

# Studying ageing:

*experiences, description, variation, prediction and explanation*



Bo G Eriksson



UNIVERSITY OF GOTHENBURG



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## Abstract

The study follows a line of experiences, description, variation, prediction and explanation concerning ageing, health promotion and longevity.

The experiences of aging were acquired during my studies of conversations, participation in longitudinal population studies in Gothenburg, and working with the Centre for Development of Home help services. A main interest of mine has been to understand how health and longevity can be promoted during aging. The first paper reports the start of the intervention studies. During these studies I have met an increasing variation between individuals in age cohorts. The other striking phenomenon is the high degree of trainability in higher ages by putting load on human functions. This training by functional load is of increasing importance with increasing age as the reserve capacity of functions generally decline during aging. Thus I am interested in variation in factors related to health, survival and death.

I studied the variation of registered death causes during one year in the United States. I expected an increased variation by increasing age as a result of decreasing functional reserve capacity and thus an increased vulnerability. Contrary to my expectation the variation by age had a bimodal distribution like a camel's back. I interpreted this finding as one example of institutional ageism. In the third report I studied variation in aspects of social participation measured in the longitudinal population studies. In agreement with my expectation the variation increased by increasing age. This is contrasted to the common attitude that the aged are lonely. In that respect I interpret that attitude as one example of ageism. The fourth paper reports predictions of 7-year survival studied by a common method, binary logistic regression, compared to a less used method: Artificial neural networks (ANN). Both methods could predict survival. The ANN gave a better prediction when the predictors were medical and health variables but not when social variables were entered as predictors. Conclusions were that ANN could be used 1) as predicting models for outcomes with a multi factor genesis which is not well understood by other methods and 2) that ANN can be used to evaluate results provided by other methods of analyses.

The two last papers reports developments of sociological theories in order to explain how social interaction can promote health and longevity. Durkheim's theories of social facts, *nomie* and *anomie* are developed in the fifth paper. I argue that the production of social facts, *nomie* and *anomie* promotes health by promoting activities. The social fact production also supports identity and feelings of cohesion. The production of *nomie* and *anomie* produce self esteem. The last paper reports health promoting functions of ordinary conversations, especially with confidants: Definition of situation, reducing ordinary anxiety, decision making, training of attention and memory, identity construction, formulation of dreams and maintenance of social networks. By these efforts I hope that I have achieved to report experiences, descriptions, variation, predictions and explanations in studying aging.

Keywords: Sociology, Gerontology, Demography, Longevity, Health promotion, Social facts, Sense of cohesion, Population, Random sample.

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I have made the experiences and the interpretations of these experiences the last 40 years. During this time I have benefited from the work of so many persons that it is almost impossible to give the earned credits to all. At the University of Gothenburg the sociological department has offered me my basis to work. The department of Geriatrics in its varying organisational shapes has been equally important to me in my research. In my early experiences the department of linguistics offered cooperation in conversational analyses. I have had the luck to have worked in the longitudinal population studies of 70-year-olds and the women studies in Gothenburg. The later study performed at the Department of Community Medicine and Public Health. Outside the University of Gothenburg I have worked with the Center for development of home help service in Sweden. Internationally I have cooperated with professor Richard M Hessler at the Department of Sociology at the University of Missouri at Columbia and Professor David Swanson, who has occupied so many chairs in sociology and demography that it has been a pleasure to follow his tracks. Subgroups of the great most importance have been the reference and research groups of the intervention study among elderly in Gothenburg. I have an obligation and privilege to mention my co-authors Valter Sundh and professors Dan Mellström and Alvar Svanborg. Valter has also been a very competent guide and companion in fields of quantitative methods.

This last year professor emeritus Dan Jonsson has in discussions challenged my reluctance to write. The critical points raised by him and the professors Ulla Björnberg and Björn Halleröd have without doubt increased the readability of the manuscripts.

This dissertation may come as a surprise to all colleagues, friends, kin and family. To you all: Thank you for your patience and support.



## **Studying ageing: experiences, description, variation, prediction and explanation.**

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## ***Introduction***

My interest in the study of ageing was awakened in the early 1970s by a phone call on a Monday morning from TV producer My Person to the Department of Sociology. She hosted a series of TV shows on ageing in society called “På äldre dar” (Daily living at higher ages). On one of her shows, a professor of psychology proposed that one reason older persons are avoided is because they smell a particular way. That suggestion caused a large number of indignant telephone calls to the complaint desk of the TV station. My asked me if there was any sociological knowledge of loneliness among older persons. At that moment I realized that we knew very little about ageing in society, but enough for me to appear on My’s show the following Sunday night.

Later on when I met the professor—who had an entirely humanistic education—he told me that when he appeared on the show, he had just arrived from an international conference, where for the first time in his life he had heard about pheromones and that it was possible humans could have receptors for pheromones. To me this was important information. It was an example of the huge gap between, on the one hand, humanistic knowledge, and on the other hand, natural science. Because my senior high school background was in natural sciences, I was aware of pheromones from an early age. I realized that gerontology—the study of ageing—had to bridge this gap, and should benefit from interdisciplinary efforts. This led my work in two directions. First, I started the first interdisciplinary course in Swedish universities on gerontology. That course mainly engaged the departments of psychology, geriatrics and sociology. Secondly, I began research in gerontology and I have focused on some special phenomena: the variation between individuals during ageing, methods to describe and explain such variation, and explanations of variation in longevity.

## ***Problem and purpose***

A common base for many social scientists is their experiences of mundane social reality. Such experiences can be used as a starting point for further investigations. Variation in experiences and observations are necessary parts of science. In general, stability and variation are investigated as objects of explanation. To achieve these objectives, phenomena have to be described, and from these descriptions variation can be investigated. When reading about gerontology, I have found very few studies on variation using variables measured on nominal and ordinal scale levels. Thus, I formulated a first general problem: are there established methods for studying variation by age on nominal and ordinal level scales, and are there any interesting fields to which such measurements may be applied?

A common question in scientific investigations is if the variation in one variable can be related to the variation in another variable. A more specific question is whether it is possible to predict the variation in one variable given knowledge of variation in other variables. My second general question in this dissertation was, if there are new or not well-established methods of prediction, what methods could be useful in gerontological research? If there is such a method, what are the benefits and drawbacks?

However, it is not only interesting to know the degree of variation, but also to obtain an educated estimate of the range of variation in the aged individual's mundane activities. A standard scientific endeavour is to use theories to explain the discovered variation and predictions. Because I am interested in the health and survival of humans, I was looking for a theoretical framework for the variation in salutogenic activities. Thus, my third general objective in this dissertation is to develop a further understanding of salutogenic processes within sociological theories. Are there social mechanisms or functions promoting health and longevity?

This report looks into the following tasks in investigations: experiences, description, variation, predictions and explanations.

My general purpose is to communicate to society knowledge of variation among the aged to prevent ageism and to provide a knowledge base for social and medical care practices. My scientific purpose is to

theoretically understand salutogenic processes, especially for application within social services and medical care. This theoretical understanding should be formulated in theoretically sound concepts, but also convey common sense understanding to home helpers and the general public. To this end, it is counter-productive to write in English. I am planning to write a book in Swedish as well. A personal and social purpose with this dissertation is that I want to obtain good social services and care if I should need them, but also to offer a theoretical understanding to improve and secure the quality of social services and care for all people. In this sense, I view my work as applied sociology.

