasions;  $\mathbf{n} = 1, \dots, 20$ ; statistical units;  $\mathbf{k} = 1, \dots, 25$  variables]

have been considered, having *the same variables* observed on the 16 occasions (survey years) and *the same statistical units* (age groups by gender or regions).

The 16 contingency tables are presented in the form of tables of quantitative data constituted by the relative frequency of each item of the above-mentioned satisfaction variables for the various 'individuals' in the various years.

## 2.1 *The Objectives of Multiway Analysis*

In the situation described above, the essential objectives of a multiway analysis (Bolasco 1999) are:

1. *Global comparison of occasions (years)*, that is, the simultaneous comparison of individual matrices with each other by seeking factorial dimensions through which the relation between the various elementary matrices can be represented
2. *'Average' structural analysis*, that is, the identification of the basic relationships between units and variables, irrespective of distinct occasions, through the definition of a common factor space
3. *Fine structural analysis* (by individual occasions), in order to examine in detail variations in the structure of elements of the matrices as the occasions change, by appropriately representing them in the common factor space

Multiple factor analysis (MFA), applied as in this case to quantitative data (frequencies relating to satisfaction level), is based on a weighted principal component analysis (PCA) of the overall data matrix according to the common point of comparison of the units (Escofier and Pagès 1998; Bolasco 1999).

It takes place in two stages:

1. PCA for each group, with which the weights to assign to the groups in order to balance their contribution to the global analysis are calculated
2. PCA of the entire data matrix in which each variable of the  $i$ -th group is weighted with the value

$1/\sqrt{\lambda_{i1}}$ , where  $\lambda_{i1}$  is the first eigenvalue of the PCA performed on the  $i$ -th group. This produces the common factors or general variables of the MFA. The factor solution is common to the three objectives of the multiway analyses previously described.

The analysis provides a representation of units and variables which is interpreted according to standard PCA criteria and offers the possibility of a highly detailed interpretation of a solution in terms of all of the modes of the overall matrix (individuals, variables and occasions) (Bolasco 1999).



The power of the technique is that results can be directly read in comparative terms, with a more powerful meaning than that obtained by separate analyses for each occasion and just comparing the final results.

### 3 Results

First, results are reported according to the gender and age of respondents and subsequently according to their region of residence. The variables grouped according to year all intervene as active elements.

The interpretation of results in a MFA requires an articulated process. In this paragraph, we describe in detail this process, referring to the gender and age study, while a shorter description of results is reported for the territorial study.

#### 3.1 Gender and Age

##### 3.1.1 Global Comparison of Occasions

As a first result, MFA provides partial (PCA) analyses of groups of variables in each occasion (year). For each group of variables, therefore, the eigenvalues and percentages of explained inertia are provided (Table 7.1).

**Table 7.1** Eigenvalues (= inertia) from separate PCA

Years (groups)	Eigenvalues					Percentage of inertia				
	1	2	3	4	5	1	2	3	4	5
1993	9.857	5.672	1.840	1.108	0.66	49.3	28.4	9.2	5.5	3.3
1994	9.274	5.430	1.791	1.492	0.9	46.4	27.2	9.0	7.5	4.5
1995	9.507	5.336	2.372	1.150	0.62	47.5	26.7	11.9	5.7	3.1
1996	9.352	5.297	1.966	1.564	0.93	46.8	26.5	9.8	7.8	4.6
1997	8.632	5.769	2.186	1.295	0.96	43.2	28.8	10.9	6.5	4.8
1998	9.104	4.862	2.508	1.308	0.95	45.5	24.3	12.5	6.5	4.8
1999	8.089	5.274	2.396	1.549	1.09	40.4	26.4	12.0	7.7	5.5
2000	8.148	4.876	2.473	1.881	0.96	40.7	24.4	12.4	9.4	4.8
2001	9.623	4.921	2.142	1.545	0.7	48.1	24.6	10.7	7.7	3.5
2002	9.585	4.586	2.047	1.397	1.05	47.9	22.9	10.2	7.0	5.3
2003	9.774	4.075	2.091	1.794	0.81	48.9	20.4	10.5	9.0	4.1
2005	8.919	4.151	2.516	2.210	1.09	44.6	20.8	12.6	11.1	5.4
2006	9.603	3.990	2.195	1.807	1.18	48.0	19.9	11.0	9.0	5.9
2007	9.269	4.673	2.489	1.515	0.96	46.3	23.4	12.4	7.6	4.8
2008	8.653	4.632	2.410	1.883	1.44	43.3	23.2	12.1	9.4	7.2
2009	9.460	4.592	2.224	1.642	0.79	47.3	23.0	11.1	8.2	4.0

A first result is that a single temporal direction of the overall variability of the phenomenon does not emerge; that is, no clear order structure seems to exist among the various years. A trend seems to be displayed by the second factor, which shows a decreasing inertia over time until 2006, and by the fourth factor, which, in contrast, slightly increases its weight.

Another important indication regarding the similarity and the dissimilarity of groups of variables is provided by the analysis of the correlation matrices between partial factors, that is, the factors of the individual analyses.

From the analysis of these matrices, not presented here for brevity, emerges that the homologous partial factors remain highly correlated with each other at least up to the second axis, that is, that the phenomenon essentially does not change over time at the level of meaning of the first two principal component combinations.

The analysis of the interstructural type designed to evaluate the similarity among the various occasions is conducted by analysing the matrix of the coefficients  $L_g$  and  $RV$  of the connections between groups (Table 7.2).

The index  $RV$  ranges between '0' (no correlation between the variables of one group and the variables of another group) and '1' if the variables are correlated (homothety). This value is completed by the index  $L_g$ , which also reports the connection between groups of variables that has the same meaning as  $RV$  when its value is '0' but also depend on the presence in the groups of numerous common dimensions connected with the significant directions of inertia for each group. The values on the diagonal of  $L_g$  (associated with a single group of variables) can be interpreted as indicators of multidimensionality of the group (which is higher the more it exceeds '1').

Essentially, the comparison of the two measurements allows a detailed analysis of the existence and of the importance of structures in common or not among the various survey years. The closeness of the structures of the matrices in the various years is basically confirmed not only in absolute terms but also relative to the dimensionality of the common structures.

### 3.1.2 Average Structural Analysis

The general MFA analysis provides the solution obtained for the entire matrix. The first eigenvalue of this analysis is at most equal, by construction, to the number of groups (in our case the 16 years): in this case, it is quite close to this maximum, so the first factor corresponds to a significant direction of inertia in each group. It accounts for approximately 45% of the variability due to the structural relations between units and variables, on average in relation to time, and to the dynamics of the individual units. On the whole, the first principal common plan reproduces almost 69% of the overall variability (Table 7.3).

The analysis also provides other tables for evaluating the contributions of the variables to the construction of the general variables and the correlation between partial factors and common factors.

**Table 7.2** Coefficients of connection between groups

Lg coefficient	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	FMA
1	1.385																
2	1.310	1.419															
3	1.335	1.345	1.399														
4	1.312	1.342	1.348	1.405													
5	1.357	1.378	1.375	1.392	1.551												
6	1.314	1.340	1.344	1.338	1.389	1.399											
7	1.376	1.404	1.402	1.415	1.463	1.411	1.582										
8	1.331	1.377	1.374	1.377	1.406	1.382	1.476	1.530									
9	1.267	1.274	1.282	1.300	1.342	1.293	1.365	1.358	1.346								
10	1.259	1.278	1.271	1.265	1.306	1.284	1.351	1.298	1.246	1.314							
11	1.168	1.219	1.215	1.234	1.246	1.236	1.323	1.306	1.204	1.186	1.267						
12	1.204	1.291	1.268	1.284	1.323	1.273	1.368	1.334	1.234	1.219	1.235	1.376					
13	1.207	1.244	1.233	1.227	1.262	1.261	1.320	1.296	1.215	1.229	1.194	1.237	1.282				
14	1.233	1.272	1.257	1.273	1.289	1.275	1.365	1.332	1.235	1.253	1.235	1.264	1.248	1.369			
15	1.288	1.311	1.301	1.312	1.378	1.330	1.418	1.374	1.265	1.272	1.247	1.303	1.286	1.314	1.443		
16	1.146	1.233	1.209	1.212	1.259	1.240	1.328	1.319	1.189	1.183	1.219	1.251	1.221	1.256	1.272	1.334	
FMA	1.312	1.347	1.342	1.347	1.391	1.352	1.433	1.401	1.307	1.295	1.264	1.311	1.278	1.311	1.352	1.273	1.365

(continued)

Table 7.2 (continued)

RV coefficient	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	FMA
1	1.000																
2	0.935	1.000															
3	0.959	0.954	1.000														
4	0.941	0.951	0.962	1.000													
5	0.926	0.929	0.933	0.943	1.000												
6	0.944	0.951	0.961	0.954	0.943	1.000											
7	0.930	0.937	0.942	0.949	0.934	0.948	1.000										
8	0.914	0.935	0.939	0.939	0.913	0.944	0.949	1.000									
9	0.928	0.922	0.934	0.945	0.929	0.943	0.935	0.946	1.000								
10	0.934	0.936	0.938	0.931	0.915	0.948	0.937	0.915	0.937	1.000							
11	0.882	0.910	0.912	0.925	0.889	0.928	0.935	0.938	0.922	0.920	1.000						
12	0.872	0.924	0.914	0.923	0.905	0.917	0.927	0.920	0.906	0.906	0.935	1.000					
13	0.906	0.922	0.921	0.915	0.895	0.942	0.927	0.926	0.925	0.947	0.937	0.931	1.000				
14	0.895	0.913	0.909	0.918	0.885	0.921	0.928	0.920	0.910	0.934	0.938	0.921	0.942	1.000			
15	0.911	0.916	0.916	0.921	0.921	0.937	0.938	0.925	0.908	0.924	0.922	0.924	0.946	0.935	1.000		
16	0.843	0.896	0.885	0.886	0.875	0.908	0.914	0.923	0.888	0.893	0.938	0.923	0.934	0.930	0.917	1.000	
FMA	0.955	0.968	0.971	0.973	0.956	0.978	0.975	0.969	0.965	0.967	0.961	0.956	0.967	0.959	0.964	0.943	1.000

**Table 7.3** Global analysis. Eigenvalues (= inertia) from MFA

N.	Eigenvalue	%	% cum.	
1	156.132	44.62	44.62	
2	83.823	23.96	68.58	
3	28.653	8.19	76.77	
4	24.455	6.99	83.76	
5	17.030	4.87	88.63	

**Table 7.4** Canonical correlation coefficients<sup>a</sup>

Years (groups)	Factors from MFA				
	1	2	3	4	5
1993	0.98	0.98	0.81	0.78	0.55
1994	0.99	0.98	0.78	0.88	0.64
1995	0.99	0.98	0.79	0.86	0.62
1996	0.99	0.99	0.95	0.86	0.65
1997	0.98	0.99	0.77	0.77	0.88
1998	1.00	0.99	0.95	0.76	0.90
1999	1.00	0.99	0.92	0.96	0.83
2000	0.99	0.99	0.94	0.94	0.70
2001	0.99	0.96	0.92	0.81	0.78
2002	0.99	0.99	0.82	0.86	0.78
2003	0.99	0.98	0.88	0.87	0.80
2005	0.99	0.98	0.89	0.83	0.79
2006	0.99	0.98	0.90	0.87	0.88
2007	0.99	0.99	0.87	0.70	0.78
2008	1.00	0.98	0.90	0.84	0.92
2009	0.97	0.96	0.80	0.88	0.71

<sup>a</sup>At the intersection of row j and column s: r(Fsj, Fs), j=1993,...,2009

Before interpreting the general structure, one wishes to have an idea of how representative this is of the set of groups or to what extent it may be specific to a single group.

In fact, the correlation value between partial factors and common factors may have a high value for all of the groups, for some of them or even for a single one. In this sense, MFA makes it possible to highlight factors that are common to all of the groups, factors common to certain specific groups and factors specific to one group.

A factor of the general analysis is common to those groups for which the correlation with the homologous factors of the partial analyses is high (therefore, the trend that it represents exists in these groups), and it may not be present for those groups for which the correlations are weak (Table 7.4).

With regard to the set of groups, the relation between interclass inertia and total inertia for each factor is analysed with reference to a segmentation of the individuals

**Table 7.5** Ratio [(between-inertia)/(total inertia)]

	Factors from MFA				
	1	2	3	4	5
Ratio	0.98	0.95	0.74	0.69	0.54

that groups the same individuals together into a single cluster (there are as many clusters as there are individuals and each cluster contained as many individuals as there are active groups). This value, if close to 1, tells us how close the representations of one single individual through the different groups are and to what extent the factor highlights a structure that is common to the different groups (Table 7.5).

The coordinates of the groups on a factor are interpreted as the contribution that the variables of the group give to the factor itself. These coordinates determine the groups of variables that are most closely connected to the factors and to use them for the interpretation.

In short, these indices in our case show not only that the common factors are a structure for all of the groups but also that they always represent significant directions of inertia for them.

### 3.1.3 Interpretation of the Common Structure

In order to interpret the factors, the variables are represented in the circle of correlations. Given the large number of years considered, only three occasions were highlighted: 1993, 2000 and 2009 (Fig. 7.1).

In the first axis, in all of the partial analyses, an opposition is found between the very satisfied and not at all satisfied labels in the various ambits considered. It can therefore be interpreted as a factor that summarises overall satisfaction.

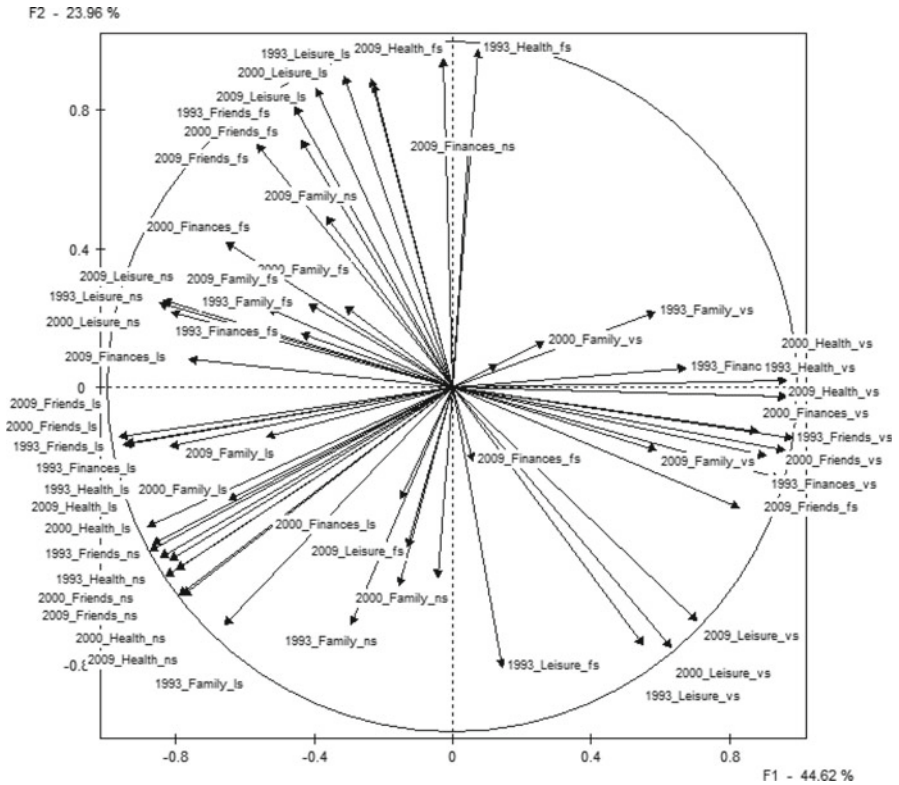
Identifying a factor of overall satisfaction is consistent with both approaches to life satisfaction definition (bottom-up and top-down). Indeed, the factor may be interpreted both as a latent variable which expresses individual predispositions and a synthetic variable which summarises satisfaction with the various ambits of daily life.

The second axis is related to satisfaction too. In particular, it represents the relations with satisfaction with leisure time (very or fairly satisfied vs. little satisfied).

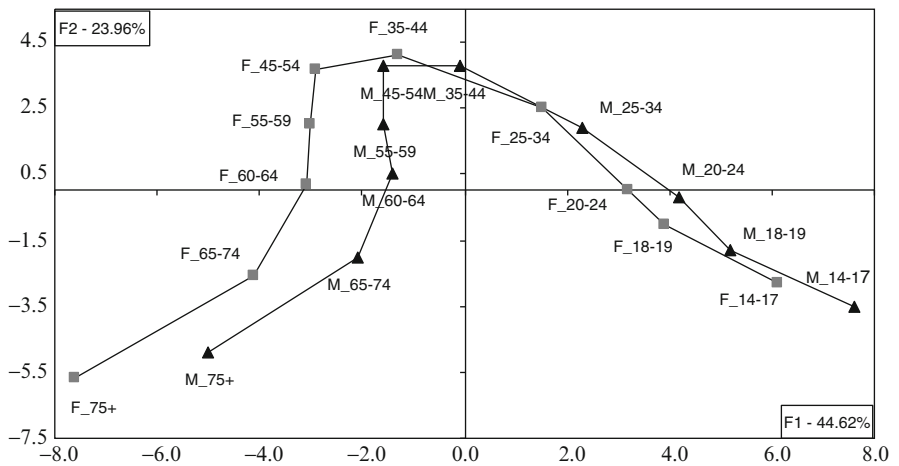
By projecting the partial clouds on the principal axes of the total cloud, the role of active individuals, their trajectories and the distances from the average point (the average individual is at the centre of gravity of its partial equivalents) are interpreted (Fig. 7.2).

On the first factorial plan, the statistical units (individual/average points) are represented to interpret it in relation to these.

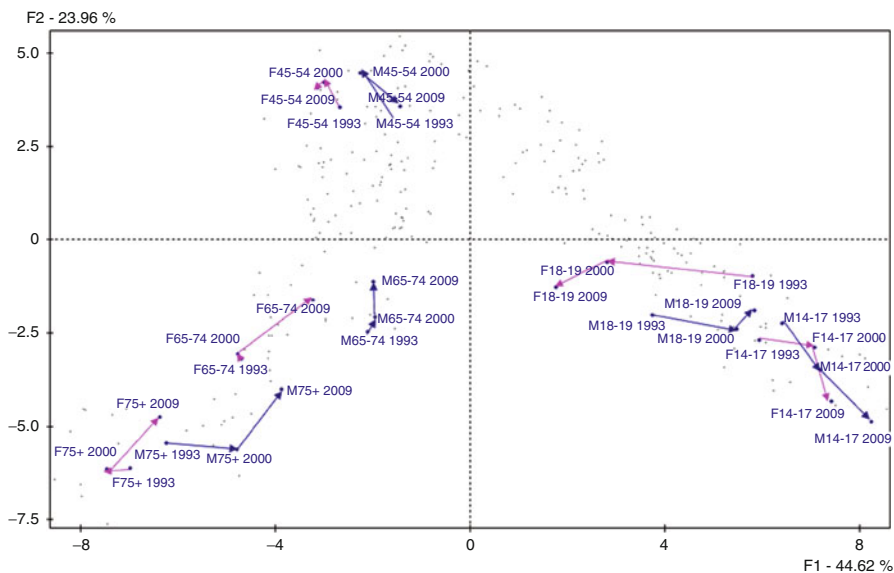
By observing the figure, the pattern appears to be similar for males and females and curvilinear on the first factorial plan. The variability of the phenomenon is best represented by the opposition between young age classes and old age classes and by the one between central age groups and younger and older age groups in a similar manner between males and females.



**Fig. 7.1** First factorial plan from MFA: variables (*vs* very satisfied, *fs* fairly satisfied, *ls* little satisfied, *ns* not at all satisfied)



**Fig. 7.2** First factorial plan from MFA: mean individuals



**Fig. 7.3** First factorial plan from MFA: trajectories of partial individuals

The first axis basically seems to graduate overall satisfaction with reference to the gender and age of interviewees, while the parabola layout expresses the fact that the point of minimum satisfaction, with leisure time is reached in the 35–54 age class.

By representing also ‘partial’ individuals, that is, those relative to each individual group, it is possible to identify their trajectories, which are characterised by the form and by the length of the segments relating to each pair of consecutive years. As before, the most significant trajectories were showed in relation to three occasions (1993, 2000 and 2009).

A temporal trend related to certain age groups (which are those that have characterised the phenomenon the most) emerges. For the youngest (aged 14–17), a rising satisfaction trend is shown, regarding both overall satisfaction and satisfaction with leisure time (summarised by the second factor). In the 18–19 age class, males and females show different trends: while overall satisfaction increases among males, it reduces among females. The central age class (45–54) shows a fairly stationary trend. For the elderly, an increase in overall satisfaction as well as a decrease in satisfaction with leisure time is observed (Fig. 7.3).

Moreover, the age classes resulted as more dynamic (the younger and the older) are also those with the strongest contribution to the axes and the strongest within inertia; that is, they have contributed the most to the change in the structure of the phenomenon over time by altering their relative position.



**Table 7.6** Eigenvalues (= inertia) from separate PCA

Years (groups)	Eigenvalues					Percentage of inertia				
	1	2	3	4	5	1	2	3	4	5
1993	11.587	2.414	1.714	1.559	0.840	57.9	12.1	8.6	7.8	4.2
1994	11.365	3.220	1.515	1.209	0.807	56.8	16.1	7.6	6.0	4.0
1995	10.723	3.064	1.820	1.417	0.850	53.6	15.3	9.1	7.1	4.3
1996	12.529	1.853	1.547	1.225	0.807	62.6	9.3	7.7	6.1	4.0
1997	11.396	3.009	1.454	1.018	0.779	57.0	15.0	7.3	5.1	3.9
1998	11.337	3.297	1.701	1.021	0.707	56.7	16.5	8.5	5.1	3.5
1999	10.530	3.554	1.785	1.250	1.168	52.7	17.8	8.9	6.3	5.8
2000	11.340	3.185	1.675	1.323	0.758	56.7	15.9	8.4	6.6	3.8
2001	11.326	3.262	1.256	1.163	0.919	56.6	16.3	6.3	5.8	4.6
2002	9.931	3.613	2.030	1.547	0.787	49.7	18.1	10.1	7.7	3.9
2003	10.548	2.510	1.946	1.465	1.019	52.7	12.6	9.7	7.3	5.1
2005	12.131	2.446	1.664	0.967	0.683	60.7	12.2	8.3	4.8	3.4
2006	12.255	3.749	1.224	0.756	0.649	61.3	18.7	6.1	3.8	3.2
2007	12.009	2.119	1.712	1.013	0.805	60.0	10.6	8.6	5.1	4.0
2008	11.710	2.855	1.604	1.086	0.747	58.5	14.3	8.0	5.4	3.7
2009	11.284	3.374	1.489	1.211	0.898	56.4	16.9	7.4	6.1	4.5

### 3.2 Regions

Multiple factor analysis is replicated by considering the 20 Italian regions as statistical units.

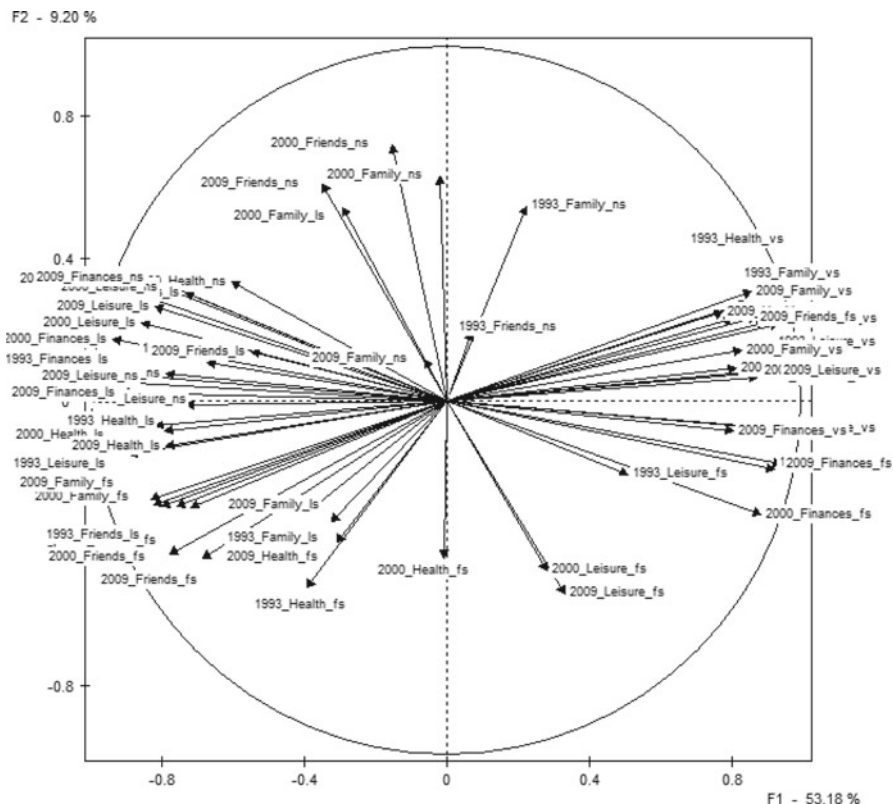
The comparison between the various occasions shows, as in the previous analysis, that a clear temporal trend in the variability of the phenomenon does not appear (Table 7.6).

Differently, a greater concentration of the variability emerges on the first factor, which varies between 50% and 61%. In addition, the homologous partial factors remain highly correlated only in relation to the first axis, meaning that the phenomenon does not change over time.

Therefore, a single structure emerges across the country that is common to all of the years considered, and it is the one expressed by the first factor. The other factors of the average analysis express common structures but do not correspond to significant directions of inertia in all of the years considered.

The first factor (53.18%) from the general analysis, as in the age and gender analysis, summarises overall satisfaction given the opposition between 'very' and 'fairly' satisfied and the 'little' and 'not at all' satisfied of the various life domains. The results concerning the second factor (9.20%) shows how it essentially represents satisfaction with the relational sphere (family and friends) for the country as a whole (Fig. 7.4).

Although the additional contribution provided by the second axis in terms of overall representation of the phenomenon is relatively weak, it is useful to consider



**Fig. 7.4** First factorial plan from MFA: variables. Territorial study (*vs* very satisfied, *fs* fairly satisfied, *ls* little satisfied, *ns* not at all satisfied)

it in the analysis because it provides an important contribution to the interpretation. This dimension is present in all of the occasions yet is of greater importance during certain periods in comparison with others.

The representation of the statistical units (individual/average points) on the first factorial plan is interesting with regard to the first two axes of the MFA.

With reference to the overall satisfaction axis, we obtain a North–south dualism: the North is characterised by high levels of satisfaction, the South by low levels, while the central regions are in a barycentric position (Fig. 7.5).

When assessing the results of this dimension, it is necessary to take into account the possible presence of different dispositions (i.e. optimism-scepticism) in the geographical areas, linked to the cultural context as suggested, that is, by the folklore theory (Rampichini and Schifini D'Andrea 1997).

This structure turns out to be stable over time as a consequence of its presence in all the considered occasions. Significant trajectories in relation to regions do not emerge.

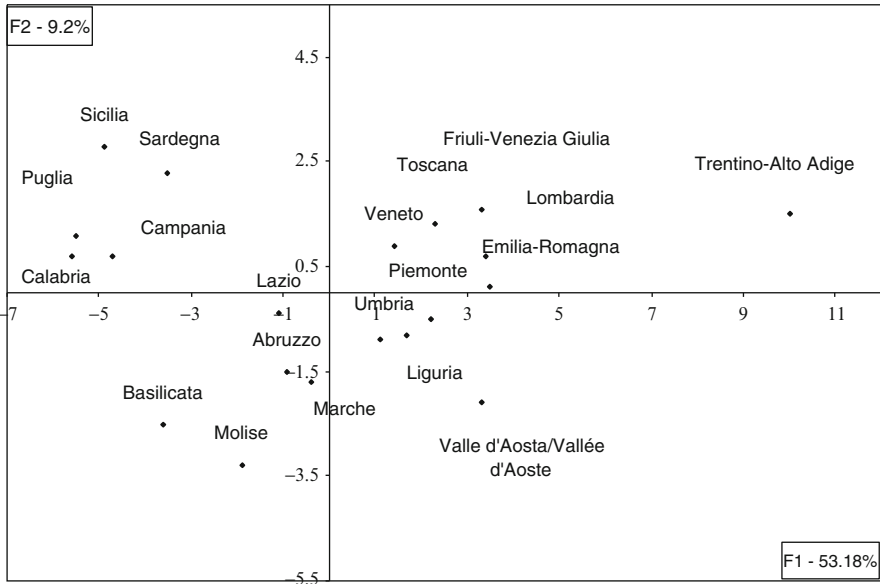


Fig. 7.5 First factorial plan from MFA: mean individuals (regions)

## 4 Conclusions

The methods used in the analysis allowed us to highlight, in the various analyses, the presence of a 'structure' that is strong and stable over time.

This structure essentially consists of a general factor (overall satisfaction), independently of the statistical units taken into consideration, and of a specific factor, which depends on the statistical units considered and which represents the relation with specific spheres of satisfaction.

The first factor can be interpreted both as a latent variable, which expresses individual predispositions (a top-down approach), and a synthetic variable, which summarises satisfaction with the various ambits of daily life (a bottom-up approach).

Dynamic analysis shows trends only in the gender and age analysis, that is, changes in overall satisfaction and leisure activities involving younger people (14–17 years) and elderly (65 years and over).

## Appendix






See Tables 7.7, 7.8, 7.9, and 7.10.

**Table 7.7** Coefficient of connection between groups: territorial study

Lg coefficient	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	FMA
1	1.094																
2	1.028	1.120															
3	0.979	0.965	1.141														
4	0.901	0.891	0.927	1.056													
5	0.983	0.958	0.970	0.926	1.107												
6	0.935	0.910	0.953	0.955	1.001	1.124											
7	0.988	0.961	0.984	0.920	1.023	1.025	1.175										
8	0.910	0.847	0.940	0.812	0.964	0.919	0.996	1.124									
9	0.917	0.898	0.876	0.901	0.931	0.930	0.973	0.918	1.119								
10	0.939	0.893	0.976	0.869	0.945	0.911	1.055	0.984	0.969	1.212							
11	0.876	0.805	0.884	0.832	0.932	0.877	0.947	0.997	0.895	0.975	1.129						
12	0.905	0.905	0.911	0.914	0.939	0.957	0.960	0.864	0.940	0.938	0.868	1.074					
13	0.957	0.906	0.933	0.882	0.973	0.928	0.950	0.979	0.914	0.946	0.968	0.931	1.112				
14	0.921	0.893	0.894	0.918	0.939	0.931	0.941	0.883	0.905	0.902	0.927	0.947	0.953	1.070			
15	0.944	0.900	0.949	0.929	0.963	0.933	0.949	0.935	0.929	0.967	0.970	0.935	0.974	0.991	1.096		
16	0.927	0.894	0.905	0.870	0.939	0.942	0.955	0.953	0.899	0.927	0.958	0.937	0.970	0.980	0.948	1.129	
FMA	1.013	0.984	1.011	0.966	1.032	1.014	1.052	1.001	0.993	1.026	0.988	0.994	1.018	0.999	1.020	1.008	1.074

RV coefficient	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	FMA
1	1.000																
2	0.928	1.000															
3	0.876	0.853	1.000														
4	0.838	0.819	0.845	1.000													
5	0.893	0.860	0.863	0.856	1.000												
6	0.843	0.811	0.841	0.876	0.898	1.000											
7	0.872	0.838	0.850	0.826	0.898	0.892	1.000										
8	0.821	0.755	0.830	0.746	0.865	0.818	0.867	1.000									
9	0.829	0.802	0.775	0.829	0.837	0.829	0.849	0.819	1.000								
10	0.815	0.766	0.830	0.768	0.816	0.780	0.884	0.843	0.832	1.000							
11	0.788	0.715	0.778	0.762	0.834	0.778	0.823	0.885	0.797	0.833	1.000						
12	0.835	0.825	0.822	0.858	0.861	0.870	0.854	0.786	0.858	0.822	0.788	1.000					
13	0.868	0.812	0.828	0.814	0.877	0.830	0.831	0.876	0.819	0.815	0.864	0.852	1.000				
14	0.851	0.816	0.809	0.863	0.862	0.849	0.839	0.805	0.827	0.792	0.843	0.884	0.874	1.000			
15	0.862	0.812	0.849	0.864	0.874	0.840	0.836	0.842	0.839	0.839	0.872	0.862	0.882	0.914	1.000		
16	0.834	0.794	0.798	0.797	0.840	0.836	0.829	0.846	0.800	0.792	0.848	0.851	0.865	0.891	0.852	1.000	
FMA	0.934	0.897	0.914	0.907	0.947	0.923	0.937	0.911	0.906	0.900	0.898	0.926	0.931	0.932	0.940	0.915	1.000

**Table 7.8** Global analysis. Eigenvalues (= inertia) from MFA: territorial study

N.	Eigenvalue	%	% cum.	
1	15.0146	53.18	53.18	
2	2.5972	9.20	62.38	
3	1.9066	6.75	69.14	
4	1.2767	4.52	73.66	
5	1.0117	3.58	77.24	

**Table 7.9** Canonical correlation coefficients<sup>a</sup>: territorial study

Years (groups)	Factors from MFA				
	1	2	3	4	5
1993	0.98	0.60	0.82	0.87	0.56
1994	0.96	0.51	0.86	0.71	0.56
1995	0.97	0.73	0.87	0.80	0.47
1996	0.96	0.80	0.62	0.76	0.49
1997	0.98	0.83	0.70	0.71	0.47
1998	0.97	0.94	0.71	0.85	0.63
1999	0.98	0.89	0.90	0.59	0.52
2000	0.96	0.83	0.70	0.50	0.60
2001	0.96	0.82	0.82	0.68	0.48
2002	0.97	0.79	0.73	0.71	0.47
2003	0.96	0.58	0.79	0.82	0.61
2005	0.97	0.82	0.88	0.62	0.56
2006	0.98	0.70	0.75	0.71	0.60
2007	0.97	0.77	0.80	0.76	0.53
2008	0.98	0.69	0.87	0.89	0.66
2009	0.97	0.73	0.85	0.63	0.54

<sup>a</sup>At the intersection of row j and column s: r(F<sub>s</sub>j, F<sub>s</sub>), j = 1993, ..., 2009

**Table 7.10** Ratio [(between-inertia)/(total inertia)]: territorial study

	Factors from MFA				
	1	2	3	4	5
Ratio	0.94	0.53	0.59	0.46	0.26

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# Chapter 8

## The Quality of Life Measured Through the Subjective Indicators of Safety: *Fear, Worry About Crime and the Risk of Criminality*

Alessandra Federici, Maria Giuseppina Muratore, and Daria Squillante

### 1 The Meaning and Importance of *Fear of Crime* in *Ontologic Safety*

*The Scream*, the most famous painting by Munch and one of the most famous of Nordic expressionism, captures an intense explosion of psychic energy in a painting that gives a lit and immediate metaphoric return, to symbolically abstract and condense sensations, emotions, feelings and parts of personality provoked *by* and leaning *on* reality, that refer to the multidimensional perception/experience of *safety*. The concept and the experience of “safety” can be visualised as a *continuum* of cognitive-emotive declinations of contextual and episodic worry, focalised fear and pervasive and spread anxiety. Following the escape lines of colour and the symbolic totality of *The Scream*, “*the Conceptual Man*” by Munch stands out, sinuous and soft, cut diagonally by the parapet of the bridge, which embanks an unnatural landscape, desolate and unwelcoming, crushed by a sky dramatically striped by red: a clean, full symbol of *environmental/contextual decline* and “*criminal red*” intended in a general sense. It is, however, the oval of the mouth that centres the true significant nucleus of the word: those sound waves of a scream that move the whole painting, agitating both the body of the man and the waves that define the landscape and the sky, while in the background the shapes of two men with strong and vertical shapes, deaf, impassive and indifferent, stand out to witness the fragility and atomisation of human relationships and material hostility that is warned of the (non)places of modernity.

How can we define and distinguish the fear and worries about the *risk of victimisation* from *community atomism* “screamed” by the Man of Munch, a flag waver of

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“reassuring” *safety claims* (Bauman 2000, 2006; Bauman and Vecchi 2004)?<sup>1</sup> And how much does the causal polyhedric nature of this *giddiness of fright*, more or less anxiety inducing and spread, make a problem of the identification of an interdisciplinary and multivaried model that explains the origin and projects involved scenarios of fear? And how much “worry” and “fear of crimes” could still attract and hide deeper worries/fear of the deep tied with an individual and social order that does not guarantee for everyone that atavistic *ontological safety*, which is a singular and collective perception of the continuity of one’s own identity (Giddens 1990) and one’s own environment?

In this sense, it is interesting to distinguish the possibility that *fear of criminality* can inflict itself as an *objective meaning*, in other words as a correspondence between the *sign* and expressed *meaning* and also as a *signifier* of other fears that are not better crystallised. The construction and analysis of objective and subjective indicators<sup>2</sup> of *fear of crime*, therefore, is not sufficient for an exhaustive interpretability of “*fear*” declared in occasion of the *safety* survey and to explain the influence that “*fear*” exercises on individual daily life and behaviour. In fact, during the first victimology research, carried out during the 1970s and 1980s, known as “*traditional approaches to the sentiment of insecurity*”, the basic hypothesis identified a univocal directionality between criminality and the feeling of (in)security of the citizens, precisely in a cause-effect dynamic. However, more recent analyses have demonstrated more complex pictures, allowing the *fear of crime* to be explained by other types of “insecurity”. For example, the provocatory and almost paradoxical question raised by Lagrange et al. (1992) is very interesting, according to which “*could it not be, in depth, that the fear of crime has nothing to do with criminality?*”

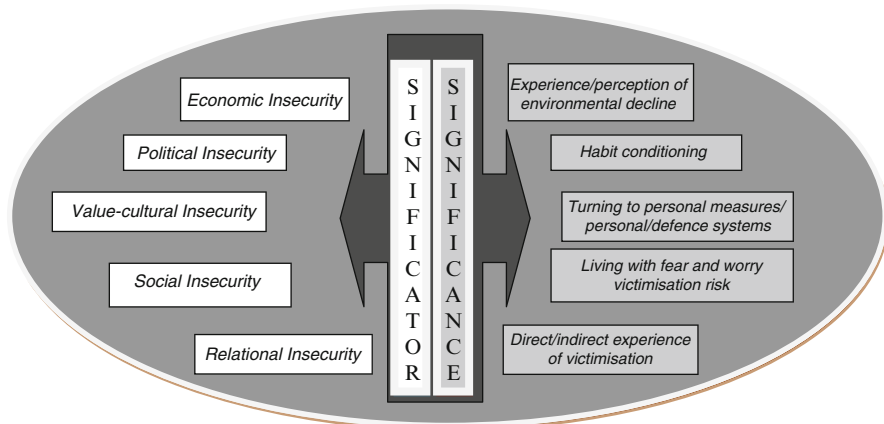
In Bauman’s short essay *Identity*, a book based on the correspondence between Bauman and the Italian journalist Benedetto Vecchi, Bauman demonstrates the thesis according to which our modernity has passed from a *solid* to a *liquid* phase. Because of this “liquidity”, nothing takes on a shape, neither the individual nor the social and institutional constructions, nor the economic system or the valued architecture at the foundations of human communities. Like in the landscape of *The Scream* by Munch, “liquidity” determines a state of continuous and very fast change, “frightening” the perception and background of human experience, both singular and collective.

It is possible to recognise many current and complex challenges in the perception of one’s own *ontologic safety*: a very strong crisis affected the traditional idea of family,

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<sup>1</sup>Interesting in this sense the analysis of S. Roché who, thoroughly analysing in a diachronic perspective the relationship between the presumed growth of crime and the spreading of insecurity, identifies in the periods of the end of century – more specifically end of the nineteenth and twentieth century – some attention points of the positive criminal schools (Italian and foreign) on the themes of social preservation from crime and social safety in a general sense, more tied to the movements of decomposition and recomposition of the social identity and balances than to the true increase in criminal rates.

<sup>2</sup>Refer to paragraph 3 for identification and presentation of the objective and subjective indicators of fear and worry.



**Fig. 8.1** Fear of crime as significance and signicator and the dimensions of its interpretation

with its imperishable character of belonging to a long range, almost an eternal belonging; the deep transformation of the concept and background of the “community”, moved by powerful atomistic and individualistic drifts; the *new economy* and the restructuring of the work market in terms of flexibility, mobility and precariousness; the secularisation and success of laity in the ideological, political and philosophical setting of the public as much as the individual; and the demobilisation of rights, duties and freedom of every human being, represent concrete. The confused and unstable identity is caused by several joint oscillations, both intra- and interdimensional – determining often worse effects on emotional well-being, pushing to crystallising a global insecurity on a more manageable insecurity such as that of *crime*. In this sense, *fear of crime* cannot be interpreted just according to the direct and indirect experience of victimisation, to the perception of social and environmental decline and to the worry of the victimisation risk, but it becomes the signicator of other insecurities, complicating the analysis of fear of criminality and the subjective perception of safety (Taylor and Hale 1986) (Fig. 8.1).

This no longer univocity of relations between fear and criminality requires the re-actualisation of *criminal policies* and a felt reflection by *policy makers* in identifying and updating contents and methods for a new policy that exceeds the conception of the *quality of life* mainly compressed in objective indicators.

In this evolutive perspective of the conception and measuring of the quality of life and well-being, the Nobel prize winner for economics Amartya Sen develops the *Human Development approach*, which makes it possible to methodologically consider the multidimensionality of well-being, the differences between individuals created by personal characteristics and the material and moral context in which they live: a context marked by material conditions and rules of behaviour that have been shared and sedimented through time. In particular, Sen concentrated on the question about “which well-being”. Sen defines well-being as a set of dimensions,

defined *Capabilities* of being and doing, and a subset of *Functioning* given by the true and free exercise of the individual abilities of real people, placed in a social, moral, territorial and historical context. Assuming that human beings who live and act in society are men and women, and that both subjects are connoted for many social, class and category differences, and again for differences of age and ethnic groups, Sen leaves the concept of a single, abstract, neutral and objective subject. Therefore, the individual fulfilment in each dimension – in the case of our analysis, the ability to *live a safe life* – depends on the interaction between subjective and objective, individual and collective and introspective and environmental. In the meantime, Martha Nussbaum elaborated her own version of the theory, making it take on a specifically normal character and using the debate on the rights for women (Magni 2003). Both Sen's and Nussbaum's approaches support the idea of development intended not as economic growth but rather as *human development*. According to Sen, "development can be seen (...) as a process of expansion of freedom enjoyed by human beings", and well-being represents "the freedom to enjoy what realises a fully human life" (Sen 2001, 2004, 2010). Consequently, both the serene subjective perception and the feeling of an objective safety of the contexts crossed in one's own daily life represent the basic dimensions in the construction both of individual and community well-being.

Sen's theorisation is therefore impudently concrete, because *guaranteeing a capacity* means guaranteeing the practical conditions of its effective exercise, in a conceptual and operative movement of freedom from a negative definition – i.e. freedom *from* something – to a positive concept – the freedom that flows *in* doing and *in* being. The result is the creation of a world that is *right*, where we all have the capacities to live a life that is worthy of being lived and *completely human*, in which needs and desires are satisfied. With the term completely human life, Nussbaum means a life in which are guaranteed not only the most intuitive education and health but also the freedom to speak and – for our study interests – protection of physical integrity.

*The capability approach not only represents a philosophical theory but can* (and should) be translated into policy principles and acts, thanks to the collaboration of other disciplines. Sen therefore involves *policy makers* even with regard to the construction of "healthy and safe environments", and to give the idea of how effectively the dimensions of well-being intersect with political and institutional responsibilities. With reference to a territory, this approach aims at constructing matrixes that intersect residents' "capacities" with institutions' functions (aimed at applying regulations, training, guaranteeing safety and so on) highlighting the specific contributes of the different sectors at different dimensions of well-being. In this manner, the "multidimensionality" becomes a key for potential cooperation between social/institutional structures and shared responsibility with regard to living a satisfying life as a whole. As far as safety is concerned, if living "a safe life" represents a "capacity", a "being able to" live a safe life, each public institution must do the best in order to guarantee the position of "being able to" live a healthy and safe life for each individual.

## 2 Structurality or Functionality of Crime in the Personal and Collective Construction of Fear

As mentioned, from the pioneering interpretive literature of a casual directionality between an increase in the crime rate and fear of crime, the most recent literature and empirical research on the study of insecurity perception has distorted the survey reasoning and results that guaranteed a one-way connection between victimisation and subjective fear. The results show a decisively wider, more multidimensional and interdisciplinary conception and a strict link between the spread and propagated anxiety with the deep modifications of the social background. Age, economic discomfort, gender, social-environmental decline, cultural poverty and solidarity network fragility have risen little by little to active variables in generating a more or less pervasive, episodic and circumstantial insecurity, inevitably but necessarily complicating the defining and operative research framework (Barbagli 1998; Sabbadini and Muratore 2003; Gray and Jackson 2007).

Briefly, analysing the evolution of definition and analysis of safety perception makes evident how the growing uncertainty that characterised United States (during the 1960s) and Great Britain (during the 1970s) and the tangible collective anxiety for criminality and victimisation was an effect of modern life (Stanko 1990). From 1982, the inclusion of sets of items concerning the fear of crime in the surveys on safety, such as the British Crime Survey (enriched during time with new dimensions), was internationally recognised as a milestone of victimisation surveys and of definition of new indicators – including subjective as well as objective dimensions. So how much fear is structural to the criminality carried out and undergone – even in its indirect declinations of soft crimes (drugs, prostitution, vandalism, degraded context) (Van der Wurff and Stringer 1988) – and how instead crime, fear of crime and the perception of insecurity, can be functional to the expression of less identifiable and less manageable fears at a singular and collective level?

By analysing throughout the criminal literature, we can identify different approaches to the interpretation of the perception of insecurity, which condense even important studies and shades of different authors (Farrall et al. 2000; Muratore and Arsani 2004; Roché 1988):

### 2.1 *The Theory of Victimisation*

During the first theoretical developments on victimisation (1960s–1970s), the theory of victimisation postulates that the objective risk of sustaining a crime and the direct personal experience of victimisation are the two key factors in understanding the differences between people when declaring themselves frightened or not regarding criminality (Lee 2001; Liska et al. 1988; Skogan 1981, 1987). The *fear of crime* as a product of victimisation, therefore, is the simplest element in the causal matrix

for understanding the perception of insecurity and the fear of crime. In fact, this interpretation of subjective insecurity was not sufficiently supported by the empirical evidence, adding value in literature to the so-called *Risk-fear paradox* (Hale 1996). That paradox shows the very weak correlations between victimisation and perception of insecurity/fear of criminality. In fact, the paradox identifies groups of people who should have been insecure and frightened given their experience of victimisation but who instead were not (among which the social groups more at risk of victimisation, e.g. young men in a degraded context) and others who should have been sure but declared themselves as being frightened (such as elderly females with relatively contained victimisation rates).

## 2.2 *The Theory of Imaginary on Victimisation*

The second theoretical and empirical approach focuses on the connection between *fear/perception of insecurity* and *imagining being a crime victim*. This imaginary is originated from both *indirect experiences of victimisation* transmitted by known people (Skogan and Maxfield 1981) and media information, which acts as a real *crime multiplier* by intensifying the violence and drama of criminal narration, so much so as to rouse mechanisms of amplification of the risk perception (Farrall et al. 2006). Contrary to the previous approach (victimisation), this model found an empirical evidence by obtaining positive confirmation (Farrall et al. 2007a, b). The indirect background of victimisation through multimediatic interpersonal communication such as a triggering matrix of *fear of crime* was supported by interesting and repeated studies that postulated how *crime narration* can generate notable feeling of insecurity and anxiety towards the safety perception. The indirect narration of victimisation sensitises the imaginary to the *possibility*, interpreted in terms of *risk*, of crime, above all when the victimisers have similar socio-demographic or environmental position characteristics to those who have been victimised.

## 2.3 *The Theory of Vulnerability*

According to the *theory of vulnerability*, the insecurity is defined by three main dimensions: (1) exposure to risk, (2) the cognitive anticipation of negative consequences and (3) the loss of control and the absence of defence instruments, protection measures and possibility of escaping. The interaction between the three dimensions defines, for each subject, the intensity of the insecurity perception, making it possible to identify specific “typologies” of “fear people”, in which the greatest accentuation of one of the three dimensions that influence the background of the *fear of crime* affects particularly the insecurity perception, for example,

women, the elderly, people in poor physical condition and people who live in degraded contexts and uprooted by social protection and solidarity networks (situational factors).

## ***2.4 The Theory of Environmental Perception***

According to this approach (Garland 2001), the *fear of crime* is affected by the environmental decline of one's own reference context or of the contexts in which one develops opinions/perceptions related to the level of (in)security. The decline of social and supportive networks, the fraying of social control and the decline of urban environment (vandalism, poor lighting, graffiti, presence of drug addicts/pushers and prostitutes) have been frequently and positively associated to the perception of insecurity. In this field of research and measurement of disorder, criminality and perception of fear, the renowned Roché's theory of *Vitre Cassée* (2000) analyses how the individuals who are most sensitive to disintegration and incivility, intended as a breakage of public order, escape from the declined spatial and value system. The alteration of normality intended as being *public order*, causing an increase of social insecurity generates *fear due to breaking the rules* – the symbolic “*broken glass*” – leads to mistrust in the institutions and stops people from reporting the fact with the consequent ulterior increase in crime.

## ***2.5 The Theory of Economic Solidity and Sustainability***

According to this model, people's level of perceived (in)security is related to the level of faith they place in present solidity and in the future trajectories of economic well-being, contextual to their spatial reference poles. Economic fragility and uncertainty, according to this interesting approach developed by Greenberg (1986), generates feelings and backgrounds of vulnerability that are projected from socio-economic vulnerability to physical vulnerability. Anxiety and worry for the abstract uncontrollability of the progress of systemic macroeconomic variables is translated into and perceived as a concrete non-controllability of criminal events.

