

Reports from the project

Individual Development and Adaptation

**WOMEN'S HEALTH, WORK, AND EDUCATION IN
A LIFE-SPAN PERSPECTIVE**

**Technical report 1: Theoretical background and overview
of the data collection**

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The research program Individual Development and Adaptation (IDA) was initiated by David Magnusson in 1964 and was led by him until 1996 when Lars R. Bergman became the principal investigator.

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Foreword

This data collection has taken the effort of many people. Foremost I want to thank David Magnusson and Magnus Sverke. David initiated and led the IDA-program for over 30 years until 1996 and laid a solid foundation to the new data collection. The unique strength of the new data only emerges when they are combined with the old data going back to age 10. Magnus Sverke was my right-hand man and project coordinator through the whole data collection. He carried the heavy burden of the responsibility for the day-to-day work of a complex data collection organization. His dedicated effort and skillful work has kept the project running on the right track.

Our medical staff engaged in the intensive psychological-medical investigation, Eva Carlsson, Gunilla Friman, Lena Hugmark, and Agneta Valhjalt did an extremely fine job in collecting the medical information at the clinic and also in motivating our participants. The psychological part of this investigation, as well as the "clinic hostess" function, were carried out efficiently by Eva Nyqvist, Carina Moqvist, and Mariann Palmér. Statistics Sweden was sub contracted to carry out the personal interview part (with Anette Björnram as their investigator). They did a very good job and also achieved a high participation rate. We also thank our colleagues Ulf Lundberg and Mats Palmér who took the responsibility for the data collections of stress hormones and bone density, respectively. They did this very professionally and Mats and his team took care of the whole data collection at his clinic. Sheilagh Hodgins and Micheline Lapalme contributed much to the design and monitoring of the SCID data collection.

Throughout we have had a strong support from the unit for community medicine at Örebro County Council, and in particular Bo Werner and Sirkka Elo have contributed to the new data collection in many ways.

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Last but not least we want to thank our wonderful reference group consisting of four participants: Lena Kuremyr, Helli Malers, Kerstin Monks, and Maria Åvall. To be able to several times discuss the design of the data collection and receive very good advice have been extremely useful.

Stockholm, January 4, 2000

Lars R. Bergman

1. INTRODUCTION

This is the first technical report from the data collection within the IDA program directed to the women in the main group at the age of 43. It was carried out in 1998. The theme of the data collection was *Women's health, work, and education in a life-span perspective*. This report includes a fairly comprehensive theoretical background and brief descriptions of certain currently planned projects using the new data. A short overview of the data collection is also given to be followed by more detailed descriptions in ensuing technical reports.

Much less research effort has been spent on studying female adjustment, work and health than on studying its male counterparts. Several reasons for this have been proposed such as the fact that more senior researchers are male than female, males have more "visible" problems that disturb society and cost money, and so on (for an overview, see, Adelson & Doerhman, 1980). In fact, a very limited number of longitudinal studies have concentrated on female development and, not infrequently, theories about female development and the emergence of adjustment problems are simply "extrapolations" of theories developed on mainly male samples (Gilligan, 1988). A changing society with changing demands on women lead to different life conditions for women. These changes include many improvements but also carry an increased risk for stress and role conflicts, etc., and all these factors impact women's development in various ways.

The aim of the data collection just finished is to provide the data for a coherent research effort for understanding the developmental processes in females leading to good or bad adjustment with regard to certain aspects of work, mental and physical health, social relations, and family life. A large number of researchers from psychology and medicine will be involved, together covering a variety of research areas. The site of the program is at the Stockholm Laboratory for Developmental Science, Department of Psychology, Stockholm University. Research will also be carried out at other departments to which members of the program belong.

An overview of a number of research projects that currently are planned is given in Appendix 1.

2. THE NEW DATA COLLECTION WAS CARRIED OUT WITHIN THE FRAMEWORK OF THE IDA PROGRAM

The IDA program and its data base is the basis for the research program proposed here. IDA, has been evaluated both nationally and internationally and it has been pointed to:

- The coherent theoretical background provided by the holistic-interactionistic paradigm.
- The comprehensive data base with data of a high quality which makes possible both a broad and a deep study of individual development.
- The emergence within the program of a methodology especially suited to the study of individual development from an interactionistic perspective.

2.1 The theoretical framework

A holistic-interactionistic theoretical framework has guided the IDA program from the beginning. It can briefly be characterized in the following way:

- It implies a perspective in which individuals are seen as coherent wholes, involving both psychological, biological and social factors.
- The individual is part of a complex dynamic person-environment system containing many sub systems at different levels. Each subsystem is a whole containing many parts but also part of a system at a higher level. The delineation of “the right” subsystem to study in relation to the problem of interest is of decisive importance.
- The different factors in a sub system form together a whole that is more than the parts that constitute the sub system. Their relations in a specific case is normally in a state of balance and each value of the configuration describing the subsystem is “adjusted” to the other values.
- Interactions and reciprocal causality between the factors of a subsystem are the rule rather than the exception.
- In spite of the almost infinite complexity of the person-environment dynamical system it is often to be expected a structure and simplicity in the main features of how the systems operate and manifest themselves in the studied individuals (Bergman & Magnusson, 1997).
- Within this theoretical framework, a person-oriented approach is natural in which the available information about an individual is viewed mainly as a whole or a small number of sub wholes (often operationalized as value profiles or patterns in a number of measured variables). This is in contrast to the conventional variable-oriented approach concentrating on the parts and with the variable as the main conceptual and analytical unit. The person-oriented approach has been developed within the program and methods suitable to pursue it have also been devised, partly within the IDA-program (see Section 2.2). This approach is seen by us as a valuable complement to a more conventional variable-oriented approach.