### ***Types and sources of knowledge***

Knowledge can vary considerably, e.g., from interpretations of single, almost idiosyncratic phenomena, to interpretations of complex systems according to scientific laws. The possible sources of knowledge are also very diverse, e.g., from a philosopher's introspection to monitoring of changes in our surrounding world by instruments guided by complex measurement theories and technology. Similarly, an interdisciplinary field such as gerontology needs to make use of different kinds and sources of knowledge.

This presentation is founded upon five main sources of knowledge:

- 1) Data obtained from random samples of aged persons through laboratory investigations.
- 2) Data obtained from structured interviews in random samples of aged persons.
- 3) Registrations or accumulated registrations from official records.
- 4) Personal experiences from structured interventions into the praxis of probands, social groups, organizations and social services. The method has been guided by conversations and interviews, and observations and reports of the results of these interventions.
- 5) Theory, mainly sociological theory, but also from fields within gerontology.

The main road to academic success is to formulate a clearly defined and thus restricted problem and then find suitable research methods and sources of knowledge, making it possible to give a restricted answer. We

discover small pieces of knowledge that are especially useful if they fill lacunas in the body of assembled knowledge. A further merit in new knowledge is if it can be incorporated into frameworks of larger and more widely accepted theories. In this line of work, this endeavour is valued if it results in more precise and fruitful formulations. In this dissertation, I have tried to come up with small pieces of well-documented results filling small lacunas in the existing knowledge, and results built more on personal experience integrated with theory.

## ***My experiences***

My first research effort in gerontology was triggered by an idea represented in an opening address to the American Sociological Association [1], which declared that ethnomethodology was a blind alley in sociology. I was not convinced by this opening address, and my general idea was that if ethnomethodology was applied to a much neglected field such as ageing in society, then it would be demonstrated that ethnomethodology could not only produce knowledge on ageing but also that the opening address had been wrong.

Because ethnomethodology had a strength in conversational analyses, I collaborated with the Department of Anthropology, Linguistics and Psychology to establish a laboratory for the study of face-to-face communication in groups. At that time, I also tried to engage the Department of Geriatrics but they declined any co-operation. In the group for conversational analyses, we managed to persuade Emanuel Schegloff from UCLA to conduct a workshop in conversational analysis. Thus, we started to build a laboratory to study face-to-face interaction in groups. The research was interrupted at an immature stage because only the sociological part of our research proposal received funding. The subject of investigation was conversations among groups of older persons. We recruited groups from clubs for retirees and made audio and video recordings. These conversations were transcribed in detail in the style developed by the UCLA. An initial report on the project with some preliminary analyses of conversations in groups was published [2]. The laboratory activities continued within the Department of Linguistics and the video recordings are still filed in their archives. One of my insights from this work was that you cannot trust details in retrospective reports

of conversations. On the other hand, I developed a sensibility for observation and remembering parts of conversations.

After the conversational analysis project was interrupted, the Department of Sociology was approached by Professor Alvar Svanborg from the Department of Geriatrics, with an invitation to co-operate in a broad, interdisciplinary, longitudinal intervention study among 70-year-old inhabitants in Göteborg. Professor Bengt Rundblad was engaged in a reference group as a representative from the Department of Sociology, and I was engaged as a researcher in the project titled the InterVention study of Elderly in Gothenburg (IVEG). The presentation of that study is the first report in this dissertation [3]. The IVEG studied a third cohort of 70-year-olds in Gothenburg born in 1911 and 1912. This report is included in this dissertation to provide some understanding of my experiences of interdisciplinary gerontological work. Two earlier cohorts born in 1901 and 1902, and 1906 and 1907 [4, 5], were studied using the same methods, but without the intervention.

We encountered many difficulties at the start of this multidisciplinary intervention research in the late 1970s. At first, some of the members in the reference group engaged in strong efforts to set demarcation lines against other disciplines, while other members reached out for co-operation. The most remarkable example of this was when the member with a background in economics declared that because of his discipline's basic concept of preferences, he looked forward to working with the member whose background was in psychology. This offer was rejected and the reason given was that the economist did not understand preferences at all. The member with the background in economics was further advised that if he were interested, he could apply for a basic course in psychology and if admitted, co-operation could commence.

IVEG began with pilot studies in which we investigated the needs and resources among intervention subjects called probands. The goals of the intervention were to increase health or postpone morbidity, support a self-chosen life style and facilitate access to personal and social resources for older persons. The entire research group met weekly to discuss each intervention proband. During this practical goal-oriented effort, the competences of all parties, both in assessing needs and resources and in suggesting solutions, were demonstrated. A very productive consensus developed and hostilities suspended. This *modus operandi* continued during the first wave of IVEG investigations. To my benefit, I was trained in recognizing the importance of knowledge

presented by representatives from other disciplines. These experiences have been very important to me in my extended field-work with staff and clients of social and medical care services. During this period, the sociological theoretical basis for the interventions presented in the fifth report in this dissertation [6], was developed.

Interdisciplinary research encountered multiple difficulties. As IVEG studied a third cohort of 70-year-old probands, data collection was mainly restricted by its origin and domination by geriatrics, other medical disciplines and paramedical disciplines. Because it was a multi-cohort longitudinal study, most of the assessments were decided on when the first cohort born in 1901 and 1902 was first investigated. To maintain comparisons between cohorts and longitudinal age waves, most of the variables had to be the same and measured by the same procedure. There were strong restrictions on entering new assessment protocols into the studies. It was also difficult for researchers from different disciplines to accept styles for reporting joint results. These difficulties also emerged when choosing journals for publication with discipline-orientated journal reviewers.

This last difficulty was also encountered concerning dissertations. The monograph has been the mode of dissertation in sociology, while at the Sahlgrenska Academy, it has been a compilation of reports. Reports from the Sahlgrenska Academy are usually authored by many persons. It is in most cases the doctoral candidate, his or her supervisor, other members of the research team, and the head of the research group or head of department, who have co-operated in different ways. The Sahlgrenska Academy views with suspicion a published report of original research with a single author, while at the Faculty of Social Sciences at the University of Gothenburg, co-authored reports are similarly viewed. The contributions of the doctoral candidate and his/her co-authors must be declared. Because there are university policies promoting interdisciplinary research, I think there should be greater openness to the range of styles of co-operation and co-publication that reflect interdisciplinary interdependence in research and publishing.