## ***2.6 The Theory of Experience and the Expression of Fear of Crime***

The fear of crime must be differentiated from the *daily worry* of personal risk and a *generalised expression of anxiety* in facing social change, stability, order and cohesion.

Daily worry turns out to be more associated with those people who live in areas that are particularly hit by crime and decline in comparison with those who crystallise on the perception of insecurity anxiety that is global and not well defined. As Bauman shows, crime represents a symbolically “dense” notion, such as to be moved onto a wide range of social problems. However, both the worry and anxiety in relation to the perception of safety from crime can be interpreted as *seismographs* of the perception of a collective and complex moral cohesion. In this view, to investigate if the questions on the *frequency* of fear can better capture the daily worry directed towards crime, Farrall and collaborators (such as, Jackson and Gray) developed and tested a set of questions and a series of indicators by introducing two new measuring perspectives: (a) a filter question allowing the researcher to identify those who during the reference period (usually 3 years and 12 months in the main safety surveys) had been through emotions/backgrounds of worry and fear and (b) questions allowing the frequency and intensity of these episodes of “fright” to be measured. The numerous and rigorous studies allow the authors to determine inferior estimates of the daily experience of fear of crime in comparison with less specific indicators, suggesting how the standard measurements probably identify emotive-cognitive backgrounds *tied* to the sphere of fear but not *distinctive* to the fear of crime. In this sense, the author analyses and confirms how the intensity of the images, which connote specific emotions, has an impact on background and on daily habits more in virtue of their strong symbolism and meaning than in their true diffusion and incidence (Tyler 1980, 1984).<sup>3</sup>

## 2.7 *The Theory of Contextual Worry and the “Frightening” Trait*

Gabriel and Grave (2003) suggest the necessity to distinguish between fear as an expression of a *personality trait* and worry as a *temporary emotional* state. The set of questions re-elaborated even by Farrall, as mentioned before, allows the researchers to distinguish individuals who are marked by a personal inclination to feel themselves afraid and those who experiment *episodes* of fear in tight connection with specific situations of true danger and risk of criminality. Those who are characterised by a greater predisposition to fear show danger and feel fear of victimisation more frequently and more intensely, beyond external stimulating objects.

The extremely rich interdisciplinary literature and empirical research aimed at defining and studying the *fear of crime* constituted the background allowing Istat (Italian National Institute of Statistics) from 1996 to start investigating the complex phenomenon of fear, by first defining at best which indicators able to inform about its complexity. Consequently, the multipurpose survey “Citizen’s Safety” has been

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<sup>3</sup>The authors give the example of airplane accidents, which are in effect perceived and feared as being more frequent than they truly are, in virtue of the catastrophic and uncontrollable effect that they generate when they occur. As a result, conclude the authors, we introject their impact on our lives deeper than what should be attributed to them.

enriched with items exploring worry about crime and the fear intensity and frequency. The next paragraphs present a study aimed at identifying some *clusters* that represent the different approaches to the fear of crime and victimisation based on the data of the Istat multipurpose survey on “Citizen’s Safety”.

### 3 The Multipurpose “Citizen’s Safety” Survey

The Citizen’s Safety survey is a periodic survey of Istat carried out last time in 2008–2009 using the CATI (*computer-aided telephone interviewing*) survey technique on a stratified sample of 60,000 Italian citizens of over 13 years of age. The main purpose of the survey is to identify the point of view of those who have suffered individual and family crimes and, through a series of screening questions, identify the number of victims and crimes that occurred in Italy during the last 12 months prior to the interview. The questionnaire focuses also on the reporting victims’ behaviour, the crimes’ dynamic (place, time, type and amount of the damage suffered...) and the victims and author characteristics. Furthermore, some questions are specific on fear of crime, safety perception in the area in which one lives as well as the presence of *soft crimes* and the social-environmental decay and the protection systems households use to defend themselves and own homes from crime.

The analysis<sup>4</sup> has been conducted in order to explore the relationship between objective – such as frequency and intensity of crimes suffered and social-environmental context – and subjective – worry for personal safety and feeling of insecurity – aspects. The subjective information is related to the most wide concept of “safety”, defined as being able to live without worry, “sure” not to become a victim of danger situations and not to suffer damage.

### 4 Data Analysis: Methodology and Result Interpretation

The concept of insecurity, declined in terms of fear of becoming a victim in a real or presumed dangerous situation, strictly related to both personal and social well-being, has been operationalised in the survey, breaking down the subjective dimensions of “fear of crime” and of “safety perception” in sub-dimensions that are more easily recognisable and measurable, which make it possible, for example, to high-

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<sup>4</sup>The analysis was carried out by SAS software (*Statistical Analysis System*) and SPAD (*Système Portable pour Analyse des Données*) statistical software. In particular, the performed multiple correspondence analysis allowed the *experience* elements and the *expressive* elements to be linearly combined by extracting the factorial axes on which the individuals have been subsequently classified. For this purpose, the mixed, not hierarchic, classification technique was used (SEMIS), which allows us to identify clusters of individuals, namely, social “ideal types” of acting in presence of fear of crime and the sense of personal insecurity.



light the existence of a true external menace for the individual or even the intensity of worry of suffering damages following criminal events.

In particular, three dimensions were defined to identify the operative definitions of the concept of “perception of safety”:

- *The subjective and objective fear of being victim of an event that is negative for oneself* (if it happened that the person did not go out alone, if and how much the fear of crime influences daily habits or again if anyone had suffered the fear of being about to suffer a crime, even if the fact has already occurred or not)
- *The insecurity feeling inside and outside the domestic walls* (e.g. how safe a person feels when he/she walks along the road in the dark or when a person is at home alone by night)
- *The worry of suffering crime* (how much people are worried about suffering a theft, an aggression or sexual violence personally and/or for their own family)

Moreover, in order to complete the frame, more objective indicators, tied with the daily habits of the individual, were identified:

- *The citizens' daily habits* (how often they leave home by day and by night for enjoyment or work and how often they use public transport)
- *The social context and the environment in which they live* (the presence of social and environmental decay and the opinion/evaluation on the “liveability” of the area in which they live)
- *The victimisation experiences* (type and number of personal and family crimes suffered)

The analysis aimed at combining subjective “*expressive*” aspects (perceptions) with concrete “*experience*” aspects (reality of those who are living/have lived through situations of decline and criminality), by giving a new reading on how behaviours and life habits connect with each other, worries towards criminal risk situations and the perception of fear of the citizens.

The analyses carried out on the “Citizen’s Safety” survey data (Muratore et al. 2004) allow us to realise that the individual fear represents a phenomenon involving an extremely high percentage of citizens. In particular, a high number of interviewed expressed a great insecurity in particular conditions (going out alone and/or walking in the dark) or affirmed to never go out, either alone or with others. It should, however, be specified that only a scant part of the population in particular situations has real fear of suffering a crime, even though almost all of those who are afraid expressed a high level of suffering (“a lot” or “enough”). Even the worry of crimes (violent individual crimes and household property crimes) is decisively high. More analytically, it can be confirmed that people are more worried about becoming the victim of sexual violence, followed by the fear of burglary, aggression or robbery, while people are less worried about being bag-snatched or having their car stolen.

Regarding the indicators on the perceived risk of criminality in the area in which one lives, almost eight people out of ten define the quarter where they live at no or at little risk of criminality. When requested to give a subjective evaluation of the level of criminality reached with regard to 1 year before the interview, the majority

estimated the situation almost unchanged, while a decisively smaller quantity confirms that criminality has risen.

From the analysis of the *soft crime* indicators present in the survey, it emerges how citizens often see in the area in which they live, in decreasing order, acts of vandalism against public good, vagabonds or homeless people, people who use drugs, people who sell drugs and lastly prostitutes looking for clients. In addition, almost one-third of the individuals see that in the area in which they live there is poor lighting, and that they live in a degraded area – in which, for example, there are abandoned or decaying buildings, green areas that are not looked after and dirty or neglected streets.

To carry out the multiple correspondence analysis of the data (Bolasco 1999; Greenacre 1984; Lebart et al. 1997), it was decided to select which indicators produced by the survey could become active variables and which illustrate, taking account of the descriptive survey results, the survey theoretical-conceptual framework and the research features and aims. Considering that the role of the *active variables* is that of actively contributing in the formation of the factorial axes while the role of the *illustrative variables* is only of being an aid to the interpretation of some latent aspects of the axes, it was decided to consider among the first:

- Worries of crimes
- Objective fear of becoming a crime victim
- Daily life behaviour (how much a person goes out by day, in the evening, by night or if he/she uses public transport)
- Individual preventive behaviour (performed to prevent danger situations)
- Generic fear of crime

While it was decided to insert among the second:

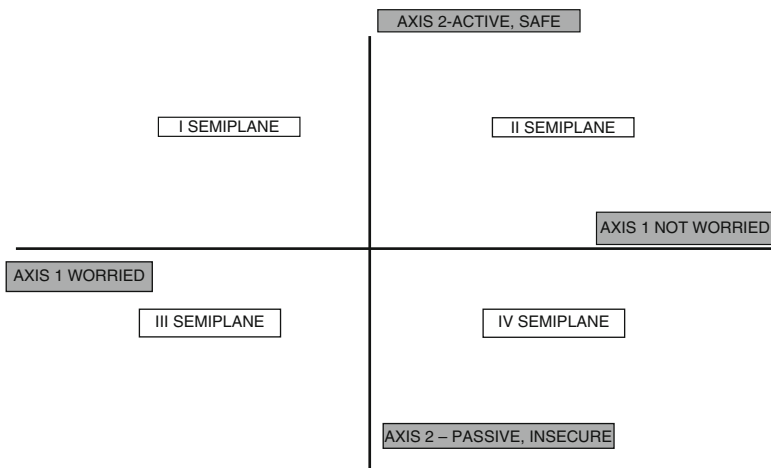
- Socio-demographic variables (sex, age, social status, region, main territorial area, demographic dimension of municipality of residence)
- Perception of safety when walking in the dark alone
- Safety systems used to protect one's own house
- Soft crimes
- Evaluation of the level of criminality reached in one's own area
- Relationships with the police

The CORMU analysis procedure produced 84% of inertia explained by the first two dimensions.<sup>5</sup> In particular, the analysis of the *accumulated contributions* of the involved active variables allows us to state, preliminarily, that:

- The *first dimension* is explained mainly by the indicators related to *the worries of crimes* and the individual defence strategies taken to protect oneself when one goes out alone.

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<sup>5</sup>The authors applied the “optimist” formula of Benzecri which is used to re-evaluate the percentage of inertia explained by the first and most important identified factors.



**Fig. 8.2** Interpretation of the first two axes of the factorial plan

- The *second dimension* is explained mainly by the indicators related to the *daily behaviour* in dark and isolated contexts, namely, in situations in which the risk of becoming a victim is higher clearly emerges.

The joint observation of the coordinates and squared cosines of the active variables and the test values of the illustrative variables allows us, finally, to *interpret* in a more complete and analytic way the first two identified dimensions. In particular, by analysing which variables and items contribute to axis construction, the first axis was interpreted as *the dimension of worry*, while the second axis is qualified as *the dynamism dimension*.

A detailed analysis of the factorial planes formed by the first two axes (Fig. 8.2) allows us to identify four typologies, corresponding to the most important attributes of the four semiplanes:

- The *first and second semiplanes* identify those who show the following characteristics: (a) going out every day or several times a day for work and for enjoyment both by day and by night, (b) using public transport every day, (c) feeling very/quite safe when they are alone in the street also in the dark, (d) being not afraid when walking in the street alone at night, (e) being not provident, (f) being not worried about the possibility to (personally or family) suffer a crime, (g) defining the area in which they live as being not very/not at all under criminal risk and (h) declaring that the fear of crime does not influence their habits.
- The *third semiplane* identifies those who show the following characteristics: (a) having felt an objective fear of remaining victim of a crime during the 3 months before the interview; (b) declaring to be very frightened by what happened; (c) declaring themselves to be very worried about suffering crimes; (d) having installed safety systems in their home; (e) declaring that, during the 3 years before the interview, they effectively suffered car theft or theft of objects from

**Table 8.1** Description of the six classes

	Percent	Description
<i>Cluster 1</i>	35.7	Adult men, “active”, always safe and never worried about suffering crimes, they live in “peaceful” areas
<i>Cluster 2</i>	32.1	Adult women, “active”, a little or not at all safe, worried about their safety, who live in degraded areas, who have suffered household crimes and fear them in the future
<i>Cluster 3</i>	5.2	Adults who, during the last 12 months, have felt an objective fear about the possibility to suffer a crime (and for this reason they are very afraid) and who, during the last 3 years, have suffered a crime against their person; influenced by crime, they often see situations of degradation in the area in which they live
<i>Cluster 4</i>	4.2	Elderly women, alone, “not very active”, insecure of going out at night alone for fear of crime, very influenced by fear of crime, even though they have never suffered personally crimes and declare that the area in which they live is not at criminal risk and there are no signs of social-moral disorder or neglect
<i>Cluster 5</i>	15.5	Adult women, married, “fairly active”, safe in the street at night because they never go out alone, who live in peaceful areas in which there are no signs of risk situations or neglect
<i>Cluster 6</i>	7.3	Elderly women, widows, “not active”, completely isolated who never go out because too old or too ill, worried that they or their family can suffer sexual violence or theft, who evaluate their own area as free of elements of socio-environmental decay

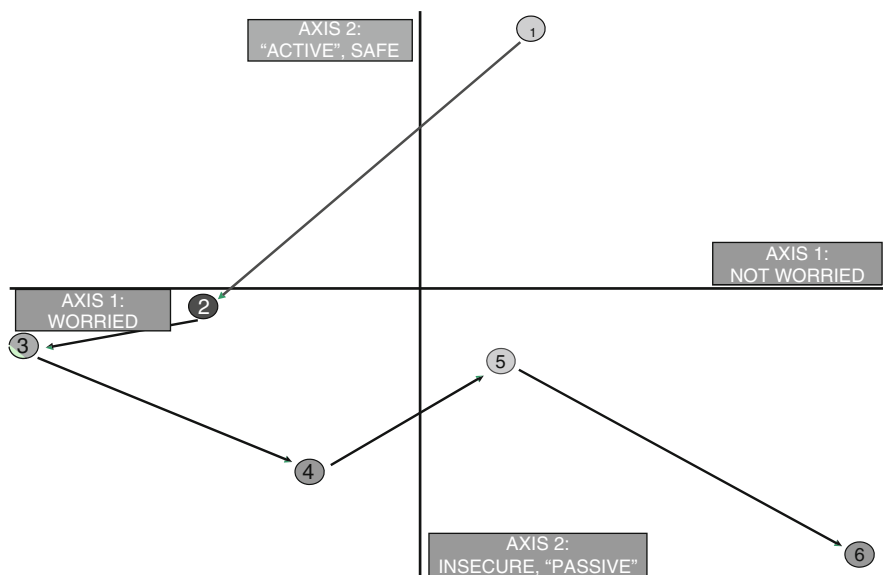
car and crimes against the individual as bag snatching, pickpocketing and threats; (f) declaring that the fear of crime negatively affects their habits; (g) defining the area in which they live as being very/fairly under criminal risk and (h) seeing frequent acts of violence against public items.

- The *fourth semiplane* identifies those who show the following characteristics: (a) never going out either by day or by night, (b) never going out alone when it is dark since they are too ill or old or fearful of the criminality characterising the area in which they live and (c) feeling not/slightly safe inside their home.

These results produced an interesting picture of how the different involved indicators combine: on the one hand the connection between “objective fear” (worry, direct victimisation) and the negative evaluation of the place in which one lives and fear of crime and on the other the relationship between those who have little contact with the outside world (the community) and who do not feel very safe in the street or at home, renouncing in this sense going out at night alone.

This representation highlights the relationship between personal risk, worry about what could happen and concrete situational factors of victimisation. The bond between social isolation and subjective fear emerges alarmingly, fear that is not “justified” by factual elements of crimes suffered or social-environmental decline that has been lived.

The application of the classification procedure, carried out on the results of the cluster analysis shown here, is a necessary step for identifying the behavioural profiles and the Weberian “ideal types”.



**Fig. 8.3** Projection of the six clusters onto the factorial plane of the first two axes

The methodological choices used produced six groups of individuals, the main characteristics of which are given in Table 8.1.

The projection of the groups of individuals on the previously constructed factorial axes makes it possible to distinguish in a more intuitive and immediate manner the characteristics and most salient aspects of the six clusters (Fig. 8.3).

## 5 Conclusions

The scientific and political aspiration to measure and conceptualise the *fear of crime*, in parallel with the growing re-evaluation of the *quality of life* as a combined product of multiple objective and subjective dimensions and no longer just economic, has motivated through the years an important revisitation of the topic in order to explain insecurity and the fear of crime. As mentioned, even though the pioneeristic theorisations of *fear of crime* hypothesised a causal relationship between an increase in the crime rates and insecurity perception, the latest literature and research bring institutional and scientific attention to the need to develop complex and interdisciplinary models of interpretation and analysis that consider growing social and existential uneasiness, which can be riskily crystallised into sub-products of the *fear of crime*, distorting survey results. A *constructional approach* to the study of crime is therefore necessary, which integrates the varied individual, relational, environmental and cultural phenomenologies that influence the perception of

safety and the symbolic construction of social reality. The analysed data, on the one hand, repeat the interaction of the multiple dimensions and on the other offer additional point to be surveyed regarding the impact of the dimension of criminality on the quality of life.

The interpretative scenario highlighted in this chapter underlines the existence of a linear combination between subjective and objective indicators by leading to a sort of *gestalt* of the “safety and fear of crime” phenomenon. It is not possible, using this type of analysis, to identify the direction of this bond and understand which aspects influence what and how. Further analyses, based upon more explicative statistical models, applied to the highlighted individual types could contribute to more deep comprehension of the phenomenon by explaining more univocally the direction of the obtained results.

However, the obtained results allow us to state that (a) fear of crime is not just irrationality, a non-ideological diagnosis of the socio-environmental aspects, local and national, as a result of direct or indirect backgrounds of criminal situations (b) but is also *tout court* fear, fear as anxiety for a (well)being that is missing and faulty and which conditions the vision and perception of oneself and the surrounding reality.

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# Chapter 9

## Hours of Work and Life Quality

Maria Clelia Romano\* and Daniele Spizzichino

### 1 Introduction

Employment is a central aspect of people's life quality. Being employed and receiving adequate pay to make one's living is consistently ranked as an important requirement for individual quality of life (Clark 2001; EU 2004). Work not only provides an individual with an adequate income, it is also a source of psychological stability and development. It provides individuals with a clear time structure for the day, a stable pattern of regular activity, a sense of identity and participation in a collective purpose.

On the other hand, workers spend a great deal of time at work: arguably more than they spend on "doing" any other particular thing. As a result, workers' perception of it and the satisfaction that they derive from it constitute an extremely important component of their well-being, not least because they are significantly and strongly related to life satisfaction (e.g. Campbell et al. 1976).

Job quality is certainly a multidimensional concept that requires both objective and subjective measurements. The chapter reports the main results of a study on satisfaction with working time: using Time Use data, it highlights the need to integrate objective information about hours worked with information of a subjective nature. Through a descriptive analysis and a logistic model, this study investigates the relationships between satisfaction/dissatisfaction with time devoted to

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\*The authors share the general view expressed in the chapter. However, M.C. Romano mainly edited paragraphs 2, 3, 4, 6 and 8, while D. Spizzichino mainly edited paragraphs 5, 7 and 9. Paragraphs 1 and 10 are equally edited by the authors.

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work and, on the one hand, the main demographic characteristics of the worker and the job's characteristics and, on the other hand, other indicators of perceived well-being.

## 2 Job Satisfaction as an Indicator of Job Quality

In the past, much of the economic analysis of the labour market seems to have paid scant attention to the non-wage aspects of a job. Nevertheless, as long ago as 1974, Flanagan et al. argued that in order to avoid discontent among workers, firms need to provide the right mix of wages and non-pecuniary job characteristics. They also noted that the preferred mix likely differs between workers and may change as income rises.

Clark (1998), using survey data across nine different OECD countries, proposes a partial taxonomy of six job characteristics that workers deem important: pay, hours of work (both overwork and underwork), future prospects (promotion and job security), how hard or difficult the job is, job content (interest, prestige and independence) and interpersonal relationships. These are all important correlates of a good job, from the workers' point of view, or of job satisfaction. According to Clark, workers' decisions about whether to work or not, what kind of job to accept or stay in and how hard to work are all likely to depend in part upon their subjective evaluation of their work, in other words, their job satisfaction.

Empirical studies on what constitutes a good job also provide evidence that quality of work is comprised of more than monetary rewards. When workers are asked, they say that the monetary rewards from working come a long way behind other aspects of the job, such as job security, job interest, promotion opportunities and autonomy (Clark 2004).

Consequently, it is not sufficient to collect objective measures about the various dimensions of job quality. Asking workers directly is very important because some of the job's characteristics (job interest, job difficulties, etc.) are not measurable. Other items, such as hours of work, can be measured, but it is not clear whether they have a linear relationship with job quality. For example, while it is clear that a higher paid job is a better job, the situation with respect to hours is less clear cut. A 35-h-per-week job may be too long for some people and too short for others (Clark 2004). There is no way of knowing without asking workers how many hours they would prefer to work. Therefore, the possibility of using one dimension to classify jobs according to their quality is often rejected. The Employment in Europe report (EU 2001) suggests that "in the absence of a single composite indicator, any analysis of job quality must be based on data on both objective and subjective evaluations of the worker-job match". The EU, with the report Employment in Europe 2002, goes further in including job satisfaction in its definition of quality of work and claims that "in all Member States self-reported job satisfaction is strongly positively correlated with wages, job status and job related skills acquired through training". Therefore, job satisfaction can be considered, at least to some extent, a good proxy for job quality.

Beyond the research literature and studies, job satisfaction is also important in everyday life. Employees should also “be happy in their work, given the amount of time they have to devote to it throughout their working lives” (Nguyen et al. 2003).

The last decade has witnessed renewed interest among economists and other social scientists in studying job satisfaction as an indicator of job quality (Smith 2007). This has come about above all because, as many studies have shown, job satisfaction is closely related to labour market behaviour such as productivity (Mangione and Quinn 1975), quits (Gazioglu and Tansel 2002) and absenteeism. Moreover, job satisfaction is considered a strong predictor of overall individual well-being (Diaz-Serrano and Cabral Vieira 2005) and, as the wage, a good predictor of intentions or decisions of employees to leave a job (Freeman 1978; Akerlof et al. 1998).

### **3 Work Hours: The Mismatch Between Ideal and Actual Hours of Work**

Analyses of the labour market typically emphasise, among other items, hours of work. Using information on 14,000 workers in 19 OECD countries, Clark (2004) showed that wages and hours are among the least important characteristics of a job and that, on the contrary, subjective evaluations of income and hours have a strongly significant impact on job satisfaction, even when their objective counterparts are controlled. Nevertheless, policymakers generally analyse data relating to hours worked but pay scant attention to subjective – albeit available – information regarding working time. This study highlights the added value that analysis of subjective indicators offers to studies on working time and the need not to neglect in policy planning the complexity of the relations that exists between objective and subjective indicators.

In contrast to the standard theory,<sup>1</sup> according to which people choose their optimal number of hours, there is much evidence that work hours cannot be freely varied within jobs and are instead strongly influenced by employer preferences, institutional factors and imperfect mobility of the labour force. The number of hours worked reflects not only the labour supply decisions of individuals but also employer preferences, technology, industrial relations and the business cycle. This would suggest that some workers who do not work their preferred number of hours need to change jobs in order to adjust the number of hours worked or, more simply, many workers will remain in disequilibrium with respect to the number of hours worked. Simply because the amount of labour supplied is likely to reflect both workers’ and employers’ preferences, there is, inevitably, a mismatch between the ideal and actual number of hours worked.

There are, therefore, many sources of this mismatch (between the ideal and actual number of hours worked), and an overemployment or underemployment

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<sup>1</sup>The conventional microeconomic model of the labour market suggests labour suppliers sort themselves or are matched into jobs that reflect their preferred work time in the long run.

mismatch may persist for a long time. Yet it is also clear that if there is a persistent mismatch between desired and actual hours, this is both individually and socially suboptimal (Golden and Gebreselassie 2007).

## 4 The Time-Related Overemployment

Time-related overemployment and underemployment are the consequences of this mismatch. The International Labour Organisation (ILO) defines time-related underemployment as a situation wherein the number of hours worked by an employed person is insufficient and the person is willing to engage in more work and is not already working more than a specified number of hours. There is no international definition for overemployment. However, in this chapter, employed people (aged 15 or over) are classified as overemployed if they want to work fewer hours, either in a different job or in their current job. In this overemployment classification, no threshold for a minimum number of hours worked is applied because it is feasible for a person to want to work fewer hours, even if he/she is working fewer hours than the average.

Unlike many studies of working-hours constraints, the focus here is less on underemployment, even though underemployment is more common and may be more adverse to worker welfare.

Over the long run, longer work weeks are often interpreted as reflecting a more productive economy; conversely, shorter work weeks are read as a symptom of an inefficient or overly rigid labour market (e.g. Rogerson 2008). Attention has often been paid to overemployment insofar as it has considerable spillover (hidden) social costs, and curbing it with appropriately targeted policies may potentially serve to reduce the extent of underemployment, at least in sectors and workplaces where they coexist.

However, others have argued that even in narrow economic terms, very long hours are undesirable. Above a certain threshold, an increase in hours actually decreases the long-run level of output because worker fatigue decreases productivity over the entire working day.

Even when economically efficient, long hours may have other negative individual or social effects and may entail high social costs not only for workers but also for their families, severely impacting the entire household's perceived well-being. What the threshold is or what conditions must exist for overemployment to have negative effects is hard to say.

Golden and Altman (2008) distinguish between three separate concepts: long hours, overemployment and overwork. Long hours simply means hours that are longer than average. Overemployment refers to the situation in which workers supply more hours than they would like to, because employers do not offer work at the desired number of hours. Overwork refers to an intensity or duration of labour that harms a worker's physical or mental health due to fatigue or stress. By this definition, it is possible to be overemployed or overworked even if one is not working long hours, depending on preferences and job intensity; conversely, very long hours may be both voluntary and non-harmful to the worker. However, there is good reason to

believe that long hours are associated with overwork and overemployment. Moreover, hours that are desirable and salutary for individuals may have negative social effects (Fraser and Gornick 2009). Overwork, even if voluntarily chosen, can have negative effects on the individual. Long hours have been associated with reduced mental and physical health and increased mortality (Spurgeon et al. 1997; Sparks et al. 1997; Lamberg 2004).

Reports of overemployment also vary according to demographic and occupational characteristics. Reynolds (2003) investigated mismatches between actual and preferred hours and hypothesised that tensions between work and family responsibilities might drive the desire for shorter hours. As female employment and the prevalence of dual-earner couples have increased, the difficulty of balancing long hours with family responsibilities has increased (Jacobs and Gerson 2004).

## 5 The Data

The questions used to measure overemployment may vary widely. Some place the ideal number of hours in relation to possible reductions/increases in salary, while others only enquire into satisfaction with current work hours. In addition to differences in formulations and in the resulting differences in estimates, at the international level overemployment and underemployment are measured using subjective criteria. In addition, the alternative of using the objective indicator concerning hours worked, despite having the advantage of ensuring that people are not counted as time-related over or under employed if they are working above a certain number of hours, requires some difficult choices: about the type of hours worked (actual, usual or a combination of actual and usual hours worked, including or excluding overtime) and the choice of cut-off point to apply. A question on overemployment and underemployment was included in the Time Use survey which for the first time in 2002–2003 surveyed satisfaction in relation to time dedicated to some areas of daily life, in addition to satisfaction with the areas themselves. More specifically, respondents were asked to express the degree of satisfaction with regard to the time that they dedicated to their spouse/partner, themselves, children, parents, other relatives, studies, work, friends, leisure and rest time.<sup>2</sup> Satisfaction in relation to economic situation, health, studies, work, life as a couple, relationships with friends, the quantity and quality of leisure time<sup>3</sup> and one's own life in general<sup>4</sup> was also surveyed.

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<sup>2</sup>The question asked was: "Are you satisfied with the time you dedicate to...?". The possible responses were "Yes", "No, it is too much" and "No, it is too little".

<sup>3</sup>The question asked was: "Think about the last 12 months. How satisfied do you feel you are with the following aspects of life?". The possible responses were "Very", "Fairly", "A little" and "Not at all".

<sup>4</sup>The question was: "Are you, overall, satisfied or dissatisfied with the life that you lead now?". The possible responses were "Very satisfied", "Fairly satisfied", "A little satisfied" and "Not at all satisfied".

The reason for deciding to analyse data from the Time Use survey rather than the Labour Force Survey is precisely the wealth of information that the former survey makes available regarding the interviewee's quality of life in the various areas, by not limiting itself to the work condition alone, as the latter survey does. This makes it possible to study not only the relationships between overemployment and individual and work characteristics but also the relationships between overemployment, life times and perceived well-being. The Labour Force Survey, in fact, despite collecting extremely detailed information about the work condition and measuring overemployment and underemployment in accordance with Eurostat directives, is lacking in detailed information about both the quality of the work performed and, more generally, interviewees' quality of life.

## 6 Objective and Subjective Measures of Worked Hours

In the Time Use survey, a sample of 55,773 individuals were interviewed. Of these, 22,312 were employed. When asked the specific question regarding how they judge their working time, two Italians out of three (65.0%) respond that they are satisfied with the time that they dedicate to their work, while just under a third (31.5%) find it is too much and a marginal 3.5% are dissatisfied because they feel it is too little.

Workers satisfied with the usual number of hours worked constitute the vast majority and are more than 14 million. Just seven million workers, in contrast, think that they dedicate too much time to work and another almost 800,000 too little. In other terms, Italian workers' dissatisfaction with regard to working time is primarily a problem of overemployment.

Table 9.1 illustrates the distribution of employed people by classes of usual number of hours worked.<sup>5</sup> This information, although valuable for employment policies, says little about how individuals perceive their working time. Furthermore, on the basis of the objective criterion, estimating overemployment and underemployment is extremely complex, above all for the choice of the threshold in relation to which to classify workers.

For example, if we consider overemployed workers whose usual weekly number of hours is over 48,<sup>6</sup> in Italy 15.7% of employed people find themselves in this condition, around half the number of those who consider their working time to be excessive. The objective indicator thus appears to underestimate the phenomenon. The introduction of a new variable (the sex of workers) into the analysis highlights

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<sup>5</sup>The question asked was the following: "Excluding meal breaks and travel between home and work, how many hours do you usually work a week?"

<sup>6</sup>As suggested by Eurostat, which considers a working week of over 48 h undesirable (Council Directive 93/104/EC of 23 November 1993). Also, according to ILO (2010), could be considered to work excessive hours are workers who devote to work more than 48 h. In particular, workers within the 40–48 h per week band are more debateable, and dependant, to a degree, on national circumstances, so mainly only those at the upper end of the range could be judiciously categorised as working excessive hours.

**Table 9.1** Employed people by usual weekly hours of work and sex and overemployment rate

Usual weekly hours of work	Male	Female	Total
1–20	3.0	13.9	7.3
21–29	2.1	11.3	5.6
30–34	2.4	6.5	4.0
35–39	17.3	21.5	18.9
40	34.3	27.0	31.5
41–48	17.5	10.2	14.7
49–59	11.7	4.4	8.9
60 and over	9.1	3.3	6.8
Variable number of hours	2.4	1.6	2.1
Don't know/don't remember	0.3	0.2	0.3
Average	42.9	35.5	40.0
Obj. overemployment rate (more than 48 h)	20.7	7.7	15.7
Subj. overemployment rate	33.2	28.9	31.5
Overemployment gap (subj.-obj.)	12.5	21.2	15.8
Obj. overemployment rate (more than 40 h)	38.3	17.9	30.4
Subj. overemployment rate	33.2	28.9	31.5
Overemployment gap (subj.-obj.)	-5.1	11.0	1.1

Source: Istat Multipurpose “Time Use” survey, 2002–2003

the fact that the underestimation, although common to both males and females, is particularly high for the latter.

If the threshold is lower and, for example, workers with a higher than 40 h a week<sup>7</sup> are considered overemployed, the estimates provided by the two indicators for the entire group of workers are closer to each other, but the disaggregation by sex highlights a negative difference among males and a positive difference among females. The objective indicator overestimates the number of overemployed males by about 5 percentage points and underestimates the overemployment among females of about 11 percentage points.

Similarly, if workers are disaggregated according to the type of work, the objective indicator, using the threshold of 48, underestimates overemployed employees and overestimates self-employed workers. Using the threshold of 40 h a week, employees are less underestimated and self-employed people are more overestimated (Table 9.2).

In other terms, the objective measures are significantly different from the subjective measures, independently of the variability connected with the thresholds used. The variability of the gap grows when additional variables are introduced

<sup>7</sup> 40 h represent a “normal” work week besides the mean value.

**Table 9.2** Employed people by usual weekly hours of work and type of work and overemployment rate

Usual weekly hours of work	Employees	Self-employed workers
1–20	7.6	6.2
21–29	6.3	3.9
30–34	4.0	3.8
35–39	24.0	5.0
40	37.3	15.7
41–48	12.2	21.3
49–59	4.8	19.8
60 and over	2.2	19.5
Variable number of hours	1.4	4.2
Don't know/don't remember	0.1	0.6
Average	37.8	46.3
Obj. overemployment rate (more than 48 h)	7.0	39.3
Subj. overemployment rate	30.1	35.4
Overemployment gap (subj.-obj.)	23.1	-3.9
Obj. overemployment rate (more than 40 h)	19.2	60.6
Subj. overemployment rate	30.1	35.4
Overemployment gap (subj.-obj.)	10.9	-25.2

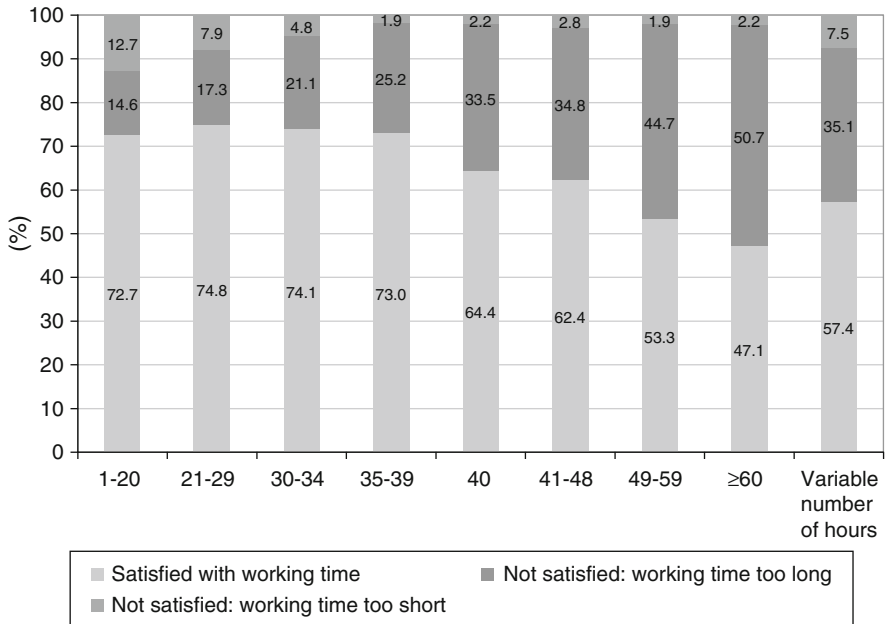
Source: Istat Multipurpose "Time Use" survey, 2002–2003

into the analysis, highlighting the opportunity to use different thresholds according to the workers' and job's characteristics. This happens because of the different system of preferences that workers have with regard to work hours, which can vary a great deal according to individual characteristics and aspects of the work performed.

The discrepancies highlighted until now obviously do not exclude the existence of a relationship between the two information items. Beside the inconsistencies, the relationship between the objective situation (usual number of hours worked) and perceived condition is clear from Fig. 9.1, which shows satisfaction expressed in relation to the usual weekly number of hours worked.

The number of overemployed individuals increases as weekly hours increase. Around 17.3% of those working between 21 and 29 h a week said that their work hours were too long, compared, for example, with 33.5% of those working 40 h, rising to 50.7% of workers who typically dedicate 60 h or more to work. Similarly, the number of underemployed increases as the total number of hours a week decreases. Finally, the percentage of satisfied respondents is highest among those who work between 21 and 29 h a week.

Beside an understandable, as well as predictable, relationship between hours worked and perception of time dedicated to work, the heterogeneity of the picture that emerges shows that other factors can also influence the perception of one's own



Source: Istat Multipurpose “Time Use” survey, 2002-03

**Fig. 9.1** Employed people by satisfaction with time devoted to work and usual weekly hours of work (Source: Istat Multipurpose “Time Use” survey, 2002–2003)

working time, since given the same number of hours worked, not only are there those who declare themselves satisfied and those who declare themselves dissatisfied but also those who feel that their work hours are too long and those who conversely say that they are too short. In other words, working long hours does not necessarily imply dissatisfaction with one’s hours of work, just as reduced hours of work are not necessarily always satisfying. The relationship between hours of work and the worker’s perception therefore involves other factors.

## 7 Descriptive Statistics: Characteristics of the Overemployed Workers

Table 9.3 shows the distribution of satisfied and dissatisfied (overemployed and underemployed) workers by some of the main characteristics of the worker and their work. The tables also show the mismatch ratio and the overemployment ratio. The first is defined here as the sum of overemployment plus underemployment, divided by the share of workers that prefer the “same hours” they currently have, that is, the ratio of those who are dissatisfied to those who are satisfied with their number of work hours. The second one is the overemployment over underemployment rate.



**Table 9.3** Employed people by satisfaction with time devoted to work and individual characteristics

	Satisfied	Not satisfied: work hours too long	Not satisfied: work hours too short	Mismatch ratio <sup>a</sup>	Overemployment ratio <sup>b</sup>
<i>Sex</i>					
Males	63.8	33.2	3.0	0.57	11.07
Females	66.8	28.9	4.3	0.50	6.72
<i>Age</i>					
15–24	69.9	26.1	4.0	0.43	6.53
25–34	66.0	30.4	3.6	0.52	8.44
35–44	63.6	32.9	3.5	0.57	9.40
45–54	63.4	33.3	3.3	0.58	10.09
55–64	64.6	32.0	3.3	0.55	9.70
65+	75.4	21.3	3.3	0.33	6.45
<i>Education level</i>					
University degree or higher	65	31.4	3.6	0.54	8.72
Upper secondary	65.7	31.4	2.9	0.52	10.83
Lower secondary	64	32.2	3.7	0.56	8.70
Primary education, no education	65	29.9	5.1	0.54	5.86
<i>Type of work</i>					
Employee	66.7	30.1	3.2	0.50	9.41
Self-employed	60.4	35.4	4.2	0.66	8.43
<i>Professional status</i>					
Executive	62.2	36.6	1.2	0.61	30.50
Director, manager, employee, supervisor	66.7	30.8	2.5	0.50	12.32
Teacher	77.1	19.9	2.9	0.30	6.86
Manual worker, apprentice, domestic worker	65.4	30.5	4.2	0.53	7.26

Entrepreneur, self-employed professional	60.8	35.0	4.2	0.64	8.33
Self-employed worker, associate in cooperative	60.3	35.5	4.2	0.66	8.45
<i>Commuting distance</i>					
I don't have a fixed place of work	61.5	32.3	6.2	0.63	5.21
I work from home/telecommute	59.1	36.3	4.6	0.69	7.89
Less than 1 km	66.4	29.7	3.8	0.50	7.82
From 1 to less than 5 km	66.9	30.2	3.0	0.50	10.07
From 5 to less than 10 km	65.8	31.1	3.1	0.52	10.03
From 10 to less than 20 km	65.6	31.7	2.7	0.52	11.74
From 20 to less than 50 km	62.2	34.7	3.1	0.61	11.19
50 km and over	62.9	34.5	2.5	0.59	13.80
<i>Sector of economic activity</i>					
Farming, hunting, fishing	62.6	31.3	6.2	0.60	5.05
Mining, energy	69.8	27.6	2.7	0.43	10.22
Industry and manufacturing activity	63.1	34.6	2.2	0.58	15.73
Construction	62.9	32.8	4.3	0.59	7.63
Wholesale and retail	61.0	36.0	2.9	0.64	12.41
Hotels and restaurants	54.8	38.9	6.3	0.82	6.17
Transport, warehousing and communications	58.6	39.0	2.4	0.71	16.25
Monetary and financial intermediation	64.0	34.2	1.8	0.56	19.00
Real estate activities, rentals, ICT	64.8	31.2	4.0	0.54	7.80
Public administration and defence	73.9	23.8	2.4	0.35	9.92
Education	75.3	21.1	3.5	0.33	6.03

(continued)

Table 9.3 (continued)

	Satisfied	Not satisfied: work hours too long	Not satisfied: work hours too short	Mismatch ratio <sup>a</sup>	Overemployment ratio <sup>b</sup>
Health and other social services	69.8	27.5	2.7	0.43	10.19
Other services	64.5	29.9	5.7	0.55	5.25
<i>Work outside standard hours</i>					
Works from home/outside working hours	60.7	36.5	2.8	0.51	13.01
Does not work at home/outside working hours	66.3	30.0	3.7	0.65	8.11

Source: Istat Multipurpose "Time Use" survey, 2002–2003

<sup>a</sup>The numerator is the sum of overemployment plus underemployment, and the denominator is the proportion of workers that prefer the "same hours" they currently have

<sup>b</sup>Overemployment rate divided by underemployment rate

As the table shows, the values of the latter indicator are always greater than one, showing that even when Italian workers are disaggregated according to main socio-demographic or work characteristics, the proportion of overemployed workers is always higher than that of underemployed workers.

In keeping with the different amount of weekly hours worked, the mismatch ratio and the overemployment ratio are higher among males. Nevertheless, females more frequently consider the amount of time dedicated to work excessive, when it assumes “normal” values: 37.2% of females who work 40 h a week consider their working time excessive, compared with 31.6% of males. In fact, the desired number of work hours varies according to gender, since on average females who are satisfied with work time work 7 and a half fewer hours than males per week (34.3 and 41.8 h, respectively). Similarly, the average usual number of weekly hours worked by overemployed females is 39.3, compared with 45.6 for males.

The mismatch ratio also increases in the age classes between 35 and 54. The central stages of the individual life cycle are those in which family responsibilities and duties make reconciling work and family time more difficult and the perception of an excessive workload may increase.

The percentage of individuals who are satisfied with their work hours does not vary significantly with education level. The overemployed ratio, by contrast, is higher among those who have a medium-high or high education level.

It is not only the characteristics of the worker but also the characteristics of the work itself that influence the individual’s perception of work hours. In keeping with the average number of hours worked, which is higher than for employees, self-employed people are more frequently dissatisfied with work time and record a higher mismatch ratio (especially if they are self-employed professionals, entrepreneurs or self-employed workers). This difference according to type of work highlights the importance of the system of expectations in generating satisfaction or not. Self-employed workers have also implicitly accepted the aspects of their work connected to work hours, including their possible extension. As a result, they consider more “normal” to work 40 h a week compared with employees.<sup>8</sup> 34.2% of employees who typically work 40 h a week feel that they dedicate too much time to work; this percentage falls to 28.5% for self-employed workers. Similarly, employees who say that they are satisfied with their work hours on average work 37 h a week, while self-employed workers who are satisfied work 44 and a half hours a week. Overemployed employees work 40.3 h a week on average, compared with 50.6 h for self-employed workers. In addition, differences in perception of working time

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<sup>8</sup> According to de Bustillo Llorente & Fernández Macías (2005), there are two types of mechanisms that make the level of expectations and the objective characteristics of the job tend to adapt. First, expectations tend to adapt to objective conditions. For years, social psychologists have been studying psychological mechanisms that make people tend to adapt their expectations and even their perceptions of the environment to its actual conditions. It is very difficult to maintain a conception of the world (or in this case, of work) that is too discordant with reality. If one cannot change things, one adapts. Second, the objective conditions also tend to adapt to expectations. People try to find jobs that fit their work expectations. Ultimately, if a person finds a job that does not fit his/her expectations and is not capable of changing his/her expectations, he/she will probably end up leaving it.

between self-employed workers and employees cut across the sexes, but are more noticeable among females.

Once again, it is those who work in the “hotels and restaurants” and “transport” sectors who express the greatest degree of dissatisfaction with work hours, which are felt to be too long more frequently than by workers in other sectors of economic activity. It is worth pointing out that – in keeping with the findings of other studies<sup>9</sup> – the workers who are most satisfied with their work hours are teachers.

Finally, it is interesting to observe the relationship that emerges between distance from the workplace and satisfaction with working time. The most dissatisfied are those who work at home, followed by those who work over 20 km from the place where they live. Among the former group, the percentage of overemployed is particularly high, highlighting the negative consequences of overlapping work spaces and times with the spaces and times for family life.

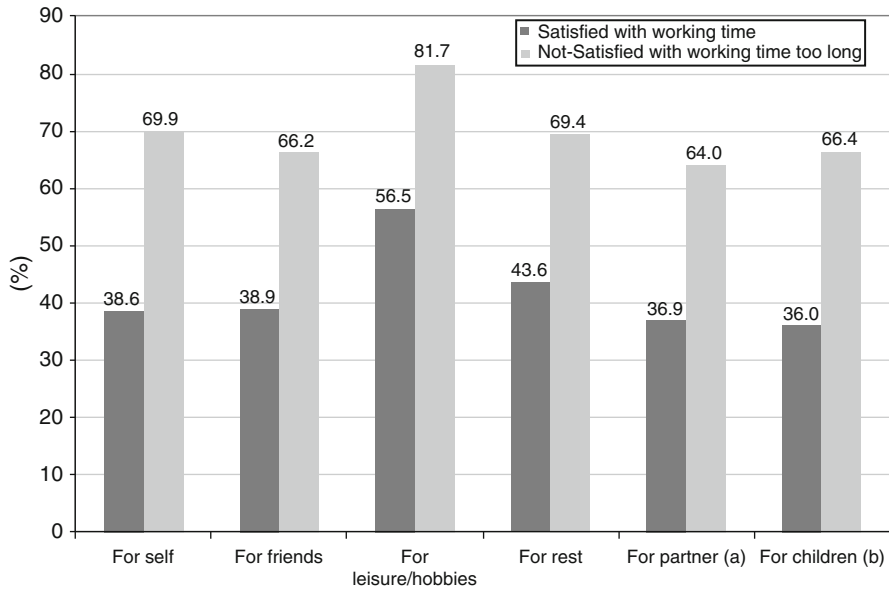
The habit of bringing work home or in any case working outside the hours/places “traditionally” set aside for it increases the feeling of dedicating too much time to work: indeed, 36.5% of workers who sometimes work outside standard hours are dissatisfied because they feel that they work too much, compared with 30.0% of those who do not have this experience. This relationship emerges independently of the number of hours worked: it can thus be seen among those who work up to 20 h a week in total as well as among those who work over 50 h. It is however more evident among males, for whom the percentages of workers who are dissatisfied because they work too much are 40.3% where work “overspills” and 31.0% where this does not occur, respectively; for females, it is probable that the flexibility of working hours and the opportunity to work from home or at moments that are not considered – according to a traditional view of working times – “working hours” is more frequently experienced either as an intrinsic aspect of their own work (take, e.g. teachers) or as an opportunity that helps them to manage their own life schedules better rather than as a source of dissatisfaction.

## 8 Overemployment and Well-Being

Time dedicated to work occupies, as we have seen, a significant part of the day and consequently impacts the organisation of all other living times, if only because of the physiological need to “square” the 24 h. More time spent at work leaves less time to recover from fatigue (Tam 2010). More time spent at work also means less time spent at home and with the family and less leisure time. Disruption of the work-life balance is the most common consequence of overemployment and has been shown to be associated with increased work-family conflict and indirectly with psychological distress (Major et al. 2002). The data analysed confirm the relationship between working time and satisfaction with the time dedicated to other areas of one’s own life.

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<sup>9</sup>The category of teachers is a professional category which also in the context of other studies has shown specific features that make it in certain respects a “privileged” category. See also: Istat. *Conciliare lavoro e famiglia: una sfida quotidiana*. Rome: Istat (2008) (Argomenti no. 33).



**Fig. 9.2** Employed people who consider time dedicated to a series of life’s aspects insufficient by each aspect and satisfaction with time devoted to work. (a) The figure refers to workers living as a couple. (b) The figure refers to workers living as a couple with children (Source: Istat Multipurpose “Time Use” survey, 2002–2003)

Those who feel that they dedicate too much time to work express dissatisfaction with the amount of time that they are able to dedicate to themselves, their family, leisure and so on more, often than workers who consider their working time adequate (Fig. 9.2).

Indeed, the time budget data also confirm that overemployed individuals sacrifice not just a part of their leisure time to work but also a part of their time to “personal care” (e.g. sleeping). In the case of females, a kind of substitution effect is also witnessed as they react to the workload outside the home with a reduction in time for household work (Table 9.4).