The theoretical framework briefly indicated above is founded in the interactionistic, holistic research paradigm that is now emerging within the new developmental science (Cairns et al, 1996; Magnusson, 1996). Many contributions have been given by David Magnusson (Magnusson & Allen, 1983; Magnusson, 1985; Magnusson & Törestad, 1992; Magnusson, in press) and the theoretical framework of the IDA program has been presented in a book (Magnusson, 1988). The person approach is summarized in Bergman and Magnusson (1997) and in Magnusson (1998). The theoretical work is carried on, partly within the IDA program, by David Magnusson and Lars Bergman.

Of course, on a general and somewhat superficial level there is nothing new in the main ideas of a holistic paradigm. They were discussed already at the end of the nineteenth century by William James (James, 1890) and many researchers have theoretically and empirically entered the area (for instance Allport, 1937; Block, 1971; Cairns, 1979). What is new is a consistent, detailed theoretical structure that is related to the modern thinking concerning nonlinear dynamical systems that has emerged within the natural sciences

The promise and potential of the holistic-interactionistic paradigm and that it is in line with emerging trends within a much broader field than developmental psychology has been documented in different ways. One example is the Nobel symposium arranged by David Magnusson in 1994 on the theme individual development. The symposium was cross-disciplinary and perspectives from both the social sciences, medicine, and the natural sciences were represented. Many of the world leading researchers on individual development participated and a unanimous conclusion from the symposium was the paramount importance of a holistic perspective and the danger of the present day fragmentation of research, especially within the social sciences (Magnusson, 1996).

Starting from the theoretical framework presented above, several conclusions can be drawn concerning the planning of a research program with the purposes stated here:

1. A longitudinal design is necessary where the women are followed from childhood to middle-age. To understand the process of individual development you have to follow the same individuals over the time period of interest. All other approaches are indirect and, although sufficient for other purposes, are not adequate for our purpose of finding mechanisms explaining the developmental courses of individuals (see, for instance, Bergman, 1993; McCall, 1977; Wohlwill, 1973). Short-cuts relying on retrospective questions introduce serious problems of data quality and cannot provide information about many areas of interest. Many of our research questions will also rely on information covering long periods in the individuals lives. The importance of longitudinal studies was emphasized by the European Science Foundation which gave longitudinal research the highest priority in the establishment of European scientific networks. The first network to be established in 1985 was *The European Network for Longitudinal Studies on Individual Development*, led by David Magnusson.
2. Cohort effects can be important to consider, see, for instance Schaie (1965, 1983). For this purpose a variety of designs are available, preferably using longitudinal data from more than one cohort as outlined by Baltes and Nesselroade (1979). There are, however, reasons to believe that often mean levels are more sensitive to cohort differences than the structure of relationships and the nature of operating mechanisms. These two last aspects are at focus here. Our evaluation is that for most central problems we so far have planned to study, the one-cohort longitudinal design will be adequate. Nevertheless, for some purposes, a two-cohort design would be highly useful. In another context, David Magnusson, Magnus Sverke, and Glen Elder plan to apply for the funding of a new data collection on the IDA Pilot Group to carry out such a study.
3. Adjustment is far from a unidimensional phenomenon. The adjustment process contains a large number of interwoven components, both psychological, biological and social, and it is important to have a reasonably broad picture of the different aspects of the process. As far as possible, this picture should be considered even if only very limited aspects can be focused on in a specific study. Of relevance is the so called "co-morbidity" phenomenon stating that many adjustment/health problems tend to co-occur in the same individual (Caron & Rutter, 1991).

4. Good adjustment is something different from the mere absence of bad adjustment and the mechanisms that lead to exceptionally well-functioning individuals are also highly important to charter. They may be of a different nature from those leading to a bad adjustment and, hence, not only differ in “input values” in one and the same mechanism. This is also a topic of current interest in psychology. For instance, Martin Seligman, stated the importance for psychology of studying this area in his APA presidential address. Within the health area the difference between good health and absence of disease has been long recognized (WHO, 1958, p. 459).
5. In many cases, the standard arsenal of methods used within the social sciences is not suited to the demands raised by conducting research within the theoretical framework described above. Standard methods must be complemented by new methods of which the person approach developed within the IDA program is one example.

2.2 Methodological work within the IDA program

As mentioned in the previous section, methodological work is carried out within the IDA program with regard to longitudinal research methodology and the person approach. Three aspects of this work is here of special relevance:

1. The development of strategies and methods for carrying out the above mentioned person approach (Bergman, in press; Bergman & Magnusson, 1983, 1987, 1990, 1991, 1997; Magnusson & Bergman, 1984, 1988; Magnusson, 1998). Different methods for studying profiles and patterns over time have been explored and have often implied a classification approach where groups of individuals with homogenous developmental patterns are formed (Bergman, 1988, 1991). One major method developed within the program is the LICUR method for cross-sectional classification followed by longitudinal linking (Bergman, 1998). The interest has also focused on methods for studying so called “unique” persons with developmental patterns unlike all other persons’ patterns. A new method is under development that will identify “white spots” in developmental data, i.e. developmental paths that for some reason are *not* followed. We have also developed a statistical package for person-oriented analyses, called SLEIPNER, that can do most of the analyses mentioned above (Bergman & El-Khoury, 1998).
2. Research undertaken with the purpose of transferring and transforming methods for studying nonlinear dynamic systems developed in the natural sciences (NOLIDS) to the study of individual development within our areas. Lars Bergman has started a project with that purpose financed by HSFR (see Kelso, in press, and Thelen & Smith, 1998, for overviews). So far only a small number of exploratory studies have been undertaken where the newly developed ISSA and ISOA methods for descriptive developmental analysis have been introduced. These methods are “hybrids” between ordinary person-oriented methods and NOLIDS (Bergman, 1995; Bergman & El-Khoury, in press). The ultimate goal is to be able to model development using NOLIDS so that the process of change is modeled (*dynamic* modeling) in contrast to the ordinary statistical modeling in which a model of the data is constructed (*static* modeling).

3. The new data collection has been a highly complex undertaking, including both an extensive personal interview with many hand-outs and several different studies in the laboratory. Issues of securing data quality were then important and the work concerning measurement techniques undertaken by Lars Bergman might here be useful. He initiated and led the Measurement, Evaluation and Development Laboratory (MED) at Statistics Sweden and, among other things, devised procedures for developing and testing questionnaires (Bergman, 1995; Bergman et al., 1994; Bergman & Wärneryd, 1982).

Of course, a vast amount of methodological work is carried out by many research groups around the world that is highly relevant to us. For instance, concerning the use of structural equation modeling (SEM) for different purposes, including the simultaneous modeling at different aggregation levels and latent growth curves (Gustafson, 1996; Jöreskog & Sörbom, 1989; McArdle & Epstein, 1987; Raykov, 1996, and others). A more person-oriented approach is presented by Collins and Wugalter (1992) in the form of Latent Transition Analysis which can be used for studying the development of discrete latent classes. Configural Frequency Analysis provides tools for studying all possible value patterns longitudinally (Krauth & Lienert, 1982; von Eye, 1990a, b). Issues of intra- versus interindividual variability in the context of studying living systems will also be carefully considered as discussed by Nesselroade and Featherman (1989) and Nesselroade and Ford (1987). Another useful approach is event history analysis (Mayer & Brandon, 1990).

2.3 The new high performance computer

Recently, the IDA research group, together with professor Lars-Göran Nilsson, received funding for a high performance computer. This will enable us to develop computer intensive methods for hypothesis testing in classification settings and for the study of dynamic systems. The system will also be completely sealed off, containing no possibilities for e-mail, etc. This will increase the security of the system with regard both to sabotage though virus, etc., and with regard to the confidentiality of the information stored.

2.4 Main features of the data bases of the IDA program

The IDA-program was initiated by David Magnusson in the beginning of the sixties and he has led it for over thirty years until 1996 when Lars Bergman became the principal investigator but with Magnusson still taking an active role in the program.

The first data collection was made in 1965 for three complete school-grade cohorts of children aged about 10, 13, and 15, respectively. The youngest one, called the *main group*, and the one aged 13 in 1965, called the *pilot group*, have been followed up to adult age. Each cohort comprises about 1400 boys and girls. Extensive information was collected from different sources:

From the children themselves information was collected about, for instance, intelligence, school performance, adjustment to school, anxiety, psychosomatic symptoms, mobbing, vocational preferences.

From the teachers information was collected about, for instance, ratings of aggression, motor restlessness, lack of concentration, certain symptoms.

From the parents information was collected about, for instance, education and vocation, conditions of living, family situation in general and problems with the child.

From peers information was collected about, for instance, social relations.

Test information was collected about, for instance, achievement and intelligence.

Register information was collected from official records about, for instance, school marks and number of hours absent from school.

In the second data collection, three years later when the main group participants were in grade 6 and the pilot group participants in grade 9, approximately the same data collection was repeated but with three important additions: (1) For a representative sample of ca 240 children from the main group a medical examination was undertaken including the measurement of the excretion of stress hormones, EEG, and physical capacity. This group is called the *biomedical* sample. (2) Extensive information was collected concerning various aspects of vocational preferences. (3) Information about self-reported criminality was collected for the males in the pilot group.

In grades 7-9 additional data collections were carried out for the main group. The same type of data that had already been collected was collected again and in addition to that two age-relevant questionnaires were given, namely one about norm breaking and norm groups and another one concerning self-reported symptoms of teen-age girls.

Additional data collections were carried out during the high school years (grades 10-12) mostly related to experiences of the school situation and issues of relevance to vocational and educational behavior. Ability test data were also collected for those attending the theoretical stream in grade 12.

At early adult age several mail questionnaire surveys were carried out directed to different groups, focusing on education, vocation, family and job situation. At age 26, the main group was studied in this way and the biomedical subsample was also interviewed, medically examined and tested in the laboratory.

In addition to the above mentioned information, data have been collected from official records about criminality, alcohol abuse and health problems.

For detailed descriptions of the earlier data collections the reader is referred to Magnusson, Dunér, and Zetterblom (1975), to Magnusson (1988), and to Magnusson and Bergman (1997).

The new data collection for females at age 43 is reported in Section 3.

2.5 Issues of ethics and confidentiality

Issues of confidentiality and data protection have always been taken very seriously within the IDA program. For instance, only code numbers are used on the data base with the key in our safe. Data about identifiable persons never leave our research group. The computer work is carried out at our laboratory in Stockholm and data files with information about persons are not disseminated to other research groups. For further information it is referred to our brochure entitled "Fundamental Ethical Rules in Longitudinal research".