On the basis of the knowledge attained through the IVEG project, Nils Fernow, Hans Lindkvist and I started Centrum för Hemtjänstutveckling (Centre for development of home-help service (CHU)) in 1992. Our mission was to secure quality in home-help services and nursing homes care. The quality standards were set by the Socialtjänstlagen (Law of social services). This law ensures that the basic needs of all Swedish



inhabitants are satisfied. In the first place, it is the individual's responsibility to achieve the fulfilment of these needs. If the individual does not have the resources to fulfil their basic needs and no other agent provides such a service, then it is the responsibility of the local authorities to fulfil these basic needs. Among older clients this is mainly done by providing assistance with home helpers, access to nursing homes, and subsidies for housing. The assistance should be given to preserve and develop the client's resources, and conform to standards for treating clients with respect and dignity. There are standards for groups with special needs including children, disabled and the aged. The standards for aged care include assisting in providing secure and comfortable living with meaningful activities in fellowship with other persons. These standards for assisting the aged are in harmony with research that suggests activity and fellowship promote health, independence of services, and longevity. It is even so that meaningfulness promotes activities. Among friends, it is especially valuable to have access to a confidant.

The *modus operandi* of the CHU was selling its services to municipalities under certain conditions. First, the political board in charge of home-help services and nursing homes had to decide if working to ensure quality in the manner promoted by CHU could, or should, be adopted within their competence of decision-making. In most municipalities, this was pursued through formal lecturing and seminars with the board that lasted from two hours to over half a day. The principal managers of general social services and social services for the aged participated in most cases. The second step was to have two days of formal education for all management and investigators responsible for home helpers and nursing homes. The third step was to have a one-day education session for all home helpers, nurse assistants and other workers who assisted clients. At the end of this, participants were assigned an individual task based on the needs of a client, to do something they had never done before with the client and at least one person who was not actively engaged in home-help work or nursing home work. The task had to be completed within a limited time, in most cases about four weeks. The fourth step was to meet each team of home helpers and nursing home staff, to supervise and evaluate their accomplishments. The fifth and last step was a second round of assigned individual tasks, followed by meeting for evaluation and supervision.

During the education day, in most of the municipalities, home helpers and others often expressed sceptical opinions on what I said was

achievable in my neighbourhood, offering instead the view that in their experiences, the aged were so sick and dependent that activities and fellowship was far beyond their needs and faculties. At that point I always offered to join the sceptics in their work with their “worst cases”. This offer was almost always accepted. Thus, I have met and worked with many home helpers and their “worst” clients. Aside from one case of diagnosed borderline psychosis, it was always possible to improve goal achievement by assisting with meaningful activities, fellowship formation, and care. In most municipalities, I also had the opportunity to supervise groups of management staff in their work of assessing needs among the aged, and to guide home helpers and other care providers. During this work with CHU, I met, taught and often supervised at least 500 officers in home-help and nursing homes, and at least 2,000 home helpers, assistant nurses and others working to assist the aged.

The above experiences were my main sources of information for this dissertation. A second source was data from official registers. In the following presentation, I omit many other important observed relationships between social interaction and health and survival, such as the reduction of high blood pressure during relaxation with one’s own children, and secretion of bonding hormones during intimate interaction.

### ***The reports in this dissertation and the line of presentation***

The presented reports draw on my experiences, but not in a chronological order. My training in conversation analysis has increased my sensitivity when observing interactions, even while participating in the interaction. I have benefited from this sensitivity during my work with the IVEG project and the CHU. It was during this work that I encountered the wide variation in the lives of people that I found so interesting to study. This paper reports the basis for the IVEG project experience and describes how systematically organized experiences produce data for description. This is followed by two reports, both on description of quantitative variation. The first is on causes of death and the second on social participation. Variation in longevity, as predicted by social network aspects compared with predictions from medical data, is

the subject of the next report. The prediction of longevity is interpreted by the final two reports. The first one is developed from Durkheimian sociology, especially social facts and anomie. It also sketches an understanding of the vast variation open to human action. The last report focuses on the functions of ordinary conversations, and offers greater understanding of the need to approach the vast qualitative variation in order to assist older members of society in fulfilling their basic needs. In this way, I try to follow the main ideas: experience, description, variation, predictions and explanation.

- I: Eriksson, B. G., Mellström, D., and Svanborg, A., (1987) 'Medical-social intervention in a 70-year-old Swedish population. A general presentation of methodological experience', *Compr Gerontol C* 1: 49–56.
- II: Eriksson, B. G. (2008) 'Dispersion of Registered Death Causes as a Function of Age in the 1999 U.S. Population', in S. H. Murdock and D. Swanson (eds) *Applied Demography in the 21st Century*, New York: Springer.
- III: Eriksson, B. G., (2008) 'Ordinal dispersion of ratings of social participation as a function of age from 70 years of age among the H-70 panel, Gothenburg Sweden', *Archives of Gerontology and Geriatrics* 47(2): 229–239.
- IV: Eriksson, B. G. and Sundh, V. (2010) 'Prediction of seven years survival by artificial neural network and logistic regression: A comparison of results from medical and social data among 70-years old in Göteborg Sweden'. Manuscript.
- V: Eriksson, B. G. (2010) 'A Durkheim inspired interpretation of social mechanisms relating to health, longevity and, sense of coherence in ageing populations'. Manuscript.
- VI: Eriksson, B. G. (2010) 'Interpretations of some aspects of conversations and their relations to health and longevity in ageing populations'. Manuscript.

## ***Variation: description***

Report I [3] presents a general outline of the type of data collected in the gerontological population studies in Göteborg [4, 5] and some of the experiences on which this dissertation is based. Even when we commenced the intervention among IVEG probands, we had in mind the large variation within this population and the need to base our decisions on individual properties of the proband. This was the credo conveyed to the research group by the senior researchers in the reference group.

### Quantitative dispersion

When gathered my experiences in a dissertation, I was astonished by the fact that so little had been published on increasing variation as a function of age. I was also aware of the fact that the standard readers on survey methods declared there were no good measures of variation on nominal and ordinal scale levels. In the more specialized articles and readers, this kind of variation was most often called dispersion. I could not find any presentation of measurements of dispersion in the ordinary readers that was suitable for statistical inference from samples to populations. Furthermore, I learned from experienced teachers of sociological survey methods that no such measurements existed. Thus, I set out to fill two small lacunas in ordinary gerontology: to describe variation assessed on nominal and ordinal scales as a function of age.

There are in fact an infinity of functions that are candidates for measuring dispersion. A question therefore arose as to which function or functions to choose. My first criterion for choosing was that it should be possible to relate a measure to a common idea of variation among researchers engaged in quantitative studies. The second criterion was to use a measurement that was common in other scientific fields of dispersion, such as the dispersion of species in ecological studies. The third criterion was that the properties of the measurement should be known for their use in statistical inference.

The most well-known concept of variation is variance. For the nominal case, I showed in [7] that the commonly accepted Simpson's D [8] can be reformulated as a sum of terms of the form  $p \cdot q$ , where  $p$  is the proportion of individuals in one category and  $q = 1 - p$  is the proportion

of individuals in all other categories. This generalizes the well-known formula  $p \cdot q$  for the variance of a dichotomous variable. Thus Simpson's D is related in an understandable way to a more general concept of variance. There are also published distributions and algorithms on how to compute confidence intervals for D and how to draw inferences from samples to populations [9].