From the data analysed, a clear link emerges between satisfaction with working time and other indicators of well-being measured in the Time Use survey. Specifically, the cross-analysis, on the one hand of the satisfaction expressed with working time and on the other of satisfaction with regard to work overall, confirms the importance of the time aspect in terms of the overall quality of working life. 85.5% of workers who are satisfied with the time that they dedicate to work say that they are also satisfied, in general, with the work that they do (Table 9.5). This percentage, by contrast, falls to 67.1% among overemployed workers and to 38.1% also among underemployed individuals. It should in any case be noted that, while being satisfied with the time aspect is frequently associated with a positive perception of work in general, it is equally true that the proportion of workers who are satisfied with their own work, despite feeling that they dedicate too much time to it, remains high (over two thirds): it is very likely that overall job satisfaction is a precondition for expanding

**Table 9.4** Time dedicated by employed persons to daily activities in an average day by sex and satisfaction with time devoted to work (mean time and difference in hours and minutes)

Activity	Males			Females		
	Satisfaction with time devoted to work			Satisfaction with time devoted to work		
	Yes	No, too much	Difference: yes – no, too much	Yes	No, too much	Difference: yes – no, too much
Personal care	11:23	11:01	-0:22	11:12	11:00	-0:12
Paid work <sup>a</sup>	5:50	6:46	0:56	4:21	5:10	0:49
Household work	1:15	1:10	-0:05	4:03	3:38	-0:25
Free time	3:42	3:19	-0:23	2:48	2:38	-0:10
Travel	1:44	1:40	-0:04	1:28	1:30	0:02
Unspecified time	0:06	0:04	-0:02	0:08	0:04	-0:04

Source: Istat Multipurpose "Time Use" survey, 2002–2003

<sup>a</sup>The data about paid work have been collected, as for the other activities, through the day diary and are not directly comparable with the data on usual weekly hours of work

**Table 9.5** Employed people by satisfaction with time devoted to work and other well-being measures

	Satisfied	Not satisfied: work hours too long	Not satisfied: work hours too short
<b>Job satisfaction</b>			
Very	17.1	10.3	4.2
Fairly	68.4	56.8	33.9
A little	12.2	25.5	42.3
Not at all	2.2	7.5	19.5
<b>Life satisfaction</b>			
Very	10.4	4.6	4.8
Fairly	74.6	66.7	56.7
A little	13.7	25.5	31.5
Not at all	1.2	3.1	6.9

Source: Istat Multipurpose “Time Use” survey, 2002–2003

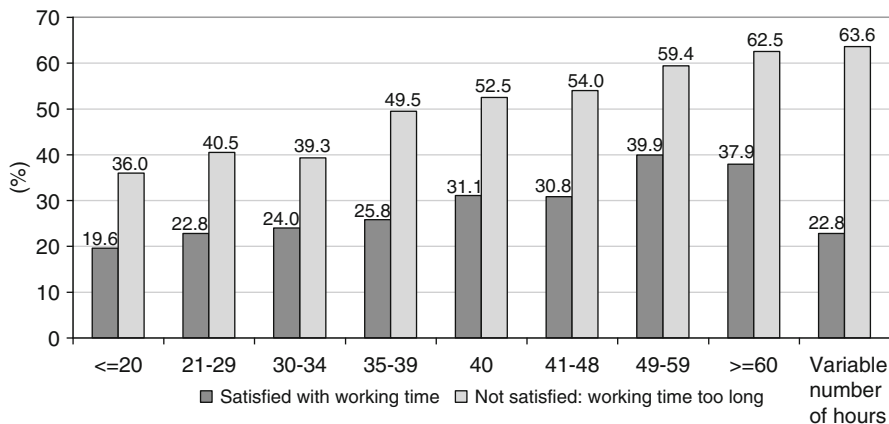
the time dedicated to it. Conversely, for workers who do not work long enough hours, it is less likely that the work is perceived as gratifying: the sense of inadequacy of working time (and probably the financial resources upon which they can count) predominates and influences the overall evaluation of the work factor.

Furthermore, those who are satisfied with the time that they dedicate to work are also more frequently satisfied in general with the life that they lead: 85.1% of those who are satisfied with their working time are also satisfied with their life, compared with 71.4% and 61.6% of the overemployed and underemployed. It should be emphasised that, once again, the negative perception of life quality is more widespread among those who are dissatisfied because their hours of work are too few, further confirming a situation in which the inadequacy of working time significantly impacts workers’ perception of overall life quality.

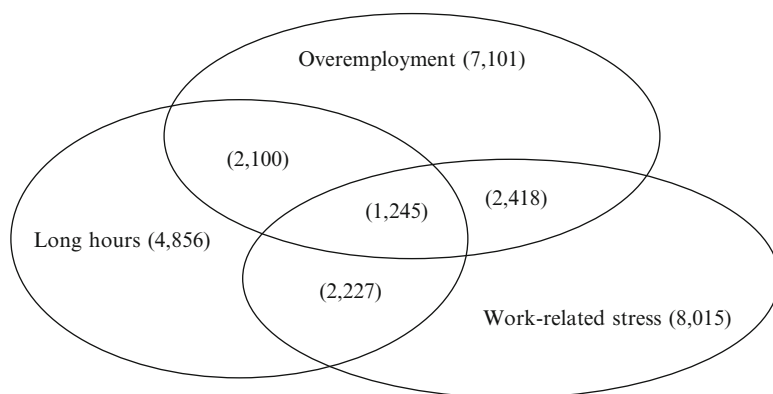
Overemployment can also have negative effects on the workers’ psychological and physical balance. Those who work a high amount of weekly hours more frequently report being stressed by their work. In addition, given the same number of hours worked, the percentage of workers suffering from work-related stress increases in cases in which they feel that they work too much. For example, in the 40-h-a-week group, 52.5% of overemployed workers and 31.1% of workers satisfied with their working time are stressed by their work. To summarise, working too much or, to put it more accurately, feeling that one dedicates too much time to one’s work is an aspect that is associated more frequently with a state of work-related stress (Fig. 9.3).

In conclusion, overemployed workers can be satisfied with the job and with the life, but they also can feel work-related stress. As shown in Fig. 9.4, overemployment is sometimes, but not always, associated with long hours or work-related stress or with both of them. The work-related stress is not necessarily associated with a long working time, or with the overemployment, although a large proportion of workers under stress from work devote to work more than 48 h or, even if they work fewer hours, consider too long their working time. Anyway, more attention should be paid to the segment in which the three critical points are added together: more than one million people (1.245) who work more than 48 h are overemployed and stressed from work.





**Fig. 9.3** Employed people stressed by work by classes of usual weekly hours of work and satisfaction with time devoted to work (Source: Istat Multipurpose “Time Use” survey, 2002–2003)



**Fig. 9.4** Long hours, overemployment and work-related stress (absolute values in thousands) (Source: Istat Multipurpose “Time Use” survey, 2002–2003)

## 9 Factors Associated with Overemployment: A Multidimensional Analysis

Logistic regression models make it possible to summarise the relationships analysed hitherto between the various aspects of life and dissatisfaction with time dedicated to work.<sup>10</sup> Specifically, dissatisfied individuals have been analysed, as they believe

<sup>10</sup>This model makes it possible to understand the associations of several (independent) variables with a (dependent) response variable. The association of each individual independent variable with the response variable is evaluated by checking simultaneously for the effects of all of the other independent variables included in the model. In this type of regression, the dependent variable is of the dichotomic kind.

that the amount of time dedicated to work is too great, in contrast with satisfied individuals. On the basis of sex and type of work, four models have been generated: male employees, self-employed males, female employees and self-employed females. The aim in doing so is to highlight any differences by sex and working position in the associations with the chosen dimensions. In particular with regard to sex, it has been decided to keep males and females distinct, as the job characteristics valued by females and males have repeatedly been shown to differ. For example, with reference to working time for the UK (Sloane and Williams 2000) and for the USA (Donohue and Heywood 2004), increased usual hours of work are often associated with lower job satisfaction for females but not for males. In general, many studies suggest that males and females make occupation and workplace choices based on different preferences over job attributes.

The independent variables selected refer to socio-demographic characteristics of the worker, of the work activity and other indicators of perceived well-being.<sup>11</sup> The models express the probability of being overemployed: values of greater than 1 for  $\exp(\beta)$  (odds ratio) indicate a greater degree of dissatisfaction, while values of less than 1 indicate greater satisfaction.

The variable most strongly associated with satisfaction with time dedicated to work is the one relating to satisfaction in general with one's work. This is true for males and females whether they are employees or self-employed. Lower levels of satisfaction with one's own work correspond to a lower level of satisfaction with time dedicated to it. The relationship is more marked for employees, particularly if they are females; for these, the odds ratios are 1.78, 3.51 and 7.86, respectively, for the "fairly" satisfied, "a little" satisfied and "not at all" satisfied compared with the "very" satisfied with their own work. They are followed by male employees where the "not at all" satisfied have an odds ratio of 4.94. The values for self-employed workers who report being "not at all" satisfied with their work are lower, with odds ratios of 4.13 for males and 3.92 for females (Table 9.6).

The greater the number of hours worked, the greater the dissatisfaction with time dedicated to work as it is considered too much; males and females with jobs as employees show similar levels of dissatisfaction. Compared with those who work 31–39 h a week, those who work at least 40 h are less satisfied: specifically, those who work 40 h have an odds ratio of 1.36 for males and 1.62 for females; those who work 41–50 h have an odds ratio of 1.6 (males) and 1.55 (females); lastly, those who more than any other group consider their work hours excessive are those with a total number of weekly hours of over 51 (odds ratios of 2.67 both for males and females).

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<sup>11</sup> The variables taken into consideration are age; marital status, education level; geographical area of residence; household type; usual weekly hours of work; work outside standard working hours; type of work schedule; professional status; sector of economic activity; distance from workplace; type of work (regular, occasional, seasonal); flexibility of working hours; atypical working hours; satisfaction with one's job, with life overall, with one's economic situation, with time dedicated to self, to partner, to children, to parents, to other relatives, to studies, to friends, to leisure and rest; difficulty of reconciling schedule with partner's hours of work, with children's school times, with office opening times, opening times of leisure places, shop opening times and public transport timetables; feeling of stress and self-perceived health.

**Table 9.6** Logistic regression model for satisfaction with time devoted to work. Probability of being dissatisfied because time is too long

Variable ( <i>reference response</i> )	Males				Females			
	Employees		Self-employed		Employees		Self-employed	
	Exp (B)	Sig.	Exp (B)	Sig.	Exp (B)	Sig.	Exp (B)	Sig.
Geographical macro-area ( <i>South</i> )								
North	1.49	***	1.64	***	1.44	***	1.56	**
Centre	1.57	***	1.96	***	1.45	***	1.59	*
Usual weekly hours of work ( <i>31-39</i> )								
1-30	0.95		1.36		0.72	**	0.53	*
40	1.36	***	1.09	***	1.62	***	1.56	
41-50	1.60	***	1.37	***	1.55	***	1.81	*
51+	2.67	***	1.71	*	2.67	***	2.12	**
Variable hours of work	1.56	*	1.50		1.49		1.23	
Work outside standard hours ( <i>No</i> )								
Yes	1.13		1.19	*	1.14		0.93	
Work schedule ( <i>part-time</i> )								
Full-time	1.68	*	1.15		1.61	***	0.92	
Distance from work ( <i>work from home/teleworking</i> )								
I don't have a fixed workplace	0.87		0.81		0.64		0.96	
Less than 1 km	0.93		0.90		0.51	*	0.81	
From 1 to less than 5 km	0.99		0.86		0.58		0.80	
From 5 to less than 10 km	0.94		0.99		0.58	*	0.73	
From 10 to less than 20 km	0.87		0.89		0.64		0.54	*
From 20 to less than 50 km	0.96		1.04		0.61		0.91	
50 km and over	1.14		0.93		0.78		0.69	
Satisfaction with own job ( <i>very</i> )								
Fairly	1.28	**	1.27	*	1.78	***	1.57	*
A little	3.34	***	2.35	***	3.51	***	3.64	***
Not at all	4.94	***	4.13	***	7.86	***	3.92	***

Satisfaction with life ( <i>very</i> )									
Fairly	1.26	*	1.84	***	0.89		0.98		
A little	1.22		2.52	***	0.93		0.73		
Not at all	1.47		4.31	***	1.38		0.50		
Feeling of stress ( <i>no, never</i> )									
Yes, always	1.48	**	1.72	**	1.47	*	2.49	**	
Yes, often	1.55	***	1.65	***	1.83	***	2.20	***	
Yes, sometimes	1.17	*	1.20	*	1.29	**	1.42	**	
Satisfaction with time dedicated to self ( <i>yes</i> )									
No, it is too much	1.45		1.16		0.89		3.43	*	
No, it is too little	1.60	***	2.01	***	1.59	***	1.81	***	
Satisfaction with time dedicated to partner ( <i>yes</i> )									
No, it is too much	1.83	*	0.89		2.43	**	0.52		
No, it is too little	1.32	***	1.21	***	1.11		1.00		
Satisfaction with time dedicated to children ( <i>yes</i> )									
No, it is too much	0.86		0.62		0.80		0.47		
No, it is too little	1.50	***	1.22	***	1.50	***	2.20	***	
Satisfaction with time dedicated to parents ( <i>yes</i> )									
No, it is too much	0.66		0.69		0.95		2.51		
No, it is too little	0.99		1.05		1.07		1.55	**	
Satisfaction with time dedicated to friends ( <i>yes</i> )									
No, it is too much	1.36		1.43		1.05		2.43		
No, it is too little	1.64	***	1.98	***	1.62	***	1.65	***	
Satisfaction with time dedicated to leisure ( <i>yes</i> )									
No, it is too much	0.70		0.74		0.91		1.20		
No, it is too little	1.36	***	1.50	***	1.23	*	1.49	*	
Satisfaction with time dedicated to rest ( <i>yes</i> )									
No, it is too much	1.56		1.35		1.03		1.90		
No, it is too little	1.74	***	1.85	***	1.51	***	1.41	*	

(continued)

Table 9.6 (continued)

Variable ( <i>reference response</i> )	Males			Females		
	Employees		Sig.	Self-employed		Sig.
	Exp (B)	Exp (B)		Exp (B)	Exp (B)	
Difficulty in reconciling schedule with partner's hours of work ( <i>not at all</i> )						
Very	1.39	1.33	**	1.12	1.32	
Fairly	1.10	1.37		0.85	1.31	
A little	1.15	1.06		0.85	0.89	
Difficulty in reconciling schedule with children's school hours ( <i>not at all</i> )						
Very	1.17	0.88		1.17	0.59	
Fairly	0.78	0.99	*	1.22	0.60	*
Not very	0.86	0.96		1.00	0.81	
Difficulty in reconciling schedule with office opening times ( <i>not at all</i> )						
Very	1.03	1.03		1.26	1.48	
Fairly	0.97	1.09		0.89	1.21	
A little	0.90	1.10		0.90	1.11	
Difficulty in reconciling schedule with opening times of leisure places ( <i>not at all</i> )						
Very	1.39	1.40	*	1.13	1.27	
Fairly	1.17	0.99		1.18	1.02	
A little	1.13	0.97		1.08	1.04	
Difficulty in reconciling schedule with shop opening and closing times ( <i>not at all</i> )						
Very	1.20	0.98		1.38	0.97	*
Fairly	1.32	1.13	**	1.21	1.19	
A little	1.08	0.83		1.25	1.07	*

\*\*\* $p < 0.001$ ; \*\* $p < 0.01$ ; \* $p < 0.05$

The table contains only the variables which show a significant association with satisfaction with time devoted to work. Nevertheless, the models include all of the variables in the note 11

In contrast, female employees who work less than 30 h a week (with an odds ratio 0.72) are more satisfied. For self-employed male workers, the link with hours worked is less strong, only those who work more than 51 h display greater dissatisfaction (with an odds ratio of 1.71 compared with those who work between 31 and 39 h). Self-employed females are more satisfied when weekly hours are fewer than 30 and more dissatisfied when they exceed 41.

In contrast, the relationship between overemployment and dissatisfaction with life overall is confirmed only for males. As dissatisfaction with life overall increases, so does dissatisfaction with time dedicated to work. The association is clearer for self-employed workers than for employees. In fact, while a person who is “fairly” satisfied with his/her own life exhibits an odds ratio of 1.84 compared with a “very” satisfied person, this value rises to 2.52 for the “a little” satisfied and to 4.3 for the “not at all” satisfied (these two responses are not significant for employees). For females, as has been seen, the relationship is not significant; clearly, the factors linked to life satisfaction in general are other ones.

Moreover, there are other work-related aspects that are connected to *overemployment*: the type of work schedule (part-time/full-time) and working outside standard hours. Having a full-time or part-time job is linked to lesser or greater satisfaction with time dedicated to one’s own work only for employees: those who work full-time express less satisfaction than those who work part-time (an odds ratio of 1.68 for males and 1.61 for females).

For self-employed male workers, the habit of bringing work home or in any case working outside the hours/places “traditionally” set aside for it is associated with greater dissatisfaction with work hours. Instead, for females – as already observed – it is probable that the flexibility of working hours and the opportunity to work from home or at moments that are not considered “working hours” is better accepted.

Confirming what has been seen in the descriptive analysis, working time influences the time dedicated to other aspects of life: the overemployed in fact exhibit greater dissatisfaction as a result of being able to dedicate little time to other things. This is true for both males and females (irrespective of the type of work, whether as employees or self-employed) who consider the time they dedicate to themselves, friends, leisure and rest to be too little. A relationship with the time dedicated to one’s partner is observed only for males. Overemployment is associated with lack of time dedicated to children mainly for females (with an odds ratio of 2.2 for female self-employed workers and 1.5 for female employees). For males, this is true only for employees (with an odds ratio of 1.5). The difficulty of reconciling different demands on time is in any case clear, in the presence of work hours that are considered to be invasive with regard to daily life.

Those who consider themselves the most stressed by life are less satisfied with time dedicated to work. The strongest impact is for females self-employed. Those females who feel always stressed have an odds ratio of 2.49. Female employees and males who are employees or self-employed exhibit lower values. For the latter category, those who are always or often stressed have around a 70% higher probability of not being satisfied with the time dedicated to their own work compared with those who are never stressed. For male employees, the probability is around 50%.

A further difference between females and males regards distance from work; the association is significant for the former (especially if they are employees), while it is not for the latter. In particular, female employees who work from home or telework consider the time that they dedicate to work to be too much compared with those who work less than 1 km or between 5 and 10 km from home. In other words, the perception of working too much time is more frequent for those who stay at home compared with those who commute to their workplace.

Finally, at the geographical level, it is in the North and Central Italy, compared with the South, where workers say that they are less satisfied with time dedicated to work because they consider it too much.

## 10 Concluding Remarks

Subjective indicators usefully complement analyses of workers' quality of life and help to interpret an extremely complex reality. The amount of hours worked, in fact, only partially reflects the worker's system of preferences, as it is highly conditioned by exogenous factors (firm, type of work, etc.). It tells us little or nothing about the experience and perceived well-being of the interviewee.

Of course, also satisfaction expressed with working time is only one of the indicators regarding quality of work. Without a doubt, it would be necessary to be able also to include in the analysis indicators that cover other aspects of quality of work. Concentration on only one or two of these aspects is likely to give a misleading picture both of where the good jobs are and of workers' behaviour.

Nevertheless, the study of this specific aspect already introduces a number of interesting points upon which to reflect. There is in fact no single ideal number of work hours that is ideal for everyone. Individual variables and job's characteristics influence the level of satisfaction expressed by workers. Dedicating a high amount of hours to work daily does not necessarily imply dissatisfaction, just as working fewer hours does not always imply greater satisfaction. The same amount of work time may be perceived as excessive by some and satisfactory for others. Employment policies and, in particular, the debate on work hours cannot continue to limit themselves to interpreting data of an objective nature while ignoring the complexity of the relationships that exist between hours worked, satisfaction expressed, work characteristics and overall well-being. Official statistics must welcome this challenge too, not only by improving and increasing available information on job satisfaction in all of its various aspects but also by seeking to construct composite indicators, which, without neglecting the heterogeneity of the dimensions to consider, can be useful policy tools at the same time.

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**Part III**  
**Quality of Life, Public Administration**  
**and Civil Society**

# Chapter 10

## Civic Evaluation as a Tool for Analyzing and Achieving Quality of Life Under the Citizen's Point of View

Angelo Tanese and Alessio Terzi

### 1 What Is Civic Evaluation?

#### 1.1 Definition of Civic Evaluation

Civic evaluation can be defined as an action research performed by citizens, through the use of established and verifiable methods, to issue reasoned judgements on realities that are significant for the protection of rights and the quality of life (Terzi 2010).

Therefore, citizens themselves, organized and provided with the appropriate evaluation tools and techniques, produce important information on fields that are deemed significant, such as services provided by public or private organizations (i.e. health, transportation, school, telecommunication, utilities, financial services, etc.) or public policies applied in given fields (such as welfare, environment, justice) at a national or local level.

Civic evaluation allows, in this way, to monitor and verify, for example, compliance with certain quantity-quality standards provided by contractual undertakings or Service Charters, the compliance of given policies to the expectations of citizens or, more, the compliance with specific regulatory obligations, sometimes widely ignored.

Civic evaluation is, therefore, a mainly “technical” activity. Citizens are not limited to the expression of subjective opinions, but they are able to issue judgements, based on data and information collected and processed according to specific methods and, where possible, judgements that are valid and meticulous from a scientific

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point of view. This technical dimension makes civic evaluation a process similar to other types of social evaluation and research (Moro 1998).

The elements which make civic evaluation different from other types of evaluation are:

- In the first place, the “point of view”, from which reality is observed, which identifies, formalizes and makes measurable typical aspects of the citizen’s experience, which cannot be interpreted from other observation perspectives
- Second, the fact that such activity is performed directly and autonomously by organized citizens, playing an active role in society in order to improve institutions and policymaking

Within the civic evaluation processes, citizens are at the same time:

- *Promoters* of the process, that is, subjects expressing the need to examine in depth and issue a judgement on a given problem
- *Enforcers* of the survey, because the data and the information regarding the problem are gathered and processed directly by them
- *Users* of the knowledge produced, because they have a direct interest in producing a change in the reality analyzed

It is, therefore, not possible to divide the strictly “technical” activity of producing information, from the more properly “political” activity of exploiting it in order to influence society in a concrete way.

Civic evaluation integrates these two dimensions, because it:

- Identifies and makes measurable the significant aspects from the citizen’s point of view
- Defines a set of technical tools for data collection and for information processing
- Allows citizens to assert their interpretation during policymaking processes

Summarizing, in civic evaluation processes, the evaluation action necessarily coexists with the mobilization of the people concerned with a specific issue, the sharing of information and assessment of the problem and the involvement in finding and implementing solutions. The evaluating citizen is always – and in any case – an active citizen who is interested in changing society.

## ***1.2 Civic Evaluation as Expression of Active Citizenship***

For the above-mentioned reasons, there is no doubt that civic evaluation can be considered as a form of expression of active citizenship.

We mean, by “active citizenship”, the ability of citizens to organize themselves autonomously, to mobilize human, technical and financial resources, and to act within public policies, through different methods and strategies, in order to protect rights and attend to the greater good (Moro 2005a; Arena 2006).

This is a wider concept of citizenship than the traditional one, which lists an assembly of rights and duties which asserts that an individual belongs to a national identity.

This new concept lays stress on exercising powers and on citizen responsibility in tackling the problems of public life that interest him/her directly. In other words, organized citizens offer themselves as political players. Their presence is related to governance in society and to the general interest, not only with the resolution of single issues, or with the mere defence of private interests.

Civic organizations, therefore, make citizens the primary players in the defence of their own rights and in the care of the common good, in a role that is not alternative but complementary to the role of democratic institutions.

For this objective, the ability to make citizens main players of the policymaking process and to enhance their level of empowerment in the public arena becomes crucial (Moro 1998). One of the most efficient strategies consists in enhancing the citizen's level of specialization and knowledge of the single issues, through better analysis and information production skills. This is what Aaron Wildavsky (1993) defines as "analyst citizen".

A citizen becomes an analyst when he/she is able to produce autonomously a knowledge of social phenomena or problems, through which he/she can direct his/her own actions within the system of relationships between the political actors and public policy.

According to the active citizenship approach, therefore, civic evaluation, as described above, is a vital empowerment tool offered to citizens and civic organizations (Terzi 2010). The autonomous production of information can allow the reduction of subordination, to or dependency on others or, in positive terms, to enhance the power of citizens and their ability to influence (Moro 1998).

The knowledge coming from civic evaluation processes can produce actions of information, listening and assistance to citizens, interaction with institutions, participation in public policies or, in a simpler way, complaints, claims or legal action.

In any case, such knowledge is a potential source of original power, not derived from other authorities: the power to produce and spread information and judgments based on reality, the power to survey and verify the correct operation of institutions, the power to directly intervene to solve problems or to meet needs coming from citizens (e.g. through co-production of public policies or services) (Moro 1998).

Acting on the system of relationships, citizens can produce a social change and start collective learning processes. The result of such processes depends, obviously, on the relationship system itself and on its context.

This is not the right place to deepen the examination of the links between evaluation, organizational learning or social change (Suarez-Herrera et al. 2009; Torrigiani 2010). In any case, it cannot be doubted that civic evaluation, among the several forms that can be taken by policy evaluation, is specially linked to learning processes. The will to act is intrinsically present in the evaluation action itself (Palumbo 2001).

### ***1.3 Civic Evaluation and Participatory Evaluation***

The last thought leads us to a further consideration regarding the distinction between civic evaluation and participatory evaluation.

A few years ago, the onset of participatory approaches in evaluation practice started a wide debate, which is still very active (Garaway 1995; Brisolaro 1998; Cousins and Whitmore 1998; Gregory 2000).

According to many authors, drawing on several concrete experiences, the involvement of stakeholders in evaluation processes can bring many benefits. First, it widens the perspective used to tackle a specific issue and improves the quality and depth of the issues on which the evaluation process is founded. Second, it makes the process more clear and shared, encouraging comparison, communication and collaboration between subjects with different interests. Lastly, it helps the evaluation process itself and makes each stakeholder more conscious and capable in the evaluation (Robinson and Cousins 2004).

Summarizing, a participative approach is considered an element which can make the findings more useful, significant and believable.

The civic approach to evaluation is partially different from the participative, although very close to it. Usually, participative methods develop the listening of the different stakeholders with sophisticated techniques, but they do not recognize them as subjects able to produce on their own structured evaluations. The point of view of citizens, in particular, is considered a survey object, one of the several points of view which may be taken in account while developing the different evaluation steps.

In civic evaluation, the citizen ceases to be a mere survey object and becomes the evaluating subject which analyzes reality using his/her own tools, collects data, analyzes documents, interviews managers, service directors, etc.

In this process, citizens seek confrontation and dialogue with institutions and other actors, possibly in a partnership and collaboration relationship, but they consider evaluation activity an autonomous and independent power. The main goal is, therefore, to make citizens more capable and efficient in their participation in public life and in their relationship with the institutions. It becomes possible, through the findings of the evaluation, to create pressure to share and to implement the improvement programmes with the institution itself.

In conclusion, with respect to participatory evaluation, civic evaluation appears to grant citizens greater autonomy and to provide them with better possibilities of interaction at the same level with the institutions involved. At the same time, the civic evaluation process does not aim at guaranteeing that every point of view is expressed, as is in the participative evaluation processes, even if it remains open to other stakeholders and requires confrontation with external interlocutors.

This said, in the real world, the distinction between civic evaluation and participatory evaluation can be less clear and appear a pure academic exercise. The need positively and actively to involve citizens in the definition, implementation and evaluation of the public policies is still a very open and topical issue.

On the other hand, forms of concrete citizen participation can also vary in relation to the political context and the evolution of time. In Italy, notwithstanding

some renovation processes started during the 1990s, there is still a weakness in the institutional processes of evaluation of the policies and performance of public administrations (Stame 2001). Formal evaluation is still scarcely practised, in the same way that inclusive and participatory decision-making processes are still limited to few local experiences. This entails that civic evaluation initiatives themselves, in some cases, flank evaluation processes performed by the institutions but, in other cases, fill a blank, express a need for knowledge and play an almost controlling role over the actions of institutions themselves.

In this sense, indeed, civic evaluation in some way anticipates and stimulates the birth of forms of participatory evaluation and, more generally, better attention to the involvement of citizens in governance processes.

## 2 The Experience of Cittadinanzattiva in Civic Evaluation in Italy

During the last 10 years, Cittadinanzattiva<sup>1</sup> has been the first organization that promoted and developed projects and methods of civic evaluation in different fields of activity of the Italian Public Administration (Table 10.1).

In the health-care field, in particular, through the Civic Audit method, during the 2001–2010 period, mixed teams of citizens and operators performed a full cycle of evaluation in more than 150 local and hospital health public authorities, gaining significant cultural and organizational returns.

The examination of the Civic Audit method will be deepened in the next chapter. Two evaluation initiatives are briefly shown herein: they were performed, respectively, with regard to school buildings and urban quality.

### 2.1 The “*Impararesicuri*” (Learn Safely) Campaign

Starting from 2002, Cittadinanzattiva promoted a national campaign for the collection of up-to-date data regarding the condition of the Italian school building stock, through the monitoring of a significant number of buildings nationwide.<sup>2</sup>

To this end, dedicated sampling tools were designed and revised. The evaluation teams are formed by volunteers coming from Cittadinanzattiva but also by teachers, parents, groups of students, with the addition, in some cases, of school managers and directors of the school prevention and protection service.

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<sup>1</sup> Cittadinanzattiva is a civic participation movement which, since 1978, promotes and protects citizen and consumer rights in Italy ([www.cittadinanzattiva.it](http://www.cittadinanzattiva.it)).

<sup>2</sup> During the first year, the campaign covered 70 schools and gradually spread throughout the nation. In 2004, 200 buildings were monitored, 382 in 2005, 271 in 2006, 184 in 2007, 132 in 2008 and 82 in 2009 covering nearly all the Italian regions.

**Table 10.1** Characteristics of some civic evaluation projects carried out by Cittadimanzattiva: similarities and differences

Project	Territorial dimension	Methodologies adopted	Citizens/associations involvement	Period	Outputs and exploitation
<i>Health Civic Audit</i>	National/ regional/ local	Evaluation through a matrix of about 380 and 11 tools for gathering data (questionnaires and checklists)	Volunteer citizens composing mixed teams together with health operators	Since 2001 up to today	6 National reports 8 Regional reports Improvement plans at a local level Political-institutional interlocktion at a national level Formulation of national and regional proposals of policies on the basis of the critical points emerged from the evaluation
<i>First report on prosthesis and supplementary assistance – critical routes, quality of life and best practices</i>	National/local	Gathering of data through a tool (questionnaire) and case studies	Associations of chronic patients and users	2010–2011 (A second edition in 2012 is planned)	First report Political-institutional interlocktion at a national level on the basis of the proposals included
<i>Annual report on chronicity policies</i>	National	Gathering of data through a tool (questionnaire)	Associations of chronic patients and users	Since 2003 up to today	8 Editions of the report Political-institutional interlocktion at a national level on the basis of the proposals included
<i>Federalism in health civic watch – annual report</i>	National	Processing of data purposely gathered and already existing data	Cittadimanzattiva regional secretaries	2011 (A second edition in 2012 is planned)	First edition of the report Elaboration of a model of civic rating of regions Political-institutional interlocktion at a national level on the basis of the proposals included
Evaluation of differences in the health policies and in the governance processes in Italian regions					



<i>Monitoring of the state of implementation of the European Charter of Patients' Rights</i>	Supranational (European)	Evaluation through matrix of about 156 and 4 tools for detecting data (questionnaires and checklists)	Citizens and European partner associations	First edition: 2006–2008 Second edition: 2009–2010	2 Reports presented to European Institutions during the European Patients' Rights Day Presentation of the single national reports to national health authorities in the countries involved
<i>Consumers</i>					
<i>Audit in public services</i>	Local	Evaluation through tools (checklists for data gathering)	Volunteer citizens	2005	Final report
Pilot civic evaluation of front-office services provided by public administration, local transport, water service, post offices					
<i>Quality of local public transport</i>	Local	Evaluation through tools (checklists for data gathering)	Volunteer citizens	2006	Final report
Evaluation of the quality of local public transport in Rome – bus stops					
<i>Evaluation of urban quality</i>	Local	Evaluation through tools (checklists for data gathering)	Volunteer citizens	2009–2010	Final report
<i>School</i>					
<i>Monitoring of school buildings</i>	National	Monitoring: gathering of data through two tools	Volunteer citizens	Since 2003 up to today	9 Reports
Civic evaluation of the degree of safety, quality and comfort of a sample of school buildings, carried out by citizens (about 130 civic monitors trained in 2008)					

The teams, appropriately trained in the use of the tools, perform the monitoring within the schools which declared themselves ready to perform the survey. All the collected data are then sent to the national headquarters of Cittadinanzattiva, which proceeds with the preparation of a national report and with the dissemination of the findings through a public presentation at a national level and a number of meetings in the different cities participating in the survey.<sup>3</sup>

The evaluation structure of “Impararesicuri” decomposes safety in 4 components, 17 factors and 315 indicators. It is possible to couple each school building with a synthesis score, which shows the overall safety level.

The monitoring is performed by a pair of evaluators which have at their disposal two tools:

1. The “structural observation grid” which is used to record the information collected during the inspection through direct observation or through simple questions to the personnel present (the topics are related to common paths, educational services, rooms, systems, general services and toilets, condition of the building, construction sites).
2. The questionnaire for the head of the prevention and protection services aims at three objectives: to gather information on safety not detectable by direct observation, to gather useful elements to learn which knowledgeable persons in authority use to tackle safety issues and to gather general information on the monitored school.

The implementation of the “Impararesicuri” campaign allows citizens to have at their disposal every year a wide-ranging and updated picture of the safety conditions of Italian school buildings. It also allows, based on rigorously collected and processed data, to address to the institution specific proposals for intervention in the fields of safety and quality improvement of the school premises, including specific undertakings and the performance measurable of concrete actions.<sup>4</sup>

## ***2.2 The Civic Evaluation of “Urban Quality”***

The project is born from the joint efforts of Public Administration Ministry and Cittadinanzattiva in the framework of a Memorandum of Understanding entered in order to “develop innovative initiatives in the horizontal subsidiary field”.

After an early evaluation testing performed by the citizens on the school services and the municipal front-office services, in 2009, a civic evaluation method of urban quality was ready.<sup>5</sup>

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<sup>3</sup>The latest national report, presented on 16 September 2010, is available at <http://www.cittadinanzattiva.it/imparare-sicuri/rapporto-imparare-sicuri-viii.html>

<sup>4</sup>The yearly monitoring activities are joined by other information and awareness initiatives, besides an award for good practices.

<sup>5</sup>The work group included Public Function Department, Formez, Cittadinanzattiva and Fondaca.

“Urban Quality” was intended as quality of the environments wherein citizens move, live, socialize and work. Components and dimensions of urban quality were identified through a national *focus group* including social research experts, civic organization representative and main figures of local authorities. The aim was to answer the following question: *Which are the essential components with regard to “Urban Quality”? How can these components be declined in an essential way, so as to identify accurate and measurable dimensions?*

In this way, ten components of urban quality were shared (safety, connectivity, sociality, healthiness, maintenance, etc.). For each component, quality dimensions were defined, and for each of them, some quantity-quality indicators were identified.

Experimentation involved 14 cities coming from four southern Italian regions: Campania, Puglia, Calabria and Sicily. In each city, it was decided to limit the observation scope through a “spatial” approach focusing the attention on a specific portion of urban territory so as to allow the citizen to collect information in a direct, continuous and deep way through a given time.<sup>6</sup>

Through a public solicitation, in each participant city, a local team of evaluating citizens (around ten members each team) was formed. The team identified its own coordinator who kept the formal contacts with the authority.

Each local team, after an appropriate training, was given the task to collect direct and indirect information. For direct collection, a “grid” was prepared to be used as a real “notepad” along the survey course. The direct collection is subdivided in “one-off” observation, repeated observations and direct/older experience. The directly collected information were completed and integrated by an already available data set which was to be requested from the reference authorities and institutions.

To order and process the data, a database was prepared, and the criteria for the consensual attribution of the score were defined.

The process provides, at the end, the preparation of a final report and the confrontation with each authority regarding concrete improvement actions.

### 3 Civic Audit in Health Care

#### 3.1 Purpose and Goals of Civic Audit

Civic Audit is a critical and systematic analysis of the performance of the health public authorities<sup>7</sup> promoted by civic organizations. It is therefore a tool at the disposal of citizens aimed at promoting the evaluation of the quality of the performance of the local and hospital health organizations (Terzi et al. 2010).

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<sup>6</sup> The spatial approach is generally used in the so-called *safety audits*, widely spread in Northern America. The approach provides that groups of citizens “walk” along a predefined urban path recording a number of factors which impact on the subject of the analysis.

<sup>7</sup> With “health authorities” or “health organizations”, we mean all public health organizations, including local health units and hospital authorities.

The first experimental cycle of Civic Audit was started in 2001 aiming at defining and proving on the field the theoretical and methodological framework drafted in cooperation with 12 health local units. Starting from 2003, the possibility to endorse Civic Audit was extended to the universe of health organizations, and the number of involved public authorities constantly increased throughout the years.<sup>8</sup>

Today, it can be asserted that Civic Audit is established in the Italian health-care service, as the main concrete form of evaluation in the public sector which features citizens as main players, in a framework of collaboration between civic organizations and health organizations.

The decision to provide active citizens with their own tool of evaluation of the action of the health authorities was born to meet three types of problems (Lamanna and Terzi 2005).

The first need was to give a concrete shape to the citizen centrality. Civic Audit was contemplating to overcome a reductive vision of the role of citizens as mere recipients of services. In fact, with respect to the more traditional methods or customer satisfaction surveys, in Civic Audit, the citizen is no longer a pure subject of survey, but he/she becomes the evaluating subject who visits premises and interviews the people in charge (Tanese et al. 2003). The centrality of citizen is exercised therefore in the concrete definition of specific criteria for the design and the evaluation of services and health policies.

The second need was to make the action of health public organizations more transparent and verifiable. In 1980, Cittadinanzattiva founded the Patients' Rights Tribunal, a network of offices throughout the country, in hospitals and health structures, aimed at collecting reports and inputs coming from citizens (Petrangolini and Moro 1987). This long experience was the base founding development of the concept of making the opinion of citizens even more significant in the view of changing the health system (Petrangolini 2007). From this point of view, Civic Audit is also one tool to increase the accountability level of health authorities and their directors.

The third essential reason was to create an evaluation procedure which was local but was also founded on homogeneous and comparable criteria, so that also the disparity and fragmentation degree of the National Health Service could be valued. We will see, indeed, that Civic Audit is based on a unified indicator system which makes the performance of the authorities easily comparable in a benchmarking perspective.

### ***3.2 The Evaluation Structure of Civic Audit***

The design of Civic Audit started from four questions, representative of as many aspects of the common citizen experience with regard to health services (Lamanna and Terzi 2005):

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<sup>8</sup>Overall, the authorities involved, during years, amounted to 175, that is, more than 50% of Italian health public organizations.

1. The first topic focuses on the citizen as user of the services, involved in prevention, diagnosis, care and rehabilitation process. *“Which were the actions promoted by health authorities aimed at concretely putting citizens and their need at the centre of their interest?”*
2. The second topic interests the citizen, ill and suffering from serious or chronic pathologies: *“What priority was given to policies having a significant health and social relevance, such as risk management, pain management and the support to the chronically ill?”*
3. The third issue is related to the exercise of the citizenship rights and entails the need to ask if *“The participation of citizens is considered by health authorities to be an essential resource for the improvement of health services or is promoted (if any) only like a formality provided by some laws?”*
4. The fourth issue regards the citizen and the community in which he/she lives: *“What answers were provided by the health authority to a problem deemed as urgent by the local community?”*

While the fourth question is related to local issues, the first three are valid for all the countries and allow to organize the evaluation structure in 3 evaluation components and 12 evaluation factors, according to the following scheme:

*Orientation to citizen:*

1. Access to health services
2. Protection of the rights and improvement of quality
3. Customizing of care, privacy and assistance to patients
4. Information and communication
5. Comfort

*Commitment of the authority in promoting some “policies” which are particularly relevant to health and society:*

6. Patient safety
7. Safety of premises and plants
8. Chronic illnesses and oncology
9. Pain management
10. Prevention

*Involvement of civic organizations in the policies of the authority:*

11. Implementation and operation of the user participation practices
12. Other forms of citizen/health authority participation and interaction

Each of the 12 factors above is investigated through the detection of a set of indicators that are the same for all the organizations (overall, 380 indicators were detected).

The evaluation structure of the Civic Audit is completed with the definition of the application levels, the areas of the National Health Service wherein the detection of the indicators is performed. The planned and applied levels are three, until now:

- The authority area (the health organization area in the whole)
- The hospital assistance area
- The primary care area, comprising:
  - The fundamental health assistance (districts, family medicine, domicile care)
  - The territorial specialized assistance (health centres)
  - The territorial and semi-residential specialized assistance (in particular, mental health and drug addiction services)

For the collection of data, the team employed five types of questionnaires aimed at the directors of the authorities involved in the Civic Audit and six different checklists for the direct observation performed by auditors (citizens and health operators).

All the indicators are coupled to a recognized standard,<sup>9</sup> and it is therefore possible to calculate, with easy steps, for each level and factor, a “Standard Adequacy Index” (IAS). If the standard is completely met, the indicator has a 100 score, zero if opposite. The weighted average of the scores of the indicator groups is the IAS value. The difference between IAS and 100 measures the gap between the detected situations and the full achievement of all the standards.

The study of IAS is the base of the local evaluation and of the benchmarking and allows to perform system analysis having a particular value in national and regional application cycles.

### ***3.3 The Evaluation Process and the Ways of Citizen Involvement***

As we have seen above, Civic Audit is not a mere collection of information but a civic evaluation process promoted by a civic organization and approved by health authorities, which can be subdivided in four main steps: preliminary operations, preparation, execution and final actions.

Preliminary operations to the audit execution in a health authority are two: formalization of the participation to the programme and the training of the people in charge.

In order to participate in the Civic Audit programme, the partnership between the Authority General Direction and the Local Director of the Patients Right Tribunal is formalized. The parties (public and civic) proceed, then, to appoint their respective persons in charge who will have the duty to guide the realization of the Civic Audit programme.

In some cases (currently eight), the region itself is interested to the implementation of the audit in all the health organizations and enters directly in a convention with Cittadinanzattiva.

The authority and civic people in charge attend the regional training course on the Civic Audit, wherein the methodological system, the tools employed for data

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<sup>9</sup> The sources used for the standard recognition were the recommendations of the international institutions, the regional and national regulatory guidelines, the Patients’ Rights Service Charters and the recommendations of the scientific societies.

collection, the operation cycle to be followed and the participation procedures are presented. Participation to the training course is compulsory for the access to the Civic Audit programme.

The evaluation teams (a number between a minimum of 8 and a maximum of 20 people) will be composed by citizens and by service operators.

Citizens are selected through public solicitations, which give anyone interested the possibility of participation. The service operators are chosen by the agency director of the authority.

The team members are prepared for Civic Audit with a training module cared by the people in charge who have participated in the regional training. The operative team makes use of the technical assistance from the national and regional headquarters of Cittadinanzattiva.

Each team defines a local plan of Civic Audit which includes:

- The definition of the survey field, that is, the detailed list of the structures that will be subject to the analysis, the names of the people in charge to be interviewed and the indication of the operators responsible for receiving the teams
- Indication of names of people in charge of specific data collection operations (distribution of questionnaires and direct observation)
- Data collection calendar

The execution stage comprises the operations of data collection and their return on electronic media.

Based on collected data, the team prepares a local evaluation report divided in four parts: data analysis, brief evaluation report, plan for the elimination of the non-conformities and the plan for the corrective actions.

The national or regional headquarters of Cittadinanzattiva prepares a final report at the end each Civic Audit application cycle, comprising the analytic illustration of the benchmarking tables, discussion of main elements highlighted by data analysis and improvement recommendations addressed to different interlocutors.

Roughly a year after the conclusion, a verification on the actual results is planned and, in particular, a verification on the degree of implementation of the plan for the elimination of the non-conformities and the plan<sup>10</sup> for the corrective actions. Usually, this verification is joined by a new cycle of Civic Audit.

### ***3.4 The Civic Audit Effects***

In the past, Cittadinanzattiva performed a few analyses to evaluate the real effects and impact produced by 10 years of experimentation and performing of Civic Audit in the Italian health agencies. These analyses gave four main results.

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<sup>10</sup>In particular, there were performed a focus group and a questionnaire with around 15 particularly significant realities, a research on the websites of the health authorities and regions, an in-depth examination about the Rome health organizations and a report of the Emilia Romagna Health Agency regarding the regional experience of Civic Audit.

First, Civic Audit proved to be a participation tool itself, which opened new relationship channels between citizens and health institutions. The regional public solicitations which invited the citizens to be part of the enforcement of Civic Audit received hundreds of applications. In total, during the years, around 3,000 citizens could actively participate in the evaluation of health agencies. A direct involvement in the evaluation of the services which allowed also to revitalize or to improve other form of consultation and participation already set forth by the law, but frequently reduced to mere formalities.<sup>11</sup>

A second impact is more cultural. The Civic Audit has in part contradicted the reductive visions which consider citizens lacking the required expertise to attend the public issues (Moro 2005b).

The most evident confirmation comes from the declaration of the European Charter of Patients' Rights in 2002 which was followed by a monitoring on the degree of implementation of the 14 rights performed in 14 countries employing a Civic Audit inspired method. This work won, in 2007, the first prize of the European Economic and Social Committee as the best initiative of the civil society and became a benchmark, which found confirmation in the official documents of the same committee and of the European Parliament and contributed to the decision to issue a European directive on patients' rights (Moro 2009).

Moreover, the joint work of the citizens and of the operators in the area of local teams and regional coordination groups aided the updating of the respective cognitive models. The discussion of the evaluation reports and of the improvement plans, with the required sharing of the criteria of reading and evaluation of the data, led to share a new way to consider health service.

During these 10 years, a "critical mass" of around 100/150 people were formed (between local people in charge of the Civic Audit, head of the public relation offices and quality services, health authority directors) which are particularly active and involved in ensuring the Civic Audit implementation. Their activity significantly improved and enriched the procedure system of the Civic Audit, provided useful elements for the revision of the evaluation structure completed in 2009, promoted the circulation of good practices and gave its contribution to the definition of the criteria of interpretation of the data and identification of corrective actions.

A third significant element has been the progressive evolution of Civic Audit from a strictly local dimension related to the single agency to a more regional vision. During the time, actually, thanks, above all, to the possibility of benchmarking, Civic Audit was used to support the regional policies as well. For example, it was joined to the structure accreditation processes, to the evaluation of the general directors of the agencies, to the establishment of the public relation offices and of the quality services or to the revision of the Service Charters.

Lastly, from single authorities' point of view, the audit is a tool starting from which concrete and verifiable improvement actions have been started in many realities. In general, they are interventions of adjustments to the proposed standards

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<sup>11</sup> Mixed consulting committees, participation conferences, the service conferences, etc.



starting just from the critical points arisen from the evaluation. This is the area where the effects of the audit can be more tangible and immediate. The ability to translate the civic evaluation in real improvements in the quality of health services depends, in wide part, on the ability of the health agency to exploit the audit results in its planning and management processes of the services and from the collaboration relationship established with the civic organizations.

## **4 Obstacles and Development Prospects of Civic Evaluation in Italy**

The Civic Audit represents, even now, the most complete experience of civic evaluation realized in Italy. In spite of this, as already seen, there are other public administration intervention ambits affected by direct evaluation processes by the citizens. In general, we can confirm that currently in Italy many national and local institutions are taking an interest in the civic evaluation approach (OECD 2010).

What generally interests them is not the instrumental and technological apparatus of civic evaluation, which is necessarily not particularly sophisticated, given that it must be easy for the non-professional evaluation team to use. The institutions instead appear to be interested in the innovative approach and the active role given to citizens during the different phases of the process. It is necessary, however, to carefully analyze the reason for this interest in the specific Italian context.

Italian Public Administration is characterized by a widespread weakness in systems for evaluating and measuring performance, and by evaluation of public policies that are not, as yet, consolidated.

Certainly, important experiences of innovative public administrations exist, but mainly at a local level, where very advanced evaluation systems have been consolidated for some years (public policy evaluation, service quality evaluation, personnel evaluation, etc.). These are generally those administrations that have also developed the best planning, programming and control systems, those that are most transparent and most interested in allowing their accountability level to grow, and those who are more careful in involving stakeholders. In these ambits, civic evaluation can bring greater completeness, making it possible to better integrate the point of view of the citizen in the local governance processes.

Where the administration does not have evolved government systems, however, the attention to civic evaluation processes can have an ambivalent meaning. On the one hand, it can indicate a new opening and desire to put the citizen at the centre of change. On the other hand, it can be a form of compensation for the absence of other instruments, as if the administration was delegating a duty of its own to the citizen, being that of assessing reality and formulating proposals for action.

Looking at it in another manner, civic evaluation is, for a conscious public administration, an additional resource for pursuing a model of good government. Public administration that is weak in the governance and management processes involving the citizen can risk becoming an end in itself, a more ideological or formal option

rather than a substantial contribution to the production of knowledge that is useful for deciding and achieving a real change.

The theme, in any case, is particularly complex and requires the realization of ad hoc surveys to evaluate the concrete impact of civic evaluation processes on the operation and performance levels of the public administrations.

In this chapter, we will limit ourselves to indicating in more general terms the factors which, in our opinion, can obstruct or, on the contrary, favour civic evaluation in Italy as a useful instrument for changing and improving institutions.

## **4.1 Obstacles**

The difficulties that civic evaluation meets in Italy can be divided into factors that are inside and outside the evaluation process itself.

The first internal factor is of a purely technical nature. Carrying out an evaluation process presupposes both the willingness and the resources (material and immaterial) that are not always easy to find, even from an economic and financial point of view. Civic organizations are largely based on the voluntary and spontaneous activity of citizens who only occasionally transform themselves into “analysts”. It is therefore necessary to find a balance between the need to maintain this voluntary and spontaneous characteristic of participation and the need to make the evaluation activity “more specialized”, defining procedures, instruments, rules and organization. Should the investment be too low, the risk arises of the evaluation activity being “weak” from a technical and methodological point of view, and thus not very efficient. If the investment is very high (e.g. in terms of planning, citizen involvement, training, communication), the civic organization that supports it must also be able to support it. This implies the choice of a “technical quality threshold” for evaluation, below which it is opportune not to fall and over which it is difficult to go with the resources that are available.

A second internal limit to evaluation can be of the perceptive type. Organized citizens normally feel that their action has an effect on reality much more than is really true. In a health ambit, for example, the teams that carry out the Civic Audit can easily feel themselves at the heart of health system operation and overestimate the impact of their activity. What they concretely generate on the services analyzed is probably lower than that expected or perceived.