In 1986 the IDA-program was examined by the ethical committee of HSFR and given a very positive evaluation. With regard to the new data collection: Extensive written information approved by the Swedish Data Inspection Board was given to all participants beforehand. A special form of informed consent was also given to those participating in the medical part. A general permission from the Data Inspection Board has already been obtained and their directions are carefully followed. For the medical part we have obtained permission from the ethical committee of the county hospital of Örebro (RSÖ). A reference group consisting of four subjects was formed for the new data collection and they have taken part in the planning, including the questionnaire construction. It proved to be very useful.

3. THE NEW DATA COLLECTION FOR FEMALES AT AGE 43

3.1 Overview of design and variables

In order to study women's work, health and education in a life-span perspective a new data collection was carried out for the women in 1998 (n=639 eligible cohort members). They were then approximately 43 years old. It contained the following parts:

A comprehensive personal interview focusing on work and family (n=569 participants). The interview protocol was modified from that used by the Swedish Level of Living Survey and we are grateful for their permission to do so. Important areas covered also social relations, attitudes to work, femininity-masculinity, distribution within the family of responsibilities and actual work carried out with regard to the home and family, self-reported health, and more. In the context of the personal interview a number of questionnaires were also administered, either as hand-outs or as leave-afters. They are listed in Table 1.

An intensive psychological-medical investigation (n=369 participants). It was directed to women living in the county of Örebro or living elsewhere but belonging to the biomedical sample of IDA. A thorough physical health examination was carried out by a physician and a number of health questionnaires were also filled out by the subjects. Psychological tests were given as well as a psychiatric interview of every second woman based on the SCID protocol (n=205 participants). The instruments used are listed in Table 2.

A study of stress hormones. The excretion of stress hormones was measured at the job and in the women's homes. Both urine and saliva samples were taken and catecholamines and cortisol measured. This study was restricted to those living in the Örebro area (n=218 participants).

A study of bone density. The investigation of bone density was carried out at the county hospital of Örebro (RSÖ). This study was also restricted to those living in the Örebro area (n=339 participants).

Table 1. List of instruments relating to the personal interview in the new data collection

Hand-outs

Pupils questionnaire
Social relations
Work related attitudes and experiences (employees)
Experiences of present unemployment (the unemployed)
Health related questions

Leave-afters

Parentel questionnaire
Work values
Domestic work
Female identity
Union-related attitudes and experiences (union-members)
Union related attitudes and experiences (non-members)
Life goals and questions about the future
Perceived stress scale
Life event history (Lifeline)

Table 2. List of instruments relating to the intensive psychological-medical examination

Questionnaires filled in by the medical staff

Psychiatric interview (SCID)
Physical health
Medical questionnaire
Neck and shoulder problems
Memory tests

Self-administered questionnaires

Life satisfaction
Alcohol and drugs
Karolinska scales of personality (KSP-questionnaire)
Right- or lefthanded
Mental health questionnaire
Woman's safety
Positive and negative affectivity
Some questions about being on the sick-list

3.2 Participation and drop out

The females in the main cohort consisted originally of all girls who were in the school system of Örebro in grade 3 1965 (n=512). Girls who moved into the community took part in the data collections at higher ages and were added to the cohort. Girls who moved away from the community were still retained in the cohort. At adult age it had grown to n=682 women. When the new data collection started, 639 of these women could be approached in the new data collection and they constituted the frame¹. The participation and drop out of these women in the different parts of the new data collection are reported in Table 3. Of course, in addition to the dropout we report here, a certain partial dropout occurred, especially for the leave-afters in the personal interview. It amounts to about 5-10 percent of the participants for most instruments.

¹Of the 682-639=43 women, 9 died before 1990, 17 were not in the national registers (having died after 1989, moved abroad or received a new personal id). 13 women had previously been de-identified or had expressed a strong wish not to take part in any new data collection, and 4 women had erroneously been excluded from the frame.

Table 3. Participation and drop out in the new data collection

Part of the new data collection	Number of women participating	Total number of eligible women in the cohort	Participation rate in percent
Personal interview	569	639	89.0
Intensive psychological-medical investigation, not counting SCID	369	479	77.0
SCID interview	205	479 (~247 were sub sampled)	Calculation of part. rate complicated, see below
Investigation of stress hormones	218 (excluding 8 self-selected women)	347	62.8
Investigation of bone density	333	440	75.7

It should be pointed out that, in a strict sense, the participation rate is somewhat lower than that reported above. In the case of the personal interview we could use the number of all living women in the cohort in the denominator (n≈670) and for the intensive psychological-medical investigation we could use in the denominator all living women in the cohort who either lived in the Örebro region or belonged to the biomedical subsample (n≈500). The two participation rates then become 85 percent and 74 percent, respectively.

To aid the reader in understanding the character of the data collection and in the dropout generating process the following description is given for each part of the new data collection separately:

Personal interview study. The data collection agent was Statistics Sweden. All women in the total cohort with the exceptions given above were approached. Of all interviews, 21 were by telephone with those who initially had refused but were possible to contact anyway.