The dispersion of nominal data is often easy to understand without any computations. Take the dispersion of marital status in Sweden as a function of age. At first, it is zero because all members are unmarried. Then it starts to increase slowly with age as some members get married, and increases more rapidly as more people marry. It is still rising as some people divorce, and increases even more when some become widowed. At the higher ages, this dispersion decreases again as there are mainly only two marital statuses left in the population—unmarried and widowed. This is caused by the low frequency of divorce among the older cohorts, together with the higher mortality among those divorced, leaving very few divorced individuals in the population. Fewer women remain married because of the combined effects of the customary marriage of women and older men within the oldest cohorts, and the higher mortality rate for men. This leaves us with a population mainly composed of unmarried and bereaved.

A dispersion that consists of nominal variables with many values is not easily understood or even described verbally. I therefore chose a nominal variable to analyse after some consideration. Candidates for the analysis should be variables that are internationally well recognized and of importance in the field of securing quality care for older persons. A second consideration emerged from the idea of increasing variation between members of an ageing birth cohort. To satisfy this later criterion, I chose to study registered causes of death. The hypothesis was that, because of the higher degree of vulnerability of the aged person, there should be an increasing dispersion in death causes reflected in registered death causes among older persons. The reason behind the idea of higher vulnerability was the decreasing reserve capacity in many functions during ageing. Thus, it is more likely that an aged person could die from common influenza or from an ordinary fall, compared with a younger person with stronger immune functions and bone structure. Thus, my research question was: is there an increased dispersion of registered death causes in consecutive birth cohorts?

Registered causes of death can be obtained in many modern societies and there is a vast literature on measurement praxis, reliability and

validity of the variable. The World Health Organization (WHO) uses a common method to divide registered causes of death into thousands of classifications. These causes are also re-tabulated into comprehensive categories. The largest such grouping contains 358 different causes of death. The categorization is made with possible prevention strategies in mind, and to provide data for evaluating different regimes of treatment of morbidity.

Registered causes of death thus meet my criterion of importance for securing quality in the care of older persons. To study dispersion of registered death causes require a large number of cases. In Sweden, there are about 100,000 deaths per annum, which I judged to be too few for studying dispersion. Thus, I turned to the USA, which has about 2.5 million deaths per annum. For my study I used one year, 1999, which has the drawbacks of cross-sectional studies. I have conducted but not published repeated cross-sectional studies of registered causes of death in the USA, and found a stable pattern of the kind that I have published.

The main finding was that the dispersion of registered death causes was bimodal with one maximum in the middle-aged and one maximum in the ages 80–85. This result contradicts my idea of increasing dispersion as a function of age. Along with many of my colleagues, I am reluctant to dismiss my earlier hypothesis, in this case, of increasing variation in death causes. My position on the bimodal result is that until further investigations are made, I maintain the hypothesis of increasing variation in death causes by age. Consequently, I am left with the burden of reasonably interpreting the bimodal curve. I suggest that deaths among higher age groups are conceived as more natural and therefore not as carefully investigated as deaths occurring among lower age groups. Such a practice could result in a high dispersion of registered death causes in the middle ages, while an actual increase in manifest death causes is recognized and registered in the age span of 80–85, after which causes of death are of such low interest that registration becomes less accurate.

The registered cause of death is a description of cause of death. My interpretation is that the quality of these descriptions decreases with increased age. It is an institutionally governed and performed practice to assign and register death causes. My interpretation of the bimodal result is that it reflects institutional ageism. Ageism is discrimination against older persons. In this institutional case, it undermines the chances of achieving one of the objectives of registering causes of death:

identifying real causes of death that could be candidates for preventive actions.

Variation in aspects of social participation is studied in the third report [10]. Social participation is often measured on an ordinal scale. Social participation variables typically include response values such as never, seldom, often. I chose social participation because loneliness is a component of attitudes towards older persons in Sweden. Attitudes are composed of three elements: cognition, emotions, and habits or behavioural dispositions. These elements are examples of stereotyping. Thus it is interesting to study variation in aspects of social participation with increasing age. A consequence of increasing variation is that stereotyping becomes less adequate with increasing age in a birth cohort. Further, I chose to study aspects of social participation as these meet the criterion of being important to dependency, morbidity and mortality among older persons and thus are related to the quality of social service and aged care. My research question was: is there an increasing dispersion in measures of social participation with increasing age in a birth cohort?

With the same criteria for choosing a measurement of ordinal dispersion as in the nominal case, I chose the normalized measure LN2 proposed by Blair & Lacy [11]. As in the nominal case, this measurement is developed from proportions, but in this case cumulative proportions. The rationale behind the use of cumulative proportions is that in the assessment of a property on an ordinal scale, say from less to more, those who have the greater amount of the property also have as much as those with less of that property. For this study, I chose the first cohort in the population studies of older persons in Göteborg, as this cohort enabled more observation waves and a longer time for longitudinal follow-up from the start at 70 years. A problem in studying possible increased dispersion in a birth cohort by age is increasing mortality risk with age. Thus, with increasing age, there are larger proportions of the members who are closer to dying. In the last period of an individual's life span, it is more likely that social participation decreases. Thus, the proportion of members of an age cohort who are close to death contributes to low social participation and thus gives a higher dispersion. With this process in mind, the study uses two modes of longitudinal comparison. One is to study all living members at an observation age. Including the near-to-death members in comparisons made between observation waves contributes to a higher dispersion. It is not an incorrect estimation of dispersion, but it has a double genesis in ageing

and dying. The second way to study variation of dispersion in a birth cohort is to only study the members who have survived at least until the next wave of investigations. Thus, the process of changing social participation due to closeness to death is less. In my study, I chose to compare those who lived and took part in the last observation at age 90. The main result, with two exceptions, was an increasing dispersion in social participation with increasing age [10]. There was no example of decreasing dispersion.

The gerontological and practical consequences of the reported increasing dispersion in social participation is that the stereotyping cognitive attitude towards older persons as being lonely becomes increasingly more inadequate as birth cohorts grow older. Because the cognitive element of the attitude is accompanied by the emotional and habitual elements, this inadequacy is one example of ageism in Swedish society.

### Qualitative variation

A main idea in the IVEG project was that a functional load on human faculties will train and preserve these faculties, with the exception of the ageing of the organs of perception. The general method of putting load on the faculties is to use them; for humans, this means to engage in activities. Generally, the training has effects regardless of the activities undertaken. However, each individual's reasons for engaging in activities are important. In the IVEG study, I asked those who did not get outdoors at least once a week why they did not leave their building. They gave three typical answers: I have no companion, I do not know what I should do and I do not know where to go. These answers point to the importance of social networks, perceived possible action space, and arenas for action. Thus, it is important for gerontology to have concepts and theories that capture relevant aspects of network functions and the spaces of possible actions and arenas report V [6]. Guided conversations and interviews are used to assess the high variation and richness of experiences, activities and possibilities in the lives of older persons, as discussed in relation to report VI [12]. I shall discuss this further in the explanation section, which is concerned with interpretation of predictions.



## ***Interpretation of variation: prediction***

I have an interest in studying longevity in relation to social and medical variables, among these, social participation. My general research question in report IV [13] was: are there, for practical uses, any benefits of ANN analyses compared with logistic regression analyses? Sub-questions were: 1) How well can we predict longevity comparing social and medical variables as predictors?, 2) How well does a standard method of prediction work compared with a less used method, and 3) Can we draw any conclusions if there are differences between the methods?