This cognitive distortion can be in part resolved by reinforcing the evaluation of the evaluation itself, in other words, dedicating special attention to measuring the efficiency and real impact of the civic evaluation processes.

There are also external obstacles to civic evaluation development, these being essentially of the political and technical type. The relationship between institutions and citizens (therefore also the availability of the citizens to participate in the evaluation) in Italy still seems to be dependent on the electoral cycle. The changes made to government organs, following an election, can have an important and at times unpredictable effect on the continuity and development of civic evaluation projects.

They can be interrupted, suspended or on the contrary promoted and reinforced, more according to the sensitivity of individual figures (e.g. a politician, manager or services manager) than on respect for the principles of institutional continuity. In reality, the activity of civic evaluation should not be affected by the electoral cycle, proposing itself instead as an instrument of knowledge that supports institutions, and not this or that political party.

The last obstacle, previously mentioned, and which is probably the most important, is the weakness of the management and evaluation systems present in Italian Public Administration, which inhibit the development of systems that are more evolved and transparent in measuring and comparing the results. The data and information are not easily accessible, and in many contexts, evaluation is seen as a type of control rather than as an opportunity to learn. It is a cultural factor, overcome only partially by the reform processes that have taken place during the last 20 years.

In reality, what happens today is the fragmentation and differentiation of accountability levels and managerial strata of public administration. As already mentioned, more evolved contexts express a more informed demand for citizen participation and are open to civic evaluation. Indeed, in these contexts, it is necessary to guarantee better technical quality of the evaluation itself to ensure that the information produced has a true additional value opposed to the information already available and generated by the administration.

On the contrary, the less advanced ambits are less sensitive to civic evaluation or are not able to absorb the knowledge produced, even while making themselves available for evaluation. These are the contexts where ideological drift and legitimization of citizen participation as an end in itself is easier than making a solid mark on reality.

## 4.2 Opportunities

In the face of these difficulties, it is necessary to highlight that all the most recent public administration reform interventions in Italy have evidenced the need to measure performance, transparency, reporting and participation.

The most recent is Italian Legislative Decree no. 150/2009, which deals with the adoption by public administrations of new instruments, such as the *performance plan*, the *performance report* and the *3-yearly programme for transparency and integrity*.

In practice, this decree indicates that the evaluation, reporting and transparency of public administration actions are no longer voluntary and sporadic initiatives of the individual body, but obligatory phases that shall be integrated into a performance management system on which the governing action of the same administration rests.

This new “prescriptive space” for evaluation and transparency seems to be an additional answer to the continuing request for accountability, change and governance in public administration that has matured during recent years in Italy. Indeed, even though in a general frame of institutional delegitimization and mistrust

in politics, the demand for public services (above all in essential services such as health, education and justice) remains to the fore in the mind of Italians. The rapid development of some civic evaluation processes and the involvement of thousands of citizens bear witness in part to this desire for change and participation. In Italy, in short, citizens still seem to have faith and expectation in change, from which it is possible to follow roads that improve politics and public services.

From this point of view, civic evaluation has in itself a great development potential, because it mixes the production of information with its use for action. It is a type of social research that has installed within itself the objective of producing a change in reality and the means to achieve it, given by the desire to participate and become protagonists on the part of the citizens. Faced with a request for change and a weakness in the replies of the institutions, citizens, in partnership with the institutions themselves, can supply useful knowledge for learning, in other words, for the construction of a new model of social relations and governance of complex problems.

For this purpose, the final positive element is the specific competence that some civic organizations have themselves developed. The easy access to and circulation of information can today favour, even inside civil society, a more rapid spreading of knowledge and the learning of new tasks. Organized citizens carry knowledge and qualified experience, and they no longer correspond to the old image of passive beneficiaries of interventions that are decided on and realized by others. Citizens, if organized, are always more able to analyze and judge reality, with their own instruments. Civic evaluation, from this point of view, can be an instrument for channelling and finalizing new forms of citizenship.

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# Chapter 11

## Security, Quality of Life and Development: A Holistic Approach

Maurizio Sajeve

### 1 Security as Part of Socio-economic Development

This chapter has the aim to show how security is not an individual concept, but it is instead a collective concept, result of the interaction of social structures and human agency in socio-economic systems. The achievement of security at the individual level does not imply the actual achievement of ‘security’, as it focuses mainly on the defence of the individual from other subjects or sources of threat. The question is: are neoliberal economic policies and individual success, individual security, based on the goal of capital accumulation, and the related measurements at aggregated level by GDP growth able to guarantee security in a larger sense?

The UNDP concept of ‘human security’ underlines the importance of severe threats’ absence: *‘Job security, income security, health security, environmental security, security from crime – these are the emerging concerns of security all over the world’*. According to Sen, *‘Human security is concerned with reducing and, when possible, removing the insecurities that plague human lives’*. Human security, in its broadest sense (Commission on Human Security), includes the absence of violent conflict, human rights, good governance, access to education and health care, and positive right for each individual to get opportunities to fulfil own potential. Sen’s concept of development similarly considers security as an intrinsic aspect of development, whose goals are freedom and expansion of human capabilities, social cohesion and absence of conflicts. The European Commission, DG Enterprise and Industry, in its activity of security research and development, reports as follows: *‘One of Europe’s main objectives is to preserve its values as an*

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*open society, including respect for fundamental rights and freedom, while addressing the increased and diversified security threat. Over the last decade we have witnessed a shift in security threats... the need for preparedness in case of natural disasters and civil crisis management have gained importance in our daily life. Internal and external security has become increasingly inseparable. Addressing them requires the use of modern technology prompting citizen concern. At the same time, Europe must secure its economy and its competitiveness against an increased threat of disruption to its basic economic infrastructures, including industrial assets and transport, energy and information networks. By cooperating and coordinating efforts on a Europe-wide scale, by stimulating the cooperation of providers and users of civil security solutions, the EU can better understand and respond to the risks in a constantly changing world. Human security is an emerging paradigm for understanding global vulnerabilities whose proponents challenge the traditional notion of national security by arguing that the proper referent for security should be the individual rather than the state. Human security holds that a people-centered view of security is necessary for national, regional and global stability'. In 2004, the report of Wim Kok defined the Lisbon strategy: 'the promotion of growth and employment in Europe is the next great European policy'. In February 2005, Lisbon Agenda was redefined in the vision of the promotion of growth and jobs for sustainable development: 'making growth and jobs the immediate target goes in hand promoting social or environmental objectives'. In March 2005, a resolution of the European Parliament for the midterm revision of the Lisbon strategy reported the following: 'sustainable growth and employment are Europe's most pressing goals and underpin social and environmental progress' and 'the well-designed social and environmental policies are themselves key elements in strengthening Europe's economic performance'. A EU Green Paper on a European Strategy for Sustainable, Competitive and Secure Energy (European Commission 2006) reports as follows: 'the most fundamental question whether there is agreement on the need to develop a new common European strategy for energy, and whether sustainability, competitiveness and security should become the core principles to underpin the strategy'.*

These very promising resolutions raise some questions: how much are these very promising intents coherent with the European stability pact? The objectives to achieve have regard in fact to competitiveness, sustainability, jobs, security and social and environmental goals, so welfare as well. A great number of alternative approaches, theories and indicators have been trying to drive economic development and competitiveness. It seems, however, that there is a lack of theoretical foundations regarding the relations between welfare, competitiveness, development and productivity (Togati 2005). How could socio-economic development be measured by the amount of accumulated capital, when the individual success of capital accumulation is source for loss of social cohesion and increase of security threats? Is a society based on production of individual security and defence of individual economic results able to achieve socio-economic sustainable development and citizens' security?

## 2 A Socio-economic Perspective of Security and Development

As reported above, this chapter enhances the similarity of the concepts of security and development, when looked by the perspectives of freedom and human capabilities and resulting from a complex interaction of social actors. Whenever development policies are not focused on people's capability expansion, citizens' well-being, freedom and positive rights, security is often pursued by defensive and repression policies. These policies are implemented by strengthening police intervention, using private security services, tightening 'big brother' control systems and sanction systems. Again, these kinds of policies aim at defending individuals, social groups or national systems from an external environment, which is basically hostile to them, tending to separate or isolate individuals and generating a feeling of suspect. Some questions arise: is such scenario in line with a concept of human development and human security? Can individual security be part of a concept of human development? An answer can be given by looking at the preservation of liberty suggested by Montesquieu's discussion. In past times, when the international system was so much more unstable, the continuous insecurity involved a suppression of individual liberty and self-fulfilment for the sake of political survival. A greater stability allows instead modern nations to reach the political liberty and economic prosperity of their citizens. Montesquieu refers to the concept of '*federal republic*', a '*society of societies*', whose purpose is achieving collective security. The first European communities were actually born after World War II with a primary goal of avoiding conflicts. Common interests, goals and agreements for general well-being have been a sort of guarantee against the possible generation of conflicts. When we think about some criticism against the European Union, we should not then forget that this major, often forgotten goal was finally successfully achieved within the European continent. Of course, if old types of open conflict, referring to certain characteristics, got to an end, other kinds of conflicts, such as terrorism for the sake of separatism, are still present. Where some areas result to have remarkable differences among one another, the federal state is often a good solution for maintaining both social cohesion and communities' autonomy. Montesquieu referred as well to supranational federal structures and organisations in order to preserve political liberty, arguing that the corruption of political virtue is the result of self-interested individualism and human actions driven by personal satisfaction, material prosperity or power in pre-eminence. The political virtue of the ancient republics for the assurance of the public good implied in fact the suppression of individual self-interest and desire (Ward and Fott 2007, 1–6).

The mentioned self-interest is represented in modern societies by the same foundations of economics systems, which hold the primacy of individual economic results for the sake of growth, sometimes exceeding also in illegal action and corruption phenomena. But even inside social and legal rules, the majority of recent literature of optimal growth, assuming the concept of full employment, divides the national production into 'consumption' (considered as a source for welfare) and 'investment' (considered as a source for economic growth), each of them



excluding the other. This implies a rivalry between welfare and competitiveness. As a consequence, at the European level, for instance, the well-known and deeply studied conflict between present and future welfare arises, generating social conflict. From one side, the achievement of Maastricht constraints has involved a policy of 'necessary sacrifice' for achieving a strong accumulation of capital and a better future, called by Sen the BLAST view of development (Sen 1997), by using the acronym of a Winston Churchill's expression about 'blood, sweat and tears'. From the other side, Lisbon policies have the aim of making Europe the most competitive area in the world, which would implicitly mean spending for innovation and efficiency of infrastructural and socio-economic systems. The question is: how much it is possible to hold the BLAST theory and sacrifice European well-being and welfare for reaching competitiveness? In Giddens' terms, from a perspective of theory of structuration, human action for reaching competitiveness would weaken the social structure and reduce enablers for citizens' well-being.

A solution to overcome the dichotomy of 'hard choices' between present welfare and future growth could consist in detaching from the logic of rivalry of consumption and investment of the BLAST ('blood, sweat and tears') theory and to promote and defend a positive relation between welfare, investment and competitiveness. A first intuitive justification is based on the question if it would be really possible to be competitive at global level by holding the BLAST theory, reducing salaries and taxes, imposing sacrifices to European well-being and welfare.

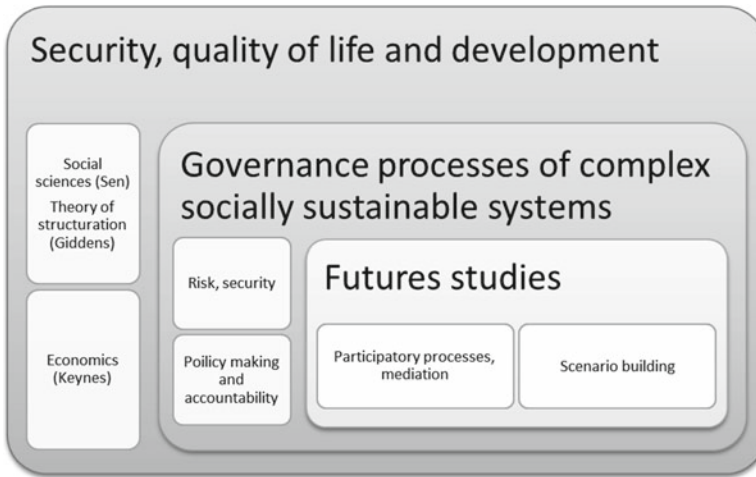
If, as so promoted at European Commission level, we have to take the way of innovation and sustainability, welfare and competitiveness should not be considered as being in contrast (Adam Smith's concept of mutual aid). This argument can also be supported by that part of the economic literature of the late twentieth century that focuses on a wider interpretation of economic development, also called 'development economics' (Amartya Sen and Joseph Stiglitz, exerting influence at UNDP and World Bank's level) which involves, besides quantitative measurements of growth (GDP), also the qualitative changes that are produced in the standards of living of a society. The traditional production function is in fact not able anymore to take into account those aspects of development that refer to qualitative changes, resulting for instance from innovation and globalisation (Togati 2004). Sen's capability approach has greatly contributed for changing the development paradigm, shifting from a vision of mere economic growth to a vision of human well-being. Sen's theory (Sen 1989) describes, in particular, the existing confusion between means and goals. Growth and wealth are not goals to achieve but instead means for achieving development. Development may be rather identified with 'a process of expanding the real freedoms that people enjoy' and the 'promotion and expansion of valuable capabilities' (Sen 2000). The purpose of development is to enlarge those human freedoms and choices that allow people to live full and creative lives and to increase their own capabilities. This approach to development, focused on the human being, has been advocated by every Human Development Report of the United Nations since 1990.

In spite of Sen's radical positions, he remains liberal. His GALA view (*getting along with a little assistance*) for solving the dichotomy of hard choices between

welfare and competitiveness does not exclude possibilities for the BLAST hard view of development to be applied (Sen 1997, 7). The GALA conception of development naturally solves the interrelation between improvement of social welfare, seen as an incentive for production capacity, and potential development of an economy. These concepts enhance the nature of critical infrastructures and systems as those fundamental tangible or intangible assets of a society, public goods whose efficiency and qualitative level is a key element for determining the entity of economic development, well-being and competitiveness at global level. According to the GALA conception, *'public services can make people more capable of helping themselves and others'* (Sen 1997, 5). The process of growth merely linked to the deployment of market mechanisms cannot be considered as a source for development, freedom and cooperation between individuals, exchange of information and the *'mutual advantage'* of Adam Smith that comes from interdependences and cooperation. Sen's conception of development and the emphasis on the positive relation between welfare standards and productivity are taken as foundations of an alternative framework that would include, among others, aspects of public expenditure.

Sen still supports the role for the individual preferences, but those are put in relation with the social context and public discussion. This reflects also Giddens' theory of structuration and the conception of relation between individual action and social structures. The possibility for an individual and his capabilities to grow depends often on the possibility to join other individuals having similar hopes or needs. So, individual capabilities depend upon collective capabilities. They are strictly interrelated. Giddens analyses the causal factors of the social reality and refuses to consider the social reality as only affected by individuals or social forces. People are indeed not entirely free to choose their own actions, and in many cases, as reported before, they act in a highly uncertain environment and with limited knowledge. In any case, they are the actors of social change and can choose the future of society. So, in Giddens view, the relation between structure and action is a fundamental element of social theory. Structure and agency cannot be studied separately, as they act together (concept of *'duality of structure'*). People make society, but are at the same time constrained by the society itself. Structures are created, maintained and changed through actions. Actions are the product of the structure and its background. Cause-effect relation happens in both directions. In *'New Rules of Sociological Method'* (1976), Giddens reports: *'social structures are both constituted by human agency, and yet at the same time are the very medium of this constitution'* (Fig. 11.1).

In our case, socially sustainable systems, security and development are realised through human actions and structures directed to shape a sustainable society and change or promote sustainable structures or rules. Structures consist of rules and resources. The rules constrain the human actions, and the resources make them possible. Capital growth would be indeed one of the resources needed to realise a secure and socially sustainable system, which is the goal of development. The rules can avoid that capital growth would go in the wrong direction, generating social conflict or a non-sustainable future instead of socio-economic and human development.



**Fig. 11.1** The conceptual framework

Social structures and human action produce indeed the social system (so-called structuration). For Giddens, systems are defined as ‘*the situated activities of human agents*’ (Giddens 1984) and ‘*the patterning of social relations across space-time*’. Giddens defines structures as ‘*...sets of rules and resources that individual actors draw upon in the practices that reproduce social systems*’ (Bone 2005). So, people act by the use of the ‘social grammar’, which belongs to their background and culture, learned by the processes of socialisation and experience. Human action takes place through the resources at disposal in a way which is appropriate to the social contexts. Rules and resources are therefore not deterministic, as they are the result of the complex interaction between the two elements of social structures (rules and resources) and human agency. Thus, the upcoming scenarios of this kind of action are highly uncertain and not totally predictable. Security and development are therefore not achievable through the mere action of individuals, but it is the result of human agency and social structures.

Such intuitive justification from a more societal perspective needs however to be integrated by a more rigorous economic analysis (Togati 2005). A possible solution to the ‘dichotomy of hard choices’ may take advantage from an integration of Keynesian theory and heterodox perspectives on human development such as Sen’s capability approach.

The old growth theory approach (neoclassical) implied a negative, or even absent, relation between welfare and competitiveness. According to this traditional vision, assuming the full employment of resources, increments in investment require greater savings and therefore limited budgets and welfare cuts. The welfare system, as it consumes resources, does not promote investments. The potential income is consumed or saved and then reinvested, and the interest rate is the only factor of equilibrium. Deficits are to be avoided so as they create inflation. Decreasing returns of

capital involve the need of technological development. According to the purchasing power parity principle, welfare creates inflation, which decreases competitiveness. According to these principles, investments would have to flow towards developing countries, where marginal productivity of capital is greater.

The lack of convergence between rich and poor countries experienced at empirical level lets space to the new endogenous growth theory (ETG) and to a concept of enlarged capital. The New Economy includes indeed in the concept of capital also research and development (R&D), education, knowledge, human capital and social and economic infrastructures, which generate increments in productivity. This would explain why in developing countries the inefficiency of governments and the lack of skilled workforce decrease productivity. Such vision defines a more 'people friendly' approach. If markets do not produce research enough, public expenditure, or I would say then public investment, may take this role.

In any case, the EGT has own limitations, so it still denies that growth can be generated by increments of the aggregated demand. Again, the level of welfare does not, for the EGT, generate increments in productivity and competitiveness. Moreover, EGT still assumes the full employment of resources and steady states of balanced growth. These assumptions are at least debatable, especially in the New Economy, where the notion of scarce resources falls. There are no mechanisms that guarantee flexibility of prices in all markets. The actual income is not equal potential income, which is only a speed limit of the system. The system finds actually equilibrium also in presence of deficit and unemployment.

According to Keynes, the real income is not generated simply by stock of resources. Instead, it is generated by demand flows. The relation between stocks and productivity is not so simple and clear because resources are not attracted always towards countries and markets where the demand is greater. So, investment is in a way autonomous, as it does not depend only on the interest rate but also on a number of other more complex structural factors. There is clearly a role for intangibles, such as market and technological changes, plurality of perspectives, risk and security perceptions, non-linear propagation of risks, social and political climate, country risk, conflict dues to unequal income distributions, functioning of financial systems, national information and educational system, transparency and knowledge uncertainty. Investment is therefore, in Giddens' terms, again the product of the interaction of contexts and individuals, social structures (rules and resources) and human agency, propensity to invest of single operators. Barro's regression equations include a number of variables coming from the enlarged concept of capital. However, those variables are often dependent upon one another, through the true causal factors: the propensity to invest and consume, generated by expectations.

Trust is the factor, which influences first the propensity to invest and then the capital stock. Trust in economics is also identified as the difference between actual and potential individual behaviour to maximise one's utility. So trust is an enabler of social structures, which determines human agency, determining propensity to invest. This is because it reduces the economic cost of transactions and enables new forms of cooperation and business activities, employment and prosperity. Trust can be therefore considered as a form of social capital as it has widely demonstrated that

its high level enhances economic development whilst a low level is an inhibitor (Zak and Knack 2001; Braynov and Sandholm 2002). In neoclassical models, trust is given no role, as all resources are optimally allocated and what is not consumed is automatically invested in production activities. Keynes instead talks about the well-known 'animal spirits', result also of the level of trust. The real income is never equal to the potential income, which is only the speed limit of an economy. Not all savings are automatically invested, because there is an irrational element, constituted by the willingness to invest, which depends upon a more complex cause-effect relations at the investor's psychological level. Investment is the result of investors' propensity to allocate their capitals towards given production activities and given markets instead of saving them. The level of trust in a given economic system, its stability and reliability, the effectiveness of legal and jurisdictional systems, the level of corruption, the trust in public and private security services and in banking systems, and the level of uncertainties are all elements, which increase or decrease economic operators' propensity to invest and, in due course, affect the economic and human development of a system. The crucial feature of the Keynesian stance is the inversion of causal factors with respect to standard theory: rejecting the primacy of the supply side and stocks of resources, the flows of aggregate demand are here the causal factors affecting the actual income. In fully self-adjusting markets, the stocks would 'automatically' generate the 'right' amount of flows. Recent developments of capitalist economies and theories towards the so-called knowledge-based economy (KBE) that assign to 'knowledge' and 'intangibles' an increasing role make the link between stocks of physical capital and returns of productivity slighter, confirming the Keynesian scepticism about the self-adjusting properties of markets. The autonomy of demand flow variables is confirmed by the KBE to be even more unstable in respect to the past, for the greater uncertainty of globalisation and rapidity of technological change.

Keynes 'animal spirits' may refer to the action of economic actors responding to given contexts and social structures. The Keynesian perspective refuses to consider the so-called structural as independent causal factors and tries to identify their interactions. Structural factors play a key role not because they affect directly the outcomes as standard theories hold but because they affect the true causal factors, namely, the propensity to consume and invest. Trust and social capital are not factors independent from physical capital as the Barro regressions suggest. Trust influences the propensity to invest and, later on, the stock of physical capital. Trust and capital stock should therefore not be considered as independent and at an equal stage. Whilst the stock of capital as a causal factor implies a smooth investment function and full employment, a low level of trust decreases the propensity to invest, causing a lower growth of the capital stock. Similarly, public R&D is in contrast with the identification of capital stock as a causal factor. In fact, public R&D is justified by given market failures, and capital stock as causal factor presupposes implicitly the stable functioning of markets without any external intervention.

In occasion of hard structural reforms, where salaries are low and the labour market so flexible, labour productivity decreases, social conflicts arise, income distribution increases, and consumption decreases. The general climate becomes

also more unstable, and uncertainty and risk become greater, causing in the long run economic instability. An example can be given by looking at investments in developing countries, where the political situation is unstable and security is lower. When investments by multinational companies are done, they generate short-term returns, till when it is profitable. Then they will move to other markets, searching for higher returns of capital. Such globalised economy is not centred on the development of society and citizens' well-being; instead it looks centred on the development of multinationals. It might draw resources and wealth instead of generating it (Winterfeldt 2007). EGT models, even if 'people friendly', confuse means and goals and consider man as a mean rather than the aim of growth.

There is no contrast between 'the economic' side of reality (based on inexorable laws of competition and globalisation) and 'the social' side (based on the idealisation of the so-called European social model), as it is often emphasised in the literature (e.g. Dahrendorf 2005). Economic constraints and social models of European countries are therefore not in contrast. According to Dahrendorf (1996), there is a need of a 'Third Way' of politics for squaring the circle between social justice and growth and between public and private long-term investment in systems' security and positive trends of expectations of economic operators. These concepts enhance the nature of critical socio-economic systems as those fundamental tangible or intangible assets of a society, public goods whose efficiency and qualitative level is a key element for determining the entity of economic development, well-being and competitiveness at global level, improvement of human conditions, positive freedom of individuals for the improvement of their lives, well-being and security and capabilities' expansion, in spite of not being always quantitatively measured.

In developing countries, sometimes also in developed countries, we can find often a relatively high income per capita accompanied by a high rate of criminality and a high level of Gini index, measuring great disparities in income distribution. This does not mean that a high GDP involves lack of security. But this means instead that a high GDP is not necessarily an index of security and development. So, GDP growth is not the goal of development, when for developed country we intend a country in which freedom, security and well-being are present. As Sen reports, real income is an analytically inadequate metric for making welfare comparisons (Sen 1999, 79–80). The utilitarian vision would like to reduce well-being, the real goal of development to '*one homogeneous good thing*' (Sen 1999, 77) represented by the real income, able to satisfy subjective preferences. That real income is instead a mean, and the utilitarian measure is again inadequate. There is a need to weight, through open public discussion and critical scrutiny, the different components of quality of life (or of well-being) (Sen 1999, 81) in order to understand what really economic needs are (Sen 1999, 153).

Volker Winterfeldt, talking about the efforts done for the Namibian development, reports as follows: '*The liberal discourse, whether in its classical or its present shape, boldly rests on the glorification of the principle of social retardation: first comes the successful individual, the entrepreneur, then (if all goes well, and always to a lesser extent) society, that productive majority actually instrumental in creating economic wealth. First come, first served. The liberal economic ideology is not the*

*epitome of social responsibility. It is class-biased, and so is its concept of development.*' Namibia's *Vision 2030* document shows its contradiction when it tries to harmonise hard economic liberalism and the efforts to produce social welfare in a developing society. Actually, the Ramatex experience about promotion of foreign direct investment in Namibia demonstrates how neoliberal economic policies, in the long run, might affect or even negate the realisation of collective structures based on social solidarity. Instances of social welfare should instead preserve and promote collective structures of social solidarity as main factors for sustainable development (Winterfeldt 2007, 91). The individualistic conception of privileged classes might consider collective action useless for enhancing capabilities. However, for marginalised people, Sen's development as freedom means organising in collectivities, unions, political parties, women's associations, etc., in order to make a choice of shared values and preferences, often against a powerful opposition. These organisational structures make possible participatory deliberative processes based on discussion and debate.

In the same way, the concentration of economic power over production of security might be an obstacle for his achievement. Policies of strong competition for the sake of income growth, increasing capabilities on some parts of society, negate sometimes to other social groups collective structures and social cohesion. In many contexts, strong disparities in income distribution ensure individual security to the winners and negate it to the losers. This creates a condition of political instability in which, if we refer to Montesquieu's concepts, restriction to freedoms might be the result, rising walls on the borders to preserve political stability. Physical freedom might be limited for guaranteeing own safety, and psychological freedom might be affected when the government is then obliged to limit citizens' rights or when the instability generates individualism and corruption.

The key point is support alternative conceptions, such as the GALA view, which can justify a positive relation between public policies of expenditure and intervention in those sectors that are critical for guaranteeing economic development, investments and therefore productivity growth. Increasing investment may not imply the reduction of consumption. Instead, an increase of consumption (and aggregate demand) may be a source of investment growth. Public policies for achieving greater levels of confidence, quality and security of social systems and infrastructures, positive business environment, knowledge and skills of labour force and economic stability are factors that attract investments and lead to economic development.

In spite of being formally privatised, complex socio-economic systems and structures represent indeed public goods, sources of well-being and economic development for whole countries, regional or continental areas. The stakeholders of a critical complex socio-economic system might seem, at a first look, to be represented mainly by the system operators, who are formally in charge of guaranteeing its security. The system's criticality and vulnerability concern in this case disruptions having direct negative impacts on the concerned stakeholders. Looking at socio-economic systems by an extended perspective of cause-effect relations, other elements of their criticality may come up. Security and risk, in this perspective, involve short- and long-term potential impacts on the continuum of socio-economic

development and competitiveness of a whole society. The criticality of certain complex systems derives then from both their importance for single actors (operators, end users) and their wider relevance for social structures, supporting national security and economic development.

In the consideration of operators' expectations and risk perceptions as key causal factors affecting investments and therefore having a great impact on the future choices, hereafter a broader consideration of risk is considered. Traditional and limited enterprise risk management visions do not often look at risk in its broader vision and, therefore, it hardly can front the complexity of critical complex systems.

### **3 Risk Management and Security Services Versus Risk Governance**

The International Organization for Standardisation (ISO) and the International Electrotechnical Commission (IEC) consider risk as '*the combination of the probability of an event and its consequences*' (ISO and IEC 2002). Technically speaking, risk is a function of probability of occurrence of a negative event and the magnitude of its adverse effects. However, the technical definition of risk is based on the hypothesis that the two elements of probability and magnitude are known. These quantities can be sometimes simple to be measured, with a certain degree of uncertainty. In other cases, where the uncertainty is too high, these quantities can be almost impossible to be known. Uncertainty can be referred as what we know we do not know but also at what we do not know we do not know. In a situation of complexity, where sometimes stakes are high (e.g. natural hazards and threats to the environment or health), values in dispute and decisions urgent, high uncertainty may involve the inversion of 'hard' objective scientific facts and 'soft' subjective value judgements. When scientific inputs are 'soft' (uncertain), decision-making becomes 'hard' and the use of the precautionary principle and stakeholders' participation becomes of a greater importance.

Hence, in situations of high uncertainty, risk does not result in an objective factor that can be univocally measured, but in a subjective perception and value judgement, in the expectation of a negative impact. Risks are, in this case, not real phenomena but particular mental constructions of individuals, the product of observation and experiencing of reality elaborated according to the individual's particular visions, feelings, values and cultural backgrounds. Each particular conception of risk is important so as it identifies a given possible scenario and consequently the preferred preventive actions. In relation to the context, to the actual adverse effects and to the particular interests, the level of risk acceptability may differ substantially. The acceptability of the risk to the various stakeholders will determine different judgements about its criticality. In the case of complex critical systems, constituted by a multiplicity of stakeholders, a common perception of risk might never exist. As the philosophical stance of crossing dialogue in cross-cultural systems suggests,



the ontological assumption, the nature of reality, is considered as a partial and subjective perception.

In many contexts, and particularly in complex systems, the actual probability and entity of a harmful event is actually not known or achievable with an acceptable level of uncertainty. Paradoxically, a probable loss can be uncertain and related to a single event whilst having a certainty in the aggregate of multiple events. Even where the risk factors are known or predictable, they are however related, most of the times, to a single and restricted event that is produced on the sphere of a single actor and on a restricted area. In the current context, the same event usually has different impacts on different stakeholders. Complex risk situations derive in multiple perspectives and the involvement of many organisations and jurisdictional contexts. Extending the scope to an axiological view, the concept of risk in a given circumstance should accommodate the different nature of the loss, types of events and stakeholders' concerns. In this vision, risk communication and risk perception are essential factors for all human decision-making. The definition of risk may easily vary between different applied sciences and specific applications and situational contexts. It can be assessed qualitatively or quantitatively.

In cases of particular complexity, systems theory tries to give answers. Systems theory is an emerging area of science that studies holistic systems, an interdisciplinary field of science studying the nature of complex systems in nature and society. Its main rationale is to study how relationships between parts produce the whole behaviour of a system and how the system interacts and forms relationships with its environment. Whilst other large systems can be described as merely 'complicated', the reference to complexity identifies a context which is holistic (i.e. the whole cannot be understood by the mere accumulation of its parts), emergent (i.e. high-level patterns derive from simpler rules at lower levels) and chaotic (i.e. non-linear behaviour sensitive to initial conditions) (Kastenberg 2005).

Two major families of theory treat the subjective estimation of the dangerousness of risks: the psychometric paradigm and the cultural theory. Looking at the cultural theory of risk, different people and social groups fear different risks. As Douglas argues, risk perception depends on social structures ('ways of life') that generate attitudes towards the world ('cultural biases'). Trust is a key factor in influencing people's perceptions of risk: information by trusted sources appears more reliable. In his main contribution, Knight looked at the distinction between risk and uncertainty (Knight 1921). Two major families of theory treat the subjective estimation of the dangerousness of risks: the psychometric paradigm and the cultural theory of risk. In the psychometric paradigm, Amos Tversky and Daniel Kahneman describe how human judgement and decision-making differ from rational choice theory. In many cases, ignoring relevant information (high uncertainty), a risk is taken only for the desirability of options, pleasant feeling or mental suffering. Some heuristics refer to the following cases:

- The availability heuristic: events can be more or less easily imagined and appear as risky.
- The anchoring heuristic: adjustment of a piece of known information to create estimates of an unknown risk (uncertainty).

- The asymmetry between gains and losses: preference for a sure thing over an unsure with a higher expected utility but possibility of getting nothing. Preference for not losing than for gaining.
- The threshold effects: preference for moving from uncertainty to certainty over moving from higher to lower uncertainty.

Amos Tversky and Daniel Kahneman describe, again, how human judgement and decision-making differ from rational choice theory. In many cases, ignoring relevant information (high uncertainty), a risk is taken only for the desirability of options, pleasant feeling or mental suffering. According to the cultural theory of risk, different people and social groups fear different risks. As Douglas argues, risk perception depends on social structures ('ways of life') that generate attitudes towards the world ('cultural biases'). Trust is a key factor in influencing people's perceptions of risk: information by trusted sources more reliable than information from non-trusted sources.

The gap of isolated risk management practices stays in the fact that security matters are often managed by single operators, so that the uncertainty in which they operate increases together with the associated risk. In spite of belonging to the free market, given infrastructures and systems reveal in fact to be critical for the security of the citizens and for the general well-being and economic development of a society and represent therefore a public good. Particular risk management views of different operators, although legitimate, might often enter in conflict, missing a wide solution or pursuing security of society. Governments neither have a comprehensive understanding nor produce an effective action by themselves or with a restricted set of players. The complexity of the risk situation is irreducible, and a made-up simplification will easily fail to fulfil stakeholders' expectations. Gaps arise in relation to its strict and narrow private business vision, which hardly can be applied to the complexity of the system just described. Gaps arise also in the scope of the interests involved. Private business, even multinational companies, cannot take the responsibility of the security and risk of a whole country or continent. The limitation of the scope and also of the perspective and cultural vision are great barriers for the management of a whole system affecting a multiple and diversified interests and concerns. They do not consider security as part of the social structure of a society.

For all the above traditional enterprise, risk management approaches fail in giving an answer for managing systems' complexity, as soon as private stakeholders usually restrict their view to their own systems. The simple addition of separated risk management operations might not be sufficient to handle a complex system characterised by a plurality of stakeholders, a vague definition of roles and responsibilities and lack of information about risk-related cause-effect relations. As the risk types, range and uncertainty expand, the risk management decisions of each single stakeholder have to be jointly coordinated, according to given relations between different policies and risk-related value systems. Risk-policy interventions can be set up sometimes by institutions at political level, through incentives and constraints on the sphere of decision-making. However, in a deregulated context, when security systems are in private hands and governments have not anymore the power to effectively manage the system, a matter of risk governance arises.

Decisions are made therefore through a collective effort. Whenever the number of stakeholders is too large to allow efficient and effective decision-making, an entity can be delegated to facilitate the process and define the roles and the responsibilities. But the multiplicity of actors is actually only one of the conditions that more easily generate complexity. In a regulated context, where national law is applied *erga omnes*, a plurality of stakeholders is concerned. However, one of the characteristics of legislation and regulation is the detailed definition of roles and responsibilities of the stakeholders involved. Moreover, legislative acts have the other essential characteristic of containing a mechanism of action or repression consequent to their non-compliance. The judicial power is the only entity that is called to ensure the respect of a law and the resolution of conflicts. A matter ruled by law is therefore not in the sphere of governance, because it solves by itself the complexity of interaction between stakeholders.

In an interconnected open system, isolated risk management views and actions by single stakeholders cannot provide the needed overall solution for risk handling. The single legitimate appreciation and management of the risks by one stakeholder can easily enter into conflict with the actions of the others and with the more generic view of the system and the security of society as a whole. Single risk management solutions will rarely produce a harmonic and broad handling of risks that respects all interests and concerns. Stakeholders and society need a proper approach for integrating their risk standpoints and consequently making adequate risk management decisions. In cross-cultural collaborative research, more elements contribute to the successful integration of different perspectives and cultures: the quality of relations among management relationships among cross-cultural teams and the access to data and cultural differences in gender equality (Easterby and Malina 1999). In spite the reference is to teams of researchers, the same thing could be said about teams of stakeholders or decision-makers, researchers and politicians.

Whilst the cultural theory of risk enhances the differences in the risk perspectives, in the stakeholder theory, Freeman talks about models of the groups which are stakeholders of a corporation and identifies methods by which management can take into account their interests. Freeman's stakeholder approach (1984, 48) is defined as '*The stakeholder approach is about groups and individuals who can affect the organization, and is about managerial behaviour taken in response to those groups and individuals*'. This concept can be referred to that responsible management that is able to promote the creation of business know-how and long-term success. In our case, long-term success is about how to reduce risk and increase security, in relation to the plurality of stakeholders affected by the system. If I am allowed to interpret the mentioned definition for the purpose of this research, the organisation in our context is the complex of stakeholders, the whole community of operators that manage critical networked infrastructures, each of them for a different part of the interconnected system.

In the case of socio-economic systems, it is of major importance to involve 'the social side'. In many sectors, a single company serves a multitude of customers at the same time, so that the service acquires a particular criticality. Entrepreneurs, managing directors or boards of directors have got the responsibility of administrating

critical goods and services, which are essential for the well-being of entire nations or continents. The above described vision can be found also, in a different form, in the stakeholder theory. Besides investors, employees and suppliers of a corporation, other parties are also involved, including governmental bodies, political groups, trade associations, trade unions, communities, associated corporations, prospective employees, prospective customers, the public at large and even competitors. Stakeholders are all those actors, who, for own their choice or not, have a stake related to an economic activity. They are affected by this activity and affect the same activity by their own choices and behaviours. In those cases in which critical systems are managed by single private actors, but still are relevant for the economy of a whole country, we can answer in this way, to support a joint vision of private business and public economy (Freeman et al. 2007). The goal of management is therefore to take into account the consequences of the economic activity onto all different stakeholders and maximise their well-being in the long run, a condition that should ensure the interest of shareholders as well. This means also that stakeholders interact among one another, creating interdependence between ethics and business results, between the need of securing public goods and pursuing enterprise goals. In fact, in spite of such interdependence, stakeholders' theory is not a socio-economic theory nor a politics theory nor a theory of general ethics. It remains an enterprise management theory. I could argue that when critical public sectors belonging to national economics are translated by deregulation to the market sector, traditional enterprise risk management fails, as soon as private stakeholders tend to restrict their view to their own systems. Traditional risk management practices are not able to give an answer for managing systems' complexity, as the simple addition of separated risk management operations might not be sufficient to handle a complex system characterised by a plurality of stakeholders and a vague definition of roles and responsibilities, nor a perfect knowledge of risk-related cause-effect relations. There is apparently a need of making a compromise, which is able to guarantee the minimum conditions of well-being and security of society. As the risk types, range and uncertainty expand, the risk management decisions of each single stakeholder have to be coordinated with the ones of the others, according to given relations between different policies and risk-related value systems. In the context here described, some questions arise: how to solve the dichotomy of liberalised socio-economic systems based on public security services privately owned, yet having high public relevance for the existence of a high level of criticality for security, economic development, business and society?

The answer to the management failures above treated focuses on the concept of governance, already treated by the EU and the OECD from a public and corporate perspective, and applied to risk issues by the International Risk Governance Council (IRGC) (Sajeva and Marcelo 2006a, b) but never translated into a theory generally accepted. Where more isolated approaches are not able to handle complexity, a governance theory would constitute an alternative managerial and organisational model directed to manage and rule the security of complex interconnected systems. With the term governance, the author refers to *'a conceptual construct dealing with societal sensitive and complex issues that can be translated in a decision-oriented*

*process, inclusive of all concerned private and public stakeholders. The process' outcome is based on the participative deliberation, the informing of options, and the commitment to the implementation of the joint deliverances. The governance process represents the interface with stakeholders, the source and support of strategic decisions and the instrument through which the principle of accountability can be properly implemented... Governance is a concept that expresses the aspiration for 'joint and integrated management' of affairs that cannot be handled by single stakeholders because of their multi impact effect and because of the complexity of relations between them'.*

The governance approach for the security and development of socio-economic systems can be fully based therefore on social Giddens' structuration theory, as it takes into account individuals as inserted in social structures. Individuals are subject to rules, but they are able to produced changes, thanks to the rules themselves. Governance of security and risk can be defined as the realisation of social structures, made of rules and resources, which are enablers and inhibitors for stakeholders. Such socio-economic system, based on a security- and development-oriented social structure, would realise a multi-perspective vision able to cope with complexity and to overcome the currents gaps of more isolated risk management approaches. This would represent a way to detach from a Frankfurt school of security, based on defence and security tools, and to embrace the idea of the school of Copenhagen, for which security is instead a process and cannot be achieved by the mere provision of protection tools to single individuals or social groups.

In a deregulated context, when complex socio-economic systems or parts of them are put in private hands and governments have not anymore the power to effectively manage the system, a matter of risk governance arises. Decisions are made therefore through a collective effort. Whenever the number of stakeholders is too large to allow efficient and effective decision-making, an entity can be delegated to facilitate the process and define the roles and the responsibilities. But the multiplicity of actors is actually only one of the conditions that more easily generate complexity. In a regulated context, where national law is applied *erga omnes*, a plurality of stakeholders is concerned. However, one of the characteristics of legislation and regulation is the detailed definition of roles and responsibilities of the stakeholders involved. Moreover, legislative acts have the other essential characteristic of containing a mechanism of action or repression consequent to their non-compliance. The judicial power is the only entity that is called to ensure the respect of a law and the resolution of conflicts. A matter ruled by law is therefore not in the sphere of governance, because it solves by itself the complexity of interaction between stakeholders.

Risk governance represents an alternative organisational and managerial structure able to front the complexity of a whole system that cannot be managed by the isolated action of the single actors involved. In presence of upcoming instances of liberalisation of markets, when the pure regulatory activity setting governmental powers is in a phase of decline, a new comprehensive decision-making approach is required. Security levels of critical elements, those considered necessary for ensuring the prosperity and development of the economic system and of their participants,

have to be ensured by the joint undertaking of all interested parties. This alternative risk governance model is a step further, which goes beyond typical public regulation or to private management, and considers an organisational model based on cooperation and voluntary participation for addressing policies towards the common good. In order to guarantee security assurance in a multinational, deregulated and interconnected context, risk governance can fill the gap of more traditional risk management practices. In absence of regulation or legislation in given sectors that however are crucial for the economy of a system, decisions can be made through a collective effort, a risk governance process that would involve a great number of stakeholders, identifying their roles and responsibilities.

Governance is not a traditional risk management structure, but nor a legislative framework. It therefore does not refer to an interpretation of the stakeholder theory referring to political economics, which has been sometimes promoted (Freeman et al. 2007, 39). It remains a voluntary and 'participatory joint integrated management' approach set in order to pursue common goals and resolve common affairs, concerning a plurality of stakeholders, having the common aim of managing critical systems, possibly holding at the same time divergent conceptions and perceptions of risk and security, different interests and concerns and different cultural beliefs. A risk governance policy, indeed, can still refer partly to enterprise management, but it is mainly directed to involve private and public stakeholders into the decision-making process, making the security of a system also their own interest and goal. In contraposition to traditional management practices or CSR strategies, the governance eye is placed outside the enterprise and look at the whole system, identifying stakeholders' roles and responsibilities and cooperative management approaches for the common goal of risk reduction. In governance, a so-called extended peer community is asked to identify critical points regarding the existing uncertainties, the values and the quality aspects, which can best frame the phenomenon object of study. This approach refers to a 'democratic participation' and is a key strategy for dealing with the knowledge economy, able to provide quality assurance for a complex system not manageable by traditional approaches. Participation is not reserved only to experts, professionals' associations and stakeholders but rather extended to all those who are interested for building greater consensus in the risk governance process. They assume names like 'juries', 'conferences' and 'citizens' and are called to assess proposals, scientific or political, and can involve somehow moral and political aspects. In the specific context of socio-technological systems, the economic strategy for Lisbon 2010 goals, founded on the construction of a knowledge-based society, involves a new consideration of the relations and interfaces between science, technology and society. Knowledge, creativity and technological development, taken as main factors of growth, constitute a complex system in continuous interaction with society, which has to be measured not just by indicators but put in relation to different contexts, interests, values and elements of uncertainty. An extended participation of citizens to the evaluation of the impacts of technological achievements on their own sphere is a tool by which the analysis is adapted to different realities. A growth in spread of scientific concern and in exchange of information and skills, too often limited to a monopolistic and separate class, constitutes then a further step

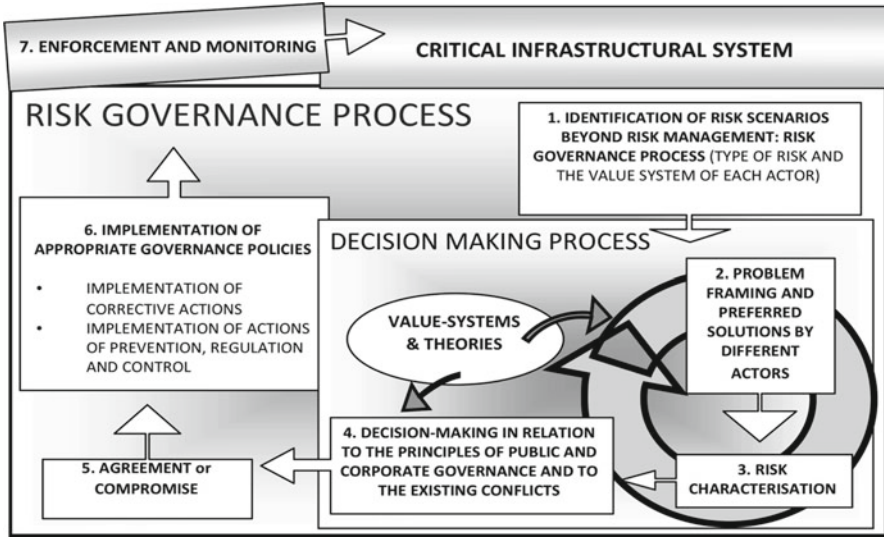


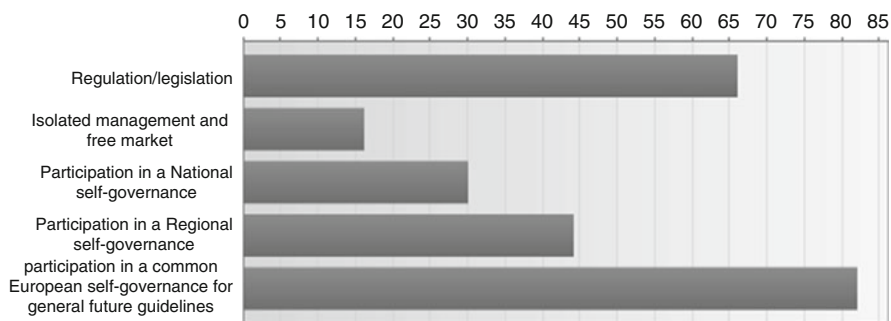
Fig. 11.2 Risk governance process (Sajeва and Marcelo 2006a, b)

towards participation. In this vision, a risk governance process has been defined in previous publications (Sajeва and Marcelo 2006a, b). The analysis conducted in this chapter is mainly theoretical.

However, it takes advantage of previous studies and surveys applied in practice. In consideration of such principles of participation and collective security, instances of governance have been promoted at European Commission level for the security assurance of critical social sensitive and complex systems, such as the electric power infrastructural system (Sajeва and Marcelo 2006a, b) and the transition process towards free-carbon energy sources (Sajeва and LaBelle 2010). Governance processes have taken advantage from Delphi methodologies, for realising a continuous recursive decision-making process in which all parts of the society can participate and organise themselves in collectivities for holding their visions and preferences (Sajeва and LaBelle 2010, 74). This has been done through workshops, interviews and online questionnaires. These methods are mostly applicable in European countries. However, the concrete application of participatory decision-making processes can happen in many different ways, according to the social structure and stage of development of a given society (Fig. 11.2).

#### 4 A Finnish Perspective

A number of interviews have been carried out for a European FP7 project on Privacy Awareness through Security Branding (PATS), about the national and sectoral understanding of security and privacy issues. The interviews revealed, as expected,



**Fig. 11.3** On-line survey on the self-governance of energy systems' security (Regulatory, market and policy structure for security of energy supply, economic development, environmental and social sustainability, health protection and general well-being (Number of respondents: 150))

a multitude of different perspectives, reflecting security actors' and personal people attitudes, visions and perspectives. The exercise has allowed to draw, on the basis of all interviews, a sort of Finnish identity and approach in fronting security, well-being, technology and privacy attitudes (Fig. 11.3).

The interviews reveal first the general nature of Finns (Sajeve 2010a, b). Used to live in great spaces, they give very much importance to security, once intended as land around themselves. After emigration to cities, security was represented by the respect of laws, the trust in institutions and security services, the moral values (honesty) and the transparency of information. In different countries, there is more or less discrepancy between the formal legislation and the actual behaviour of citizens, meaning the level of elasticity and subjective application or respect of law. In Finland, the law is respected and followed as it is, as close as possible to its formal formulation. It seems clear that there is much more need of feeling secured and safe than need of keeping personal information secreted, also because traditionally Finns tend to claim or get only what they are allowed. Sometimes, even if a service is to be claimed, Finns do not claim it, but just expect that it is given, for the reason that it has to be given. The comparison with other countries' cultures is immediate, in those cases in which citizens have to fight in order to get a given service. In this respect, it is important however to recall the considerations of some interviewed actors of the security sector, who noticed, within their working activity, a progressive decrease of these values, and a decrease in security.