The intensive psychological-medical investigation, not counting SCID. The eligible women in the cohort for this study were those of the n=639 women who lived in the county of Örebro and/or belonged to IDA:s previously studied biomedical sub sample (n=479). All women who participated in the personal interview and fulfilled the criteria just mentioned were approached. In addition, a selection of 18 women from the drop out in this study were also approached. Thirty-two of the potentially eligible women in the cohort were not approached because it was feared they would resent this.

The SCID investigation. It was planned to be the last part of the half-day of intensive psychological-medical examination. The psychiatry sector of the Örebro County Council had promised that the psychiatrists we had previously trained should be available for the project. However, it became clear after the data collection had run for some months that, for various reasons, they could only partly manage this. Therefore we could only carry out SCID interviews for approximately a little more than half the women who participated in the intensive psychological-medical investigation at the clinic. At the *first phase* of this SCID data collection, whether a women took part in a SCID interview or not (which took place last in the half-day at the clinic) depended on the availability of a psychiatrist. At this stage 164 SCID interviews were carried out and no one who came to the clinic refused to take part in the SCID, if it was offered. However, the nurse who scheduled the visits to the clinic had the impression that a few persons avoided/sought the SCID interview by rescheduling their time at the clinic to a time when there was not/was a psychiatrist available (the exact number is hard to estimate but is probably around five). Hence, the n=164 persons participating in SCID at this stage can be considered reasonably representative of all persons who took part in the intensive psychological-medical investigation. At the *second phase* of the SCID-data collection, additional SCID interviews were made by contacting a random sample of those not previously interviewed. They had then to come to the clinic for a second time only for this purpose. In this second phase, 83 women were approached for an interview and 41 were interviewed, indicating a very high drop-out at this stage. If only phase 1 cases are considered, as will be done in some studies, the participation rate, taking the sub sampling into consideration, is 77.0 percent. If the total sample of n=205 cases are considered, the weighted participation rate is much lower, namely 55.3 percent. A thorough analysis of the participation and drop out in the SCID-interview is necessary but is deferred to a later publication.

The investigation of stress hormones. All women living in the vicinity of Örebro was offered this opportunity (n=347). It put a heavy strain on the participants who had to collect urine and saliva samples at both work and at home but was also logistically complicated for our staff who had to make sure the participants collected and stored the samples in an appropriate way. Our staff then had to collect the samples.

The investigation of bone density. All women who took part in the medical examination and who lived in the Örebro region were asked to participate (n=440). If they belonged to the biomedical subsample the investigation was of a whole-body type, otherwise only a partial examination was carried out.

APPENDIX 1. OVERVIEW OF CURRENTLY PLANNED PROJECTS

It is planned for a large number of researchers within psychology and medicine to collaborate in using the IDA data base. Most of them are listed in the overview of research projects given below.

Since a long time the IDA program has a well developed collaboration with the Center for Developmental Science, University of North Carolina at Chapel Hill. Up to his tragic death on November 10, 1999 it was led by professor Robert B. Cairns who also directed the Carolina Longitudinal Study (CLS) in which two cohorts of altogether about 700 children have been followed from childhood to adult age. The IDA program and the CLS program have many interests in common and this collaboration will continue and will be expanded to the whole Center for Developmental Science. The collaboration will involve several disciplines and a great number of distinguished scientists. For this purpose, we have been funded by STINT. Among other things we have created an annual institute on developmental science for the training of young scientists and for initiating international cooperation. The third institute will be held in Chapel Hill on May 11-18 this year.

Of course, the IDA program and all the involved researchers cooperate with a large number of different research groups, both nationally and internationally, but for the sake of brevity these activities are not described here. However, of special interest may be the cooperation we have developed over the years with the longitudinal program led by professor Lea Pulkkinen at the University of Jyväskylä, Finland. The similarities between her program and ours makes possible the replication and elaboration of results (of course, this also applies to the CLS program).

The scientific work will be carried out within our common holistic-interactionistic theoretical framework presented above but will, of course, in each specific case mainly be developed within the theoretical framework of the area under investigation. To present all these different frameworks here is not feasible.

Work and spare-time activities

(Professor Gunn Johansson, Department of Psychology, Stockholm University, has the main responsibility for this area.)

Knowledge about job related factors in psychology has so far been based largely on cross-sectional studies. The few exceptions when truly longitudinal information has been collected over different life stages (for instance, Valliant, 1977) cannot compete with the IDA database with regard to comprehensiveness, quality of the sample and possibilities for generalization. The research questions below are of primary interest.

1. **The interplay between a person's work life and other life.** The increased participation of the women in the labor force has brought attention to the balance between the job and the other activities in a woman's life, especially the family life.
2. **Early causes of vocational success and work related attitudes.** Within the IDA program we have a rich set of information from the women's childhood that can contribute to the explanation of success/failure in their work life and to understanding job attitudes, centrality of work, involvement in trade unionism, etc. The interplay between the type of job a woman has, her personality, and her personal development is rarely studied and a longitudinal approach is almost totally lacking.
3. **Present health and job history.** So called job exposure matrices (JEMs) are planned to be used and related to the health of our sample of women who are in their forties. Since we have information about a host of other possibly important factors dating *before* the job exposures, these factors can be controlled for.

Education

(Dr. Magnus Sverke, Department of Psychology, Stockholm University, has the main responsibility for this area.)