The question arises of how to interpret variation in assessed and registered variation in relevant variables. A common idea of interpretation is to relate the variation in variables to variation in other variables. Such comparisons can be formulated in terms of prediction. Is it possible to predict the value of a dependent variable given that you have information on the values of one or more independent variables? Such questions are often analysed by regression models and in more complex cases by structural equation modelling. The question 'Is it possible to predict survival?' frequently arises in gerontology. In this presentation, I compare one standard logistic regression model method with an artificial neural network (ANN) method to predict survival. The reason for this is that survival is dependent on many variables and these variables occur in a manner that is problematic for regression models. First, I present some problems encountered in regression analyses and then briefly introduce the ANN method. This presentation heavily draws on my co-operation with Valter Sundh, the statistician in charge of the H-70 studies.

### Three concerns in regression models

When using traditional statistical inference such as regression models to evaluate the ability of explanatory variables to predict a certain outcome, uncertainty always remains over the results and conclusion we report; there is always a possibility that if we used a more realistic (i.e., more complicated) model, we could reach a better understanding of the association between the studied outcome and the available predictors.

However, there are three good reasons for always trying to find the simplest regression model: interpretability, linear problems, and overfitting.

To be able to interpret complicated associations, we need to find the simplest model that gives an adequate fit of the observed data: the principle of parsimony. A model with few predictor variables and with simple patterns of association is much easier to understand and report than a model with many predictors and/or with complicated association patterns. There are three main ways in which an association pattern can be complicated: non-linear association, interaction, and multicollinearity. These effects can of course appear in combinations.

The association between two variables is non-linear when the effect of increasing exposure is different on different levels of exposure [14]. Interaction between variables means, in the simplest case, that the association between two variables is different on different levels of a third variable [14]. Multicollinearity means that there are linear associations between the predictor variables in a model, with the consequence that the separate effect of each predictor on the outcome will be difficult or impossible to estimate with certainty [14]. If we only want to estimate the combined effect of the selected predictors, multicollinearity is not relevant, but if the aim of the analysis is to evaluate the relative importance of a selected set of predictors, the presence of multicollinearity in the sample is a great disadvantage.

Overfitting is an effect of how regression models work—they find the best fit to the observed sample given the constraints of the model [14]. If we try to explain the associations in our sample using our model at an excessively detailed level, i.e., by adding too many parameters, we will mostly explain only the random variation of the sample.

Concerns about interpretability, linearity and overfitting explain why we usually subscribe to the principle of parsimony and report very simple regression models in scientific publications. Although we are well aware that it is almost always possible to find better fitting, this involves using more complicated and unstable models. This means that doubt often remains in our minds regarding what we include in the final report of an analysis. We may have missed potentially interesting findings in our data if we have not taken time to dive deeper into the model searching process. The difficulties in finding good models for prediction give us

reason to investigate other models that may avoid these difficulties. Here we turn to artificial neural network analysis (ANN).

### A short introduction to artificial neural network analysis

ANN analysis was developed through artificial intelligence research. The idea was to make a crude analogy of neuronal activity in the brain. The neuron is a nerve cell with many outgrowths connecting to the outgrowths of many other neurons in a web formation. Information is stored and processed in these webs. The artificial neural networks are built by nodes connected to other nodes. Several types of nodes process information in different ways. The type of network that we have used in our analyses [13] is a so-called multilayer perceptron feed forwards and propagate backwards neural network. In our analyses of survival, we used the SPSS program Clementine version 9. The program provides four main outputs: (1) An ANN model that can be used for prediction of new cases, (2) A global accuracy value of how good the model is, (3) A value for each case if it is assigned a value 'survived' or 'not survived', and (4) A case accuracy value of how likely the program estimates that its assigned value—survived or not survived—is correct.

In our investigations we have compared results from logistic regressions with ANN results for two sets of data predicting 7-year survival [13], namely one set of medical variables and one set of social variables [3-5]. The best odds ratios produced by logistic regression varied from 3.5 to 4.0 for survival while the variation between odds ratios produced by ANN varied with a maximum of 39.0. There were three main results: (1) The logistic regression models for survival produced odds ratios of roughly the same magnitude for the sets of the medical and social variables used, (2) The ANN and logistic regression produced odds ratios of roughly the same magnitude for survival applied to the set of social variables, and (3) For the set of medical variables, ANN produced higher odds ratios for survival compared with odds ratios produced by logistic regression models.

The logistic regression models gave odds ratios with a magnitude found in many studies of survival. Odds ratios results of 39.0 are remarkable, but could have been determined by a sample too small to analyse. This would be an example of overtraining. It is also clear, in answer to the second research question, that it is not possible from these examples to decide that one method generally performs better than the other. It is an

empirical question. To select a model for practical purposes of predicting an outcome for an individual, it is possible to choose the model that gives the best prediction. Logistic regression models have advantages for understanding which variables contribute most to a prediction. A disadvantage of the ANN model is that it does not indicate which variable has which influence on the outcome. It is possible that the ANN prediction is better, but it has not increased our understanding of the relations between the predicting variables and the outcome. In this sense, the logistic models outperform the ANN. However, an advantage of an ANN is that it could be used to predict outcome or to support decisions on therapy for conditions that have multivariate genes and uncertain criteria for action [15].

In our analyses, the ANN produced better prediction than the logistic regression models when medical variables were used. This indicated to us hidden structures in the data set that could have been used by the ANN. This indication should prompt us to attempt to find a better understanding of the data than we could find using the logistic regression model. The ANN and logistic regression models performed equally well when the social variables were used. That result could let us conclude that we have not found any hidden structures that could provide better predictions. Thus, in this case, we can be satisfied with our analysis until better models of analysis are produced. One such candidate could be to compare the two methods used here with path analysis by structural equation modelling. This line of reasoning leads us to conclude that ANN analysis can be used as a heuristic method for evaluating other prediction methods. If the ANN performs better, it should be a reason to try to better understand hidden structures in the data.

## ***Interpretation of predictions: explanation***

Predictions are one way of interpreting data, but predictions must also be understood. We must support predictions with reasons for why variation in the predicting variable is related to variation in the dependent variable. We are seeking some mechanisms, for example, that can explain the prediction.

With social explanations, it is not obvious that causal thinking leads us in the right direction. This is at least the case when it comes to meaningful actions. The meaning of the utterance “The book lies on the table” can be analysed through compliance with linguistic rules, such as syntactic rules that give the same words in a different order another meaning—“The table lies on the book”.

I take this insight to imply that meaning can be produced by the compliance with rules. Thus, I look for mechanisms that can explain variation in meaningful action among rules. One such set of rules is social conventions. Meaningful actions can then have many correlates. One such correlate is the training effect of actions on the human body and mind.