Nowadays, the Finnish vision refers mainly to aspects of social security. At national level, the consideration of security as a right of citizens, the strong social security system and the very low level of corruption have strongly contributed to reduce security problems. This analysis revealed the presence of rules as well as enablers, allowing Finland to preserve a safe and secure environment for citizens and to reach objectives of human and socio-economic development. This means, in turn, giving also investors positive perceptions, trust and propensity to invest. Security can be in fact considered as an enabler, as it allows to satisfy basic needs and represent a driver for development. Security is as well a rule, when considered from the side of potential harm or actor who could limit others' security. Security is



also an objective of human and socio-economic development, when people constitute themselves their primary goal. The main security concerns have regard principally to the social and familiar environment. They are represented by social exclusion, lack of familiar cohesion and daily routines or abuse of alcohol. Historically, at the international level, from a national security perspective, the only concern was related to the Russian threat, due to clear geopolitical reasons, which nowadays, with the collapse of USSR, turned into the form of organised crime. Quite a lot of stress is given to the neutral role of Finland in the international scenario, engaged more in conflict resolution and peacekeeping than in strict alliances, even if, of course, for historical, religious and cultural reasons, Finland belongs to Europe and to the Occidental world. Finland, defined as a bubble, feels probably to be part in a stronger way to the Nordic countries, recently more and more part of the European Union. The referendum for the inclusion in the EU succeeded for just some votes more in favour. The main concern was probably to remain isolated again between Europe and Russia. A strong tendency wanted Finland to be part of Europe for these geopolitical reasons. What emerged is also that for such great sensitivity to security, the measures implemented are sometimes not needed. In another country, people would not pay much attention. Finland is a peaceful country, and a country where Finns want so much to maintain and preserve such peace and well-being. In a sense, nothing is left to the case. As it was remarked in an interview, Finns want that security issues are taken care as it should. It is by the way a general principle for Finns. All matters are taken care so much as possible, for achieving the best possible result.

From a conceptual point of view, security is more referring to absence of threats, well-being and welfare, and many interviewees talk about the psychological aspect of feeling secured and safe. The concept of security branding is more related to trust. In this respect, a strong reaction by one specific interviewee referred to the old conception of security in Finland (the school of Frankfurt), in contraposition to a more cooperative model (the school of Copenhagen), which should be in his opinion adopted, based on processes and not on mere defence, means, police, private security services or technologies.

In consideration of such premises on the basic Finnish background and culture, it results clear how for the majority of interviewees security control technologies (e.g. CCTVs, biometrics) do not represent really a problem. The problem is seen in the possible vulnerabilities of systems, such, for instance, the data management processes, the need of transparency about data managers and systems administrators and the possible failures related to the ICT systems or the human error or trust. For the majority of actors, what matters is the law. And in occasion of every technological development, there is a period of adaptation to new systems. The widespread trust, which is present in Finland, could be a source of failure, for a lack of awareness about possible risks. Technology is seen as the future source of security, with always more control and more integrated techniques, like some interviewees said, '*just in case*'. But the security of good administration of such amount of data is given by the trust on authorities. In spite of the existence of a debate about privacy awareness, in Finland, the majority of interviewees showed trust in institutions, police and personal data administrators. Finns have generally great trust in the

efficiency and honesty of police and security operators. This trust allows citizens to feel good, even in presence of ‘big brother’ technologies. We see, here in particular, how much trust is important for guaranteeing security. The complete transparency of information and the lack of privacy measures hold in presence of trust, honesty and total respect of laws also by administrators, when risks of failures in data processes are almost absent. The problem, as it was remarked, is more on information management than in security management and tools. In conclusion, trust and honesty in Finland make so that the lack of privacy is not seen as a big problem, for the exception of few interviewees. But for this reason, the system could very vulnerable, because the issue is not much taken into consideration (for instance, the consequences of the possible action of hackers). The reason why the system works is that it is a bubble, as it mentioned by actors. There is not much immigration and Finns, among themselves, live well in their system.

## **5 Results and Conclusions: The Role of Governance and Future Studies for Secure and Sustainable Socio-economic Development**

The analysis demonstrates how security technologies and individual security measures are only tools, whilst security has to be built on our behaviour, on processes and on human beings, which are the goal of security as well as the goal of development. Security does not result as an individual concept, but it is an interaction between individual behaviour and social structures. Everyone’s security is the security for the security of others.

Security control may even limit the freedom of everyone to feel secure himself, perhaps against a possible misuse of technology. In this vision, we feel secure when we feel free and we feel that the access to our information is given to official, reliable transparent security institutions, free from corruption. In the Finnish case, a major element is the trust for national institutions, i.e. police, considered as honest and reliable. Moreover, the individual conception of security could imply actually lack of security. The individual conception would mean that security is a commodity and is function of economic power. When this disparity enlarges, the lack of security for a given part of society becomes a threat for the other parts of society, which therefore are in danger and have to renounce to own freedom, build walls or castles and maybe engage in conflicts, renouncing also to the capability and freedom to live in peace and political stability. Concepts such as development, security and freedom are strictly interrelated. In a sense, each of them exists as the others exist. As previously mentioned, individual capabilities are based on collective capabilities. In Maslow’s pyramid, security needs immediately follow the psychological ones. Even in free market economies, the human needs listed in Maslow’s pyramid (see food, housing, employment, health family policies, free fresh water availability, security and safety, police services and national defence) hardly can be successfully put on the market. It is not rare that in such cases regulatory

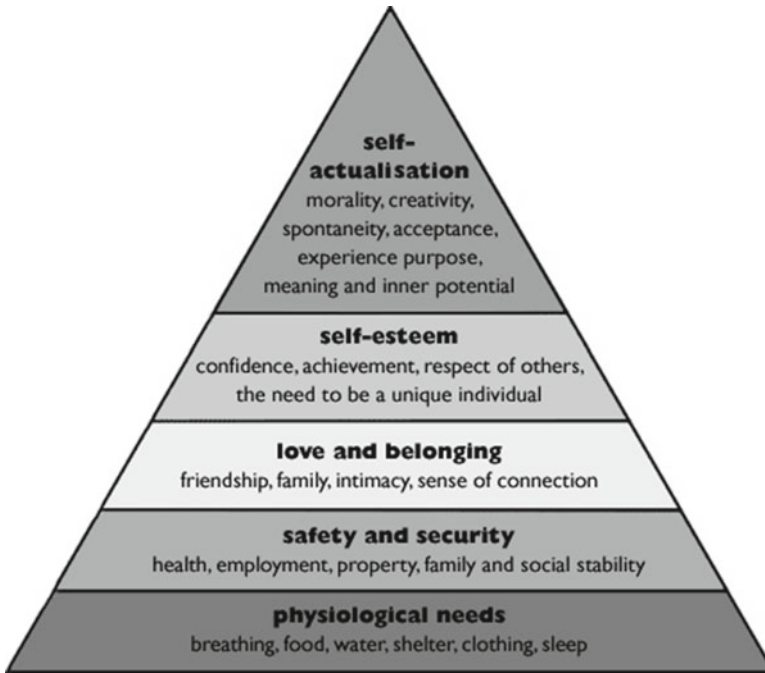


Fig. 11.4 The Maslow pyramid

support is necessary, in the form of collective governance or collective agreements, for the reason that they are however basic needs or public goods. They are often object of political debate, because their absence means absence of development and rise of social conflict.

The more those goods are shared among larger parts of population, the less we experience social conflict and political instability. Security policies should have as a first aim that of reducing the causes of threats, which undermine human capabilities, making people willing and happy to respect the capabilities of others, because they believe they are right and because they are as well enjoying them. For doing so, security cannot be made an individual good, but it has to become collective as the product of human agency and social structure. We know that other's security is also our security. Goals of income growth in critical basic needs of society, such as security, might lead to make them commodities. Economic power can ensure best protection, best lawyers and greater oligarchic security. In developing countries, high levels of corruption of national security services means often the rise of private enterprises selling security as a commodity in the free market. On the other hand, measurements of security by expenditure in countermeasures reveal lower security (Fig. 11.4).

Discussion can arise, for instance, in relation to security policies based on 'big brother' technologies. The adoption of these technologies raises strong debates

about possible loss of privacy and psychological well-being. Is the elimination or strong reduction of free will always positive? What effects have the elimination of the real will of people to be honest and fair? Security policies based on a defensive approach do not eliminate nor reduce threats. They try to limit possible attacks, increasing control. What would happen if control tools would be improperly used? Or if technological systems would suddenly fail in their functioning? A possibility is that citizens will be induced to break rules because they feel finally free. Those who feel missing own security of freedom for other aspects of life, such as lack of social or economic security, will start immediately to break the rules. Only those who have main needs satisfied will not probably change behaviour. He/She would simply feel psychologically free.

According to Montesquieu, direct democracies of republican governments (he refers about Athens and Sparta in ancient Greece) had virtue as their principle, a passion for one's fellow citizens and their laws; it is *'love of the homeland, that is, love of equality'* which he calls *'political virtue'* and the passion of patriotism. The *'political good man'*, according to Montesquieu, *'is the man who loves the laws of his country and who acts from love of the laws of his country'*. In a republic, people possess the self-control, or virtue, that would allow them to pass measures to restrict themselves as well as others. The political men of ancient Greece relied on political virtue to sustain their republics, whilst nowadays political men often speak about *'manufacturing, commerce, finance, wealth, and even luxury'*. In Montesquieu's view, modern nations lack political virtue as they are dedicated to the growth of wealth and material prosperity: *'When... virtue ceases, ambition enters into those hearts that can admit it... One was free under the laws, one wants to be free against them. Each citizen is like a slave who has escaped from his master's house. What was a maxim is now called severity; what was a rule is now called constraint; what was vigilance is now called fear. There, frugality, not the desire to possess, is avarice. Formerly the goods of individuals made up the public treasury; the public treasury has now become the patrimony of individuals'* (Ward and Fott 2007, 18–20). The disappearance of political virtue and the rise of ambition or the desire for power and physical pleasure is at the basis of loss of capabilities. This results in a desire for 'freedom' intended as being free from laws, for self-fulfilment rather than self-restraint or self-government. Security, hardly achievable individually, is the result of a more holistic thinking. Individual security and freedom implies the security and freedom of all. Security should involve the desire to feel safe and the desire to provide security to others. Security should involve detaching from a logic of protection and embracing a logic of reduction of threats. It should also involve detaching from a logic of security tools and embracing a logic of security process. This means achieving security through mediation, conflict resolution and stakeholders' participation, as well as accountability of decision-makers towards stakeholders. In a risk governance perspective for handling the complexity of social sensitive and critical systems, it is important to establish a dialogue among actors and stakeholders, for finding a common space of understanding and finding pathways towards security, safety, well-being, development and concepts converging into a unique one. Instances of participation in the definition of security needs would make

citizens and their needs the real goal of development. Risk governance can be implemented by future methodologies, for developing human capabilities in a prospective way, trying to identify probable and desirable future scenarios. Given choices can be made in order to use resources and make actions for achieving deliberately given effects. In our context, we are talking about the use of economic resources and production factors, for the achievement of well-being, quality of life and citizens' security, and true goals of sustainable socio-economic development.

Social structures can act as a constraint on human action but also enable realising changes by providing common frames of meaning and participatory governance processes, in which human actions and structures can relate to each other for achieving common goals, by the resources at own disposal. As the relation of human agency and the social structures in which they act results to be often uncertain, governance processes can identify future possible and desirable scenarios of which policymakers are accountable towards stakeholders. In practical terms, among different futures methodologies, focus groups and Delphi surveys can be used for the identification of future scenarios. A further development of the ASA (Advanced Sustainability Analysis, Luukkanen 2003) tool can help in understanding well-being, security and freedom backcasting for the determination of the actions needed for realising a certain security objective, by acting on true causal factors. Talking about security in this conception, as assimilated to freedom and well-being, it can be expressed as the composition of given drivers in the function below represented. Possible true causal factors can be represented by the Maslow pyramid basic needs. Those needs can be represented by existing indicators or ad hoc data collection, in order to measure the different performances. Such an exercise would be wise to study for its scientific validation.

$$\text{WB} = \text{CPI} \cdot \text{SEC} \cdot p \cdot \text{SCO} \cdot p \cdot \text{LAB} \cdot p \cdot \text{MAR} \cdot p \cdot \text{PHY} \\ \cdot p \cdot \text{H} \cdot p \cdot \text{E} \cdot p \cdot \text{R\&D} \cdot p - p (1, \dots, n) -$$

WB=well-being; p=% of population; PHY=physiological needs: life expectancy at birth, availability of water and food, housing policies; H=health care; E=education; R&D=research; G=Gini index; SEC=security index; CPI=corruption perception index (Transparency International), SCO=social cohesion; LAB=social and labour support policies; MAR=quality of work environment, competitiveness, absence of barriers to entry in professional sectors, fair market, absence of monopolies of dominant position

$$\log \text{WB} = \log \text{CPI} + \log(\text{SEC} \cdot p) + \log(\text{SCO} \cdot p) + (\log \text{LAB} \cdot p) + \log(\text{MAR} \cdot p) \\ + \log(\text{PHY} \cdot p) + \log(\text{H} \cdot p) + \log(\text{E} \cdot p) + \log(\text{R\&D} \cdot p)$$

The assumptions of the equation are:

- Just only one of these variables tending to zero would make the all WB tending to zero as well because the lack of only one of these needs involves a negative influence on all the others, the creation of conflicts and contradictions.
- The variables should be of course normalised in order to be able to adopt the same scaling system.

- The greatest the share of citizens enjoying the selected needs, the greatest the performance. For this reason, the variables are multiplied for the share of population enjoying the correspondent needs.

This proposal of approach, as already said, should be further analysed and practically applied in order to confirm its scientific validity or to modify in the most convenient way.

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# Chapter 12

## Democracy and Public Knowledge: An Issue for Social Indicators

Paolo Parra Saiani

*Freedom is not merely the chance to do as one pleases; neither is it merely the opportunity to choose between set alternatives. Freedom is, first of all, the chance to formulate the available choices, to argue over them – and then, the opportunity to choose. That is why freedom cannot exist without an enlarged role of human reason in human affairs*

(Mills 1959: 174).

### 1 Introduction

In this chapter I will show the connections (or their lack) between democracy, information, knowledge, numbers, and numeracy and trace the road from “political arithmetick” to modern social reports, illustrating the factors that contributed to the introduction of quantification in the public discourse. However, as it will be showed in the last section, the mere possibility to know the state of the nation is not the same as to use that knowledge.

### 2 The Number, What?, or the Beginnings of Gathering Information

The activity of gathering information on social subjects has an old story. Inventories with fiscal and administrative purposes were a common practice in the ancient Egypt as in the Roman Empire. In 1086, the Domesday Book, very similar to a

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modern census, appeared in England – promoted by William the Conqueror. In 1288, Bonvesin da la Riva published a work dedicated to the city of Milan, giving a detailed description of the topography, demography, and architecture of Milan and its environs: a very different and innovative approach from the usual one of that period. Another example is given by John Graunt, who in 1622 published *Natural and Political Observations Made upon the London Bills of Mortality*<sup>1</sup>: one of the «pioneering works in the history of statistics and demography, Graunt’s book laid the foundation for a quantitative study of society, providing numbers for the total population of London, the mortality rates for different diseases (including plague), the ratio between the sexes, and measures of longevity» (Rusnock 2005: 66–67). In 1696, Gregory King published the *Scheme of the Income and Expense of the Several Families of England Calculated for the Year 1688*, which in Laslett’s words is «the earliest reckoning of a gross national product, the first attempt at distributing that product between classes, households and individuals, in fact the point of origination of the very concept of a national income, even of the whole tendency to look at societies in their entirety, taking every single member into account» (1973: 3). Nevertheless, sovereigns did not have the possibility to rely on reliable information: depending on the sources, French population in the fourteenth and fifteenth century was estimated between 112 million and 120 billion people. As stated by Reynié, «le roi qui se sait roi ne sait pas de qui il est roi»<sup>2</sup> (1992: 43).

The development of communication and transport systems, the diffusion of accounting techniques, and the rise of mercantile capitalism – all these factors required the systematic recollection of information on population, disposable resources, and commercial flows (Lazarsfeld 1961; Braudel 1972: 369; Pinkney 1986: 50–51; Bruschi 1999: 234; Kiser and Kane 2001: 202; 205). But only a bureaucratic organization – in Weberian terms – would have permitted the gathering of such information in a permanent way. As Weber pointed out, bureaucratic administration built his rational dominion on knowledge (1922a/1995, I, ch. 3). Following Weber (1922/1995, II: 48), Habermas (1962) considered *calculability* and impersonality in the administration of the state as consequences of capitalism needs. But the relation between power and knowledge has been deeply analyzed by the Frankfurt School and by Michel Foucault. The former emphasized that large accumulation of facts and links between them was a science task in order to assist industries and government (Horkheimer and Adorno 1966: 259, Horkheimer and Adorno 1956: 142). The latter saw the activity of production of information on life conditions into biopolitics, an expression by which he defined the institutional basis of the European power system, born in the mid-eighteenth century. In his writings, the concept of population assumes a focal position: power can be exercised on population, and not on subjects; for that reason, population needed to be studied in order to be used in the production of wealth, goods, or other individuals.

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<sup>1</sup> See Hull (1896, 1899), Cullen (1975), and Piovani (2006: 17) for the debate on the authorship of the *London Bills*.

<sup>2</sup> *Amplius*, see Hecth (1977, I: 34–35) and Reynié (1992: 45).

«La découverte de la population est, en même temps que la découverte de l'individu et du corps dressable, l'autre grand noyau technologique autour duquel les procédés politiques de l'Occident se sont transformés. On a inventé à ce moment-là ce que j'appellerai, par opposition à l'anatomo-politique que j'ai mentionné à l'instant, la bio-politique. C'est à ce moment que nous voyons apparaître des problèmes comme ceux de l'habitat, des conditions de vie dans une ville, de l'hygiène publique, de la modification du rapport entre natalité et mortalité. C'est à ce moment qu'est apparu le problème de savoir comment nous pouvons amener les gens à faire plus d'enfants, ou en tout cas comment nous pouvons régler le flux de la population, comment nous pouvons régler également le taux de croissance d'une population, les migrations. Et, à partir de là, toute une série de techniques d'observation, parmi lesquelles la statistique, évidemment, mais aussi tous les grands organismes administratifs, économiques et politiques, sont chargés de cette régulation de la population. Il y a eu deux grandes révolutions dans la technologie du pouvoir: la découverte de la discipline et la découverte de la régulation, le perfectionnement d'une anatomo-politique et le perfectionnement d'une bio-politique» (Foucault 2001: 1012–1013).

Finally, Foucault directly connected knowledge and power, going back to William Petty:

«En prêtant au mot un sens différent de celui que lui donnaient au XVII<sup>e</sup> siècle Petty et ses contemporains, on pourrait rêver d'une «anatomie» politique. Ce ne serait pas l'étude d'un État pris comme un «corps» (avec ses éléments, ses ressources et ses forces) mais ce ne serait pas non plus l'étude du corps et de ses entours pris comme un petit État. On y traiterai du «corps politique» comme ensemble des éléments matériels et des techniques qui servent d'armes, de relais, de voies de communication et de points d'appui aux relations de pouvoir et de savoir qui investissent les corps humains et les assujettissent en en faisant des objets de savoir» (Foucault 1975: 33).

The Foucaultian approach was then drawn on by stressing the coercive power of numbers on individuals in order to convert them into objects able to be manipulated (Cohn 1987: 224; Anderson 1991: 163; Appadurai 1996). On the other hand, such a position was offered by Petty himself:

And finally when we have a clearer view of all persons and things, with their powers & families, we shall be able to Methodize and regulate them to the best advantage of the public and of particular persons (1661/1927, I, IV, 25: 90).

And where power is not exercised with ostentation, it takes action insidiously, as census can be an instrument of social control and institutionalization of differences.<sup>3</sup>

<sup>3</sup>Many authors consider statistics as a social construction (Kitsuse and Cicourel 1963; Hacking 1990; Rose 1990; Poovey 1998), by which it is possible to create an oppressive language, institutionalizing normality and abnormality. But there is no unanimity in considering normalization and individual control as an expectable result of quantification. On the contrary, the success of numbers entails freedom for the individual: Sherman (2001) state that quantification has give back to individual his own responsibility, showing him as his poverty is the result of aspects that he may control. Porter (1995, 2005) and Hess (2000, 2005) draw the attention to the introduction of the thermometer in order to take directly our own temperature, without having to contact an intermediary (the doctor and his opinion). «No doubt the quantification of body temperature is only one example of a new social technology. But the standardizations that prepared the way for quantification in the hospital and in daily life did not simply serve to document, measure, control and regulate the individual. They also somehow allowed the individual to regulate and control this social technology» (Hess 2005: 122).

The systematic activity of gathering information modified the same reality it was supposed to study (Desrosières 1989: 232ff.). On the other hand, it favored innovative approaches on the theory side by modifying the unit of analysis. Studies by Booth, Rowntree, Bowley, etc., all contribute to overcome the ideological view of poverty seen as a breach, a pathology, to be attributed only to the individual. This is well demonstrated in 1848, when an outbreak of cholera focused attention on Britain's city slums; the "Economist" opposed the passage of a Public Health Bill declaring:

«Suffering and evil are Nature's admonitions; they cannot be got rid of; and the impatient attempts of benevolence to banish them from the world by legislation, before benevolence has learnt their object and their end, have always been more productive of evil than good» (in Abrams 1951: 25).

Similarly, the diffusion of expressions like "rate of criminality" (around 1830) and "unemployment rate" (in the early 1900s) underlined the collective responsibility at the expense of the unlucky or reprehensible individual person (Himmelfarb 1991: 41; Porter 1995: 37). In the same way, suicide is no more attributed to each single individual, and their regularities became properties related to society on the whole, as in the Durkheimian production.

### 3 "I Tell You a Secret", or Information Applied to the Administration of the State

The expression Political Arithmetick, coined by William Petty, made explicit the conjunction between two spheres until then thought as separated: on the one hand, reason of state, the privilege of aristocratic élite; on the other hand, arithmetic, a "vulgar" discipline cause her ties with trade. Petty thought that the use of numbers would allow the impact of personal and subjective opinion in state strengths determination to be neutralized:

«The Method I take to do this, is not yet very usual; for instead of using only comparative and superlative Words, and intellectual Arguments, I have taken the course (as a Specimen of the Political Arithmetick I have long aimed at) to express myself in terms of *Number, Weight, or Measure*; to use only Arguments of Sense, and to consider only such Causes, as have visible Foundations in Nature; leaving those that depend upon the mutable Minds, Opinions, Appetites and Passions of particular Men, to the Consideration of others» (Petty 1690: vi–vii; italic in the original).

Torgerson pointed that the dream of «putting an end to the strife and confusion of human society in favor of an orderly administration of things based upon objective knowledge» was «prevalent in the Enlightenment of the 18th century and was reasserted with the advent of positivism in the 19th century» (1986: 34). And in particular, quantification of social phenomena should have guarantee an objective knowledge; statistics is then seen an indispensable science for a liberal state. As stated in the 1860 statute of the Statistical Society of Paris – statistics is "nothing

else than the knowledge of the science of facts [...] It ought to provide the basis upon which society is governed” (in Porter 1995: 80).

The search for objectivity was explicitly stated in the program of the Statistical Society:

The Statistical Society will consider it to be the first and most essential rule of its conduct to exclude all opinions from its transactions and publications – to confine its attention rigorously to facts – and as far as may be found possible, to facts which can be stated numerically and arranged in tables (British Association for the Advancement of Science 1833: 492).

Thus objectivity – supposed to be an intrinsic property of numbers – would have allowed politics to decide in a rational way on economic and social topics; so rational that if “facts” would be known, disagreement would cease. This statement, clearly a heritage of the true genuine positivism, will be – as we will see in the following paragraphs – a point of view common also with the later “social indicator movement” of the 1960s.

It should be evident that all those initiatives were led by economic, fiscal, and political reasons; thus, it was quite obvious that all those statistics had to be kept secret. As we can read in the *Discours historique à Monseigneur le Dauphin sur le Gouvernement intérieur du Royaume* (1736), “Le secret qui est l’âme des grandes affaires, est surtout nécessaire dans les finances. Plus les forces de l’Etat sont ignorées, plus elles sont respectables” (in Brian 1994: 155). In the words of Bonvesin da la Riva:

«Don’t do it! How many troubles follow good intentions! This pamphlet will arrive to some stranger tyrant; and he, listening to the wonders of Milan, will be infatuated with the city that he will find a way, with a trick or by deception, to subdue it» (da la Riva 1288: 55; my translation).

Numbers were not always to be kept secret. In the Ancient Rome, numbers were public, used as symbolic tools to highlight the Empire strength.

“A Rome, au seuil de l’ère chrétienne, l’empereur donnait à connaître aux citoyens authentiques l’étendue de l’Empire. L’ostentation du nombre des hommes, manifestation supposée de la puissance collective, trouvait son sens dans le jeu d’une structure sociale précise. Le mandataire rendait compte à ses commettants de leur puissance commune. Il consacrait par ce geste à la fois son autorité sur eux et leur domination sur les autres sujets” (Brian 1994: 154).

In a different way, the French Bureau de Statistique «aimed to gather and publish information to promote an informed citizenry» (Porter 1995: 79). The successive Restoration government did not have quantitative research among his priorities, but a new vision of statistics was born, a vision that was spread also abroad. For example, Italian Melchiorre Gioja defined statistics as “quella somma di cognizioni relative ad un paese, che nel corso giornaliero degli affari possono essere utili a ciascuno o alla maggior parte de’ suoi membri, od al governo, che ne è l’agente, il procuratore o il rappresentante” (1826/1837: 4). The work of offices that produced official statistics was no more considered for the sole use of governments, but in the service of society.

As Cohen remind us, Erastus Root, writing in 1796 an introduction to arithmetic spelled out explicitly the interconnections between common arithmetic, decimal money, and republican government:

«It is expected that before many years, nay, many months, shall elapse, this mode of reckoning [decimal money] will become general throughout the United States... Then let us, I beg of you, Fellow-Citizens, no longer meanly follow the British intricate mode of reckoning. —Let them have their own way—and us, ours.—Their mode is suited to the genius of their government, for it seems to be the policy of tyrants, to keep their accounts in as intricate, and perplexing a method as possible; that the smaller number of their subjects may be able to estimate their enormous impositions and exactions. But Republican money ought to be simple, and adapted to the meanest capacity» (Root 1796; in Cohen 2003: 11).

So, Cohen synthesizes, «bad governments prefer complicated money and innumerate citizens who cannot figure out how a tyrant can be fleecing them, while republican governments should make it possible for people of ‘the meanest capacity’ to be able to decode the country’s budget and tax policy» (Cohen 2003: 11).

The initiatives for the betterment of conditions of poorest people backed by trade unions, nonprofit organizations, and religious groups in the late 1800s and at the beginnings of 1900s gave a strong impulse to the use of numbers in the study of society, especially in the United States<sup>4</sup> (Cohen 1982; Cobb and Craig 1998; Tobin 1995: 538). Only in the winter of 1929, the activity of gathering information on social topics was institutionalized. Herbert Hoover – who commissioned the report *Recent Economic Changes in the United States* when in charge as Secretary of Commerce, aiming at ameliorating national statistics on commerce – as President of the United States, set up the Research Committee on Social Trends to investigate the overall condition of the nation, in particular, the social conditions of life in the American society: health care, housing, welfare services (Hoover 1952: 312). Although the report issued in 1933 was received by contrasting views, it was «the first official document devoted to social measurement, covering numerous social conditions such as demographics, health, and education» (Cobb and Craig 1998: 8). But this impetus in the social accounting did not succeed in surviving the incipient economic and financial crisis, all the efforts being concentrated in ameliorating the econometric tools. Shackle (1967) described the years from 1936 to 1939 as the roaring years for economics: in those years, we can cite seminal works by Keynes (1936), Leontief (1936), Kuznets (1937), and Tinbergen (1939).

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<sup>4</sup>«Around 1910, the Russell Sage Foundation initiated the development of what are now called “community indicators” using processes that are remarkably like the ones that have been reestablished in the 1990s. Sage provided a grant to the Charity Organization Society (of New York) to survey industrial conditions in Pittsburgh (Smith 1991: 40–41). After the study was released in 1914, the Russell Sage Foundation was besieged with requests to fund similar studies in other cities. Since it did not have the funds to do that, the foundation provided technical advice instead. Partly as a result of this initiative, over 2,000 local surveys were taken on education, recreation, public health, crime, and general social conditions» (Cobb 1998: 6–7).

## 4 The Number, an Emancipator Tool, or the Social Indicator Movement

It was only in the mid-1960s that the economists' influence on the US public administration started to see its first troubles. The traditional way of reporting the welfare of the nation was harshly criticized because it was based only upon economic parameters, traditionally, the GDP and GNP. Many critics were used to the traditional way of reporting the welfare of the nation, referring it only to economic parameters – traditionally, the GDP and GNP. As in the famous words by Robert Kennedy:

“Too much and for too long, we seemed to have surrendered personal excellence and community values in the mere accumulation of material things. Our Gross National Product, now, is over \$800 billion dollars a year, but that Gross National Product – if we judge the United States of America by that – that Gross National Product counts air pollution and cigarette advertising, and ambulances to clear our highways of carnage. It counts special locks for our doors and the jails for the people who break them. It counts the destruction of the redwood and the loss of our natural wonder in chaotic sprawl. It counts napalm and counts nuclear warheads and armored cars for the police to fight the riots in our cities. It counts Whitman's rifle and Speck's knife, and the television programs which glorify violence in order to sell toys to our children. Yet the gross national product does not allow for the health of our children, the quality of their education or the joy of their play. It does not include the beauty of our poetry or the strength of our marriages, the intelligence of our public debate or the integrity of our public officials. It measures neither our wit nor our courage, neither our wisdom nor our learning, neither our compassion nor our devotion to our country, it measures everything in short, except that which makes life worthwhile. And it can tell us everything about America except why we are proud that we are Americans” (1968).

Those words echoed the earlier ones written by Bliss:

“The land is the endowment of the Creator and its increase in valued does not represent an increase of wealth – on the contrary, with forest and mines and the fertility of the soil to a large extent exhausted, there is a decrease instead of an increase of wealth of this character. Could the few be enabled to pre-empt the air as they have the land and compel us to pay for the privilege of breathing it, we should have an increase of property values” (1897: 99).

Notwithstanding all the critics, the work conducted by the economic counselor of the government and research institutes as Brookings became a model for all who wanted to apply social science to government action and searched for analogous criteria for projecting social policies (Carley 1981: 17; Land 1983: 3). In this way, the American Academy of Arts and Sciences started to study – funded by NASA – the indirect consequences of spatial programs on US society; the main difficulty, said Bauer, Biderman, and Gross, was in the lack of data. The report was seen by Gross as «a symptom of a widespread rebellion against what has been called the ‘economic philistinism’ of the US government's present statistical establishment» (1966: ix).

A new impetus made available a large number of national social reports: *Social Trends* (United Kingdom) and *Social Indicators* (USA) above all. On July 13, 1969, President Nixon announced his intention to sponsor an annual social report to be

delivered to the nation on July 4 of each year. «By personally identifying himself with the proposed social report, President Nixon has raised the whole project to a high level of political significance» (Henriot 1970: 243).

But the use of quantification of social phenomena for purposes of social engineering was not shared by all. In 1968, Russell Sage Foundation published *Indicators of Social Change*, edited by Wilbert Moore and Eleanor Bernert Sheldon: in this oeuvre, the authors contrasted not only using social indicators in the decision-making process, but even the publication of an annual social report. The priority had to be given to the research and the betterment of the process of gathering information (Sheldon et al. 1983: 79). Given that, problems and theoretic foundations were clearer in the “social” domain than in the economic one (Sheldon and Freeman 1970). «It is important that it be recognized, particularly by the policymaker, that the social indicator movement, neither in conceptualization nor in state of the art, is ready to deal effectively with the problems [...] that surround policy development and implementation» stated Sheldon and Freeman (1970: 110). If it can be recognized that sociology failed – not only in the 1970s – to converge in a unique one paradigmatic view of social phenomena, the preference accorded to economics may be the fruit of a process of idealization and simultaneously of underestimation of the complexity of economic issues.

## 5 Let’s Figure!, or the Misuses of Quantification

As many of his predecessors, Ogburn thought that *social reports* should be based on “facts,” not opinions, and that data and trends had to be presented without any interpretation. In Ogburn’s view, the social world can be known only by “facts,” from enumeration and measurement of social phenomena. And if the study of society and social trends is based on facts registration, then statistics is the only reliable discipline; for that reason, he said, «all sociologists will be statisticians» (Ogburn 1930: 4–6). His approach dominated the work on the following social indicators research.

*Recent Social Trends* – inspired by Ogburn – was well reviewed, except by Sorokin, who criticized the fact that «Anything that cannot be ‘measured’ is to be banned or, at best, barely tolerated somewhere at the outskirts of the ‘objective and scientific’ study [...] they have given us an irrelevant set of figures» (Sorokin 1933: 196; 197). And aiming at better grounding his critic, Sorokin reported some extracts from the report, above them the following one:

«One month after issue, 180,000 copies of a government pamphlet on furniture, its selection and use, were distributed (1931) [...] Six hundred thousand objects are lent annually by the St. Louis Educational Museum alone [...] The sale of Navajo blankets is reported as above \$1,500,000 in 1930 [...] The town of Ottawa, Kansas, with a high school population of 431 has an orchestra of 90 that has four times won the state contest» (cit. in Sorokin 1933: 197).

His conclusion, drastic and at the same time caustic: «Was there any need of this painstaking elaboration of the obvious?» (Sorokin 1933: 200).

Sorokin’s critics may be valid for a lot of today’s works: infatuation for numbers obscured the importance of conceptual refinement, pushing into the background

semantic analysis, i.e., intensional characteristics of concepts. This is a broadening problem that goes beyond this single report. The quest for precision is often incongruent: incongruent compared to the level affordable for the techniques used in data production and to the nature of the properties studied. Presenting decimals at all costs often is used to hide the lack of substance of our tables, gaining an easy credibility (Marradi 1993: 53; Horn 1993: 18). This is a common practice, to such a degree that has several names: *fallacy of the misplaced precision*, *fallacy of misplaced concreteness* (Horn 1993: 18), *specious accuracy* (Morgenstern 1950: § 3).

«Changes in consumers total spending power are reported, and taken seriously, down to the last billion (i.e., about one-half percent!), price indexes for wholesale prices are shown to second decimals, when there have been so many computing steps that the rounding off errors alone may obliterate such a degree of precision. Unemployment figures of several millions are given down to the last 1,000's (i.e., one-tenth of one percent accuracy!), when even the 100,000's or the millions are in doubt» (Morgenstern 1950: 6).

«The study of politics, like the study of economics, is usually a one-digit science at best; in fact, we do well to get the sign right more than half the time. How then can anyone be asked to take the third, fourth, and fifth significant digits seriously? Why do professional journals publish that computational debris?» (Tufté 1977: 312)

In the same way Eberstadt commented FAO's statistics:

«The FAO reports, for example, that Chad's per capita food supply rose exactly six calories per day (that is, 0.3 percent) between 1977 and 1980, and that per capita food supplies in Afghanistan and Chad differed by exactly seven calories per day (or 0.4 percent) in 1980. For the periods in question, however, it is thought that upward of 90 percent of the populace of both countries was probably rural and illiterate, and as much as half of the production of goods and services in both countries may have occurred in the non-monetized economy. (Even these estimates are only speculation, since a comprehensive economic survey has never been attempted in either nation; at the time of these FAO estimates, in fact, neither country had ever published a census of its population)» (1995: 171).

So, the words by Thomas and Thomas seem to have been written today: in searching the reasons of the distrust of statistics, they found «the unwise manipulations of data that are often made, [...] the expression in terms of great precision of results obtained when complicated formulae are applied to very inexact data, and [...] the totally erroneous assumption on the part of many statisticians that the statistical results tell all that can be told about the subject» (1928: 570–1).

## 6 The Numbers, Who Are They?, or the Innumeracy as a Democratic Issue

As we have seen, distrust of statistics is an old issue. Besides the one by Thomas and Thomas, there are plenty of other citations which we may cite, but one of the most famous is surely the one from Durkheim:

«On sait, malheureusement, que les constatations officielles sont trop souvent défectueuses, alors même qu'elles portent sur des faits matériels et ostensibles que tout observateur consciencieux peut saisir et qui ne laissent aucune place à l'appréciation» (1897/1990: 144).



«Official data will always be too ‘official’», said Gross and Springer (1967: 15). So, it is a legitimate position pretending to «move beyond the naive enthusiasm for ‘political arithmetick’ characteristic of the early nineteenth century, which valued numbers for their seemingly objective, neutral, and therefore authoritative status, to see the symbolic and constructed uses of political numbers that can both convey and hide important information» (Cohen 2003: 8). Nevertheless, in our days we have to face another problem, which can be synthesized by only one question: *When information is well constructed and it is at our disposition, who cares?*

This is a fundamental point, if we agree that «the citizens of democratic governments [...] need good information, to assess their leaders’ political decisions and judge them on election day. [...] it is increasingly the case that candidacies in the modern era can be won or lost based on the unemployment rate, the crime rate, or the Dow Jones index. Our multitudes of numerical indicators summarize the complex economic, political, and social health of the country, and citizens need to be able to decode and decipher this modern-day ‘political arithmetic’» (Cohen 2003: 7).

As pointed out by Curtin (2007: 1), it is an international custom to be surprised that some survey finds that a high proportion of people could not name their representative in the legislature (Delli Carpini and Scott 1996), have accurate knowledge about common medical conditions (Lucas 1987), correctly know about planetary orbits (Lucas 1988), the current rate of inflation or unemployment (Blendon et al. 1997; Blinder and Krueger 2004; Curtin 2007) or the Consumer Price Index (CPI), and the rate of growth in the Gross Domestic Product (Curtin 2007; Giovannini 2008a).<sup>5</sup>

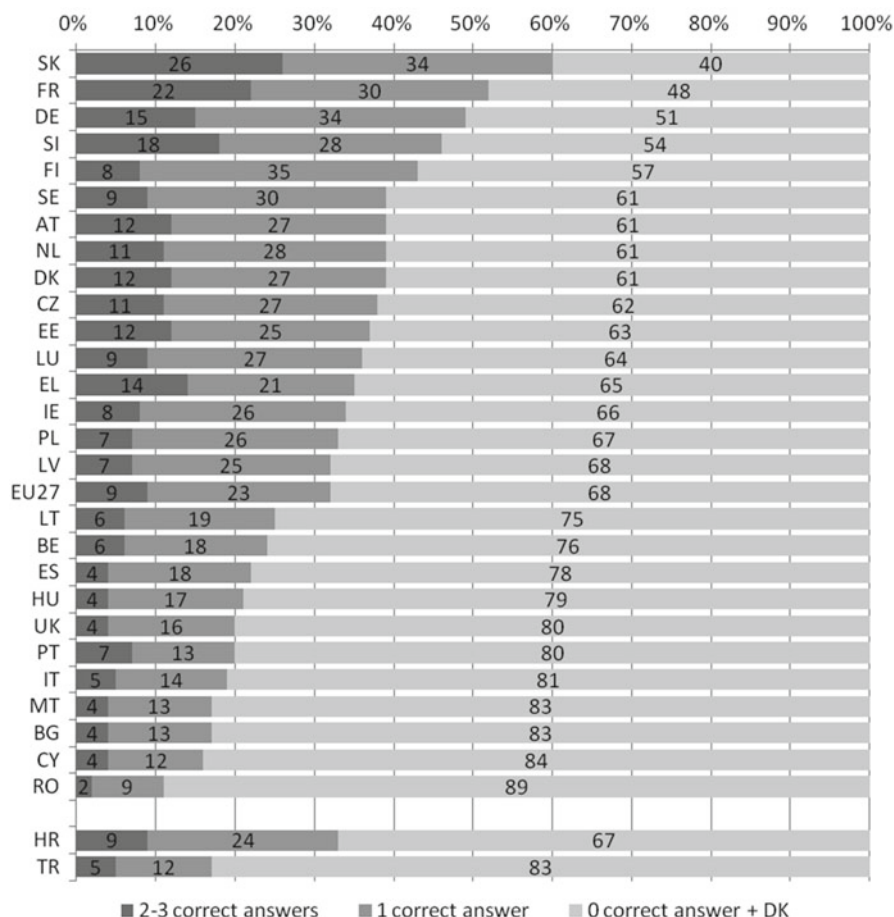
Curtin indicates that only «one-third of all [US] respondents reported that they knew the most recently published official rate of unemployment, one-in-five reported knowledge of the most recently published rate of change in the Consumer Price Index, and about one-in-six knew the most recently announced official rate of growth in the Gross National Product. What was an even more dismal assessment of the public’s knowledge of these official statistics was that one-fifth of all respondents reported that they had never heard of the official rate of unemployment published by the Bureau of Labor Statistics, one-third reported that they had never heard of the official change in the Consumer Price Index, and four-in-ten reported that they had never heard of the Gross Domestic Product reported by the Bureau of Economic Analysis» (2007: 7).<sup>6</sup>

Similar results have been found in Europe; the survey on citizens’ knowledge of economic indicators was conducted in the spring of 2007 by Eurobarometer<sup>7</sup>

<sup>5</sup>Further examples in Lusardi and Mitchell (2009), Lusardi et al. (2009, 2010); see also the reports published by the PEW Research Center ([www.peoplepress.org](http://www.peoplepress.org)).

<sup>6</sup>«To be sure, even fewer people reported that they knew the official rates when the opt-out option was given to the respondent. About half as many respondents provided a “rate” answer when the opt-out option was given for the unemployment rate (26% versus 43%), the Consumer Price Index (13% versus 27%), and for the Gross Domestic Product (9% versus 23%). The data clearly indicate that people were quick to take advantage of the question skipping option» (Curtin 2007: 7).

<sup>7</sup>Between April 10 and May 15, as part of the Eurobarometer wave 67.2. It covers 30 countries and territories: the 27 EU member states, its two candidate states Croatia and Turkey, as well as the Turkish Cypriot Community (Eurobarometer 2008: 4).



**Fig. 12.1** Knowledge of the national growth rate, inflation rate, and unemployment rate – percentage of answers not differing more than  $\pm 20\%$  from official growth, inflation, and unemployment rates (Source: Eurobarometer (2008: 27))

showed that large proportions of citizens throughout Europe claim not to know their country's growth rate, inflation rate, or unemployment rate.<sup>8</sup> Even in those countries where people were generally most inclined to give estimations for these figures (i.e., Denmark, the Netherlands, Slovakia, and Germany), more than a third of respondents replied “don't know” (Eurobarometer 2008: 42). Figure 12.1 shows the main results of Eurobarometer's survey, reporting the percentages for 2–3 correct answers, 1 correct answer, and 0 correct answer (this last percentage including the “don't know” option).

<sup>8</sup>In the EU as a whole, 53% of citizens admitted not to know their country's economic growth rate (Eurobarometer 2008: 13) and their country's inflation rate (Eurobarometer 2008: 18); 48% say they do not know the unemployment rate in their country (Eurobarometer 2008: 23).

Furthermore, the proportion of citizens who trust official statistics (46%) is similar to the proportion claiming that they do not trust (Eurobarometer 2008: 37). Trust in official statistics reaches its highest levels in the Netherlands (77%), Denmark (73%), and Finland (69%), while the least trust is found in France (with 60% who tend not to trust), the United Kingdom (58%), and Hungary (55%).

Those research findings are important for understanding the function of national statistics in implementing democratic accountability. Voters «can vote responsibly only if they have reasonably accurate information about national economic performance. This information, of course, is often made accessible when it is summarized as statistical trends. [...] Here, then, is a contribution of public statistics to the workings of democracy» (Prewitt 1986: 115). Again in the words by Prewitt, a «democratic society is preserved when the public has reliable ways of knowing whether policies are having the announced or promised [...] Numbers, a part of this publicly available political intelligence, consequently contribute to the accountability required of a democracy» (1986: 119). Steen warns that «an innumerate citizen today is as vulnerable as the illiterate peasant of Gutenberg's time» (1997: xv).

But how to conceal those theoretical findings with crude reality, where it becomes difficult to do rather simple arithmetic operations (OECD 2006)? For example, the Adult Literacy and Life Skills Survey results confirm the IALS findings that many adults have difficulties coping with literacy<sup>9</sup> and numeracy<sup>10</sup> related demands that are common in modern life and work. Furthermore, depending on the country, between one-third and over two-thirds of adult populations do not attain the level considered by experts as a suitable minimum level for coping with the increasing demands of the emerging knowledge society and information economy (Statistics Canada and OECD 2005: 31).

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<sup>9</sup>Literacy is referred to «the ability to understand and employ printed information in daily activities, at home, at work, and in the community – to achieve one's goals, and to develop one's knowledge and potential»; there are three domains of literacy skills: «(a) prose literacy – the knowledge and skills needed to understand and use information from texts including editorials, news stories, brochures, and instruction manuals; (b) Document literacy – the knowledge and skills required to locate and use information contained in various formats, including job applications, payroll forms, transportation schedules, maps, tables and charts; (c) Quantitative literacy – the knowledge and skills required to apply arithmetic operations, either alone or sequentially, to numbers embedded in printed materials, such as balancing a chequebook, figuring out a tip, completing an order form or determining the amount of interest on a loan from an advertisement» (OECD 1995: 14).

<sup>10</sup>As stated by O'Donoghue (2002: 47), «the research literature contains no universally accepted definition of numeracy». Cockcroft (1982) identifies the source of the concept and the term numeracy as the Crowther Report (1959), which defined numeracy «as the mirror image of literacy» (par. 398) «We would wish 'numerate' to imply the possession of two attributes. The first of these is an 'at-homeness' with numbers and an ability to make use of mathematical skills which enable an individual to cope with the practical mathematical demands of his everyday life. The second is ability to have some appreciation and understanding of information which is presented in mathematical terms, for instance in graphs, charts or tables or by reference to percentage increase or decrease» (Cockcroft 1982: 11; cit. in O'Donoghue 2002: 47).

So, yes, numbers may contribute to the accountability required for a democracy, but we have to discover how. Social sciences can help in that task searching for the best way of statistics communication. The main question is, as pointed out in the Eurobarometer's report, «how can data regarding social and economic progress [...] be more widely disseminated among the general public? Even more importantly, how can such information be transformed into knowledge among citizens (Eurobarometer, 2)? The point is still the one stated by Henriot:

«The task of rationalizing decision-making requires not only discrete bits of information but also the organization of that information into coherent patterns. It seems certain that more and more data will be gathered at all levels of government; what is less certain – and yet more significant – is that the data will be effectively coordinated» (1970: 237).

There is also another point: «policy decisions in Europe are increasingly taken in the supranational and intergovernmental arenas» while «the nation-state has remained the primary focus for collective identities, and public debates and citizens' participation in the policy process still seem mainly situated at the nation-state level and directed at national authorities», thus at the origin of Europe's "democratic deficit" (Koopmans and Erbe 2004: 97).

«Although citizens are bombarded by information on a constant basis, this bombardment does not necessarily bring about knowledge» (Giovannini 2008a: 178). If «what people know must not be confused with the amount of information they receive every day and absorb from the most disparate sources» (Giovannini 2008b: 5), then we have to argue that there is not an automatic equivalence between knowledge and exposition to information. As stated by a report by the National Research Council, given «the relatively low level of numerical and statistical literacy in the population at large, it becomes especially important to provide users with interfaces that give them useful, meaningful information. [...] The goal is to provide not merely a data set but also tools that allow making sense of the data». (NRC 2000: 20)

Giovannini (2007) identifies those tools in the ability «to harness the energy of collaborative data-sharing through the likes of Web 2.0, and with the growing influence of blogging and the many tools that facilitate the rapid transfer of information». But this cannot be confused with a simplistic enthusiastic support for information and communication technology, given that it reduced the cost of producing statistics and «nowadays a huge number of organisations is able to produce statistical figures and indices, frequently picked up by media [...] and this contributes to create a sense of 'confusion' [...]. This 'noise' does not help at all citizens to make the best possible choices, including the electoral ones, and this is not a good thing for the functioning of economic markets and the democracy» (Giovannini 2008a: 178). Unfortunately, fewer attention has been dedicated to statistics communication, while it should be seen as an integral part of their production and dissemination (Maggino and Trapani 2009: 2). Better levels of communicating and disseminating results are surely welcomed, but this will sort no effects without adequate numeracy and literacy levels – both on public and policymakers' side.

## 7 Concluding Remarks

Statistics quality is a long time studied subject, but a lot has to be written on indicator construction (and the question is “why using such an indicator?”) or on indices formulation (and the question is “how many information are we accepting to loose in the synthesis process?”). Quality of information visualization is a key subject for the future, strictly interrelated to dissemination process and to the citizen’s numeracy: how many times have we listened to an affirmation like “hmmm statistics? Numbers are not for me, thanks!”? Better presentations and reinforcement of dissemination alone are not sufficient: a citizen need to be able to read, write, calculate, and read numbers.

Following Stehr (2004), Pohoryles and Schadauer remind us that «information is raw material and does not allow social actions per se, i.e. knowledge-based decisions» (2009: 153). We have seen that social phenomena quantification was not an easy task, and that several concomitant factors introduced numbers into the public discourse. From a phase when a basic information such as population were unknown, to the one in which numbers were known but had to be kept secret, we have arrived till today with a large amount of data available but with little support to citizen’s knowledge. Ours is surely an information society, but is it a “knowledge society”?

As I opened with Mills, then let me close the circle:

«In essence, democracy implies that those vitally affected by any decision men make have an effective voice in that decision. This, in turn, means that all power to make such decisions be publicly legitimated and that the makers of such decisions be held publicly accountable. None of these three points can preveal, it seems to me, unless there are dominant within a society the kinds of publics and the kinds of individuals I have described» (Mills 1959: 188).

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# Chapter 13

## Flexicurity and Workers' Well-Being in Europe: Is Temporary Employment Always Bad?

Federica Origo and Laura Pagani\*

### 1 Introduction

In the last decades, many EU countries have registered an increasing share of temporary employment. Such an increase has been especially large where institutional reforms have deregulated the use of temporary contracts, thus making them the most common port of entry in the labour market. Temporary workers represent more than 45% of short-tenured employees in Germany, Greece, France, Italy and Sweden, with peaks of 80% in Spain and 70% in Portugal (European Commission 2006). Since temporary contracts are used mainly to recruit new workers, the incidence of temporary employment in the EU has a marked age profile, and it is characterised by relevant differences by gender and education. Temporary workers are actually more concentrated among the young, women and the low-skilled workers, who are also the most vulnerable categories in the labour market. The overall deregulation of Employment Protection Legislation (EPL) has often been associated to

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less generous social security systems, thus increasing job insecurity and dissatisfaction also among permanent workers (Boeri and Garibaldi 2009). Increasing competitive pressure and the recent economic crisis have called for even more flexibility/adaptability for both firms and workers, with obvious negative effects on perceived security. Nonetheless, job security remains, after pay, the most decisive factor that EU citizens consider when looking for a new job, particularly in times of crisis (European Agency for Health and Safety at Work 2009).