Very rarely data are available that enable the study of individual educational careers in a life-span perspective (with a few exceptions, see Husén et al., 1969). IDA's large data base makes this possible and against a background of a variety of relevant information from other areas. The following research questions are considered as central:

1. **What factors decide if a woman obtains a higher education?** It is well-known that women to a lesser degree than men invest in so called "prestigious" forms of higher education and training that lead to well-paid jobs (like medical school, civil engineering training, etc.). Now the women are middle-aged and, essentially, education is finished. From a societal and educational policy viewpoint it is of importance to find out, for instance, what may have hindered many capable women from obtaining a higher education.
2. **What is the educational life-cycle of women today?** The threefold role of many women as working, mothers, and those primarily responsible for the family, including the household work, can obviously create difficulties in achieving a higher education, especially "according to plan". Often the education or training must be deferred to periods in the life-cycle agreeing with these three roles. The extent and form of these obstacles, and how they are met are important questions to answer.

Physical health

Psycho social stress factors and their importance for physical health

(Professor Ulf Lundberg, Department of Psychology, Stockholm University, has the main responsibility for this area.)

Many major health problems in the industrialized world have a complex and imperfectly understood etiology. Stress and other psycho social factors seem often to be of importance, together with physical factors and the individual's genetical make-up, personality and life-style (Frankenhaeuser, 1991; Frankenhaeuser & Gardell, 1976; Lundberg et al., 1989). Research within this area has so far been concentrated to cardio-vascular diseases but the most common and most expensive health problem in the modern work environment is different types of back and neck troubles. In the Nordic countries, the costs of job absence, medical treatment and early retirement caused by such illnesses amount to 3-5% of the grand national product. They have been shown to have a background where psychosocial factors and muscle tension created by stress play important roles (Bongers et al., 1993; Lundberg et al., 1994). Based on the encompassing IDA-data base we plan to carry out the following studies:

- 1. What is the importance of paid work and unpaid work (i.e., household work, children, etc.) for mental and physiological stress and for the diseases this might bring?** Here the impact of monotonous job tasks are of special interest.
- 2. What is the interaction between individual characteristics, environmental characteristics and psycho social conditions in the process generating good/bad health?** For instance, what characterizes women that have developed a health-promoting life-style and what characterizes women that have developed a life-style that is harmful?
- 3. Can we create a testable model of the process leading to health risks and emerging diseases?** Here a number of factors have to be included, for instance, education, personality and the establishment of a life-style that is health-promoting or harmful as well as psycho social and economic stress factors and job characteristics. An especially important link in this process is the activation of the HPA-system which, among other things, increases the risk for diabetes and cardio-vascular diseases (Björntorp, 1993, 1996).

Community medicine and public health

(Dr. Bo Werner and Ms. Sirkka Elo, Unit for Community medicine, the County Council of Örebro, have the main responsibility for this area.)

The research described in this section is applied and the results will be used for planning health care in the Örebro region where the subjects live. The availability of a wealth of information about these women from the IDA-data base makes it possible to understand

and explain their health situation in the community in a way that cannot be done by an ordinary epidemiological study. Three lines of inquiry are briefly described below.

1. **The impact of the rising unemployment in the Örebro area on well-being and health.** The changed situation in the Swedish society with a much higher level of unemployment and trimmed social benefits can create serious problems especially for women who are single mothers and who are without sufficient resources and education.
2. **Violence against women.** There is a vital need for further knowledge about violence and threats of violence against women (cf. Bergman, 1987; Hydén, 1992).
3. **Use and misuse of medicine.** About 9-15 percent of the population sometimes use tranquilizers and sleeping pills (Bengtsson, 1994; Isacson & Haglund, 1988). This use is more frequent among women than among men (Cafferrata et al, 1983) and might lead to dependence and addiction and to a kind of "medicine co-morbidity" (Hemminki et al., 1989).

The menopause and female risk factors for disease

(Dr. Katarina Bremme, Institute for Obstetrics and Gynaecology, Karoliska Hospital has the main responsibility for this area.)

Women are, on the average, ten years older than men when they develop cardio-vascular diseases. A number of female risk factors are the classical ones: High blood pressure, smoking, diabetes and high levels of blood fats. For women, important factors are also lack of estrogen, metabolic changes and coagulation and fibrinolysis. A raised estrogen level affects many of the risk factors in a positive way because of the blood vessel dilatory effect. In short, this means that hormonal level is an important health factor for women and that the reduced estrogen level in the menopause can be a health hazard. The few studies made on women suggest that after the menopause they run the same risk as men do or even a larger risk of developing cardio-vascular diseases and that they often come out worse after a myocardial infarction. We do not now have sufficient knowledge about risk factors for women to start effective programs of intervention.

It is urgent to start chartering the specific female risk factors, both hormonal, psychosocial and stress related which lead to cardio-vascular diseases. By studying the women in the IDA program 5-10 years before the expected menopause we will obtain early information about a large variety of possible risk factors which can be related to other information we have about these women and form a preliminary basis for a discussion of preventive measures. At a later stage when the disease process has advanced far enough to give a sufficient number of cases, a new data collection must be made to be able to do the linking between risk factors and outcomes.

Bone density in a normal sample of women aged 43. Prevalence and precursors of osteoporosis.

(Associate professor Mats Palmér, Department of Internal Medicine, The Regional Hospital of the County Council of Örebro, has the main responsibility for this area)

When the new data collection for females already were planned and ready to start we were offered the opportunity to add an investigation of bone density to the data collection, supported by the County Council of Örebro. This information concerns a potential health problem that is highly relevant to study for Swedish women, considering our high prevalence of osteoporosis which is only surpassed by that of Norway. Here it will be possible to investigate a variety of factors in the women's present and earlier life that may be related to a low/high bone density (e.g., various medical parameters, life-style factors, upbringing conditions, etc.).