In a multidisciplinary field such as gerontology, the muscle physiologist registers and explains causally how the physiology of the body is trained by movement. The brain physiologists register and explain causally the training of the brain by their methods. As a sociologist, I try to register meaningful actions and explain them by compliance with rules, most often social conventions. It is this meaningfulness that causes the actor to act and thereby attain training. I have tried to discover such sets of social mechanisms in reports V [6] and VI [12] of this dissertation. My research question was: is it possible to link or construct fundamental sociological theories of social processes or mechanisms to health and longevity?

Report V concerns two sociological theories of processes or mechanisms that have salutogenic functions. I used the Durkheimian ideas of social facts and anomie together with insights from J.L. Austin [16], Goffman [17] and Parsons [18, 19].

The main results were:

- 1) How a class of meaningful entities, social facts, are produced in everyday life according to rule compliance.
- 2) The importance of the productions of social facts to personal identities.
- 3) Why the production of social facts is of greater importance for the frail older population.
- 4) How does one mechanism producing nomos work to avoid anomie.
- 5) Why nomos production is of greater importance for the frail older population.
- 6) How important are social networks and arenas for the production of social facts and nomos?
- 7) A framework to depict the large variety in the possible scope of actions and arenas.

The main research questions governing report VI [12] are: which functions of ordinary conversations can be found to be salutogenic and in what way/s are they salutogenic?

The salutogenic functions of ordinary conversations (OC) studied are theoretically derived and tried out in praxis by the work in CHU. The salutogenic effects of these functions are more salient for persons with low reserve capacity in vital functions. Ageing in its later stages is characterized by loss of reserve capacity in many vital functions. Thus the OC functions are of greater importance to an aged individual. The main salutogenic functions of OC are: 1) Exciting load on vital functions like muscle strength, skeleton strength, condition, circulation, brain and mental processes, and 2) Reducing harmful stress and maintaining social networks that give support to reduce risks.

The main results of report VI concern these mechanisms or functions of conversation:

- 1) Definition of a situation that is especially salient in cases where you need interaction with a confidant. An example of such importance is an actual predicament defined as severe, such as an illness that requires a call for medical assistance. The salutogenic function is to secure a basis for orientation and action.
- 2) Reduction of ordinary anxiety. According to the Thomas theorem [20], a person's state of mind, such as anxiety, is depend on their beliefs. A person can believe that a situation is very threatening and thus become very stressed and anxious. OC works to redefine the situation as less

threatening or to find a way to master or avoid the threats. The salutogenic function is to reduce everyday anxiety and possibly promote actions putting load on vital functions.

- 3) Decision making, especially to act. Many persons need discussions with other persons before they make a decision. This is the case both for major or minor decisions. Examples are 'Shall I buy this house?' or 'What shall I buy for dinner?' Often the support to come to a decision contains both a definition of the situation and reduction of anxiety. The importance for the aged person with low reserve capacity is to come to a decision to act. Other examples are 'Is this a day for an outdoor walk?', 'Is this a day to go shopping and if so, for what and where?' These OC act salutogenically by reducing the stress of decision anxiety and promoting action that puts load on vital functions.
- 4) Brain and attentiveness training. OC, especially in groups, requires monitoring speech flow and extra linguistic behaviours to: 1) Understand the meaning, 2) Find out when you are allowed or prompted to speak, and 3) Prepare to give an adequate response if you want to or are prompted to speak.
- 5) Memory training. It is not a trait of normal ageing to lose memory capacity to the extent that it creates difficulties in orientation in mundane reality or to lose memory capacity for this orientation. Nevertheless, many old persons, especially in nursing homes, complain of having bad episodic memory. The main causes of these complaints are that nothing worth remembering has happened in the nursing home. If today is just like yesterday and the day before, what is there to remember? When something happens that is remarkable, typically we talk to others about it. The more important the event was, the more probable it is that you enter the subject in a conversation. This is the first memory training as it is easier to remember events that you have discussed. The second memory training is that the next time you talk to a person who you have told about the event, it is likely that he/she asks about the possible further outcome of the event. Thus, the memory is actualized and iterated by your response to the question. This process works with special importance in OC with confidants.
- 6) Identity construction. During a life span, identity is normally transformed in interaction with other persons. Great transformations, such as when people fall in love and establish families, have been described as depending on conversations [21]. The general structure is that living conditions and interactions, especially with confidants, are changed and the subject engages in conversations about (i) What they have become now, especially in their relations, (ii) What brought them to this status, and( iii) What is the subject's future relations and lives?

- 7) Formulation of dreams. It is a trait of human existence that we may enjoy an activity with other persons and at the same time wish to be at another place or plan for a future activity. I call the object of such wishes dreams. Dreams are very important in promoting activities. Some inactive and bored persons have no such wishes. In the case where such wishes are lacking, it is possible to develop the necessary dreams in OC. As ageing exposes persons to losses of opportunities for meaningful actions, they are at risk of losing action alternatives leading to fulfilment of dreams. Thus, the salutogenic force is to develop motivation to actions.
- 8) Maintenance of social networks. Conversations in social relations that build social networks are at the core of human interaction. Social networks provide action alternatives and these actions provide the functional load that maintains the functions.

### ***Methodological reflections on the theoretic applications***

What could be said about the validity and reliability of the results in reports V and VI? There are some different meanings of validity: face validity, praxis validity, empirical validity, and construct validity. Face validity means that what we see, we accept, but it takes more to prove it. In this case, I have lectured on these propositions many times to academic audiences and home helpers. I have met students, home-help officers, home helpers and several other groups, who apparently have presented signs of face validity. A formulation has praxis validity if it works in ordinary life, so that when one acts according to their knowledge, they are not surprised by deviations from the expected results. This kind of validity has been most forcefully promoted in the pragmatic tradition. In my experience, it works well in ordinary life, in social service and in care. Empirical validity is established when propositions have been explored and tested in empirical research. That state is not reached in this dissertation. Construct validity is established by theoretically recognized concepts that are well-integrated in established theories. In this case, the meanings of the central concepts of conversation and results from conversational analyses, social facts, nomos, anomie, arenas, and social institutions have a long and well-



established place in sociology, although there are controversies on how to define them. As I am not working in the exegesis of sociological traditions, I take it that the combination of face validity and praxis validity with the concepts as they are used here places the results within a framework that I know is can be understood by lay persons, and I hope can also be understood by social scientists.

## ***Conclusions***

In this dissertation, I have demonstrated ways to describe nominal [7] and ordinal [10] dispersion and applied these methods to two problems of interest in gerontological research. These results indicate instances of ageism and institutional ageism. I have interpreted variation by studying prediction. The prediction was evaluated by comparing the outcomes of logistic regression analysis with those of ANN analysis. It was discovered that in one of the data sets, it was probable that there were structures in the data that escaped logistic regression analysis, thus prompting further investigation [13]. The ANN analysis could be used as a heuristic device to decide when further investigation of the data is called for. It has been possible for me to theoretically interpret the predictions of survival within three main theoretical traditions in sociology in terms of these mechanisms or functions: production of social facts, production of nomie/anomie, and functions of conversations [6, 12].

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## **Swedish summary – svensk sammanfattning**

Studier av åldrande: Erfarenheter, beskrivningar, variation, förutsägelser och förklaringar. (Studying aging: Experiences, description, variation, prediction and explanation.) Avhandling för doktorsexamen i sociologi.