In the public opinion, flexibility is usually opposed to security, and flexible employment patterns are considered in conflict with work security, especially for the weakest groups in the population. However, the successful labour market trends registered in some EU countries (particularly Denmark and the Netherlands) and the recent developments of the European Employment Strategy have actually highlighted an opposite view, according to which flexibility and security can be mutually supportive, thanks to appropriate labour market institutions (Madsen 2002). A welfare model successfully combining flexibility and security, also known as a “flexicurity” model, should be characterised by a blend of numerical flexibility (e.g. through low EPL), social security (in the form of generous unemployment benefits) and active labour market policies (especially focussed on active job search, training and lifelong learning). Thus, the main idea of flexicurity is to shift from job security (same job for all working life) to employment security, that is, having employment possibilities all lifelong (European Commission 2006).

With regard to these issues, an important point is to ascertain whether workers’ well-being is more affected by the type of contract rather than by perceived security, assuming that the two do not necessarily go hand in hand. A number of studies have looked at the effect of temporary contracts on job satisfaction (Bardasi and Francesconi 2003; Booth et al. 2002; De Graaf-Zijl 2005; De Witte and Naswall 2003). They point out that a negative impact emerges only for specific forms of temporary employment (such as seasonal-casual jobs or temporary agency work) and/or for specific job facets (mainly job security and career prospects). In general, no significant difference in overall job satisfaction emerges between workers in permanent jobs and workers on fixed-term contracts. Other studies have looked at the effect of the type of contract on perceived job security, usually finding that temporary workers feel more insecure concerning the prospects of losing their job than permanent workers (Clark and Postel-Vinay 2009; Erlinghagen 2008; Näswall and De Witte 2003; Chung and van Oorschot 2010). Opposite evidence is provided by Böckerman (2004), who instead finds that temporary workers, other things equal, feel less insecure than permanent ones, probably because they have already discounted the high probability of losing a job when they took up the (temporary) contract.

The heterogeneity of these results may be explained by differences in the flexicurity model prevailing in the country where workers live. In this perspective, Origo and Pagani (2009) point out that temporary workers need not necessarily feel insecure and unhappy with their job if they are likely to be continuously employed and if, in case they lose employment, they can count on income stability thanks to generous unemployment benefits, and are likely to find rapidly a new job. At the

same time, permanent workers may feel insecure if they are likely to lose their job, and the labour market is characterised by low flows out of unemployment (and, thus, high incidence of long-term unemployment) due to strict EPL.

Some indirect evidence on this aspect is provided by Ferrer-i-Carbonell and van Praag (2006), who compare the effect of temporary employment on individual job satisfaction in Spain and the Netherlands and show that only in Spain temporary contracts are strongly negatively correlated with job satisfaction, while in the Netherlands there is no relationship between job satisfaction and fixed-term contracts lasting more than a year or casual contracts. One of the explanations provided by the authors for this result is the different levels of uncertainty associated with temporary contracts in each country. Indeed, the Netherlands is considered, together with Denmark, the country where the flexicurity model has been successfully implemented. In a similar way, Facchinetti and Origo (2010) show that on average temporary employment reduces individual perceived job security in Europe; this result does not vary significantly with workers' characteristics (especially by gender), but the negative effect is actually lower in countries characterised by higher levels of flexicurity. In the case of Denmark, which is considered a "best practice" in the implementation of flexicurity in Europe, no statistically significant relationship between temporary contracts and perceived job security is found, suggesting the existence of some effects of the (macro) flexicurity model at the individual (micro) level. More direct evidence on the joint effect of the type of contract and perceived security (appraised through the likelihood of losing the job in a certain time) on job satisfaction is provided by Origo and Pagani (2009), who show that what matters for job satisfaction is mainly perceived job security, which may be independent of the type of contract. The combination "temporary but secure job" seems preferable to the combination "permanent but insecure job", indicating that the length of the contract may be less important if the worker perceives that he/she is not at risk of becoming unemployed.

Given that temporary employment is more concentrated in some groups of the population, specifically females, younger and low-educated workers, in a policy perspective it is relevant to test whether this result holds also when the empirical analysis is replicated by gender, age and education. Hence, the aim of our analysis is to evaluate the joint effect exerted by the (objective) type of contract and the (subjective) perceived job security on job satisfaction for different workers' groups. We will then consider interactions between job security and flexibility in order to evaluate the impact of different flexibility/security mixes on overall job satisfaction separately for men and women, young and old, low- and highly educated workers, with the purpose of testing whether perceived job security is more important than the type of contract in influencing job satisfaction also for the most vulnerable groups in the labour market.

In light of this objective, the remainder of this chapter is structured as follows: Section 2 describes the data and reports the descriptive results. Section 3 presents the econometric approach. Sections 4 and 5 discuss the main econometric results. Concluding remarks and policy implications are discussed in Sect. 6.

## 2 Data and Descriptive Analysis

The empirical analysis is based on micro-data from Eurobarometer. The universe of the Eurobarometer's surveys is citizens aged 15 and over residing in the European Union, and each wave contains approximately 1,000 face-to-face interviews per EU member state (except Germany, 2,000; Luxembourg, 600; United Kingdom, 1,300 including 300 in Northern Ireland). To the aim of our work, we use the 2001 Special Eurobarometer 56.1 "Social Exclusion and Modernization of Pension Systems".

In order to investigate the relationship between flexicurity and job satisfaction, this special edition of the Eurobarometer has the valuable feature of containing a set of questions to employees about their jobs, including the type of contract, their overall job satisfaction and satisfaction with various aspects of their jobs. Furthermore, it provides information on the probability that employees assign to losing their current jobs in the following year (see afterwards for a detailed description of these variables). By combining this information, we are allowed to investigate the relationship between flexicurity and job satisfaction.

Beside these questions, the survey collects data on a standard set of demographic and other socio-economic background variables, including age, gender, nationality, marital status, type of occupation and education. With respect to other EU surveys (such as the European Labour Force Survey or the European Survey on Income and Living Conditions), it also contains detailed information on job expectations, physical and psychological malaise due to work, individual motivation, importance and intensity of social relations and overall self-esteem. The latter information may proxy individual personality and psychological attitude, which are among the most important determinants of satisfaction (Ferrer-i-Carbonell and Frijters 2004).

Our sample consists of employees (excluding members of the armed forces), corresponding to 6,445 observations. Table 13.1 shows some key features of the sample. On average, respondents are 38.4 years old, and 46% are females. Around 16% of the sample completed education before the age of 15, 48% between 16 and 19 and 36% after the age of 20. As regards occupation, around two-thirds of the sample are non-manual workers (64%).

The main focus of our empirical analysis is overall job satisfaction. The precise wording of the question in the Eurobarometer survey we use to identify job satisfaction is "All in all, how satisfied would you say you are with your job?" Respondents are asked to provide a rating on a seven-point scale, with the lowest value corresponding to "completely dissatisfied" and the highest to "completely satisfied". Looking at Table 13.1, we see that the average score provided by respondents is quite high (5.16).

In Table 13.2, we report the average job satisfaction by workers' groups. We split workers according to their gender, age (younger than 30 and 30 or older) and education (age at completed education lower than 20 and equal to or higher than 20). It can be noticed that there are no significant differences between males' and females' job satisfaction (5.15 versus 5.17; the  $t$  test for the differences in the mean values is 0.52), while older workers are happier with their jobs than younger ones

**Table 13.1** Descriptive statistics of the sample: means and standard deviations

	Mean	Standard deviation
<i>Job satisfaction</i>	5.16	1.31
<i>Demographics</i>		
Female	0.46	0.50
Age	38.43	11.20
Married	0.67	0.47
<i>Age at completed education</i>		
Up to 15 years	0.16	0.37
16–19 years	0.48	0.50
20+ years	0.36	0.48
<i>Occupation</i>		
Employed professional	0.03	0.17
Top management	0.03	0.17
Middle management	0.15	0.35
Employed position: working mainly at a desk	0.19	0.39
Employed position: travelling	0.06	0.23
Employed position: service job	0.17	0.37
Supervisor	0.03	0.17
Skilled manual worker	0.23	0.42
Unskilled manual worker	0.13	0.33

**Table 13.2** Average job satisfaction by workers' groups

	Job satisfaction
<i>Gender</i>	
Female	5.17
Male	5.15
<i>Age</i>	
<=29	5.06
>29	5.19
<i>Age at completed education</i>	
Up to 19 years	5.07
20+ years	5.32

(5.19 versus 5.06 and  $t$  test equal to 3.21). Finally, more educated workers are more satisfied (average score 5.32) than low-educated employees (average score 5.07 and  $t$  test for the difference in mean values equals to 6.91).

The other variables of interest for our analysis are the dummy variables describing the type of contract/security mix characterising the workers' job.

With regard to the type of contract, we divide workers into those with flexible contracts (i.e. those with seasonal, temporary or casual jobs, and employees under contract for fixed time periods) and those hired on permanent contracts.

To evaluate the degree of security, we use the probabilistic question asking individuals about the probability that they assign to losing their jobs. The exact wording of the question we use to infer this information is: "How likely or unlikely is that

you will lose your job for some reason over the next 12 months? Would you say it is very likely, quite likely, not very likely or not at all likely?” Note that the use of a probabilistic question to evaluate job security is also suggested by Dominitz and Manski (1996) and Manski and Straub (1999).<sup>1</sup>

According to the set of possible answers, we split workers into insecure and secure workers: we consider as “insecure” workers those stating that they were very likely or quite likely to lose their jobs in the 12 months following the survey, while we consider secure workers those stating that it was not very likely or not at all likely.<sup>2</sup>

By combining the two classifications of workers described above (flexible/permanent and secure/insecure workers), we define four groups of workers:

1. Secure permanent workers: permanent workers stating that they are not very likely or not at all likely to lose their jobs in the following 12 months
2. “Permanent-at-risk” workers: permanent workers stating that they are very or quite likely to lose their jobs because the workplace would close down or they would be declared redundant (thus excluding voluntary quits and retirement)
3. “Flexicure” workers: workers on temporary contracts and stating that they are not very likely or not at all likely to lose their jobs in the following 12 months
4. Insecure temporary workers: workers on temporary contracts and stating that they are very or quite likely to lose their jobs in the following year<sup>3</sup>

Table 13.3 reports the distribution of workers according to their contract/security mix by workers’ groups. As expected, the table highlights that the incidence of temporary contracts (both insecure and flexicure) is higher for females than for males (12.6% versus 8.8%), for younger than older workers (19.1% versus 7, 8%) and for low-educated than highly educated workers (12.9% versus 6.3%). The highest share of flexicure temporary workers on overall temporary employment is found among older workers (52.6%).

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<sup>1</sup> The 56.1 Eurobarometer data set contains a question that allows evaluating subjective job security (“On a scale from 1 to 7, where 1 is completely dissatisfied and 7 completely satisfied, how satisfied would you say you are with your job security?”). However, this formulation contains an important subjective element because the meaning of “job security” may vary from one person to another (Clark and Postel-Vinay 2009) and it refers both to the probability and the cost of job loss.

<sup>2</sup> Given the wording of the question, our empirical measure of perceived security was limited to job security rather than employment security, and the results presented in the following sections will be interpreted accordingly. Some elements of employment security, for example, in terms of the likelihood of transitions between different jobs within the firm, are also captured by this measure of security.

<sup>3</sup> Given that this classification is partly based on arbitrary choices, we have checked whether our empirical results held also after slightly changing the definitions of workers’ types, that is, using a broader definition of flexicure workers (including also temporary workers stating that they were very or quite likely to lose their jobs for reasons other than lay-off, firm closure or contract expiry) and a broader definition of permanent-at-risk workers (including those stating that they were very or quite likely to lose their jobs for “other reasons” different from retirement, job change or family duties). Results (available upon request) are unchanged.

**Table 13.3** Distribution of workers by contract/flexibility mix

	Secure permanent	Permanent-at-risk	Permanent (total)	Flexicure	Insecure flexible	Flexible (total)
<i>All</i>	86.5	2.9	89.4	5.3	5.2	10.6
<i>Gender</i>						
Female	84.2	3.2	87.4	6.4	6.2	12.6
Male	88.4	2.8	91.2	4.4	4.4	8.8
<i>Age</i>						
<=29	77.9	3.0	80.9	9.0	10.1	19.1
>29	89.5	2.7	92.2	4.1	3.8	7.8
<i>Age at completed education</i>						
Up to 19 years	84.5	2.6	87.1	6.6	6.3	12.9
20+ years	90.1	3.6	93.7	3.0	3.4	6.3

A first preliminary description of the link between flexicurity and job satisfaction is depicted in Fig. 13.1. The latter shows the average scores for job satisfaction provided by different groups of workers according to their contract/security mix.

In general, for all workers' subsamples it is confirmed that perceived security matters more for job satisfaction than formal protection as provided by the type of contract. More specifically, the percentage of secure permanent and of flexicure workers in high job satisfaction scores (5 and more) is considerably higher than the correspondent percentages for both permanent-at-risk and insecure temporary workers, while the opposite is true when considering low job satisfaction scores (4 and less). Moreover, a very interesting point emerging from the figure is that in the most "protected" groups, which are those less likely to hold a temporary contract (males, older and highly educated workers), the share of flexicure workers stating to be completely satisfied (score 7) is higher than the corresponding shares among secure permanent workers.

Hence, descriptive evidence reported so far clearly shows, first, that what matters for job satisfaction is more perceived job security rather than formal employment protection and, second, that this is true especially for the more "protected" groups of workers, that is, for those workers characterised by a lower incidence of temporary contracts.

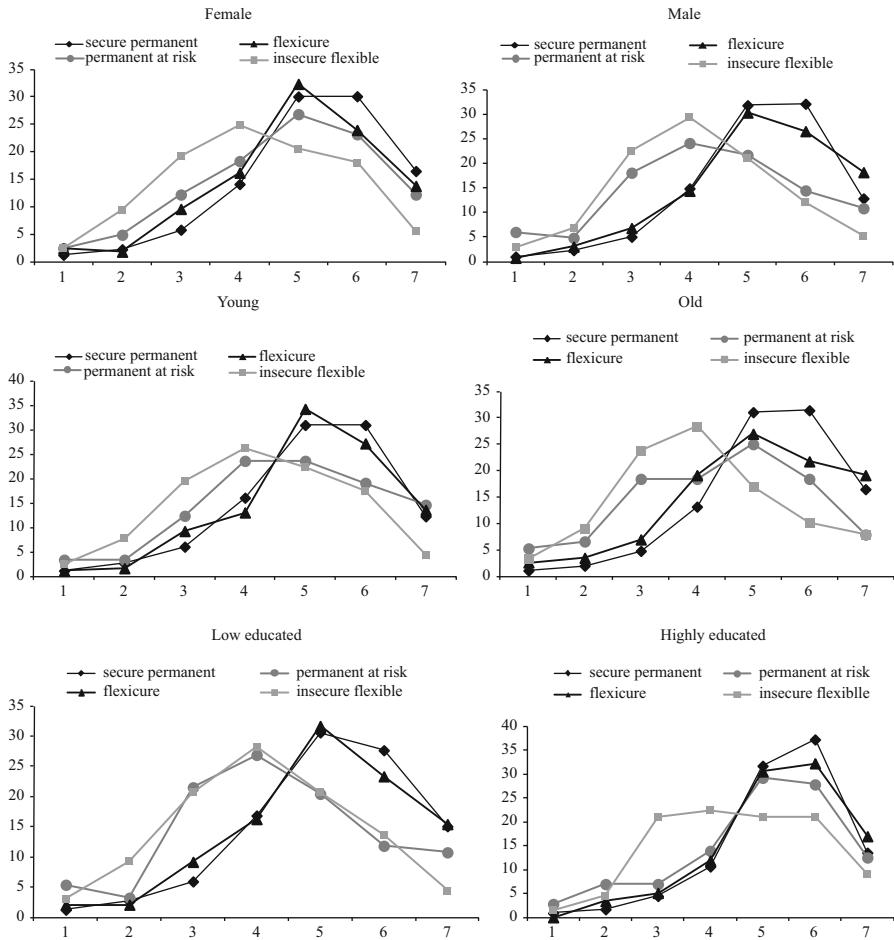
### 3 Empirical Strategy

In this section, we describe the econometric approach and discuss some methodological issues.

Let us assume that utility from the job for the  $i$ -th worker ( $U_i$ ) can be expressed as follows:

$$U_i = U_i(T_i, I_i, E_i, J_i) \quad (13.1)$$





**Fig. 13.1** Job satisfaction by types of workers

where  $T$  describes the flexibility/security mix characterising each worker (i.e. secure permanent, permanent-at-risk, flexicure and insecure flexible) and  $I$ ,  $E$  and  $J$  are vectors of variables controlling for, respectively, individual (demographic and other socio-economic background variables such as age, gender, education, marital status and country fixed effects), employer and job characteristics.

Utility from work is not observable, but it is empirically proxied by self-reported job satisfaction. As mentioned before, in the data set we use job satisfaction is measured through a Likert scale in which the lowest value (1) corresponds to complete dissatisfaction and the highest value (7) to complete satisfaction.

Hence, the empirical linear equivalent of the utility function described in Eq. 13.1 is given by:

$$JS_i = \alpha'DT_i + \beta'X_i + \varepsilon_i \tag{13.2}$$

where JS is a measure of self-reported job satisfaction and DT is the set of dummy variables related to the four types of workers defined by a specific combination of flexibility and security; the vector  $\alpha$  contains the corresponding parameters of interest to be estimated;  $X$  is a vector of observable individual, employer and job characteristics,  $\beta$ s the associated parameters to be estimated and  $\varepsilon$  is the error term.

The job satisfaction variable is a categorical variable characterised by an intrinsic ordinal nature. If we assume that the error term is normally distributed, the usual candidate estimator in this case is an ordered probit estimator.

However, coefficients estimated with an ordered probit estimator may not be interpreted as marginal effects, and this fact prevents direct comparison of the results obtained with different models and on different subsamples, which is the main aim of this chapter. Hence, in order to facilitate both presentation and discussion of the main results, we will estimate Eq. 13.2 using a Probit-OLS (POLS) estimator, first proposed by van Praag and Ferrer-i-Carbonell (2006) and already applied by Origo and Pagani (2009) to estimate job satisfaction equations.

The POLS method consists in using a traditional linear regression estimator once the (ordinal) dependent variable has been properly transformed into a “pseudo-continuous” one (Terza 1987; van Praag et al. 2003; van Praag and Ferrer-i-Carbonell 2006). POLS estimates are similar to ordered probit ones in terms of signs and standard errors, but differently from the latter, they may be directly interpreted as marginal effects.<sup>4</sup>

An important point to take into account is that the estimation of standard regression models assuming that flexicurity (or, more in general, the contract/security mix as defined by the DT dummy variables) is strictly exogenous to job satisfaction leads to biased results if flexicurity and job satisfaction are jointly determined by unobserved factors. Stated differently, if we want to identify a causal relationship and not a simple correlation between flexicurity and job satisfaction, we must consider that the former variable is likely to be endogenous to job satisfaction. If this is the case, and if we ignore it, we would obtain biased estimates of the coefficients of interest. Endogeneity may arise if there are unobserved factors (such as individual ability, motivation and information regarding the labour market) that affect both the type of contract and job satisfaction.

We deal with the potential endogeneity of flexicurity exploiting the richness of the data set in terms of information on individual characteristics, including in the regression equation a large set of variables on workers' psychological attitudes towards work and life. More specifically, the data set contains detailed information on job expectations (also in terms of security, flexibility and career prospects), physical and psychological malaise due to work (such as headaches or muscular pain due to

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<sup>4</sup>For a more detailed description of the POLS method, see the technical Appendix in Origo and Pagani (2009). Notice that marginal effects may be derived also from ordered probit estimates, but their number equals the number of categories of the dependent variable (which is seven in our specific case), thus making the layout of the regression tables more cumbersome.

work, constant worrying, sleep problems, etc.), individual motivation (measured through the willingness to work even without needing to do so in order to live), importance and intensity of social relations and overall self-esteem. If the sources of endogeneity are personality and psychological traits, which are among the most important determinants of satisfaction, these variables should catch the variation in job satisfaction produced by personality and psychological attributes and thus contribute to isolate the causal effect of flexicurity on job satisfaction.<sup>5</sup>

## 4 Main Econometric Results

Table 13.4 shows POLS estimates of Eq. 13.2 for the overall sample and separately for men and women, young and old workers and low- and highly educated workers.<sup>6</sup> The table shows the coefficients of interest from estimation of a very rich model, in which we controlled for socio-demographic characteristics (age, education, marital status, area of residence), country fixed effects, local labour market conditions (which should capture the influence of unemployment and job opportunities at the local level), employer and job characteristics (such as economic sector, firm size, occupation and tenure). Moreover, we have included all the job-related variables that should produce effects on job satisfaction, such as whether the worker has to work long hours, at very high speed, to tight deadlines, in dangerous or unhealthy conditions and indicators of the quality of relationships (with colleagues, with boss or industrial relations) inside the firm. In order to isolate the effect of past events that can anyway influence current job satisfaction, we have controlled also for variables such as whether the worker has been unemployed in the last 5 years or whether there has been a staff reduction in his/her firm. Finally, we also included a large set of controls for personality and psychological characteristics (e.g. past and future job expectations, physical and psychological malaise due to work, attitudes towards work and life, self-esteem and intensity of social relations) (see Table A.1 for a detailed description and basic statistics of all the covariates).

The results in Table 13.4 are generally in line with descriptive evidence presented in the previous section, and they mostly confirm results obtained by Origo and Pagani (2009). Specifically, they show that flexicure workers are not less satisfied than secure permanent workers, whatever group is considered, while

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<sup>5</sup> When panel data are available, endogeneity can be controlled for with fixed-effects estimators. However, since the data set we use is a cross section, we deal with endogeneity including time-invariant personality traits as regressors, as suggested by Ferrer-i-Carbonell and Frijters (2004). In our previous paper, we have tested the robustness of our results also by applying a two-step procedure (see Origo and Pagani 2009).

<sup>6</sup> We also tested the robustness of our results by changing our model specification and by using a traditional ordered probit estimator. As expected, results are unchanged. All the estimates that are not reported in the following tables are available from the authors upon request.

**Table 13.4** POLS job satisfaction estimates<sup>a,b</sup>

Variables	All	Female	Male	Young	Old	Low- educated	Highly educated
Ref. Group: Secure permanent							
Insecure flexible	-0.184** (0.080)	-0.057 (0.108)	-0.333*** (0.105)	-0.090 (0.104)	-0.266** (0.115)	-0.196** (0.090)	-0.048 (0.161)
Permanent-at- risk	-0.251** (0.115)	-0.013 (0.126)	-0.414** (0.178)	0.133 (0.220)	-0.406*** (0.131)	-0.296* (0.155)	-0.140 (0.142)
Flexicure	0.052 (0.077)	-0.053 (0.100)	0.165 (0.114)	0.145 (0.116)	-0.033 (0.099)	0.025 (0.087)	0.247* (0.150)
Observations	5,609	2,600	3,009	1,379	4,230	3,612	1,997
R-squared	0.356	0.402	0.368	0.423	0.362	0.379	0.364

\*  $p < 0.1$ ; \*\*  $p < 0.05$ ; \*\*\*  $p < 0.01$

<sup>a</sup> Controls: demographics, country f.e., local area conditions, employer and job characteristics, personality and psychological characteristics

<sup>b</sup> Robust standard errors in parentheses

workers are often less satisfied when they feel insecure, independently from the nature of the contract they hold. Hence, what is relevant for job satisfaction is more perceived security than the formal protection provided by the type of contract.

Considering results by gender, we find that women job satisfaction is not influenced by the contract/security mix, whereas job satisfaction of men is reduced by insecurity (independently from the type of contract).

In the case of age, the flexicurity coefficient of older workers is negative, while it is positive for younger employees, but again neither coefficient is statistically significant. Another finding is that while job satisfaction of younger workers does not seem to be affected by the different contract/security combinations, older workers are less satisfied when they feel insecure, even when they hold a permanent job. A potential explanation may be that younger workers are more used to insecurity, also given that they are more likely to enter the labour market with a temporary contract.

When considering estimates by education, it can be observed that the flexicurity coefficient of highly educated workers is positive and (weakly) statistically significant, suggesting that when highly educated workers feel secure, they may be even happier when they hold a temporary job than when they are hired on a permanent contract. This is not true in the case of low-educated workers, for which the flexicurity coefficient is not statistically significant. Finally, and similarly to what we found for men and older workers, also for this latter group of workers perceived insecurity reduces job satisfaction, whatever contract they hold, while for highly educated workers, the permanent/temporary nature of the contract does not affect job satisfaction.

In summary, estimates in Table 13.4 generally confirm that job stability offered by the type of labour contract and perceived security are quite different things and

that the duration of the contract may be hardly important if the worker perceives that he/she is not at risk of losing his/her job: for all groups considered, temporary workers are not less satisfied than permanent ones when they feel secure, and in the case of highly educated workers, flexicurity even increases job satisfaction with respect to secure permanent jobs. On the other hand, for some groups of workers, specifically males, older and low-educated workers, the feeling of insecurity has a negative effect on job satisfaction even when it is not combined with contractual flexibility.

## 5 Alternative Facets of Job Satisfaction

Our main estimates are based on a general measure of job satisfaction. However, it may be argued that the latter is not the best dependent variable to use, since contractual flexibility and perceived security should actually affect mainly satisfaction for aspects of the job related to job security.

To deal with this concern, the Eurobarometer data set contains information not only regarding overall job satisfaction but also on satisfaction for more specific aspects of the job. We then exploit this information and evaluate the impact of the flexibility/security mix on satisfaction for job facets closely related to job security, either directly (satisfaction with job security itself) or indirectly (satisfaction for chances for personal development).

Estimates in Tables 13.5 and 13.6 generally confirm our previous results: when contractual flexibility is coupled with perceived job security, it does not affect negatively workers' satisfaction, even for job aspects more closely related to job security.

In the case of satisfaction for job security, in just two cases, that is, male and older workers, flexicure temporary workers appear less satisfied than permanent ones, and the estimated difference is statistically significant; however, in both cases, the estimated differential is much lower than the corresponding estimates for insecure workers, both temporary and permanent. More in general, for all groups, insecure workers result much more unsatisfied with job security than workers feeling secure (whatever the contract type).

When considering satisfaction regarding the chance for personal development offered by the job, on the whole, the influence of the contract/security mix is much lower, as shown by the lack of significance for most of the estimated coefficients.

Moreover, for two subsamples of workers (male and highly educated workers), flexicure workers were found to be, even more satisfied for this aspect of their job than secure permanent workers. Finally, an interesting result regards the negative and statistically significant coefficient found for insecure temporary highly educated workers. A possible explanation is the higher expectation of the most educated workers regarding the possibility of own development through the job; this higher expectation is likely to reduce satisfaction for this job aspect when it is not met.

**Table 13.5** POLS estimates of satisfaction for job security<sup>a,b</sup>

	(1)	(2)	(3)	(4)	(5)	(6)
Variables	Female	Male	Young	Old	Low-educated	Highly educated
Ref. Group: Secure permanent						
Insecure flexible	-0.561***	-0.464***	-0.425***	-0.613***	-0.489***	-0.507**
	(0.113)	(0.124)	(0.136)	(0.103)	(0.088)	(0.205)
Permanent-at-risk	-0.824***	-0.875***	-0.378*	-1.033***	-0.953***	-0.675***
	(0.118)	(0.161)	(0.209)	(0.102)	(0.120)	(0.157)
Flexicure	-0.131	-0.197*	-0.052	-0.212**	-0.138	-0.112
	(0.104)	(0.114)	(0.117)	(0.103)	(0.086)	(0.149)
Observations	2,596	3,005	1,377	4,224	3,606	1,995
R-squared	0.311	0.306	0.312	0.308	0.309	0.305

$p < 0.1$ ; \*\* $p < 0.05$ ; \*\*\* $p < 0.01$

<sup>a</sup>Controls: demographics, country f.e., local area conditions, employer and job characteristics, personality and psychological characteristics

<sup>b</sup>Robust standard errors in parentheses

**Table 13.6** POLS estimates of satisfaction for chance of personal development<sup>a,b</sup>

	(1)	(2)	(3)	(4)	(5)	(6)
Variables	Female	Male	Young	Old	Low-educated	Highly educated
Ref. Group: Secure permanent						
Insecure flexible	-0.113	-0.164	-0.097	-0.145	-0.086	-0.303**
	(0.103)	(0.120)	(0.115)	(0.113)	(0.096)	(0.141)
Permanent-at-risk	-0.109	0.063	0.400*	-0.223	-0.045	-0.035
	(0.132)	(0.190)	(0.220)	(0.142)	(0.146)	(0.188)
Flexicure	-0.091	0.246**	0.171	-0.028	-0.013	0.347**
	(0.097)	(0.114)	(0.118)	(0.092)	(0.083)	(0.163)
Observations	2,599	3,006	1,379	4,226	3,609	1,996
R-squared	0.329	0.328	0.390	0.316	0.305	0.366

\* $p < 0.1$ ; \*\* $p < 0.05$ ; \*\*\* $p < 0.01$

<sup>a</sup>Controls: demographics, country f.e., local area conditions, employer and job characteristics, personality and psychological characteristics

<sup>b</sup>Robust standard errors in parentheses

## 6 Conclusions

In this chapter, we tested whether perceived job security is more important than the type of contract in influencing job satisfaction for different groups of workers.

In our previous research, we have actually shown that on average what matters for job satisfaction is not just the type of contract (whether permanent or temporary)

but mainly workers' perceived security, which may be independent of the type of contract (Origo and Pagani 2009).

In this chapter, we wanted to test whether this result holds also for the most vulnerable groups in the labour market, where temporary employment is more concentrated (namely, women, the young and the low-educated). To this aim, we estimated the relationship between the flexibility/security mix at the individual level and job satisfaction separately for men and women, young and old and low-educated and highly educated workers. Moreover, we studied whether this relationship changes when considering workers' satisfaction with different aspects of the job more closely related to job security, either directly (satisfaction with job security itself) or indirectly (satisfaction for chances for personal development).

Our estimates confirm that job stability offered by the type of labour contract and perceived security are quite different things and that the duration of the contract may be hardly important for job satisfaction if the worker perceives that he/she is not at risk of losing his/her job: for all workers' groups, whatever the incidence of flexible work arrangements, temporary workers are not less satisfied than permanent ones when they feel secure, and in the case of highly educated workers, flexicurity seems to increase job satisfaction with respect to secure permanent jobs. On the other hand, for some groups of workers, specifically males, older and low-educated workers, the feeling of insecurity has a negative effect on job satisfaction even when it is not combined with contractual flexibility. In the case of older workers, a potential explanation for this result may be that they are less used to insecurity than the young, also given that when they entered the labour market temporary jobs were extremely uncommon.

Our main conclusions by and large hold also when considering specific aspects of job satisfaction closely related to job security, that is, satisfaction for job security and for the chance to develop oneself through the job.

Thus, our results suggest that flexicurity, also at the micro-level, is a very important determinant of job satisfaction even for the most vulnerable workers. From a policy perspective, our analysis reveals that more flexibility may be introduced without necessarily reducing job satisfaction if this does not negatively affect perceived job security. This goal may be achieved both directly at the employer level through adequate working conditions associated with job continuity (e.g. training opportunities, career prospects and good internal relationships) and by the policymaker by combining flexibility policies with policies enhancing employment stability, such as active labour market policies helping workers' transition from one job to another.

## Appendix

**Table A.1** Variables description

Name	Description	Mean	Standard deviation
Insecure temporary	1 if seasonal, temporary or casual job and employees under contract or for fixed time period, very/quite likely to lose job in the following year	0.059	0.235
Flexicure	1 if seasonal, temporary or casual job and employees under contract or for fixed time period, not very/not at all likely to lose job in the following year	0.054	0.225
Permatrisk	1 if permanent worker very/quite likely to lose job in the following year	0.025	0.157
Permanent	1 if permanent worker not very/not at all likely to lose job in the following year	0.863	0.344
<b>Individual and local characteristics</b>			
Female	1 if female	0.430	0.495
Age	Age (continuous)	37.981	11.454
Age2	Squared age (continuous)	1573.761	914.523
Education	Age when stopped full-time education minus 6 (continuous)	12.448	3.779
Married	1 if married	0.636	0.481
Head	1 if contributes most to the household income	0.626	0.484
child5	1 if has a child under 5 years of age	0.175	0.380
<i>Residence (ref: rural area or village)</i>			
small_town	1 if lives in small- or middle-sized town	0.377	0.485
large_town	1 if lives in large town	0.300	0.458
local_u	1 if agrees that there is a lot of unemployment in the area in which lives	0.253	0.435
area_rep	1 if strongly agrees that the area in which lives has not a good reputation	0.040	0.197
localjob	1 if thinks that job opportunities in local area are very good	0.139	0.346
<b>Employer and job characteristics</b> (including employment-related past events)			
<i>Firm size (ref: less than 10 people)</i>			
Size_1049	1 if 10–49 people	0.314	0.464
Size_5099	1 if 50–99 people	0.102	0.302
Size_100499	1 if 100–499 people	0.161	0.367
Size_500	1 if more than 500 people	0.113	0.317
<i>Sector of employment (ref: manufacturing)</i>			
i_agriculture	1 if agriculture, hunting, forestry, fishing	0.006	0.075
i_mining	1 if mining and quarrying	0.002	0.050
i_electricity	1 if electricity, gas and water supply	0.010	0.101
i_construction	1 if construction	0.066	0.248
i_trade	1 if wholesale and retail trade repairs	0.145	0.352

(continued)



**Table A.1** (continued)

Name	Description	Mean	Standard deviation
i_hotels	1 if hotels and restaurants	0.036	0.185
i_transportation	1 if transportation and communications	0.068	0.253
i_finance	1 if financial intermediation	0.037	0.188
i_business	1 if real estate and business activities	0.075	0.263
i_pa	1 if public administration	0.092	0.289
i_services	1 if other services	0.232	0.422
Public	1 if works in the public sector	0.365	0.482
<i>Occupation (ref: unskilled manual worker)</i>			
O_professional	1 if employed professional	0.025	0.155
O_topmanager	1 if general management, director or top management	0.029	0.167
O_middlemanager	1 if middle management, other management	0.144	0.351
O_desk	1 if employed position: working mainly at a desk	0.203	0.402
O_travelling	1 if employed position: travelling	0.061	0.240
O_service	1 if employed position: service job	0.139	0.346
O_supervisor	1 if supervisor	0.038	0.191
O_skilledbc	1 if skilled manual worker	0.234	0.423
<i>Tenure (ref: less than 3 years)</i>			
tenure_3to4	1 if 3–4 years	0.309	0.462
tenure_5to9	1 if 5–9 years	0.200	0.400
tenure_10	1 if equal or more than 10 years	0.365	0.481
Union	1 if member of a trade union	0.249	0.432
<i>Labour income (ref: very bad)</i>			
Income_verygood	1 if the worker states that his/her income is very good	0.166	0.372
Income_fairlygood	1 if the worker states that his/her income is fairly good	0.631	0.483
Income_fairlybad	1 if the worker states that his/her income is fairly bad	0.179	0.383
Hours	number of weekly working hours (continuous)	37.735	11.049
Skillmatch	1 if uses experiences, skills and abilities	0.737	0.440
Use_ict	1 if the job involves the use of computerised or automated equipment	0.525	0.499
job_extratime	1 if often has to work extra time	0.130	0.337
job_speed	1 if works almost all the time at very high speed	0.145	0.352
job_deadlines	1 if works almost all the time to tight deadlines	0.134	0.341
job_dangerous	1 if works always/often in dangerous or unhealthy conditions	0.111	0.314
Injury	1 if had an injury at work in the last 5 years	0.100	0.300

(continued)

**Table A.1** (continued)

Name	Description	Mean	Standard deviation
rel_ind	1 if relations at the workplace between management and employees are very good	0.186	0.389
rel_hor	1 if has good friends at work	0.314	0.464
rel_ver	1 if get support from management when there is pressure at work	0.153	0.360
been_promoted	1 if have been promoted while with current employer	0.323	0.468
staff_reduction	1 if the number of people employed in the organisation has been reduced over the last 3 years	0.251	0.433
Ben_unemployed	1 if unemployed in the last 5 years	0.181	0.385
<b>Proxies for personality and psychological characteristics</b>			
Exp_secure	1 if thinks very important to have a secure job	0.066	0.249
promotion_in	1 if strongly agrees that is likely to get a better job in current organisation in the next 3 years	0.049	0.217
promotion_out	1 if strongly agrees that is likely to get a better job with another employer in the next 3 years	0.045	0.208
Values	1 if finds that his/her values are very similar to those of his/her organisation	0.114	0.318
Proud	1 if very proud of working for his/her company	0.168	0.374
tired_physical	1 if often has headaches and/or muscular pains due to work	0.201	0.401
Tired	1 if often exhausted and/or too tired after work	0.335	0.472
Stressful	1 if work is often stressful and/or keep worrying about job problems after work	0.396	0.489
motivation	1 if thinks absolutely necessary to have a successful career	0.534	0.499
motivation2	1 if states continue to work if were to get enough money to live as comfortably as would like	0.526	0.499
Unsleep	1 if often lost much sleep over worry	0.157	0.364
Worthless	1 if thinks of himself/herself as a worthless person	0.053	0.223
Sociale	1 if regularly meets friends, relatives and/or neighbours	0.827	0.378
Member	1 if member of clubs, voluntary organisation and/or political party	0.421	0.494
<i>Political party (ref: left)</i>			
pol_right	1 if right	0.141	0.348
pol_centre	1 if centre	0.354	0.478
pol_dk	1 if does not know	0.222	0.416

(continued)

**Table A.1** (continued)

Name	Description	Mean	Standard deviation
<i>Country of residence (ref: Italy)</i>			
c_be	1 if Belgium	0.026	0.160
c_dk	1 if Denmark	0.019	0.137
c_de	1 if Germany	0.262	0.440
c_gr	1 if Greece	0.017	0.129
c_es	1 if Spain	0.094	0.292
c_fr	1 if France	0.173	0.378
c_ie	1 if Ireland	0.008	0.088
c_lu	1 if Luxembourg	0.001	0.036
c_nl	1 if Netherlands	0.039	0.194
c_pt	1 if Portugal	0.022	0.147
c_uk	1 if UK	0.158	0.365
c_fi	1 if Finland	0.011	0.102
c_se	1 if Sweden	0.028	0.164
c_at	1 if Austria	0.022	0.147

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**Part IV**  
**Health-Related Quality of Life**

# Chapter 14

## From a Concept's Evolution Analysis to the Definition of a New Methodological Evaluation Tool of Health-Related Quality of Life (HRQoL) Questionnaires

Francesca Ierardi, Lisa Gnaulati, Elena Ruviglioni, and Stefania Rodella

### 1 Preface

This study, conducted by the Quality and Equity Unit of Regional Health Agency of Tuscany, in collaboration with the University of Florence, was aimed to both explore and organize the existing material regarding health objectives and to create a tool capable of evaluating the methodological process of a questionnaire building, especially HRQoL in terms of accuracy and completeness.

The two phases of the project are detailed as follows: the first one highlights the conceptual aspects, and the second one will concentrate on the methodology utilized in planning evaluation questionnaires.

### 2 Phase I: Conceptual Approach

#### 2.1 *HRQoL: Concept's Evolution Analysis*

##### 2.1.1 Introduction

Quality of life measurements are nowadays more and more utilized as an add-on to the most traditional objective (clinical or biological) measurement methods of a disease to evaluate clinical-sanitary interventions (Ferrans 1990; Pearlman and

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Uhlmann 1988; Gorbatenko et al. 2001; Hlatky 2000; Wilson and Cleary 1995; Covinsky et al. 1999; Davis et al. 2000; Rusthoven 1997; Carr and Higginson 2001; Mishoe and Mclean 2001; Chen et al. 2005).

The path to reach this statement has not been easy and some topics remained unsolved so far.

The WHO definition of health<sup>1</sup> of 1948 is considered by a lot of authors (Aaronson 1989; Parmenter 1994; Spilker 1996; Testa and Simonson 1996; Shimozuma 2002; Finlayson et al. 2004; Moons et al. 2006; Vetter 2007) an important first step of this path: the traditional 'negative' meaning of the concept (absence of disease) not only is integrated with a 'positive' one (presence of well-being), but well-being is considered in multiple dimensions, driving to a more articulated view of the health than the classic one, strictly linked to the physical status.

This definition also suggests, both from a cultural and practical standpoint, that the clinical mission should target towards a reconsideration on the traditional goals such as granting survival, treating disease and relieving pain (Holmes 1989; McCarthy 1995; Bergner 1989; Arora et al. 1986; Hennessy et al. 1994; Apolone et al. 2001; Kaplan 2002; Pais-Ribeiro 2004) considered as its only end points.

The need for a change arises also owing to some modifications occurring in the clinical field in the latest decades: from one side, the relevant technological and scientific progresses achieved contributed to improve the traditional outcomes (mortality, morbidity, hospitalization, etc.); on the other side, the increased possibilities of life lengthening brought medicine to face controversial situations (not only ethical type) as biological survival (but not social) of patients mechanically ventilated.

In addition, medicine developments helped to restrain acute diseases, defeated causes for lots of them and determined therefore a much longer life expectancy. The consequence was an increase in population ageing and in chronic diseases, which cannot be conclusively treated but need a constant and long-lasting care until the end of life. This brings up a political economic issue for all those countries that are providing public health care; in order to grant a therapy for free, especially with poor resources available, it is necessary that its efficacy is proved. This evaluation becomes particularly complicated in case of chronic diseases since it cannot be proved the equivalence between therapy efficacy and recovery from disease (Arora et al. 1986; Moons et al. 2006; Bullinger 2003; Hickey et al. 2005; Finlayson et al. 2004).

Amongst the modifications of the latest decades, it needs to be also noticed the appreciation of the patient's perception regarding his own care and therapy path as a crucial point to evaluate efficacy or taking decision regarding an intervention. Arora considers that medical care perception is different in patients and physicians, and too much often the latter fail in evaluating the skill of overcoming a problem, discomfort levels, life models, emotional status, work ability and other functional activities of their assisted. If medical intervention is addressed only to disease diagnosis and treatment, inappropriate decisions could be taken (Arora et al. 1986; Barofsky 2001). As a consequence, it is important for the physician to acquire the patient point of view.

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<sup>1</sup>In 1948, WHO defines health as '...a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity' (<http://www.who.int/about/definition/en/print.html>).

All these elements lead to a scientific brainstorming on the lack of exhaustivity of the quantitative measures in evaluating medical interventions; as a consequence, non-clinical outcomes should be selected to evaluate treatment efficacy (Arora et al. 1986, 308), taking into consideration, besides the physical well-being, the emotional and social ones too. So during the years 1960s and 1970s, sanitarians started to consider the quality of life as a research field that cannot be underestimated in order to evaluate efficacy of their efforts on patients (Davis et al. 2000; Sajid et al. 2008; Kaplan 2002).

In 1986, during the Conference on Measurement of Quality of Life in health care held in Sintra (Portugal), quality of life was discussed as one of the two primary health outcomes (the other one is length of life) (Miettinen 1987).

Since then, a lot of evidences and statements arise regarding the importance of measuring the quality of life, such as the role recognized by patients to both quality and quantity of their lives (Cella 1995); the need that a physician evaluate the quality of life of a patient, assuming this is affected by a symptom (Hlatky 2000); and the subjectivity of the link between disease and quality of life that can be very different from one person to another and based on both personal characteristics and environment (network of social support). Two persons affected by same severity of disease may have very different perceptions of quality of life, owing to multiple factors, clinical and not; again, the perception of some outcomes such as disability or severe pain, assessed worse than death, leads the person to accept a higher life risk in order to get a better quality of life. Last, the need to evaluate a treatment not only from a survival standpoint but also from a quality of life point of view: a treatment can be considered effective in case it improves the person's quality of life, even in absence of an analogue effect in years of life earned (Holmes 1989).

From a literature standpoint, there is a wide variety of publications regarding measurements of quality of life in health care that state therefore the importance recognized to it.

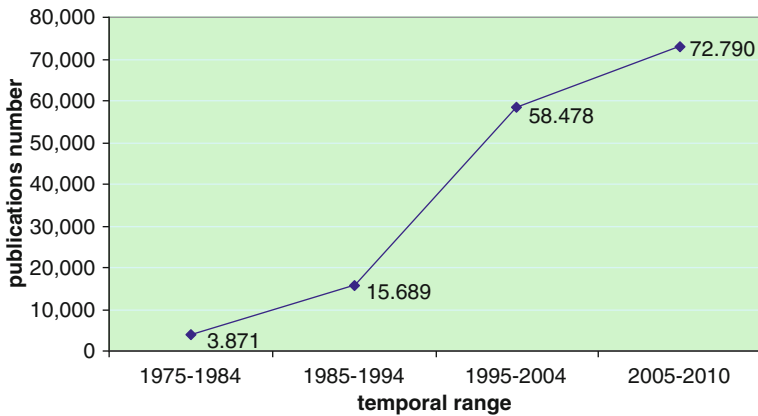
Here below, you will find the outcome of a literature review carried out by the authors (F.I.) on a medical-scientific database, PubMed, which introduced the keyword 'quality of life' in 1975. A selection of articles, containing this keyword from 1975 to now, brings out an amount of 150,828 titles. By grouping those articles by decades, it can be easily noticed the increasing interest on this topic till nowadays (Fig. 14.1).

The target of this chapter is not to get through the whole QoL in health-care topic, but to explore the existing literature to better understand how medicine had managed this topic, so far from its traditional background and mental structure and which are the main elements remained unresolved so far.

### 2.1.2 Methods

Literature review has been restrained to articles published on PubMed in the time frame 1 January 1981 and 31 December 2010. Planning it has not been so easy due to the large number of publications issued on this topic especially in the latest years.





**Fig. 14.1** Number of selected articles by decades

A diversifying strategy of tracking down articles has been put in place, that is, to divide the period of time by decades and identify some keywords and then some specific selection algorithms for each of them.

It is important to notice that PubMed does not have ‘health related quality of life’ term as keyword (or MeshTerm)<sup>2</sup> but quality of life. To conduct a specific research, other words have been added to better identify the QoL studies in health care, collect a feasible number of articles for the review from a quantitative standpoint and significant and useful publications for our study target from a qualitative one.

For the above-mentioned reasons, ‘health’ word has been differently linked to ‘quality of life’ (only for the first range of years), ‘health status indicators’ and ‘health status’ (for the following two decades); in addition for each of the produced algorithms, these words have been diversified in the research: ‘health’ has been identified as *TIAB*<sup>3</sup> and ‘health status indicators’ and ‘health status’ as *Major Topic: noexp*,<sup>4</sup> and only ‘quality of life’ has been identified as *Major Topic*.<sup>5</sup> The word ‘health-related quality of life’ has been indicated as *TIAB* both at length (for the last two decades) and its acronym (only for the last decade).

<sup>2</sup>**MeSH** (MEDical Subject Headings) in PubMed is the dictionary of terms (*Tesaurus*) monitored by è NLM (National Library of Medicine). It is used to index MEDLINE®/PubMed articles. (<http://www.nlm.nih.gov/mesh/>). <http://nmlm.gov/training/resources/meshtri.pdf>

<sup>3</sup>[TIAB] includes all words and numbers included in the title or the abstract of a citation (<http://www.nlm.nih.gov/mesh/>). <http://nmlm.gov/training/resources/meshtri.pdf>

<sup>4</sup>Do Not Explode: use [**mh:noexp**] or [**sh:noexp**] to restrict searches to articles focusing on the broadest MeSH term (<http://www.nlm.nih.gov/mesh/>). <http://nmlm.gov/training/resources/meshtri.pdf>

<sup>5</sup>The MeSH term describing the main topic [**Majortopic**] of an article is marked with an asterisk (<http://www.nlm.nih.gov/mesh/>). <http://nmlm.gov/training/resources/meshtri.pdf>

### 2.1.3 Results

#### Articles Selection

A total of 97 articles have been selected based on pertinence of title and abstract with the object of the study; 61 of those have been utilized for this article (the other were not retrievable).

The time frame 1981–1990<sup>6</sup> was the one creating less difficulties in selecting words to get a significant result from a qualitative standpoint and a restrained number: 272 articles were identified and 38 selected.

The second decade (1991–2001)<sup>7</sup> required a different algorithm to avoid a huge number of articles; by utilizing tightening keywords, 485 articles arise and 37 selected.

Last for the time frame, 2002–2010, utilizing a similar algorithm<sup>8</sup> to the second decade,<sup>9</sup> the result was wider than that: 1,586 articles and 20 titles selected. The limited number of titles useful in the latest decade versus the number of previous ones let us guess that researchers are less stimulated by the conceptual aspects and more by case studies.

#### Quality of Life in Health-Care Conceptualization

As previously said, a Conference on Measurement of Quality of Life in health care, was held in Portugal in 1986; the focus was not to provide a conceptual definition but to highlight the existing dualism between the quality of life general concept and the more specific one applied to health care (Miettinen 1987). This need appears to be the *leit motiv* driving, at least for the first decades, surveys carried out by clinical researchers, who consider the general concept of quality of life (including, apart from health, housing, work, life standards, marriage, etc.), too wide for their objectives and interests (Gill and Feinstein 1994; Gutteling et al. 2007). Miettinen, during the conference, remarked that medical research should limit the

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<sup>6</sup>The retrieval algorithm utilized is: “quality of life”[Majr] AND “health”[TIAB] AND (“1981”[PDAT] : “1990”[PDAT]) AND English[lang].