Mental health

Early factors behind suicidal behavior

(Professor Marie Åsberg, Department of Clinical Neuroscience, Psychiatry Section, Karolinska Hospital, has the main responsibility for this area.)

Suicide is an important cause of early death, before the age of 65 one of the most common causes. About 20 per 100 000 inhabitants commit suicide each year which is more than twice the number of persons who die in road accidents. Considering that there may be ten or more suicide attempts for every "successful" suicide, the importance of the problem and the suffering it signals become apparent. This situation is unacceptable from a public health point of view.

A preliminary and rough estimate we have made indicates that we can expect 10-20 women who have at some time committed a suicide attempt or seriously considered doing it. For most of them this is a repetitive trauma. To this should be added an unknown number of women with less serious thoughts in this direction. Hence, the IDA data base is large enough to study suicidal behaviors and thoughts.

Retrospective studies indicate that more than 90 percent of those who commit suicide fulfill the diagnostic criteria of at least one mental disorder. Perhaps especially vulnerable are those characterized by a so called "borderline personality disorder". Prevention and treatment directed against such disturbances might decrease the death rate caused by suicide.

The general outline presented above leads to the following research questions:

1. **What is the prevalence of attempted suicide and thoughts about suicide among a sample of women from the normal population?** Information relevant for this purpose has been collected in the new IDA data collection both in the medical examination part and in the SCID psychiatric interview. An effort will be made to obtain information also about the natural history of the phenomenon for each women.
2. **What is the importance of early disturbances in mental and physiological development for the emergence of personality disorders and suicidal acts?** This central issue is best studied using prospective longitudinal data of the type the IDA data base offers. As far as we know, there is no other study that has data of a comparable quality for elucidating the whole chain early disturbance-personality disorder-suicidal acts.

Mental disorders and psychosocial impairment

(Professor Sheilagh Hodgins, Department of Psychology, University of Montreal, Canada, is responsible for this area.)

The prevalence of certain forms of severe mental disorder is in most developed countries higher for women than for men and increasing (Klerman & Weissman, 1992). Recent estimates indicate that at least one fifth of the women will succumb, at least once, to the most serious form of depression (major depression; Kessler et al., 1994). These high prevalences for depression in women are especially worrisome when you take into account that we know mental disease can afflict an immense suffering, not only for the affected woman but also for her family (Klerman & Weissman, 1992). Mentally disordered mothers have a very negative impact on their children and this, of course, especially affects children who have inherited a vulnerability to mental disease (Hodgins, 1995; Kratzer & Rubin, 1994).

Although for each specific severe mental disorder, probably only a few women will be found in the sample, these numbers are sufficient for approximate estimates of prevalences for important groups of disorders. We are also interested in estimating the number of women in the borderland of these severe disorders and for those we will obtain larger numbers.

Against this brief background two central research questions emerge:

1. **What is the natural history of the common mental disorders in a life-span perspective?** This issue is important in several ways:
 - As background knowledge about our most common mental disorders it is vital to know the typical ways in which it appears (and disappears) in specific individuals.
 - To create better instruments for diagnosis. This especially applies to endogenous depression where we still have apparent problems of diagnosis (Spitzer et al., 1992). The use of the SCID instrument in the new IDA data collection in combination with longitudinal information from the IDA data base is here highly useful.

- As a starting point for explaining the mechanisms behind mental disorders. The scope of the early information about the subjects in the IDA program make possible studies of mechanisms behind the emerging diseases that no other study we know of can accomplish.

2. **Mental disorders and antisocial behavior.** It was pointed out above that mental disorders often are related to severe disturbances in the social functioning and to antisocial behavior. Effective preventive measures cannot be taken until this complex process is more fully understood.

The process of social adjustment

Social development

(Professor David Magnusson, Department of Psychology, Stockholm University, has the main responsibility for this area)

One issue of interest in the IDA-program from the start has been the study of the developmental pathways underlying adult mental and physical health problems in terms of alcohol abuse, criminal activity and mental illness.

During the teenage period, more male youngsters than are normally recognized are registered for crime. However, before the age of 18 most of them conform; only a small number proceed with criminal activities after that age. In a series of studies, using data from the IDA-program, we have shown that juvenile delinquents (those that are registered for crime only before the age of 18) and persistent criminals (those that are registered for crimes both before and after the age of 18) differ with respect to developmental pathways in a number of ways (Magnusson, 1998).

This result *per se* has essential consequences for prevention and treatment. It has also important implications for further developmental research in three interrelated respects: (a) for the development of appropriate general models for individual development, (b) For the application of appropriate research designs, and (c) for the application of statistical models and methods for data treatment. During the period for which funding here is sought, these implications and the questions they raise will be the focus of research. A central concept in the planning of these studies is that of co-morbidity. It implies an extension of the studies on criminal activity to include alcohol abuse and mental illness in the total picture of adult mental and physical health problems.

Social relations

(Professor Håkan Stattin, Department of Social Sciences, Örebro University, has the main responsibility for this area.)

How social relations are created, maintained and developed have from the beginning been a major focus of interest within the IDA program. One aspect of this has been a

chartering of existing relations with regard to the important reference groups: Parents, peers and the opposite sex. Another aspect has been the interaction between relations within these different major areas (Stattin & Magnusson, 1990). Knowledge about how the relations developed during the formative years is important when now the purpose becomes to investigate social relations in middle-age, when they can be assumed to have stabilized.