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Studien bygger på erfarenheter, som vunnits vid studier av äldres samtalsvanor, longitudinella studier av 70-åringar i Göteborg, interventionsstudier bland 70-åringar i Göteborg, uppgifter om dödsorsaker i USA, utbildning intervention och handledning i svensk äldreomsorg samt sociologisk teori. Av detta framgår att denna avhandling inte skulle ha varit möjlig att skriva utan ett viktigt samarbete med en mängd forskare knutna till de gerontologiska populationsstudierna, som har utgått från Geriatrik vid Göteborgs Universitet. Likaså bygger den på samarbetet kring samtalsanalys, främst med institutionen för lingvistik. Därutöver har de grundläggande erfarenheterna från arbetet inom äldreomsorgen i Sveriges kommuner inom ramen för stiftelsen Centrum för Hemtjänstutveckling varit avgörande.

Den genomgående frågan är hur vi kan förstå hur olika sinsemellan människor är och hur dessa olikheter är relaterade till varandra. Detta är ett exempel på ett allmänt drag i vetenskap: Man studerar variation och hur sådan variation kan förklara annan variation samt hur dessa förklaringar kan tolkas i någon teoretisk ram. En ursprunglig tanke, som hämtats ur gerontologi, läran om åldrande, är att människor blir mer olika ju äldre en befolkning blir. Slagordsmässigt: Vi föds som kopior och dör som original. Det vill säga att variationen ökar. Tänk på hur olika 7-åringar är. Jämför med 70-åringar. Nästan alla 7-åringar går med lätthet ur sängen själva, men ingen cyklar Vätternrundan. Några 70-åringar har svårt att ta sig ur sängen medan andra cyklar Vätternrundan. Den röda tråden löper så att först presenterar jag hur jag fått de erfarenheter, som studierna bygger på. Det sker i avhandlingens sammanfattande första del och i den därpå följande uppsatsen. Därpå följer tre mer metodinriktade uppsatser. De två första svarar på frågan om hur olika åldrande människor i en befolkning är. Variationen studeras mot bakgrund av att äldre ofta betraktas som en enhetlig, stereotyp, grupp. Den tredje metodinriktade uppsatsen svarar på frågan

hur variation i medicinska och sociala förhållanden kan användas för att förutsäga överlevnad under sju år efter att förhållandena mätts. Sådana förutsägelser uppfattas ofta som förklaringar. För att sådana förklaringar skall ges ytterligare trovärdighet krävs att de statistiska sambanden också kan ges en tolkning inom någon teoretisk ram. De två avslutande uppsatserna svarar på frågan om det finns sociologiska teorier, som kan användas för att förstå skillnader i hälsa och överlevnad.

Variation har sällan studerats när det gäller egenskaper som beskrivs i kategorier som inte meningsfullt ordnas i större eller mindre. Exempel på sådana egenskaper kan vara civilståndet ogift, gift, frånskild och änka/änkeman. För att få en spridning på många kategorier valde jag att studera registrerade dödsorsaker i 358 kategorier. Tanken var att spridningen på olika dödsorsaker skulle öka med ökande ålder eftersom den äldre befolkningen är skörare än den yngre. Därmed kan man tänka sig att förhållandevis mindre allvarliga händelser kan leda till att en skör äldre människa dör medan en yngre skulle klara av händelsen med livhanken i behåll. Så när äldre, med ett svagare skelett, faller riskerar de att i större utsträckning dö i fallolyckor jämfört med yngre. Det rapporteras också att äldre löper högre risk att dö till följd av värmeböljor eller perioder med stark kyla. Det verkar alltså troligt att äldre dör av händelser som medelålders med lätthet överlever. Min fråga var: Ökar spridningen av rapporterade dödsorsaker med ökande ålder i en befolkning. Med så många dödsorsaker som 358 behövs det ett stort material för att studera variationen. I Sverige dör ungefär 100.000 personer om året medan det i USA dör ungefär 2.500.000 om året. Jag valde därför att studera spridningen av registrerade dödsorsaker under ett år i USA. Min idé om ökande spridning kom på skam. Istället visades en kurva som ser ut som en kamelrygg. Spridningen börjar lågt och stiger i en puckel för att avta och stiga i en ny puckel för att sedan återigen avta. Detta resultat diskuteras. Det kan vara så att de registrerade dödsorsakerna är korrekta och att bilden av variation i dödsorsaker därmed är korrekt. Jag tror dock att resultaten pekar på en institutionaliserad åldersdiskriminering, där intresset för att få en korrekt angiven dödsorsak är betydligt större när en medelålders person dör än när en gammal person dör. Om jag har rätt så är man mindre noggrann vid med dödsorsaksbestämning när gamla dör. Då anger man enkla och standardiserade dödsorsaker.

Variation har inte heller studerats så flitigt när det gäller egenskaper som är ordnade i mer eller mindre utan att man för den skull kan säga hur mycket mer eller mindre. Så som vi mäter egenskapen ensamhet har den

denna karaktär. Man kan vara mer eller mindre ensam. Jag valde att studera mått på ensamhet och socialt deltagande för att studera om spridningen av ensamhet ökar med ökande ålder. Min fråga var: Ökar spridningen av uppmätt av ensamhet och socialt deltagande med ökande ålder. Med ökad spridning menas då att spridningen över kategorier som aldrig ensam, ensam ibland, ofta ensam och alltid ensam blir mer jämn. Om spridningen blir mer jämn så vet man på förhand mindre om hur ensam en människa är som jag träffar. Detta är viktigt för att i den allmänna uppfattningen, attityden, om äldre ingår att de är ensamma. Om spridningen ökar med ökande ålder så blir den allmänna uppfattningen alltmer felaktig ju äldre befolkningen blir. En sådan attityd kan då kallas för åldersdiskriminering eller ålderism. Jag valde att studera social delaktighet mätt på sju olika sätt och fann att spridningen ökar med ökande ålder för 6 av dessa sätt att mäta. I den sjunde så varken ökade eller minskade spridningen. Min slutsats blev att det finns en ökande spridning som står i kontrast till en attityd, som jag anser är ett uttryck för ålderism.

I vetenskapen är vi vanligtvis inte tillfreds med att studera hur enskilda egenskaper varierar. Vi vill gärna kunna relatera flera egenskaper till varandra. Till exempel är vi intresserade av om utbildning lönar sig. En fråga kan vara: Får svenskar med längre utbildning i genomsnitt högre lön? I min studie valde jag dels att studera om personer med fler tecken på sjukdom eller bristande fysiska funktioner dör tidigare än de med färre sådana tecken och dels att studera om personer med levnadsvanor som antas vara skadliga också dör tidigare än de med andra levnadsvanor. Såväl tecken på sjuklighet som olika levnadsvanor har svårutredda relationer till överlevnad. I min studie jämför jag en traditionell metod för att studera överlevnad, binär logistisk regression, med en metod, som är mer ovanlig, men som avses kunna klara analyser av förhållanden som bestäms av flera faktorer som sinsemellan påverkar varandra. Denna senare metod, analys med hjälp av artificiella neurala nätverk, har utvecklats inom forskning om artificiell intelligens. Metoderna har olika för och nackdelar. Detta arbete gjorde jag i samarbete med Valter Sundh från avdelningen för geriatrik vid Sahlgrenska akademien, Göteborgs Universitet. Våra frågor var: Ger de två metoderna olika resultat vid analyser och hur kan vi använda likheten eller skillnaderna i analysresultaten i fortsatta studier? Våra resultat visade på att de båda metoderna fungerade ungefär lika bra vid analyserna av hur levnadsvanorna påverkade överlevnad, medan de artificiella neurala nätverksanalyserna på ett mycket bättre sätt kunde förutsäga överlevnad när de medicinskt relevanta variablerna användes.