<sup>7</sup>The algorithm utilized for the second decade is: “quality of life”[Majr] AND (“Health Status Indicators”[Majr:noexp] OR “Health status”[Majr:noexp]) AND “Health related quality of life”[TIAB] AND (“1991”[PDAT] : “2001”[PDAT]) AND English[lang].

By utilizing a similar algorithm to the previous decade, we would have taken a too much wide outcome 2,385 articles, impossible to be analyzed in a short term.

<sup>8</sup>“quality of life”[Majr] AND (“Health Status Indicators”[Majr:noexp] OR “Health status”[Majr:noexp]) AND (“HRQoL”[TIAB] OR “Health related quality of life”[TIAB]) AND (“2002”[PDAT] : “2010”[PDAT]) AND English[lang].

<sup>9</sup>The only variation consists of utilizing both the extended term ‘*health related quality of life*’ and its acronym ‘*HRQoL*’.

quality of life studies to the clinical field; to widen it to other fields is a nonsense and a waste (Miettinen 1987). In the medical sciences therefore, though the general concept of QoL remains vague, we may find some attempts to widen it to the health dimension (Van Dam 1981; Miettinen 1987; Bergner 1989; Ferrans 1990; Siegrist and Junge 1990; Gutteling et al. 2007).

According to the literature retrieved, the issue seems to be approached (a) by some authors, by looking for an appropriate term to distinguish the general concept of quality of life by the specific health-related one and (b) by some others by trying to provide definitions (more or less complete) of the concept.

- (a) From the terminological side, quality of life applied to health was and is indicated with more of an expression: health-related quality of life (HRQoL) is the most frequently utilized. It is also indicated as *health status*, *functional status* (Bergner 1989; De Vries and Drent 2001; Janssens 2001; Gorbatenko et al. 2001; Gill and Feinstein 1994; Guyatt et al. 1993; Apolone et al. 2001; Pais-Ribeiro 2004) or *subjective health* (Siegrist and Junge 1990); with the first two words, the main objective is to distinguish the health dimension from the others included in the general concept of quality of life. With 'subjective health' instead, the aim is to highlight both the health endeavour and the source of information: the patient through his perceptions. Quality of life can also indicate the evaluation in health care. The presence of all those terms and their convertible utilization may sometimes create confusion in the reader (Ferrans 1996; De Vries and Drent 2001; Pais-Ribeiro 2004; Sajid et al. 2008), even if some authors provide different definitions. Ward (2004), for example, recognizes the difference between health status (measuring person perceptions including symptoms severity, symptoms impact, restraints in functionality activities, impact of the disease on the capacity to live of a person) and health-related quality of life (wide concept including health status, but also an evaluation component of the personal satisfaction on own current health status).
- (b) With regard to the conceptual plan, the most structured work of identifying the most utilized meaning of quality of life in health care is probably the work conducted in 1990 by Ferrans, who identified five wide categories: (1) normal life, (2) happiness/satisfaction, (3) achievement of personal goal, (4) social utility and (5) natural capacity.

The first category remarks the capacity of living a normal life. A reference is made to functioning ability of healthy people or people of same age (measuring tools are, for example, the *Karnofsky Performance Status Scale* or the *Zubrod Performance Scale*). By adopting this definition, the major problem to overcome in measuring the quality of life is regarding criteria definition to share the 'normality' concept. A suggested solution could be to use the 'normality' idea of a person as a reference standard. This brings to understanding the impact of a treatment or a disease on the patient life, but not his perception of them on the quality of life.

The second category highlights happiness or person satisfaction; both words are frequently aligned since conceptually close, even though as Campbell remarks they present some differences: happiness means a positive feeling with a brief length,

and satisfaction is the evaluation made on own life conditions based on a long-term experience. In Campbell's opinion, therefore, the satisfaction concept is closer to the QoL than the happiness one. A measurement based on this meaning is the index of well-being. Holmes (1989) thinks that the health-care operators should recognize that hedonistic philosophies fails not to evaluate the social nature of a person and that the extension of the treatment overcome the interest of a single person. As a patient health cannot be improved without making reference to his interpersonal relations, so quality of life cannot be extrapolated from the social context and evaluated apart.

Third category is focused on reaching personal goals and linked to the previous one of happiness/satisfaction since achieving a goal provides satisfaction, while failing provides discontent. This category is different from the previous one because it focalizes on reaching a goal and on the satisfaction/happiness feeling provoked, the previous one instead takes the happiness/satisfaction as central focus disregarding the reaching of the goal.

Fourth category is focused on the capacity of spending a useful social life, for example, covering socially recognized roles. This approach is generally utilized to take decision on sanitary politics, particularly on economical matters. It is critical to set criteria to define useful social behaviour.

Last category approaching quality of life in health care is regarding physical and mental skills of a person. This definition is typically used to set a reasonable limit beyond that each further treatment can be considered obstinate therapeutic intervention.

With the exception of this study, no real scientific definition on quality of life related to health have been found, merely a dimensions list: for example, Miettinen says from a medical standpoint, quality of life is freedom level from health deficiency, and here there are two dimensions, disability and discomfort (1987, 642). Pearlman in 1988 suggested that attributes of quality of life in chronic diseases can be grouped in two wide categories: functioning (social, physical, emotional and intellectual) and perceptions (life satisfactions and health status).

This inclination keeps on also after the introduction of the term 'health related quality of life', carried out by a sanitary sociologist, Patrick, probably around 1967. By that term, he meant the capacity of a person of specific sex and age to manage appropriate daily activities consistent for him. Otherwhere, the same author utilizes HRQoL to define the value assigned to life altered by disability, functional states, perceptions and other opportunities which can be affected by disease, wounds or other sanitary treatments (Niero 2002, 60).

Ware in 1991 systemized widely this concept by drawing it as concentric circles, starting from biological functioning and spreading to the role one, to find evidence of the impact of disease on the surrounding community (Niero 2002, 60).

In 1996, WHO writes that HRQoL is the individual perception on own position in life, within a daily cultural and asset context, taking into account own goals, expectations, standards and interests.

It is a wide and vague concept regarding physical and psychological health status of a person, his level of autonomy, his social relations and his relations with important environmental structures.

In 1998, Apolone and Mosconi suggested that HRQoL outlines an evaluation process focused on the influence of a disease, a treatment or a more complex intervention have on the daily performance, physical or emotional. Again Mingardi and Apolone speak about HRQoL as a treatment outcome on some aspects of the health status and life of the patient, completely measured from his standpoint (2005).

Testa and Simonson meant with HRQoL the three health dimensions: physical, emotional and social, which are influenced by person beliefs, expectations, perceptions and experiences (1996, 835).

Revicki et al. (2000) defined HRQoL as the subjective evaluation of disease and treatment impact in functioning dimensions, physical well-being, psychological, social and somatic.

Sajid et al. (2008) think that key points of the concept are physical functions, sensations, self-care, awareness, pain, emotional and psychological well-being.

According to some authors, even if currently utilized to indicate an area of interest, there is not an overall agreement on HRQoL's meaning (Gorbatenko et al. 2001; Chen et al. 2005); some characteristics pool different approaches: in particular, HRQoL always refers to a multidimensional concept comprehending the subject functioning in various dimensions of the human life; the most discussed and measured are roles and physical functioning (severity of physical limitations due to disease, in particular movements) emotional (depression or anxiety frequency) and social (limitations to standard daily activities such as working, sports, going out with friends owing to disease) (Gorbatenko et al. 2001; Mingardi and Apolone 2005; Sajid et al. 2008; Gutteling et al. 2007; Vetter 2007; O'Shaughnessy and Elder 2009). Furthermore, HRQoL is a subjective concept since patient's evaluation on his quality of life as affected by disease or treatment is required (Testa and Simonson 1996; Shimozuma 2002; Mingardi and Apolone 2005; O'Shaughnessy and Elder 2009).

Given this lowest common denominator present in the various nuances that the concept has acquired over time, the differences are mainly related to the special interests that have driven each time the researcher (Pais-Ribeiro 2004).

## Measuring HRQoL

From the analyzed articles it appears that while HRQoL seems to be approached in an approximate way, as if considered not so important by clinicians, a stronger attention is dedicated to measurement tools of the concept, in particular, which they are and what scientific criteria they are based on. The importance of this topic seems to indicate that clinicians, more accustomed to manage the objective data, facing a subjective data, took the decision to balance extendibility and reproducibility limits, granting this way the scientific basis of the opinions and perception measurement tools (Hennessy et al. 1994). Most of the selected articles therefore emphasized, from one side, scientific criteria of the measurement tools: reliability, validity and sensitivity (Janssens 2001; Testa and Simonson 1996; Mishoe and Mclean 2001; Dedhiya and Kong 1995; Mingardi and Apolone 2005; Gutteling et al. 2007; Shimozuma 2002; Sajid et al. 2008; Cramer 2002; Vetter 2007)

(more in-depth details can be read in specific publications); from the other side, they emphasized the classification of the most frequently used psychometric tools. A brief hint will follow: utilized questionnaires are mainly of two types: generic or specific per disease.

The first ones do not apply to particular pathologies or to distinct groups of patients, but are utilized for studies on general population to evaluate a wide variety of topics and applicable to various health and disease conditions. These are the most utilized to conduct general surveys on health status and to confront different pathologic conditions since they do not refer to specific pathology or to a particular patient population. They are indicated to compare different groups of patients (e.g. groups of subjects affected by different medical conditions). They are appropriate tools to evaluate impact or collateral effects of a specific treatment on a wide series of HRQoL items. Limitations are represented by its lack of sensitivity in collecting information on a specific disease and can fail to catch changes due to data treatment.

Disease-specific questionnaires are focused on most relevant disease or condition fields under study and on patient characteristics with the most prevailing condition. The advantage is the pronounced sensitivity to changes: they are particularly indicated in clinical trials to evaluate specific therapies. The disadvantage is they do not allow comparisons amongst populations with different diseases (Gutteling et al. 2007; Chen et al. 2005; Dedhiya and Kong 1995; Apolone and Mosconi 1998; Guyatt et al. 1993; Janssens 2001; <http://www.psychiatryonline.it/ital/scale/cap20-1.htm>; McCarthy 1995; Osoba 2007; Shimozuma 2002; Sajid et al. 2008; Hickey et al. 2005; Cramer 2002).

The selection of the tool is not based on objective criteria, but driven by appropriateness with regard to the survey target.

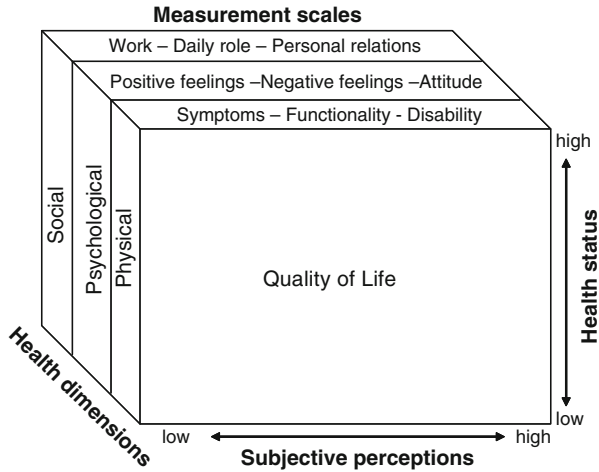
Osoba remarks this is equal to a laboratory test selection: it is as extremely important to select the most appropriate and sensitive tool for our survey objective, as selecting the most appropriate and sensitive laboratory test to meet the goal (2007).

And again regarding this topic, some authors (Barofsky 2001; O'Shaughnessy and Elder 2009; Greenhalgh et al. 2005; Ward 2004; Cramer 2002) consider HRQoL measures as belonging to patient-reported outcome (PRO). PRO is an 'umbrella' term covering a broad spectrum of measurements, referring specifically to reports on health conditions or treatments self-produced by patient. PRO is directly elaborated by the interested person; contrarily, other reports are prepared by others to evaluate or provide a professional assessment on the conditions' impact on the patient (Osoba 2007).<sup>10</sup>

At last, a small number of authors are interested in the relationship between subjective and objective dimension of the concept to be measured. Moons et al. (2006) declared that quality of life is a merely subjective experience since it is determined by the subjective evaluation on own life condition. Every HRQoL dimension therefore (generally physical, psychological, socially) can be measured in two directions:

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<sup>10</sup>See also [http://en.wikipedia.org/wiki/Patient-reported\\_outcome](http://en.wikipedia.org/wiki/Patient-reported_outcome)



**Fig. 14.2** Conceptual scheme of the domains and variables involved in a quality of life assessment

objective evaluation of functioning or health status, and subjective perceptions on health condition. Even if the objective dimension is critical to evaluate a patient health level, subjective perceptions and patient expectations translate this objective evaluation into quality of life perceived by the patient himself (see Fig. 14.2) (Testa and Simonson 1996). It derives thus that both objective and subjective dimensions are parts of the quality of life concept. In fact, variations amongst questionnaires are often represented by the emphasis given to the comparison between the objective and subjective dimension, in addition to the extension covering dimensions and questions format more that to differences in essential definition of HRQoL (Testa and Simonson 1996; Gutteling et al. 2007; Hennessy et al. 1994).

### Who Evaluates HRQoL, Patient or Physician?

The literature review brought to light that one of the topics faced by clinical researchers has been to wonder who is the most appropriate subject to articulate on patient's quality of life.

The literature also suggested that this concept has been evaluated either by sanitary operators (physicians, nurses, etc.) or patient or a caregiver like the partner or a relative, but historically the family doctor has conducted most frequently this evaluations, even with the limits involved (Aaronson 1989).

Some studies outlined a discrepancy between the physician or caregiver point of view and that of the patient in evaluating the quality of life of this latest, and concluded that third subjects are unsuccessful in identifying disease and treatment aspects important for patients (Sajid et al. 2008; Carr and Higginson 2001; Slevin et al. 1988; Pearlman and Uhlmann 1988; De Vries and Drent 2001). For example,

from a 1988<sup>11</sup> study, two important considerations emerged: physicians cannot measure their patients' quality of life properly; in fact, even if a significant statistic correlation between physician and patient scores is reported, rarely the first ones are able to explain more than 30% of variability than the second ones. Another reported aspect is the great variability emerging from the scores produced by various physicians and sanitary practitioners in evaluating their patients' quality of life. Both results agree in suggesting that only the patient can provide a proper evaluation on his quality of life, third subjects do not have necessary knowledge of his perceptions to pronounce themselves on this (Slevin et al. 1988, 109–110).

This statement is not going to astonish us if we assume that the quality of life express the point of view of the patient and is therefore a high subjective concept (Dubos 1976; Carr and Higginson 2001; Covinsky et al. 1999; Ferrans 1990; Niero 2002) whose evaluation can be reliable only if made by the person interested (Ferrans 1990).

Besides these considerations, it is not possible to exclude the case of an assisted person unable to express himself on his quality of life, for example, children or mental patients (O'Shaughnessy and Elder 2009; Niero 2002, 46; Aaronson 1989), and in these circumstances, it is necessary to require intervention of relatives.<sup>12</sup>

Nowadays, it is widely accepted the utilization of self-reported questionnaires (Niero 2002) to measure QoL, even if sometimes acquisitions carried out by physicians are preferred for practical reasons, since minor time and efforts are required than the ones made directly through the patient (Aaronson 1989).

While approaching this topic, it is advisable to give a look at the link between HRQoL and questionnaire self-filling out: if we consider what was said so far and how the topic was handled in all publications gathered (O'Shaughnessy and Elder 2009), we may think that this concept subjectivity is granted by questioning the patient. In Carr and Higginson's opinion (2001, 1357), quality of life measurements are recognized as patient-centred, since accordant and sensitive to patient will, needs and preferences (Pais-Ribeiro 2004), even though some of them fail in setting standard models and preselected dimensions of the concept (Mishoe and Mclean 2001). In a clearer way, Niero (2002, 45–48) stated a measurement can be considered subjective on three criteria basis: (1) self-reported questionnaires, situations are reported and filtered through patient judgement; (2) subjectivity refers to patient mental outlines of two types: first one based on current dwelt and the other on the ideal dwelt (or reference standard one), utilized by patient to express his assessment (welfare or discomfort); and (3) the reference standard can be set by patient or other figures (physician, community, etc.). To better understand how much concept subjectivity is flattened, beyond the questionnaire administering modality, it is necessary to identify who is going to set the reference standard (the patient utilizes

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<sup>11</sup>The study foresaw the administration of Karnofsky Performance Scale, Spitzer Quality of Life Evaluation, Hospital Anxiety and Depression scale (HAD) and a series of analogue linear scales to self-evaluate QoL, anxiety and depression. Questionnaires were filled out by sanitarians, patients (affected by cancer) and relatives. For further information on this topic, see the *proxy* use in quality of life studies.

<sup>12</sup>For further information on this topic, see the *proxy* use in quality of life studies.



this ideal for comparison with his current life and then expresses his welfare/discomfort assessment); if the ideal is set by a physician, for example, this will coincide with the therapeutic excellence; it is not necessarily the same for patient.

In general, we may conclude by saying that from the analysis on the creation of some of the most common questionnaires (e.g. SF 36), the issue is faced by widely recognizing the self-reported modality, when possible according to patient's conditions, and by involving the patient during the questionnaire planning.

These solutions nevertheless do not tackle the heart of the problem: to grant the quality of life concept individuality, one of the challenges still opens on this side of the study.

### HRQoL Evaluations in Clinical Practice Applications

As already said before, HRQoL is recognized by sanitarians as an important outcome, as well as biological and clinical ones, to evaluate interventions on patient. The added value of this type of study is represented by the patient's perception of the medical intervention (Barofsky 2001). An HRQoL survey can help in targeting the correct therapeutic dosage to ensure a better quality of life and contribute to develop a correct treatment path. It can be of help in selecting a treatment, providing information to the patient on a particular intervention outcome and can be used as a current indicator of quality check. It is advisable to facilitate communication between physician and patient, to disclose problems of patients and monitor treatment responses (McCarthy 1995; Barofsky 2001; Greenhalgh et al. 2005). Barofsky (2001) observes that a HRQoL evaluation is the only indicator of the disease impact; it is essential to evaluate treatment efficacy, useful to interpret clinical outcome and a key element for taking decision on treatment.

Despite these statements and its relevance, broadly recognized, just a few physicians support their activities with well-being evaluations (Gutteling et al. 2007; Chen et al. 2005; Apolone et al. 2001; Aaronson 1989; McCarthy 1995; Mingardi and Apolone 2005; Greenhalgh et al. 2005; Osoba 2007); recently, some trials took evidence that if a clinician has an HRQoL feedback, he has to face more topics regarding quality of life, but this doesn't influence his decisions on treatment (Greenhalgh et al. 2005). Gutteling et al. (2007) argued that notwithstanding since 2001 relevant articles on HRQoL have been published and two dedicated conferences were held (*Applications of Health Status Assessment Measures in Clinical Practice* in 1992 and in 2007),<sup>13</sup> HRQoL evaluation impact on clinical practice has been limited.

Some authors tried to list some possible reasons.

The first barriers of involving physicians in quality of life evaluations are of practical nature; in fact, this type of surveys require extra time (lot of questionnaires require too much time to be administered and therefore incompatible with frenetic rhythm of clinical practice), human resources (additional to the existing ones, already full of work and lacking of an adequate training to carry out this specific

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<sup>13</sup>[www.isoqol.org](http://www.isoqol.org)

activity), economic (cost of interviewer and analyst to process data) and logistical (e.g. looking for a place for the interview), whose availability is poor also for the standard medical activities (McCarthy 1995; Lehman 1995; Janssens 2001).

A limitation of HRQoL scores' utilization in clinical practice has been outlined by other authors (Janssens 2001; Mingardi and Apolone 2005) in the type of scales available up to now, not sensitive enough to help taking clinical decisions: they are designed and developed to get a level of validity, reliability and sensitivity sufficient to measure HRQoL changes in quite big samples (the best tool require a few ten subjects to catch big differences in health perceived) and are not able, with small or very small samples (one subject) to grab a modification, if present, especially with modest changes, even if clinically desirable.

Speaking about barriers, Osoba (2007) added the difficulty of understanding how the information on HRQoL can adjust itself to clinical practice. He described then the action plan that physicians utilize to come to a diagnosis and to treat patient disease: (1) anamnesis and check-up visit, (2) making a diagnosis and requiring laboratory and x-ray tests (to eventually reconsider a first diagnosis), (3) appropriate treatment selection and eventual adding tests and (4) follow-up. In Osoba's opinion, for each of these phases, HRQoL data can play a useful role, and they should be utilized as a conventional laboratory test (e.g. information on HRQoL will be helpful in making a diagnosis, monitoring disease's progresses and treatment of patient).

We could represent difficulties expressed by Osoba through Aaronson's words (1989): resistance in including psychosocial parameters in clinical trials seems to be due to the lack of familiarity between the two conceptual models, clinical and social one,<sup>14</sup> and to the different research traditions of clinicians and social scientists.

### **3 Phase II: Methodological Approach**

#### ***3.1 Definition of a Tool to Conduct Methodological Evaluation of HRQoL Questionnaires***

##### **3.1.1 Introduction**

The questionnaire is the measurement tool utilized in quality of life surveys.

The selection of a measurement tool for a survey is an important and critical step: its planning follows a hierarchical model starting from the identification of the concept to be measured, that is, the conceptual model, to the items definition, which forms the questionnaire.

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<sup>14</sup>The biomedical model is aimed to understand the causal relationships and classify patients in groups with specific prognoses and therapeutic meanings; the social paradigm focalizes functioning dimensions, health perceptions and overall quality of life. It takes into account the patient and his social context as causing effects on disease. Wilson and Cleary hypothesized a conceptual model trying to melt the two paradigms (Wilson and Cleary 1995).

A lot of information is available on the questionnaire designing methodology and on the importance of tracking down other tools in literature, during the phase preceding a new questionnaire planning. Very few information or nothing at all there is on the methodology of reviewing and utilizing literature to better understand the quality of tools detected, with the aim of adopting them.

The Quality and Equity Observatory of Regional Health Agency of Tuscany and the University of Florence tried to systemize a possible approach of structured reading and evaluating questionnaires, already published and validated, measuring quality of life correlated to health.

The target of our study was to create a questionnaire evaluation tool, by following an opposite path; instead of starting from the conceptual model, as we generally do, we started from the questionnaire analysis to get to the conceptual model verification.

### 3.1.2 The Evaluation Tool of an HRQoL Questionnaire

How can we select tools for applicative purposes? Which evaluation criteria should guide us in the selection? The tool should necessarily enable comparisons between questionnaires promptly in order to select the best one.

Our study led us to create an evaluation tool of a questionnaire. Since the creation of a measurement tool requires rigid procedures, we need to verify, starting with the questionnaire, whether these have been respected. Which parameters should not be forgotten while drawing up a questionnaire and therefore included in the evaluation of the tool?

As during the design of a questionnaire also for its validation, we need to take into consideration the *design* and the *validation models* (Fig. 14.3).

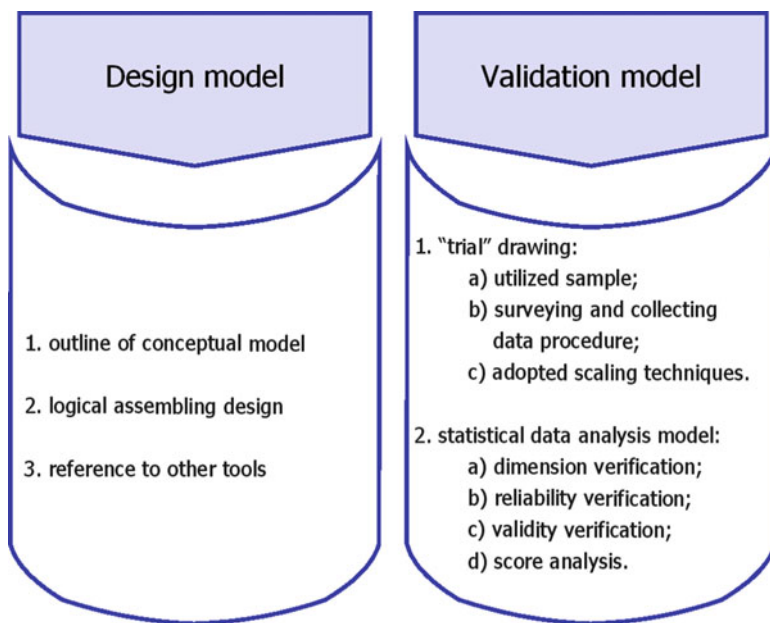
*Design model* requires:

- To precisely outline the concept and object of the study
- To detail every single step of the survey: hypothesis definition, identification of surveying areas, variables and lastly questions
- To take into consideration utilizing existing validated tools

The questionnaire is the outcome of the design model and needs to be validated before proceeding with publication.

The *validation step* requires:

- To select a pilot sample of patients to whom submitting the questionnaire to be validated
- To indicate modality of submitting the tool, moment of submission. It is important that the circumstances of validation trial and application of the tool are the same
- To outline the adopted scaling techniques: for example, whether a scaling model is additive or cumulative
- To verify how many and which dimensions arise from data and whether they correspond to the ones assumed during the initial phase
- To verify reliability of the tool by confronting the result with following surveying: to verify that way the stability of the tool and its bias degree



**Fig. 14.3** Design and validation models

- To verify the validity of the tool, that is, if the tool is measuring what we really need to measure
- To determine the modality of score defining in order to locate the respondent on the continuum and specify criteria to interpret their position, especially those lying in intermediate positions

The evaluation of a questionnaire is based on the verification of respect of its building steps; this can be done through consultation of issued material regarding the tool creation process.

In the evaluation form (Fig. 14.4), all conceptual model components have been detailed; it is indicated whether each component has been described and if it is in the same line with the research object, that is, if it has been managed appropriately. By the end of filling out the form a clear, concise but exhaustive picture of the quality of the tool will be delivered.

### 3.1.3 Application of the Evaluation Tool

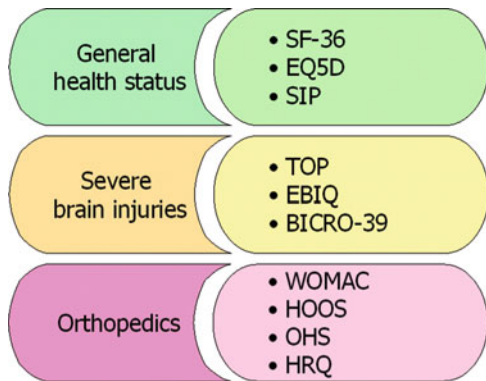
#### Questionnaires Selection

The selection of questionnaires to be evaluated has been conducted in line with the research interests of the observatory; it was oriented towards specific pathologies such as severe acquired brain injuries and hip surgery and towards the overall health status monitoring. A set of ten questionnaires has been selected amongst the most

EVALUATION FORM			
<b>Tool description</b>			
1. design model:			
1.1. outline of conceptual model			
1.2. logical assembling design			
1.3. reference to other tools			
<b>Tool verification</b>		<b>Procedure</b>	
	described	In line with	description
1. validation model:			
2.1. "trial" design:			
2.1.1. sample utilized for trial			
2.1.2. surveying and collecting data procedure			
2.1.3. adopted scaling techniques			
2.2. statistical data analysis model:			
2.2.1. dimension verification			
2.2.2. internal validity verification → reliability			
2.2.3. external validity verification → validity			
2.2.4. score analysis			

**Fig. 14.4** Evaluation form

**Fig. 14.5** Selected questionnaires in interesting area



widespread and utilized at international level (Fig. 14.5 and Table 14.1). Literature reviews have been carried out for each questionnaire in order to capture exemplified articles on tool development modality. In section reference list, all collected and analyzed articles have been cited. The international literature review (non-systematic) has been carried out through PubMed digital records.

### Results

A first remark resulting from the ten selected questionnaires is regarding the health concept. Health is a subjective and multidimensional concept, considering the person globally: physical, psychological and social status.

It is interesting to realize that in some of the analyzed questionnaires, the quality of life is considered just from the physical functioning standpoint while the social and psychological aspects are left apart.

**Table 14.1** Selected questionnaires characteristics and observation on multidimensionality

Questionnaire name	Building year	Field	Dimensions	No of items	Modality of survey administration	Multidimensionality	Characteristics
<b>SF-36</b> McHorney et al. (1993, 1994), Ware and Sherbourne (1992)	In the 1980s	General health status	Physical Psychological Social	36	Self-administered	Yes	Designed to provide a wide variety of measurements of different health status; it is adjustable to people of every age
<b>SIP – Sickness Impact Profile</b> Bergner et al. (1976a, b), Gilson et al. (1975), Pollard et al. (1976)	In the 1970s	General health status	Physical Psychological Social	136	Self-administered or face-to-face interview	Yes	Evaluation tool which provides a general overview of the health status from the behavioural point of view. It provides a continuum indicating absence of restraints (health status) on one side and a limitation (total or partial) reported by the patient, as a consequence of a disease on the other side
<b>EQ-5D – EuroQol</b> Brooks (1996), Carr-Hill (1992), The EuroQol Group (1990)	In the 1990s	General health status	Physical Psychological	15	Self-administered by patient/relative or face-to-face interview	No social dimension	Standardized tool able to measure health status and quality of life of patients, useful to evaluate quality of health-care assistance provided
<b>TOP – Trauma Outcome Profile</b> Pirente et al. (2006)	2001	Severe brain injuries	Physical Psychological Social	54	Self-administered with the supervision of a clinician	Yes	Modular tool to evaluate quality of life 1 year after brain trauma

(continued)

**Table 14.1** (continued)

Questionnaire name	Building year	Field	Dimensions	No of items	Modality of survey administration	Multidimensionality	Characteristics
<b>EBIQ</b> – European Brain Injury Questionnaire Teasdale et al. (1997)	In the 1990s	Severe brain injuries	Physical Psychological Social	63 plus three supplemental questions	Self-administered by patient with supervision of a clinician and self-administered by relative	Yes	Designed to evaluate the personal experiences of patients (and of their families) affected by brain trauma on cognitive, emotional and social field
<b>BICRO-39</b> – The Community Brain Rehabilitation Outcome Scale Powell et al. (1998)	In the 1990s	Severe brain injuries	Physical Psychological Social	39	Self-administered by patient and by relative	Yes	Designed to evaluate the consequences of brain trauma at individual level, by asking to patient or to his relatives to evaluate his functioning, before and after trauma and measuring the modifications occurred as a consequence of rehabilitation
<b>WOMAC</b> – Western Ontario and MacMaster Universities Osteoarthritis Index Bellamy and Buchanan (1986), Bellamy et al. (1988)	1982	Orthopaedics	Physical	24	Self-administered	No psychological and social dimensions	Designed to evaluate pain, disability and stiffness due to hip osteoarthritis

<b>HOOS</b> – Hip Disability and Osteoarthritis Outcome Score Klassbo et al. (2003), Nilsdotter et al. (2003)	2003	Orthopaedics	Physical	40 including WOMAC	Self-administered	No psychological and social dimensions	Developed as an adaptation of KOOS (Knee Osteoarthritis Outcome Score). It includes all WOMAC items. Created to evaluate disability due to osteoarthritis
<b>OHS</b> – Oxford Hip Score Dawson et al. (1996)	1996	Orthopaedics	Physical	12	Self-administered	No psychological and social dimensions	Designed to evaluate outcome of hip surgery
<b>HRQ</b> – Hip Rating Questionnaire Johanson et al. (1992)	1987	Orthopaedics	Physical	14	Self-administered	No psychological and social dimensions	Designed to evaluate outcome of hip surgery in patients affected by coxarthrosis



This lack is noticed especially in specific questionnaires regarding orthopaedic pathologies (Table 14.1).

Sometimes, it is therefore difficult to catalogue tools such as questionnaires on quality of life lacking on both social and psychological side.

From our study emerged that some components of conceptual model were not considered in designing the tool or were faced inappropriately.

Dimension analysis is the most variable component: it is either not examined at all, or it is carried out but not described in the article, or analyzed in inappropriate ways, for example, conducting a principal component analysis instead of a factor analysis.

It is worth saying that these two techniques are often confused in the practical use even if they are very different and need a distinct utilization.

Lastly, score analysis, meaning settlement of boundary values and score interpretation for allowing subjects discrimination, is never carried out.

Verification of reliability is worth to be observed. Since perception of quality of life may change as time goes by, even in the short term, it is advisable to utilize methods as parallel questionnaires or internal consistency to verify the stability of the tool.

In the analyzed questionnaires, on the contrary, the verification of reliability has been often conducted through test-retest method, which consists of submitting the same questionnaires in different times and verifying the correlation between the scores got by the two measurements.

If a low correlation is observed, we are led to think of a low reliability, but this can actually mean a change in perception intervened in responding, even in the short time.

The evaluation process adopted has a limit: the evaluation carried out is based on issued articles, that is, on what has been written and published.

Some problems therefore arise:

- First of all, it is difficult to track down articles especially those explaining the single steps followed in designing the questionnaire in order to recap the conceptual model path.
- Second, the questionnaire authors might have not published articles on the design process of the tool or part of it.
- It is also possible that authors have highlighted some aspects of the process, disregarding some other, relevant for the conceptual model.

Apart all these limitations, there is one big advantage, that is, to be able to make a 'conscious choice'.

After an accurate evaluation, we will be fully aware of limits and potentialities of the tool and decide to adopt it as it is or integrate it and make reference to it in designing a new questionnaire.

In conclusion, our evaluation model is a cross-sectional tool, which can be utilized in other research fields, not necessarily health related but referred to the subjective surveying.

## 4 Conclusions

To sum up, the first purpose of this chapter is to explore HRQoL concept in the existing medical literature to better understand how medicine had managed this topic and which are the main elements remained unresolved so far.

As already said before, quality of life measurements are nowadays more and more utilized as an add-on to the most traditional objective (clinical or biological) measurement methods of a disease to evaluate clinical-sanitary interventions. This concern by clinical world was born in the 1970s when all the demographic, technological, cultural and political changes fatally influenced it.

Since then, in the medical sciences, though the general concept of QoL remains vague, we may find some attempts to widen it to the health dimension.

According to the literature retrieved, the issue seems to be approached: (a) by some authors, by looking for an appropriate term to distinguish the general concept of quality of life by the specific health-related one, and (b) by some others by trying to provide definitions (more or less complete) of the concept.

Probably around 1967, there is the introduction of the term 'health related quality of life', carried out by a sanitary sociologist, Patrick.

According to some authors, even if currently utilized to indicate an area of interest, there is not an overall agreement on HRQoL's meaning, but it always refers to a multidimensional concept comprehending the subject functioning in various dimensions of the human life (physical, emotional and social functioning); furthermore, HRQoL is a subjective concept since patient's evaluation on his quality of life as affected by disease or treatment is required.

From the analyzed articles, it appears that a stronger attention is dedicated to measurement tools of the concept. Most of the selected articles therefore emphasized, from one side, scientific criteria of the measurement tools: reliability, validity and sensitivity; from the other side, they emphasized the classification of the most frequently used psychometric tools: generic or specific per disease. The selection of the tool has to be not based on objective criteria, but driven by appropriateness with regard to the survey target.

The literature review brought to light that one of the topics faced by clinical researchers has been wondering who is the most appropriate subject to articulate on patient's quality of life and that this concept has been evaluated either by sanitary operators (physicians, nurses, etc.), or patient, or a caregiver. On this subject, some studies outlined a discrepancy between the physician or caregiver point of view and the patient's one and concluded that only patient are successful in identifying disease and treatment aspects important for him.

Nowadays, it is widely accepted the utilization of self-reported questionnaires to measure QoL, even if sometimes acquisitions carried out by physicians are preferred for practical reasons.

Finally, notwithstanding HRQoL is recognized by sanitarians as an important outcome to evaluate interventions on patient in many fields, just a few physicians

support their activities with well-being evaluations. Some authors tried to list some possible reasons: at the first, they point out the need of extra time and extra human, economic, logistical resources. Moreover, the type of scales available are designed and developed to get a level of validity, reliability and sensitivity sufficient to measure HRQoL changes in quite big samples, but are not able, with small or very small samples to grab a modification, especially with modest changes, even if clinically desirable.

In the second part of our work, we observed that the line-up of an evaluation tool follows identified and well-known steps, but it is nevertheless not so clear how this information can be utilized to evaluate the quality of the tool in order to adopt it.

Therefore, we focused on the systematization of a possible approach of structured reading and evaluating questionnaires, already published and validated, measuring quality of life correlated to health.

The application of the resultant evaluation form on a set of ten HRQoL questionnaires selected amongst the most widespread and utilized at international level highlighted that the quality of life is sometimes considered just from the physical functioning standpoint while the social and psychological aspects are left apart, especially in specific questionnaires regarding orthopaedic pathologies; sometimes, it is therefore difficult to catalogue tools such as questionnaires on quality of life lacking on both social and psychological sides.

Furthermore, from this work emerges that:

- Almost all articles provide information on the utilized sample during the experimentation, the survey process, data collection, adopted scaling techniques, internal and external relevance verification.
- Score analysis, meaning settlement of boundary values and score interpretation, needed to conduct subjects' discrimination, is nearly totally absent.
- Dimension analysis is the most variable component: it is either not examined at all, or it is carried out but not described in the article, or analyzed in inappropriate ways.

The evaluation process adopted has a limit: the evaluation carried out is based on issued articles, that is, on what has been written and published.

Limit apart, there is also a big advantage: the possibility to make a 'conscious choice' since we are aware of limits and potentialities of the tool we are going to apply and we can decide to adopt it as it is or integrate it and use it as a reference point to create a new questionnaire.

In conclusion, our evaluation model is a cross-sectional tool, which can be utilized in other research fields, not necessarily health related but clearly referred to the subjective surveying.

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# Chapter 15

## The Use of Health-Related Quality of Life Measures in Official Statistics: The Italian Experience

Lidia Gargiulo, Laura Iannucci, and Alessandra Tinto

### 1 Background

The World Health Organization defines health as a “state of complete physical, mental and social well-being and not merely the absence of disease or infirmity” (World Health Organization 1948). Thus, the absence of disease is not enough, and individual’s health can be seen as the result of various aspects including not only objective health elements but also individual physical, social and relational well-being. In this context, the surveillance of mental and physical health is essential to understand health-related quality of life (HRQoL) and its impact on increasing the quality and years of healthy life, reducing health inequalities and predicting the future needs for medical care. Tracking health-related quality of life in population can help identifying subgroups with poor physical or mental health to guide policies or interventions to improve their health.

In this framework, individuals become pertinent and reliable sources of information on their health conditions. Health Interview Surveys (HIS) on the general population become an extremely relevant methodological tool to monitor the health of the population.

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## 2 The Survey on Health Conditions and Use of Health Services of the Italian Population

The survey “Health conditions and use of health services” collects information on health status, health determinants (smoking habits, overweight and obesity, etc.) and use of health services of the Italian population. It is carried out every 5 years on a sample of households spread over the whole country, using PAPI (Paper and Pencil Interviewing) technique and a self-reported questionnaire. Four rounds of interviews are carried out quarterly to take into account seasonal effects.

The first survey devoted to health was implemented in Istat in 1980, followed by several surveys in 1983, 1986–1987, 1990–1991, 1994, 1999–2000 and, the last available data collection, in 2005.

In 1980, the first Health Interview Survey was carried out back to back to the birth of the Italian Health System (L. 833/78), which was inspired by the concept of health as a social right and by the principles of universalism and equality.

In the same period, the World Health Organization launched the new guidelines “Health for all”, to be implemented by the year 2000, which stressed the importance of health promotion and preventive actions, giving more relevance to the active role of individuals, households and communities in the preservation of health. In line with the WHO definition of health, the individual perception of health becomes a relevant tool to capture elements which are not part of the traditional indicators of morbidity and mortality.

It is in this context that in Istat the Health Interview Survey becomes a routine data collection.

The first wave in 1980 covered information on health perception, the most relevant chronic and acute conditions, permanent invalidities, accidents, hospitalisation, health care and smoking habit. In the following rounds, the information collected is enriched by the inclusion of more questions on medical checkups and examinations and on lifestyles so that the analysis of risk factors can be deepened. New questions on health-related quality of life are also introduced in the two most recent editions of the survey.

The survey allows a wide range of health variables to be studied together with background information both at individual and household level, to be able to analyse health inequalities. This analysis is focused on the evaluation of the determinants of inequalities and on the identification of the frailest groups of the population, for whom specific health policies should be developed in order to reduce health disparities.

The Italian HIS is an extremely rich source of information, which carries a great potential for data analysis. For instance, the availability of information on the household context allows identifying groups of population at risk of social exclusion (e.g. elderly persons living alone, households with individuals with disabilities, one-parent households with children, etc.). Furthermore, the survey, by collecting socio-demographic and health information on all household members, provides a tool allowing health to be studied within the context of the household: for instance, it is possible to study the impact of the lifestyles of parents on their children, or to study the health of the household member providing care to a co-resident sick or elderly person.

The Italian health survey, thanks to its rich informative content, is used by policy makers to identify priorities in health promotion, to monitor the progress of population's health and to define health plans at national and regional level.

The Italian National Health System has been reorganised thoroughly in the last decade, with an increasing level of autonomy for the regions, which produced multiple regional health systems (Formez 2007; Agenzia Sanitaria Regionale 2007). In this context, it is essential that a national health interview survey can provide subregional data. For this purpose, in 2000 and 2005 editions of the national HIS, the sample size was substantially increased (from approximately 24,000 households in 1994 to 60,000 households) and the domain of interest was redefined by taking into account the subregional level as an aggregation of Local Health Authorities (ASL).

Besides the Health Interview Surveys, since 1993, the survey "Aspects of daily life", carried out annually, contains a module on health.

Starting from 1993, both the survey on "Health conditions and the use of health services" and the annual survey on "Aspects of daily life" became part of the new born *System of social multipurpose surveys on households* (Istat 2006). The system shares the same methods, and it is structured into seven social surveys and a few special surveys. The survey on "Aspects of daily life" which, besides information on health and lifestyles, provides a set of social indicators and the use and satisfaction with some services; the quarterly survey on trips and holidays and five specific surveys (on health, leisure time, safety of citizens, household and social subjects, time use), which are implemented every 5 years and constitute an integrated system covering the most relevant social aspects. Moreover, recently, three special surveys covered information on violence against women (2006), social inclusion for persons with disabilities (2004) and follow-up survey on job routes with a gender perspective (2007).

The whole system of multipurpose surveys allows the continuous monitoring of the main phenomena related to the health needs of the population, being an extremely useful tool to inform the social and health policy planning.

### 3 Outcome Measures

From an operational standpoint, the instruments measuring HRQoL can be classified into *single-item* and *multi-item* measures.

The global health state indicator, recommended by WHO (World Health Organization and Statistic 1996) and referred to the wide concept of health defined in terms of psycho, physical and social well-being, is based on a single-item question: "How is your health in general? Very good; Good; Fair; Bad; Very bad". This is a powerful tool, providing an immediate measure of the state of health of the population (Grant et al. 1995).

It is used to calculate healthy life expectancy and, in Istat, is included in several household surveys (survey on Health conditions and use of health services, EU-SILC, survey on Aspects of daily life, etc.) (Robine and Jagger 2003; Robine 2006; Cox et al. 2009). The question on perceived health is widely used at European level, and it is recommended by the European Health Interview Survey implemented by Eurostat as part of the three questions set Minimum European Health Module.

Multi-item measures are adopted to assess specific dimensions of health, rather than just measuring the individual overall health (Fryback et al. 2007). The most common are the European Quality of Life Scale (EuroQol) (McDowell and Newell 1987), the Nottingham Health Profile (NHP) (Hunt et al. 1981), the Psychological General Well-Being (PGWB) (Dupuy 1984), the Short Form 36 (SF-36) and its derivatives (SF-20, SF-12 and SF-8) (Ware et al. 1994, 1998).

The EuroQol descriptive system, also known as EQ-5D, is defined by five domains (mobility, self-care, usual activities, pain/discomfort and anxiety/depression), each with three response options (no problems, moderate problems, severe problems), defining a total of 243 unique health states.

The NHP is used to provide a brief description of patients' perceived emotional social and physical health problems. It is composed by 45 items which refer to six dimensions: energy, pain, physical mobility, emotional reactions, sleep and social isolation.

The PGWB is a tool including both positive and negative affective states. It consists of 22 self-administered items, rated on a 6-point scale, which assess psychological and general well-being of respondents in six HRQoL domains: anxiety, depressed mood, positive well-being, self-control, general health and vitality. Each domain is defined by a set of items (from 3 to 5). The scores for all domains can be summarised to provide a summary score, which ranges between 0 (the worse level of health state) and 110 points, representing the best achievable well-being.

The SF-36 questionnaire is one of the most widely used generic health status instruments to assess health-related quality of life.<sup>1</sup> It is based on 36 items,<sup>2</sup> eight dimensions, each one defined by a set of items (from 2 to 10 items): Physical functioning (PF), Role-Physical (RP), Bodily pain (BP), General health (GH), Vitality (VT), Social functioning (SF), Role emotional (RE) and Mental health (MH).

The SF-12 questionnaire is a short version of the SF-36, made up by 12 items referring to eight domains, like in the original version (SF-36). Compared with the SF-36 questionnaire, the SF-12 has only one or two items from each identified dimensional concept. The synthesis of the scores allows two summary measures to be calculated, the Physical Component Summary, related to physical health, and the Mental Component Summary, related to the psychological health (Table 15.1).

The Italian Health Interview Survey allows us to measure health-related quality of life through the 12-item Short Form physical and mental summary scores (PCS-12 and MCS-12), both for 2000 and 2005 surveys.<sup>3</sup> Moreover, in 2005, in order to deepen the possibility to study aspects of mental health, six additional questions from the SF-36 were included in the questionnaire, aimed at measuring individual Mental Health (MH) and Vitality (VT). These measures, also used at European level in the first wave of the European Health Interview Survey, focus on two opposite aspects of mental health: psychological distress and positive mental health. In particular, the MH index covers the four main dimensions of mental health: anxiety,

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<sup>1</sup>The Italian version of SF-36 was developed and validated within the International Quality of Life Assessment Project (IQOLA) (Apolone and Mosconi 1998; Apolone et al. 2001).

<sup>2</sup>The 36th item, on health changes over the past 12 months, is not contributing to the eight dimensions.

<sup>3</sup>In both 2000 and 2005, waves of the Italian Health Interview Survey version 1 of SF-12 were used (Gianicolo 2002).

**Table 15.1** Dimensions and items from the SF-36 and SF-12

Dimensions	SF-36 Items <sup>a</sup>	SF-12 Summary measures
Physical functioning (PF)	Vigorous activities	Physical Component Summary (PCS)
	Moderate activities	
	Lift, carry groceries	
	Climb several flights	
	Climb one flight	
	Bend, kneel	
	Walk mile	
	Walk several blocks	
	Walk one block	
	Bathe, dress	
Role-physical (RP)	Cutdown time	
	Accomplished less	
	Limited in kind	
	Had difficulty	
Bodily pain (BP)	Pain-magnitude	
	Pain-interfere	
General health (GH)	EVGFP rating	
	Sick easier	
	As healthy	
	Health to get worse	
Vitality (VT)	Pep/life	Mental Component Summary (MCS)
	Energy	
	Worn out	
	Tired	
Social functioning (SF)	Social extent	
	Social time	
Role emotional (RE)	Cutdown time	
	Accomplished less	
	Not careful	
Mental health (MH)	Nervous	
	Down in dumps	
	Peaceful	
	Blue/sad	
	Happy	

<sup>a</sup>SF-12 items in grey

depression, loss of behavioural/emotional control and psychological well-being. The VT index measures the level of energy and fatigue.

Both the summary measures (PCS-12 and MCS-12) and the dimension-specific scores (MH and VT) vary between 0 and 100. They are built so that higher values stand for a better perception of health. In particular, for PCS-12, extremely low levels of the mean score (approximately below 20) correspond to “substantial limitation in self-care, physical, social, and role activities, severe bodily pain, or frequent fatigue”. High PCS-12 scores, instead, indicate no physical limitations,

disabilities or decreases in well-being, as well as a high energy level. Low MCS-12 scores suggest “frequent psychological distress and substantial social and role disabilities due to emotional problems”, while high MCS-12 scores suggest absence of both psychological distress and limitations in usual social role activities due to emotional problems (Ware et al. 1998).

Considering the specific mental health measures, low MH scores correspond to feeling nervous and depressed all of the time, while high MH scores indicate feeling peaceful, happy and calm all of the time. Low VT scores suggest feeling tired and worn out all of the time, and in the other hand, high VT scores indicate feeling full of life and energy all of the time (Ware et al. 1994).

## 4 Assessing Geographic and Social Inequalities in Health Using HRQoL Measures

In spite of the large improvements in the average level of health in the EU over the last decades, with an increasing life expectancy, differences in health among people living in different geographic areas and between the most advantaged and most disadvantaged sections of the population remain substantial and in some instances have increased.

Also in Italy, where life expectancy has reached extremely high levels (84.1 years among women and 78.9 among men in 2009), the prevalence of ill health is greater among the population from disadvantaged social classes and from the south of the country (Costa et al. 2009).

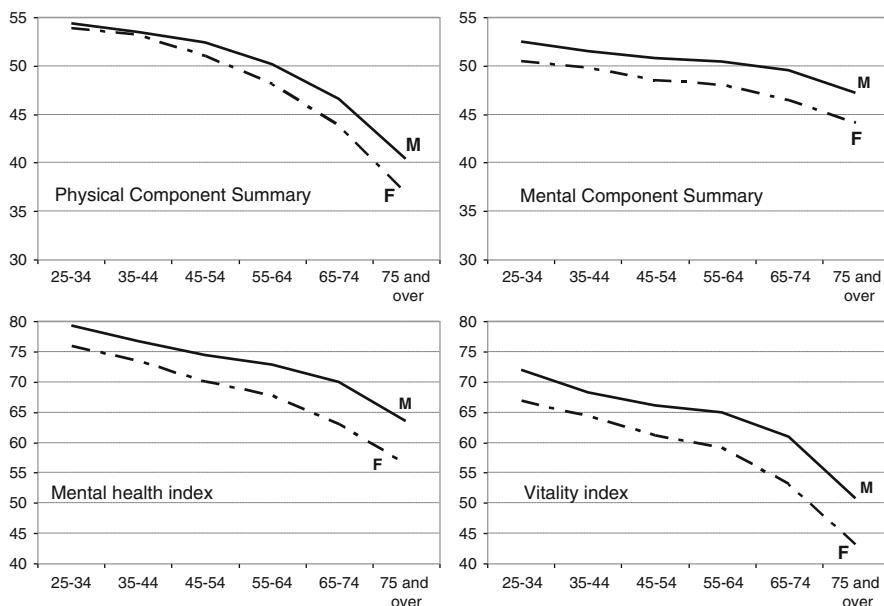
Reduction in health inequalities is an important policy target in the agenda of the European Commission (European Commission 2009), representing a key action of the EU Health Strategy (2008–2013).