En slutsats av detta är att de medicinska data antagligen innehåller strukturer, som vi inte förstår, men som ger en bättre förutsägelse om överlevnad byggt på artificiella neurala nätverk jämfört med vad vi får fram med den binära logistiska analysen. En andra slutsats är att de artificiella neurala nätverksmodellerna kan användas för att uppskatta hur bra vanliga regressionsmodeller fungerar. Om man får bättre resultat med de artificiella neurala nätverksmodellerna finns det skäl att fortsätta försöken att förstå data med hjälp av traditionella metoder, medan man kan vara mer tillfreds med sina resultat om de binära logistiska regressionerna ger likvärdiga resultat.

Här skulle jag kunna stanna. Jag har visat på variationer och möjliga förutsägelser, men vetenskapare är i allmänhet inte nöjda med att kunna förutsäga förhållanden. Vi vill också kunna förklara de förutsägelser vi kan göra utifrån data. Ett sådant sätt är att tolka data och förutsägelser med hjälp av etablerade teorier. I denna avhandling visar jag på hur levnadsvanor kan påverka hälsan med hjälp av tre teorier, som jag utvecklar för ändamålet. Det gemensamma temat för hur hälsan påverkas är att teorierna förklarar hur en känsla av sammanhang produceras tillika med meningsfulla aktiviteter, som ger den belastning av mänskliga funktioner, som krävs för att dessa funktioner skall bibehållas och förbättras.

I det näst sista arbetet står några centrala sociologiska teorier i fokus. Först använder jag mig av E. Durkheims teori om sociala fakta vilken jag kombinerar med J.L. Austins teori om performativa handlingar så att jag kan analysera vad jag kallar sociala fakta information. Denna information påstår jag dessutom är viktig för identitetens utformning och underhåll, vilket är av särskild vikt för äldre personer.

För det andra använder jag mig av E. Durkheims teori om nomi- och anomi- skapande processer för hur självvärdering åstadkoms. Dessa processer sätts in i en institutionell ram, som hämtar sina grunder från T. Parsons. Med hjälp av denna teori visas på den stora variationen av handlingar som finns på samhällsliga arenor. Detta är särskilt viktigt för den äldre människan då åldrandet kan karaktäriseras i termer av risk att förlora sociala kontakter, fysiska och psykiska förmågor samt arenor för självvalda aktiviteter. Både denna och den föregående teorin visar på hur känslor av sammanhang och aktiviteter stimuleras, vilka leder till bättre hälsa.

I det sista teoretiska arbetet utgör samtalsanalysen grunden där betydelsen av vardagliga samtal lyfts fram. Vardagssamtal är en viktig del i mänsklig gemenskap och samtal med förtrogna är av särskild vikt. I de vardagliga samtalen (1) bestäms vilken situation med vilka handlingsalternativ som står till buds, (2) reduceras vardagsångest, (3) fattas beslut, (4) tränas uppmärksamhet, tankeförmåga och minneskapacitet, (5) skapas och återskapas deltagarnas identitet, (6) formuleras deltagarnas motivation i vad jag kallar drömmar och (7) skapas och återskapas sociala relationer. Alla dessa funktioner leder till ett mer aktivt liv, som befördrar hälsan.

De tre teoretiska bidragen skapandet av sociala fakta, skapande av nomi och funktionen hos vardagssamtal ger, menar jag, en teoretisk förståelse av hur aktivitet samt känslor av sammanhang och delaktighet skapas i vardaglig interaktion. Dessa mekanismer utgör delar av förklaringen till varför social delaktighet leder till bättre hälsa och längre överlevnad.

Slutsatser: i mina studier har jag

- 1) visat på en möjlig institutionell åldersdiskriminering när dödsorsaker registreras.
- 2) rapporterat ökande olikhet mellan åldrande människor, som står i strid med den stereotypa uppfattningen om gamla som ensamma.
- 3) rapporterat för- och nackdelar när logistisk regression (LR) och artificiella neurala nätverk (ANN) använts för att förutsäga överlevnad under en 7-årsperiod. Vidare att ANN dels kan användas för att bedöma om det finns mer information att utvinna, som LR inte funnit och dels användas vid förutsägelser i situationer där utfallet är resultatet av många samverkande faktorer och där andra metoder inte ger så bra resultat.
- 4) utvecklat och föreslagit sociologiska teorier, som kan bidra till förståelsen av hur sociala förhållanden kan påverka hälsa och överlevnad. Detta sker bland annat genom skapande av sociala fakta, skapande av nomi, skapande av själkänsla och känslor av sammanhang samt genom vardagliga samtal. I vardagssamtalen minskas vardagsoro, bestäms situationer, stärks beslutsförmåga, tränas hjärna och minne, stärks identitet, formuleras drömmar om vad jag vill delta i samt skapas och bibehålls sociala nätverk.



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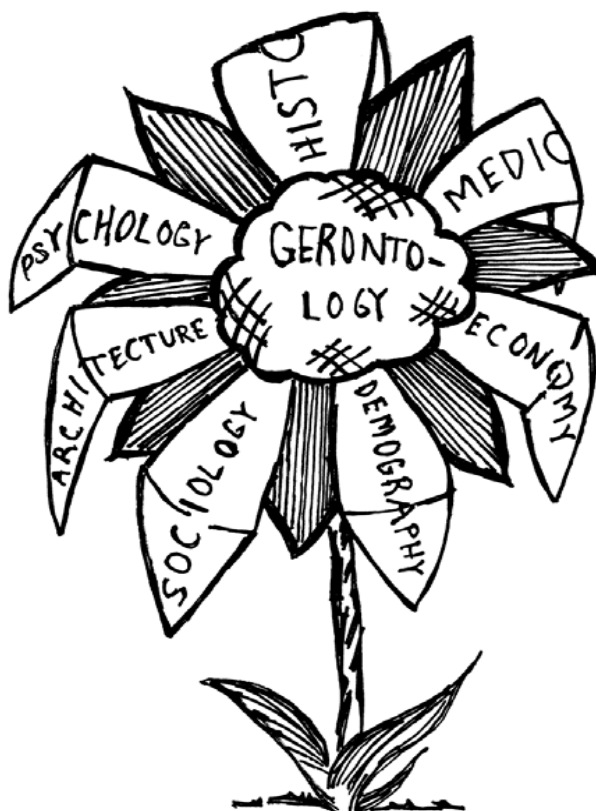
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