The information collected through the Italian HIS at individual level was used to build health profiles and study them by geographic area and socioeconomic status. The highest educational level attained was used as a synthetic indicator of social status at individual level (Costa et al. 2009).

Not taking into account the “ecologic” variables, which are included in some studies in the attempt to explain health diversities (Woods et al. 2005; Basegana et al. 2004; Diez Roux et al. 2003), social determinants represent, aside from biological factors such as age, the main factors having an impact on health inequalities.

Using summary measures PCS-12, MCS-12, MH and VT to measure health-related quality of life among the adult population (aged 25 years and over), we carried out a first descriptive analysis to see how these measures vary according to age, gender and geographic area.

The mean score for PCS-12 and MCS-12 is respectively 49.6 and 49.4 among the adult population. Physical and mental health gets worse with age, with a particularly steep gradient for the physical component. Women have a poorer physical and mental health than men at all ages, and the gender gap increases with age. This, for the physical component, is also due to the higher female longevity, which involves a higher mean age among older women comparing to older men, and therefore a higher prevalence of non-fatal chronic diseases and disabilities among older women.



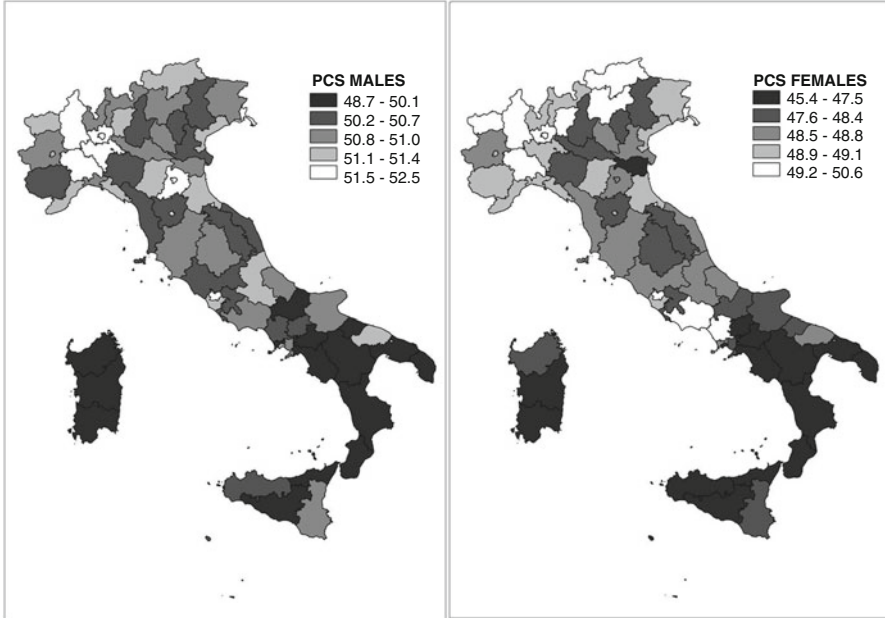
**Graph 15.1** HRQoL measures by age and gender

If we focus on the more specific mental health indexes (MH and VT), the mean score is 71.1 for MH and 62.0 for VT. The age and gender patterns are similar to those described for the physical and mental components, with a stronger decrease with age for the Vitality Index and a wider gender gap among those aged 75 and over (Graph 15.1).

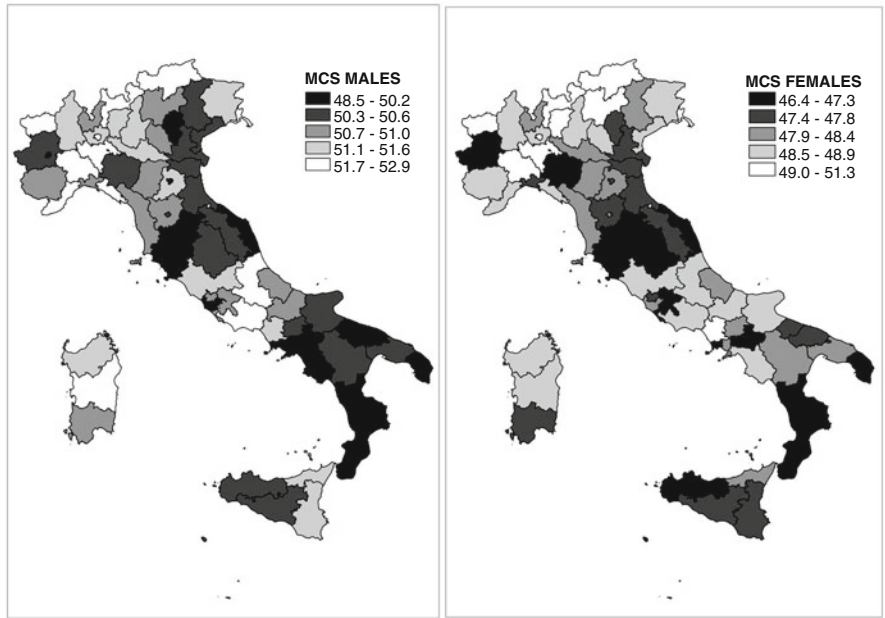
Although women refer consistently poorer physical health conditions than men, the geographic pattern is similar for both genders, with lowest mean scores of PCS-12 in some areas of the south and in the islands. The analysis of the variation of HRQoL measures by geographical areas took advantage of the innovations introduced in the 2005 Italian HIS, for which it was possible, for the first time, to produce estimates by subregional areas, built by aggregating Local Health Authorities. The HRQoL scores are represented by subregional areas grouped according to the quintiles of each distribution (Graphs 15.2, 15.3, 15.4 and 15.5).

People living in the centre and in the north of Italy are generally in better physical health, and the areas around the border between Piedmont and Lombardy (PIE\_4, PIE\_5, LOM\_1, LOM\_2, LOM\_7) have a PCS-12 mean score which falls in the highest quintile of the distribution both for men and women, meaning better physical health conditions (lightest colour in the maps in Graph 15.2).

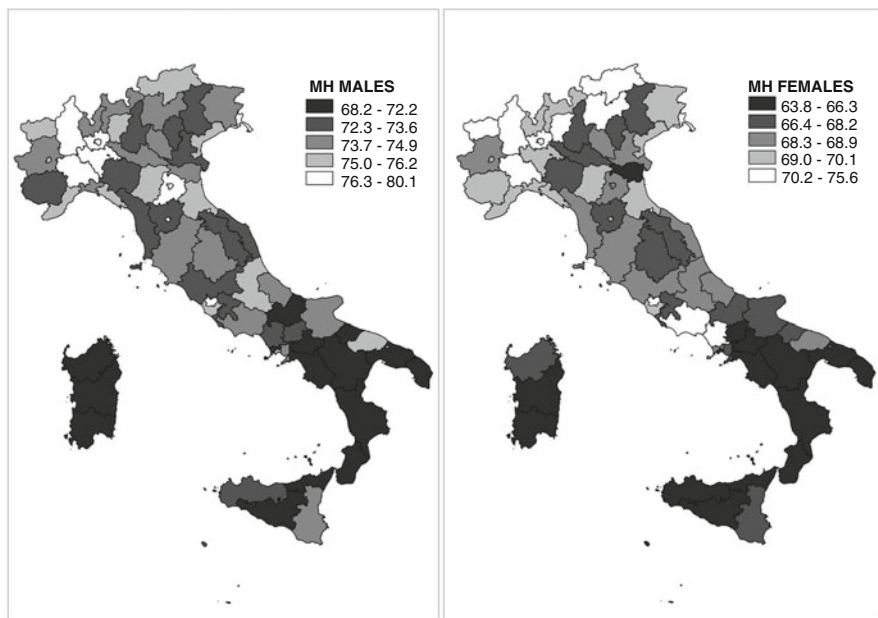
The MCS-12 measure shows a less clear geographic pattern, with low mean scores (meaning a higher level of psychological distress) in some areas of the centre (Umbria, Marche and southern Tuscany), of the south (some areas of Calabria and Puglia) and, among women, in some areas of the north (parts of Veneto, Emilia Romagna and Piedmont) (Graph 15.3).



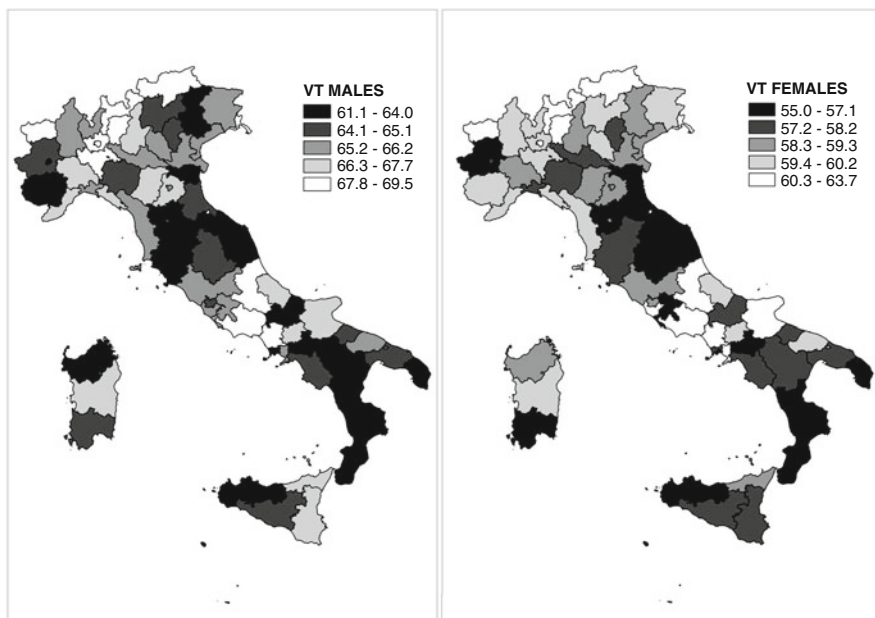
**Graph 15.2** Physical Component Summary measure (*PCS-12*) by gender and subregional areas – age standardised mean scores



**Graph 15.3** Mental Component Summary measure (*MCS-12*) by gender and subregional areas – age standardised mean scores



**Graph 15.4** Mental Health Index (*MH*) by gender and subregional areas – age standardised mean scores



**Graph 15.5** Vitality Index (*VT*) by gender and subregional areas – age standardised mean scores



A similar geographic pattern to the one described for MCS-12 is found for the specific indexes of mental health (MH and VT) (Graphs 15.4 and 15.5).

However, to be able to better understand these geographical variations, it is essential to take into account, as pointed out in literature (Costa and Spadea 2004), the interactions of the territorial context with the individual social disadvantage and its effects on health.

Multiple logistic regression was used to study the association between the four HRQoL indexes considered and geographic and socioeconomic variables.

The indexes were dichotomised using the first quintile of each distribution of mean scores.

The geographic variable was grouped, according to the NUTS-1 classification, into five areas: north-west, north-east, centre, south and islands. The socioeconomic status was measured by the level of education, classified into three categories according to ISCED classification: primary or lower secondary (low), upper secondary (medium) and tertiary education (high).

The models were all controlled by gender, age group (25–44, 45–64, 65–74, 75 and over) and an indicator of objective health (based on the presence of disability, comorbidity or presence of at least one severe chronic disease).

First, we modelled the probability of being below the first quintile of the distribution of the Physical Component Summary mean score (PCS-12), that is, the probability of being in poor physical health. The relationship with the geographic variable and socioeconomic status was analysed.

Comparing to the north-west, the risk of being in poor physical health is higher in all other geographical areas, with the highest odds ratios (ORs) in the south and in the islands. The relationship with the level of education is even stronger, with increasing ORs when the level of education decreases: the risk of being in poor physical health is more than double among the adult population in the lowest educational group, comparing to the most educated one.

When looking at the interaction between geographic area and level of education, we found that socioeconomic differences in health are statistically significant in all geographic areas; however, they are stronger in the regions of the centre and south of Italy. In the south, the least educated adult population has nearly three times the risk of being in poor health comparing to the most educated population living in the same area. The analysis of interactions showed also that the north–south divide in physical health remains evident only among the least educated group of population, where the risk of being in poor physical health is approximately one and a half as much for the population living in the south and in the island, comparing to those living in the north-west.

When considering the MCS-12 scores as outcome variable in the logistic regression model (dichotomised using the first quintile of the distribution), we found that, after controlling for gender, age and objective health, the geographic and socioeconomic differences observed for physical health remain, but they are weaker. Socioeconomic differences are stronger in the south and in the islands, where the risk of being in poor mental health is nearly double among the population with low education comparing to those with high education. In this case, geographic differences are not strong in any educational group (Tables 15.2 and 15.3).

**Table 15.2** Logistic regression models: odds ratios for Physical Component Summary (PCS-12) and Mental Component Summary (MCS-12) mean scores

		PCS-12	MCS-12
NUTS1 areas	North-west	1	1
	North-east	1.13 (1.07–1.20)	1.03 (0.98–1.08)
	Centre	1.14 (1.08–1.21)	1.11 (1.06–1.17)
	South	1.38 (1.31–1.46)	1.11 (1.06–1.16)
	Islands	1.50 (1.40–1.60)	1.07 (1.01–1.14)
Level of education	High	1	1
	Medium	1.33 (1.21–1.45)	1.14 (1.06–1.22)
	Low	2.08 (1.92–2.26)	1.35 (1.27–1.44)
Presence of disability/comorbidity/ severe chronic disease	No	1	1
	Yes	6.28 (6.03–6.54)	3.69 (3.55–3.83)
Age group	25–44	1	1
	45–64	1.60 (1.51–1.68)	1.06 (1.01–1.10)
	65–74	2.63 (2.47–2.79)	1.04 (0.99–1.10)
	75+	6.19 (5.81–6.59)	1.34 (1.27–1.42)
Gender	Men	1	1
	Women	1.51 (1.45–1.57)	1.70 (1.64–1.75)

**Table 15.3** Logistic regression models: interactions for Physical Component Summary (PCS-12) and Mental Component Summary (MCS-12) mean scores

	PCS-12	MCS-12
Interactions		
North-west*education (medium vs. high)	1.28 (1.08–1.52)	1.24 (1.09–1.41)
North-west*education (low vs. high)	1.90 (1.62–2.22)	1.34 (1.19–1.52)
North-east*education (medium vs. high)	1.15 (0.95–1.38)	1.16 (1.00–1.34)
North-east*education (low vs. high)	1.52 (1.28–1.81)	1.16 (1.01–1.33)
Centre*education (medium vs. high)	1.30 (1.08–1.57)	0.95 (0.83–1.09)
Centre*education (low vs. high)	2.12 (1.78–2.51)	1.18 (1.04–1.34)
South*education (medium vs. high)	1.56 (1.27–1.91)	1.09 (0.94–1.27)
South*education (low vs. high)	2.86 (2.37–3.45)	1.55 (1.35–1.78)
Islands*education (medium vs. high)	1.49 (1.14–1.95)	1.51 (1.20–1.91)
Islands*education (low vs. high)	2.43 (1.90–3.11)	1.92 (1.55–2.38)
High-education*area (north-east vs. north-west)	1.36 (1.08–1.70)	1.15 (0.97–1.37)
High-education*area (centre vs. north-west)	1.05 (0.84–1.32)	1.29 (1.10–1.52)
High-education*area (south vs. north-west)	0.97 (0.77–1.24)	1.03 (0.87–1.23)
High-education*area (islands vs. north-west)	1.20 (0.91–1.60)	0.80 (0.63–1.01)
Medium-education*area (north-east vs. north-west)	1.21 (1.07–1.37)	1.08 (0.98–1.18)
Medium-education*area (centre vs. north-west)	1.07 (0.94–1.21)	1.00 (0.91–1.10)
Medium-education*area (south vs. north-west)	1.18 (1.04–1.34)	0.91 (0.82–1.00)
Medium-education*area (islands vs. north-west)	1.40 (1.21–1.63)	0.98 (0.86–1.10)
Low-education*area (north-east vs. north-west)	1.09 (1.02–1.17)	1.00 (0.94–1.06)
Low-education*area (centre vs. north-west)	1.17 (1.10–1.26)	1.14 (1.07–1.21)
Low-education*area (south vs. north-west)	1.47 (1.38–1.56)	1.19 (1.12–1.26)
Low-education*area (islands vs. north-west)	1.55 (1.43–1.67)	1.14 (1.06–1.22)

**Table 15.4** Logistic regression models: odds ratios for Mental Health (MH) and Vitality (VT) mean scores

		MH	VT
NUTS1 areas	North-west	1	1
	North-east	1.01 (0.96–1.07)	1.04 (0.98–1.10)
	Centre	1.21 (1.15–1.28)	1.16 (1.10–1.23)
	South	1.24 (1.18–1.30)	1.17 (1.11–1.23)
	Islands	1.24 (1.16–1.32)	1.23 (1.15–1.32)
Level of education	High	1	1
	Medium	1.36 (1.25–1.47)	1.31 (1.20–1.43)
	Low	2.02 (1.87–2.18)	1.90 (1.75–2.06)
Presence of disability/comorbidity/ severe chronic disease	No	1	1
	Yes	4.05 (3.89–4.22)	4.91 (4.70–5.12)
Age group	25–44	1	1
	45–64	1.28 (1.22–1.34)	1.09 (1.03–1.15)
	65–74	1.36 (1.28–1.44)	1.26 (1.19–1.35)
	75+	1.87 (1.76–1.98)	2.38 (2.23–2.53)
Gender	Men	1	1
	Women	1.66 (1.60–1.72)	1.77 (1.70–1.84)

When looking at the association between the mental health-specific indexes (MH and VT) and geographic and socioeconomic variables, we found similar results, with slightly stronger socioeconomic differences in the south and in the islands and, mainly for VT, a more marked north–south divide among the less educated group of the population (Tables 15.4 and 15.5).

## 5 Conclusions

The experience presented can provide a stimulus for reflection on the importance of subjective indicators in assessing health-related quality of life, as part of the wider debate on the measurement of welfare, which is developing in Europe in recent years.

Indeed, the inclusion of well-established instruments to measure HRQoL in the Italian HIS questionnaire, in addition to the changes introduced in the sample design to consider the reorganised Italian National Health System which requires subregional estimates, allows Official Statistics to be able to better understand and explore subregional specificities in health. This provided insights in the study of health inequalities, also considering geographic differences.

The analysis of these indicators, properly integrated with other epidemiological indicators that refer to the traditional measures of mortality and morbidity of the population and from other information flows, allowed the information potential for the design of national and local health and social policies to be enriched.

In a broader perspective, Istat is also working hard towards the definition of indicators allowing to “go beyond GDP”, taking into account the discussion in

**Table 15.5** Logistic regression models: interactions for Mental Health (MH) and Vitality (VT) mean scores

	MH	VT
	Interactions	
North-west*education (medium vs. high)	1.49 (1.26–1.75)	1.34 (1.13–1.58)
North-west*education (low vs. high)	2.08 (1.79–2.42)	1.75 (1.50–2.05)
North-east*education (medium vs. high)	1.29 (1.07–1.55)	1.17 (0.97–1.41)
North-east*education (low vs. high)	1.79 (1.51–2.12)	1.49 (1.25–1.77)
Centre*education (medium vs. high)	1.36 (1.15–1.60)	1.45 (1.20–1.74)
Centre*education (low vs. high)	2.07 (1.77–2.41)	2.13 (1.80–2.53)
South*education (medium vs. high)	1.21 (1.02–1.43)	1.22 (1.00–1.48)
South*education (low vs. high)	1.94 (1.66–2.26)	2.07 (1.74–2.48)
Islands*education (medium vs. high)	1.55 (1.19–2.01)	1.42 (1.07–1.89)
Islands*education (low vs. high)	2.39 (1.88–3.04)	2.42 (1.87–3.14)
High-education*area (north-east vs. north-west)	1.16 (0.93–1.44)	1.20 (0.96–1.50)
High-education*area (centre vs. north-west)	1.24 (1.01–1.53)	0.99 (0.79–1.23)
High-education*area (south vs. north-west)	1.36 (1.11–1.68)	1.05 (0.83–1.31)
High-education*area (islands vs. north-west)	1.11 (0.84–1.46)	0.96 (0.71–1.28)
Medium-education*area (north-east vs. north-west)	1.01 (0.90–1.13)	1.05 (0.93–1.19)
Medium-education*area (centre vs. north-west)	1.14 (1.02–1.27)	1.07 (0.95–1.20)
Medium-education*area (south vs. north-west)	1.11 (0.99–1.24)	0.95 (0.84–1.08)
Medium-education*area (islands vs. north-west)	1.15 (1.00–1.33)	1.02 (0.87–1.18)
Low-education*area (north-east vs. north-west)	1.00 (0.94–1.06)	1.03 (0.96–1.10)
Low-education*area (centre vs. north-west)	1.24 (1.16–1.32)	1.21 (1.13–1.29)
Low-education*area (south vs. north-west)	1.27 (1.20–1.34)	1.24 (1.17–1.32)
Low-education*area (islands vs. north-west)	1.27 (1.19–1.37)	1.32 (1.22–1.43)

Europe, launched by OECD. The current crisis has in fact made the debate on how to measure the progress of societies or the well-being of people and the environment even more relevant because it has identified the limitations of current paradigms for evaluating reality and guiding policy formulation. Health is one of the important domains that will contribute to the measurement of fair and sustainable well-being of societies.

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# Chapter 16

## Individual and Family Quality of Life in Intellectual Disability: A Challenging Relationship

Marco Bertelli, Annamaria Bianco, Daniela Scuticchio, and Ivan Brown

### 1 Introduction

Outcome measures for health and rehabilitation interventions have typically been based, to date, on a traditional medical approach. This approach aims to restore individuals to their ‘normal’ morphological and functional state. Since attaining ‘normal’ functioning for people with intellectual disabilities (ID) is conceptually inconsistent, outcome measures for therapeutic interventions based on the medical model for this population have often been uncertain, symptomatic, restraining or turned into basic care (Bertelli and Brown 2006). Still, the main problems identified today by family members of people with ID concern the quality of care based on this model (Mactavish et al. 2007).

In the two main international diagnostic manuals—the DSM-IV-TR (American Psychiatric Association 2000) and the ICD-10 (World Health Organization 1993)—the principal diagnostic criterion for mental retardation (MR) is a significantly below-average intelligent quotient (IQ) or a score under 70, or lower cognitive functioning (criterion A). The second criterion is concomitant deficits or adaptive

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functioning compromises in at least two of the following areas: communication, self-care, family life, social and interpersonal skills, use of community resources, auto-determination, education functioning abilities, work, leisure time, health and safety (criterion B). Such deficits must occur before the age of 18 (criterion C). MR has many different etymologies, but can be seen overall as the outcome of various pathological processes that act on the structure and functioning of some central nervous system areas.

The term 'mental retardation' has, in recent years, been systematically replaced, in both the scientific and service communities and in general cultures around the world, by the term 'intellectual disability' (Salvador-Carulla and Bertelli 2008). In 2007, the American Association on Mental Retardation formally changed its name to the American Association on Intellectual and Developmental Disabilities. The Section of the World Psychiatric Association of Intellectual Disability (WPA-SPID), as well as the working team for the new ICD-11 classification (International Classification of Diseases-11th edition) for Mental Retardation, has suggested a new category, 'intellectual developmental disorders'. The prevalence of ID is estimated to be between 1% and 2.5% (number of cases within the general population), and its incidence (number of new cases in 1 year) is around 1.8% (WHO 2007).

There is a strong need for mental health interventions for people with ID. For adults, psychiatric and related emotional problems are very much overrepresented when compared to adults in the general population. Studies vary, but estimate range from 10% to 39% of people with ID with such problems (Bouras and Drummond 1992; Costello and Bouras 2006; Deb et al. 2001). Organic (or somatic) disorders are more frequent in people with ID than among those in the general population. The causes can be traced in a greater vulnerability, which in turn is linked to a long list of factors such as insufficient sanitation, hygiene problems, congenital morpho-functional alterations and behavioural disorders. For the same reasons, there is a greater sensitivity to side effects of drugs and other therapeutic interventions. Like most nondisabled people, individuals with ID may present with emotional, behavioural, interpersonal or adaptability problems—which do not always constitute real psychiatric disorders—and they can benefit from a specialist's intervention.

In the ID field, where it is not possible to think about healing as restoring functional capacities to levels that are similar to those of the majority of people, the main focus of a therapeutic intervention that has emerged over the last two decades is improving quality of life (QoL). A QoL approach constitutes a positive alternative to the traditional medical one. It surpasses the criteria of normality and morpho-functional integrity, suggesting instead value in a treatment based on the person in his/her own physical and social complexity and not simply on the disorder symptoms affecting him or her.

QoL has gradually gained both interest and importance among the new patient-oriented outcome measures in research and clinical practice in the disability research area (Bertelli and Brown 2006; Schalock 2005; Verdugo et al. 2005). At present, QoL has evolved into an important and valuable endpoint of several clinical trials. Nevertheless, the majority of published studies concerning QoL relate to health-related QoL. Conceptually, health-related QoL differs quite markedly from general QoL, or

as it was called by Brown and Brown (2003) whole-person QoL. Health-related QoL, by its very nature, is closely associated with symptomatic and dysfunctional aspects (e.g. arthritis, cancer), aiming to repurpose a morphological and functional model of normality (De Girolamo et al. 2001). General QoL assesses the subjective perception of quality in the context of the individual's own body, environment and culture with respect to all the areas of his/her life that constitute importance and value—independent of the presence of particular pathologies or existential conditions. Thus, general QoL can be described as a line of ability development with respect to life.

At present, the majority of authors conceptualizing general QoL claim that there are common areas of life that are important and of value to all people, such as social relationships, material well-being, community and cultural belonging and others. It is the relationship between individual perception of the importance given to these aspects of life and individual perception of satisfaction with them that constitutes the most complete and effective way to evaluate QoL (Becker et al. 1993; Emerson et al. 2004). QoL assessment must therefore aim to detect in each person the hierarchy of areas of life that are actually or potentially considered to be important. By helping to enhance satisfaction in these areas of life, general satisfaction towards life will be increased.

It is acknowledged that this way of looking at QoL is fully relevant to the lives of all people, not just those with ID (Brown and Brown 2003). Thus, a natural extension of QoL study for people with ID is to study the QoL of individual family members, particularly parents and siblings (see, e.g. Turnbull et al. 2004). Such study raises important questions about the interrelationships among family members and the role family members play in supporting people with ID. A QoL approach is also useful to understand the impact a person with ID has on his/her family members' QoL. Since about 1990, the scientific literature on individuals with ID has increased very considerably. Only since 2003 has the QoL of families emerged as an important and growing area of research (Brown et al. 2003; Turnbull et al. 2007; Summers et al. 2005).

Families that have a member with ID constitute a unique system within communities. How any one part of that system functions affects how all other parts function. For this reason, both assessment and interventions addressed to people with ID also affect members of their families, and this needs to be taken into account. Conversely, family members can learn to function among themselves in new and better ways, and this itself can be an intervention that can be effective in improving the life of the family member with ID. Seltzer and Krauss (2001) also drew attention to the fundamental role played by families in the well-being of people with ID and on the considerable impact they may have on the QoL of their children. To date, however, the relationship between individuals' QoL and that of their families as a whole has been theoretical and has not yet been directly supported by empirical data.

Some authors have, however, taken into consideration some aspects of the lives of individuals with ID that have a direct or indirect impact on some specific areas of the family's QoL (McIntyre et al. 2004; Summers et al. 2005; Turnbull et al. 2007). The level of disability seems to be an important predictor of family's QoL



(Smith et al. 1993; Wang et al. 2004). The influence that children's characteristics have on decisions that concern their mothers' career choices has been examined (Todd et al. 2004). Booth and Kelly (1999) also found that the type and severity of children's disability influences mothers' decisions about work and careers. Further, a significant and complex relationship was found between childhood behaviour problems, the mothers' interest in work and stress felt from parenting (Olson and DiBrigida 1994). The transition from adolescence to adulthood may have a very strong impact on youth with ID and their families (Ferguson et al. 1988). McIntyre et al. (2004) stressed how behavioural changes of such youth, changes in daily routines and the state of health have an influence on the QoL of parents and on how they perceive or report their children's QoL.

At the core of most studies on the QoL of families is the goal of ensuring that they have available opportunities and resources, and that they feel supported in their efforts. However, it is also fundamental to respond to other needs beyond those offered by traditional service systems that many families have (Brown and Brown 2003). This can be done by detecting and responding to the interests that might add or maintain value to, and satisfaction with, their lives.

In Italy, there has been a strong ideological debate over the past few decades, as has been in case in most countries around the world, around the concept of deinstitutionalization in the mental health field. This debate has promoted the concepts, and the politics, of social inclusion and community living based on a person-centred model of support, concepts that are very much in keeping with a QoL approach.

At the present time in Italy, however, there are still many serious limitations and gaps in services for people with ID. Services that are available are heterogeneous, varying from one region to another with greater resources in the North area. Financial support is limited and, because of this, there is a high burden of responsibility on families. In addition, physical and mental health needs are not addressed satisfactorily and often are not even identified or properly assessed. There are no university programmes that currently offer specific training or education about issues related to the people with ID, and in-depth study or professional specialization is prompted only by goodwill or personal interest.

Families that have members with ID are often left aside, and their needs for help and support are only partly satisfied. One response by families to this situation has been to establish and support numerous nonprofit national organizations for the most common syndromes (e.g. Down syndrome, autism, Fragile X syndrome, Prader-Willi syndrome). However, there is no overall professional or family organization for the ID field. Moreover, the general cultural and scientific attitudes towards ID are, unfortunately, outdated by international standards today, even among health authorities who interact with the people with ID. A shared national body of research on ID is still far from being realized.

There has been some movement forward in Italy in recent years, however. SIRM (Società Italiana per lo studio del Ritardo Mentale) has been conducting an increasing amount of research and a growing number of courses and other training activities. In doing so, QoL as a theoretical framework is playing an important role in developing new and innovative approaches and interventions. This work is supported by recent

developments in conceptualizing the life experience of disability and by an emphasis on human rights such as the United Nations Convention on the Rights of Persons with Disabilities (United Nations 2006). A new interest appears to be developing towards the social inclusion and individual care needs people with ID. A new politic has been taking shape, aimed at the creation of an integrated system of rehabilitative, basic care and social services. Its aim is to develop individualized supports for the people with ID and their families. Although there is growing concern about the QoL of the person and that of his/her family, and an acknowledgment of their deep interrelationship, we do not have data available to draw any conclusions about their mutual influence.

In light of these considerations, this chapter aims to study the QoL of people with ID and that of members of their families in a more structured way, and to evaluate the possible relationship between family and individual QoL scores. We postulated that examining the relation between the specific domains of family and individual QoL could help us better understand the possible reciprocal influences and impact.

## 2 Method

Sixty-five parents or relatives of 65 people with ID were consecutively recruited from new users of five different residential facilities throughout Italy to be administered respectively with the SIQF to assess family QoL and the Italian translation of the *Quality of Life Instrument Package* (Brown et al. 1998) to assess individual quality of life.

The *Family Quality of Life Survey-2006* (FQOL) (Brown et al. 2006a) was translated and adapted to Italian by three independent translators (two psychologists and one psychiatrist), all experienced users of generic QoL assessment tools. The Italian instrument was named *Strumento d'Indagine della Qualità di vita della Famiglia* (SIQF). The guiding principle for the translation process was the equivalence with the original meaning of the items. Repeated tests for comprehension were carried out with a sample of ten family members of various cultural backgrounds and, as a result, some adjustments were made over three versions to optimize understanding. SIQF was submitted to the authors of the English version for approval and posting on the website of the International Family Quality of Life Project (<http://www.surreyplace.on.ca/Education-and-Research/research-and-evaluation/Pages/International-Family-Quality-of-LifeProject.aspx>).

The *Family Quality of Life Survey-2006* assessed nine family life domains: Health of the Family, Family Finances, Family Relationships, Support from Others, Support from Disability-Related Services, Influence of Values, Careers and Preparing for Careers, Leisure and Community Interaction. Within each domain, six dimensions are assessed by one item each: Importance, Attainment, Satisfaction, Opportunities, Initiative and Stability. Examples of some of the items are 'How important is your family's health to your family's QoL?' and 'All things considered, how satisfied are you with the relationships within your family?'

The Italian translation of the *Quality of Life Instrument Package* was named *BASIQ (Batteria di Strumenti per l'Indagine della Qualità di vita)* (Bertelli et al. 2011b). The *Quality of Life Instrument Package* is composed of 54 items organized in three main areas (Being, Belonging and Becoming) and nine sub-areas of life: Physical Being, Psychological Being and Spiritual Being; Physical Belonging, Social Belonging and Community Belonging; and Practical Becoming, Leisure Becoming and Growth Becoming. Each of these nine areas of life has a scale of six items that have been tested to be reliable indicators. For each item, four measurement dimensions are assessed: Importance, Satisfaction, Control and Opportunities. Overall, QoL scores are calculated by weighting Satisfaction scores by Importance scores. Control and Opportunities scores are considered to be modifying or explanatory measures.

This approach to QoL-IP and FQOL is distinctly founded on Becker's model of importance/satisfaction of QoL (Becker et al. 1993). Authors assert that it is possible to define areas of human life applicable to anybody's life and the relationship between the individual perception of the importance to each area of life and the individual perception of the satisfaction with the same area constitutes the most complete and most useful way to evaluate QoL. A thing that is valued highly and gives high satisfaction is a source of quality in a person's life, but a thing that does not interest a person or is not valued will never add satisfaction or quality to the person's life (Bertelli and Brown 2006; Brown and Brown 2003).

The package contains an instrument for recording QoL data for people with ID who are capable of articulating their own ideas, and a companion instrument with the same items to be completed by other persons who know the person with ID well. This latter instrument is used if those with ID cannot express their own ideas and, because there is some debate in the literature about the validity of proxy measures for people with ID, multiple (at least two) proxy measures were taken from front-line staff members (nurse, educator or assistant) for each person who did not have sufficient verbal skills to participate. This instrument is also valuable as a second perspective for those who can express their own ideas, especially since the person who knows the person with ID best has often a strong influence in making both daily living and larger life decisions. These instruments have been tested on a variety of samples of people with ID and are used as an outcome measure in various services for individuals with ID across Italy (Bertelli et al. 2009).

The interviews were conducted by four female psychologists, one male psychiatrist and two female psychiatric nurses, all experienced in the assessment of ID and previously trained on the use of the instruments. All the interviewers followed the standard instructions for administration contained in the instruments. Inter-rater reliability (Cohen's K coefficient) was calculated for the various instruments and was .7 or higher in all cases. Each participant (or legal representatives) gave their written informed consent before beginning the study, and confidentiality of the data was guaranteed by storing data securely in a locked cabinet. Protection of privacy was assured by not using names or any other identifying information on the written material.

QoL data were entered and analysed using Statistical Package for the Social Sciences (SPSS 16.0 version), and additional variables were constructed for the analysis (Bertelli et al. 2011a). For simplicity in reporting, understanding and using the QoL scores, correlation coefficients were calculated between individual main areas (Being, Belonging, Becoming) and all family domains for the Importance, Satisfaction and Opportunities mean ratings.

### 3 Results

#### 3.1 Participant Characteristics

Demographic characteristics of the sample are shown in Tables 16.1 and 16.2.

The 65 participants (parents or relatives) who took part in the study included 42 mothers, 17 fathers and 6 siblings. Their mean age was 62.2 years, ranging from 18 to 81 years. Six families included more than one person with ID. Twelve families had a single parent, 21 had two parents, and in 32 cases, the family structure included at least one parent, siblings, grandparents or uncles (see Table 16.1).

The individuals with ID were 41 males and 24 females, and their mean age was 37 (range 19–63). Twenty-five of the participants lived in a residential facility, and the other two lived with their families. For 34 participants, the cause of ID was unknown. Specific causes for the remainder of the sample are outlined in Table 16.2. The mean level of support required was 3.07 (SD = 1.09), measured on a Likert-type 1–5 scale, where 1 meant support was needed for all aspects of life and 5 meant support was needed for very few aspects of life.

**Table 16.1** Family characteristics

<i>Gender of respondent</i>	
Mother	64.6% (n = 42)
Father	26.1% (n = 17)
Sibling	9.2% (n = 6)
<i>Mean age of respondent (years)</i>	62.2
<i>Age range (min-max)</i>	18–81
<i>Health problem</i>	52.3% (n = 34)
<i>Family structure (n = 65)</i>	
One parent	12
Two parents	21
Other	32
<i>Families with &gt;1 person with a disability</i>	9.2% (n = 6)

**Table 16.2** Characteristics of the person with a disability

<i>Gender</i>	
Male	63.07% ( <i>n</i> = 41)
Female	36.9% ( <i>n</i> = 24)
<i>Age in years</i>	
Mean	37
Age range (min-max)	19–63
<i>Type of disability</i>	
ID, type unknown	34
Autism/PDD	11
Down syndrome	8
Down syndrome + PDD	2
Perinatal trauma	6
Williams syndrome	3
Prader-Willi syndrome	1
Mean level of support required (scale: 1–5, 5 high)	3.07 (SD 1.09)

#### 4 Description of the Domains and Dimensions of SIQF

QoL scores of the nine SIQF domains are shown in Fig. 16.1. As seen, the highest means were those of Family Relationships (4.65) and Health of the Family (2.58) and the lowest was Support from Others (−0.58).

The overall means of the six measurement dimensions of family QoL are shown in Fig. 16.2. As the figure illustrates, Importance was rated the highest, while Opportunities and Stability were rated the lowest.

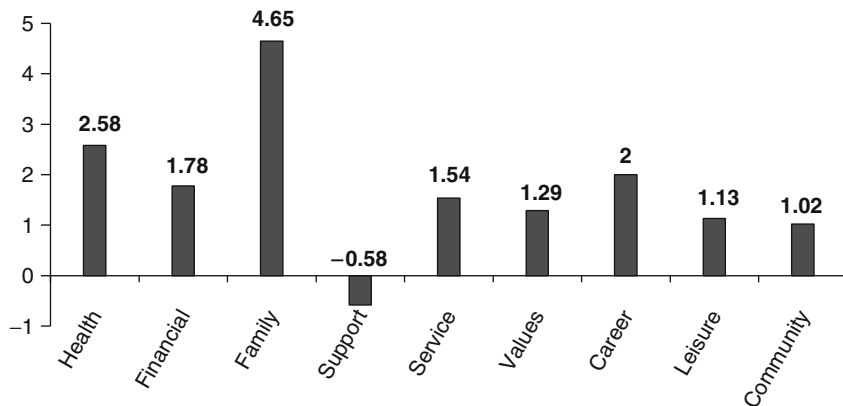
Table 16.3 summarizes the means and standard deviations for each of the six dimensions across the nine life domains.

Importance had the highest ratings overall, and these ratings were particularly high for Health, Support from Services and Family Relationships. However, they were notably lower for Support from Others. Opportunities scores were rated lowest overall, where no single domain was rated higher than 3.39. Support from Others, Finances of the Family and Support from Service were rated particularly low in this dimension.

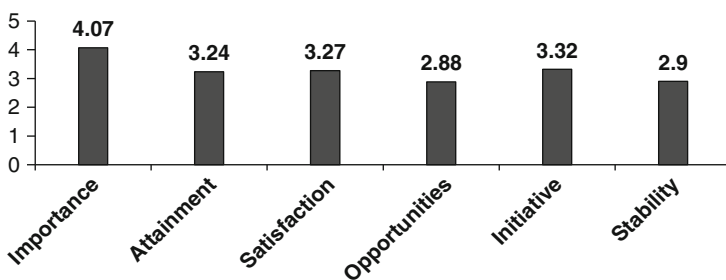
Initiative scores were higher in Family Relationships, while in Support from Others, Leisure and Community Interaction, they were lower.

Attainment scores also varied, with Family Relationships scoring highest and Support from Service, Community Interaction and Support from Others scoring lowest. The latter is the lowest score among all means.

In terms of Stability, which measures whether the participant perceives that things will improve or decline in the future, Support from Service was rated low and Family Relationship higher. The Satisfaction scores were more evenly distributed across the nine domains, but were low enough.



**Fig. 16.1** QoL (importance/satisfaction) scores for nine domains of SIQF. QoL score ranges from -10 to 10



**Fig. 16.2** Means of six measurement dimensions for SIQF. Dimensions score ranges from 1 to 5

**Table 16.3** Mean scores and standard deviations for six dimensions of nine domains of family quality of life

Domains	Dimensions of family quality of life					
	Importance	Opportunities	Initiative	Attainment	Stability	Satisfaction
Health	4.87 (0.4)	3.21 (0.9)	3.39 (0.1)	3.41 (0.9)	2.78 (0.7)	3.42 (0.8)
Financial	3.98 (0.7)	2.34 (0.01)	3.26 (1.4)	3.35 (1.1)	2.92 (0.6)	3.42 (0.7)
Relationships	4.69 (0.6)	3.39 (1.3)	4.11 (0.7)	4.12 (0.8)	3.13 (0.6)	3.82 (0.9)
Support/others	3.24 (1.3)	2.13 (0.1)	2.65 (1.2)	2.12 (1)	2.89 (0.6)	2.79 (1.02)
Support/services	4.74 (0.7)	2.55 (1.03)	3.7 (1.2)	2.66 (1.1)	2.48 (0.9)	3.13 (1.06)
Values	4.21 (0.8)	3.37 (1.1)	3.52 (0.9)	3.83 (0.9)	3.02 (0.5)	3.26 (1.1)
Careers	3.78 (1.4)	2.94 (1.4)	3.21 (1.5)	3.41 (1.3)	3.02 (1.01)	3.33 (1.1)
Leisure	3.5 (1.05)	2.92 (1.04)	2.95 (1.1)	3.27 (0.9)	2.82 (0.6)	3.1 (0.9)
Community	3.68 (0.9)	3.13 (0.9)	3.09 (1.2)	2.98 (1.1)	3.09 (0.5)	3.21 (0.8)

## 5 Correlations Between Individual and Family Quality of Life

Some significant correlations were found between the three main areas of individual QoL (Being, Belonging, Becoming) and the nine family domains. Table 16.4 shows the highest correlation coefficients for the Importance, Satisfaction and Opportunities dimensions. Most of these correlations were in the areas of Family Health, Family Relationships and Support from Others, Career and Values areas. A wide number of correlations were found between Family Importance and Opportunities and Individual Satisfaction and Importance dimensions. It is noteworthy that almost all correlations noted in Table 16.4 were negative.

## 6 Discussion

### 6.1 Family Quality of Life

The present study examined the nine life domains and the six dimensions by using the SIQF. Results showed that some domains were rated higher or lower across different dimensions. For example, Support from Others was rated lowest across almost all dimensions and, in QoL score, the only one with a negative value. This finding is consistent with previous findings from a preliminary data of an Italian study (Bertelli et al. 2011a). It is possible that families that have members with disabilities do not feel comfortable asking for help or worry about becoming a burden

**Table 16.4** Highest correlation strength values between individual and family QoL areas

Family domains	Individual domains		
	Being	Belonging	Becoming
Health	-.440** i-i -.432** s-i	-.293* i-i	-.388** i-i
Financial	-.124s-o	-.170 o-o	.205s-s
Relationships	-.281* s-o -.384** o-i -.274* o-o	-.178 o-i	-.240 o-o
Support/others	-.253* i-o -.255* s-o	-.101 o-o	-.191 o-o
Support/service	.199 i-o	.244 i-s	.253s-s
Values	.144 i-o	.246* s-i	.168 i-i
Careers	-.311* o-i	-.178s-i	.214s-i
Leisure	-.273 i-i	-.273 o-i	-.228 o-i
Community	-.118 o-i	.175s-o	.268s-i

Correlation dimensions: from individual to family

\* $p < .05$ ; \*\* $p < .01$

*i* importance, *s* satisfaction, *o* opportunities

when doing so. Despite improvements, lack of support may be associated with a tendency to stigmatize or a feeling of discomfort in dealing directly with people who have disabilities (Brown et al. 2003, 2006b).

Health of the Family and Family Relationships were rated highest overall and also in QoL score. These domains are prominent in the lives of these families. This finding suggests that these two areas of life are particularly highly valued and, if positive, are resources to the family. The fact that Importance was rated higher than other dimensions while Stability was rated lower highlights a gap between the Importance of these family QoL domains and the degree to which things are expected to get better or worse. This underscores an important consideration in recognizing needs and delivering support for families.

Families interviewed perceived a low level of QoL across most measurement dimensions in the Community Interaction and Leisure domains except for Importance. Thus, although considered important, it appeared that Opportunities, Stability and Attainment in these domains were lacking. Especially in Leisure time, scores seem to highlight a cultural difficulty in considering one's own well-being as useful to the quality of support offered to relatives with disability. Often, families said that they do not have enough time to be involved in community.

The Values domain had the most uniform distribution of scores, which were moderate. For some families, spiritual and cultural beliefs are a source of inner strength—in fact, families interviewed attributed a high level of Importance in this domain.

Although Financial well-being QoL score was rated fairly good, Opportunities and Stability in this domain were rated low. Even if families feel satisfied with their financial situation, they feel unsure about future economic stability. This finding is cause for concern, considering that this could negatively impact on the resources available to cope with the needs of everyday living. This finding becomes more of a concern since Support from Services was also rated low in Opportunity and Stability. This seems to confirm the prevalent perception that public services for families with people who have ID (especially adult) are still scarce, insufficient and inadequate.

Regarding Career, QoL scores were rated fairly good. This finding seems to be related to the employment status of this sample. In fact, most of family members interviewed are elderly and have already retired or are at the end of their working careers.

## 7 Family and Individual QoL: Are They Related?

Investigating correlations between individual and family QoL scores revealed some significant findings. However, the specific nature of these relationships is not always easy to interpret and explain.

As Table 16.4 shows, the area of individual 'Being' has the highest number of significant correlations with family domains (Family Health, Relationship within



Family Members, Support from Others and Careers). The first of these correlations concerns Importance and Satisfaction attributed by individuals to the area of Being and Importance attributed by their family members towards health aspects of family life. These correlations are the strongest and are negative. An explanation for this might lie in the characteristics of the sample. Most parents were elderly and thus more exposed to health problems. It is possible that, by comparison, the Importance and Satisfaction with areas of life (Being, Belonging, Becoming) for the person with ID are considered to be less significant. For example, the Becoming area, which refers to the things you do in life to grow and develop, such as leisure activities, and learning new things, might not be sufficiently valued because they are considered by parents to be of lower importance than taking care of your own health.

Significant but negative correlations were also found between individual Being (Satisfaction and Opportunities) and Family Relationship (Opportunities and Importance) domains. This could indicate that when the family members attempt to provide more opportunities for individuals to develop their own area of being, the development of relationships within the family is negatively affected.

The individual Being area is significantly, but negatively, correlated with the Support from Others family domain. Not surprising, individual Being appears to be more important when family opportunities for support from others are fewer or less important when such opportunities are greater. It was somewhat surprising, however, to find that individual Satisfaction with Being follows the same pattern, although this might indicate that when there are opportunities for support from others satisfaction with one's own Being is not a priority and that the opposite is true if such opportunities are low. This area merits special attention because Support from Others was rated lowest of all the family QoL domains.

The area of individual Being significantly correlates, again negatively, with family Career. This might arise because many families of our sample had elderly parents who were already retired and who thus might have attributed less importance to the area of Careers. They might also have had more time to provide opportunities for the individual to develop his aspects of Being.

In the area of individual Belonging, in addition to correlations with Family Health discussed above, there was another interesting correlation between Satisfaction perceived for individuals and Importance attributed by family members' Values. This correlation is positive. This could mean that when spiritual, religious or cultural values and beliefs are important for the family, the individual has more possibility to develop satisfaction with social and community Belonging.

This data, even if preliminary, suggests some interesting linkages between some aspects of family and individual QoL. On the other hand, our study was limited in several aspects. First, there was a relatively small sample size. A larger sample would be more representative and would allow for additional analyses. Second, some missing data in the family and individual demographic characteristics limited the full understanding and interpretation of the relationships explored. The collection of additional data and an analysis of qualitative data are desirable for further deeper considerations.

## 8 Conclusions

Family QoL is emerging as an important field of research, even if still quite limited, especially if compared with the substantial literature investigating individual QoL. Still, considerable work has been accomplished conceptualizing family QoL and determining appropriate family QoL outcomes. In addition, family is viewed as a dynamic social system that influences and is influenced by its individual members and their interactions (Summers et al. 2005; Turnbull and Turnbull 1990). A QoL framework is useful for understanding the impact of individuals with ID on the QoL of their family members.

People with disability and their families often need some help to individuate interests that could add or maintain satisfaction with life. Moreover, the perceptions of people with ID themselves and the perceptions of other people, including family members, are often differing. Therefore, the views about needs, desires and supports, the importance attributed and how satisfied they are should be deeply considered (Brown et al. 1997). This type of study underscores the importance of recognizing variability among families and assessing all dimensions before intervening in an effort to improve QoL. Results of this study suggest that QoL may be characterized somewhat differently for individuals with ID and for members of their families. This difference could impact on QoL of people with ID, especially in those areas with strongest correlations. Thus, detecting particular problematic areas and the acknowledgement of the expectations of families could allow the identification of specific needs with the aim to favour the areas of major interest and potential satisfaction to improve and develop effective strategies for support.

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