The following research questions are at focus:

1. **The continuity and change in a person's social relations in a life-span perspective.**
2. **Social relations at adult age as indicators of adjustment and quality of life.** A person's way of relating to others is an important aspect of that person's adjustment. Shallow and unstable relations often indicate social maladjustment and an earlier history of different types of adjustment problems.
3. **Social adjustment in the larger perspective of other aspects of the adult woman's life situation.** An important issue is to study the impact of job related stress, life events, etc. on the social relations of the person, both within the family and outside the family. The main analyses are planned to be prospective where early factors are related to adult social relations and other factors.
4. **The dependability of retrospective information about social relations.** A number of retrospective questions were put in the new data collection for which we have information about the correct answers from earlier data collections. The analyses of the subjects' hits and misses in these respects can have implications for the planning of surveys using retrospective questions. This research is done in cooperation with memory researchers.

Alcohol use and addiction

(Associate professor Tommy Andersson, Center for Alcohol and Drug Prevention, has the main responsibility for this area.)

High alcohol consumption and alcohol addiction are more common among men than among women but during the last decades this difference has decreased in Sweden, especially among the young. Today we estimate that about 20-25 percent of the alcohol addicts are women with a prevalence of alcohol abuse of about five percent for middle-aged women (Spak & Hallström, 1995). We have a very incomplete knowledge about the causes of the increasing alcohol abuse for women but it is believed that changed sex roles, increased participation in the labor force and "self-medication" play important roles (Wilsnack & Wilsnack, 1992). There is a consensus that the evolvement of women's alcohol addiction follows a different pattern than men's addiction do and that the consequences in many cases are more severe for women. Longitudinal studies that make possible studying individual developmental patterns with regard to addiction and in relation to other factors seem not to exist, except for the IDA program.

Against this background, three research questions are central:

1. **Women's alcohol habits in a life-span perspective.** Broadly speaking, information is lacking about this basic issue (Andersson, 1988).
2. **What are the relationships of alcohol problems to other adjustment problems?** It is well known, mainly from studies on men, that alcohol problems are related to many other adjustment problems. How do these couplings emerge for women in a life-span perspective?
3. **Mechanisms behind alcohol addiction in women.** The IDA data base offers a unique possibility for studying the mechanisms involved in the emergence of female alcohol addiction or in protecting against addiction.

Factors and processes in the development of good adjustment as contrasted to those leading to bad adjustment

(Professor Lars R. Bergman, Department of Psychology, Stockholm University, has the main responsibility for this area.)

The emergence of a person's adult adjustment is a long process and to explain the outcome at adult age the subjects must be followed from childhood and onwards using a longitudinal approach (Bergman, 1991). From an interactionistic perspective it is important to cover both extrinsic and intrinsic aspects, i.e. both the adjustment to the demands and expectations from others (e.g., achievement, aggression, hyperactivity), and the person's own experience of adjustment (e.g. happiness-unhappiness, anxiety, self-esteem; Bergman & Magnusson, 1991). Broadly speaking, good adjustment has been much less studied than bad adjustment.

From this background the following three aims of the project emerge:

1. **Finding out about the natural history of women's adjustment reactions from childhood to middle-age with a focus on good adjustment.** The emphasis is on individual patterns of adjustment reactions. An interesting contrast is here offered by Rönkä and Pulkkinen's study of the accumulation of problems of social functioning (Rönkä & Pulkkinen, 1995) relating to Bergman and Magnusson's (1997) concept of problem gravitation.
2. **Understanding more of the process that enables many women coming from a high-risk environment avoid developing adjustment problems.** Most girls growing up in high-risk environments overcome their environmental disadvantages and do not show adjustment problems at adult age. Understanding more about the mechanisms that achieved this will help in identifying protective factors that can be used in prevention. This is an area that has drawn attention in the last decade but largely confined to the youth period (e.g., Jessor et al., 1995; Kellam & Rebok, 1992; Luthar, 1993; Rutter, 1988; Stattin & Magnusson, 1996).

3. **Finding the personal characteristics and settings that appear to promote a genuinely good adjustment.** Real, genuinely good adjustment is something completely different from merely the absence of bad adjustment and is in itself an important object for scientific study. This perspective is now beginning to come into the focus of interest as symbolized by the APA presidential address by Seligman 1998 (see also Cowen, 1991).

Personality and cognition

Personality and psychobiology

(Professor Britt af Klinteberg, Department of Psychology, Stockholm University, and professor Lars Oreland, Department of Medical pharmacology-BMC, Uppsala, have the main responsibility for this area.)

Some types of behavior and personality characteristics have been shown to be related to biochemical factors. For instance, aggression and hyperactivity are related to a low excretion of adrenaline and to a low monoaminoxidas activity (af Klinteberg & Magnusson, 1989; af Klinteberg & Oreland, 1995). It is well known that the serotonin system of the brain is involved in impulse control and that a well functioning system is related to a low degree of impulsivity and sensation seeking. These two behaviors are sometimes used as explanatory factors, for instance of some types of addiction problems and antisocial disturbances. In Sweden we have for a number of years worked with the enzyme monoaminoxidas (MAO) in trombocytes which seems to be a genetic marker for personality traits that predispose the individual to addiction and social maladjustment but also to suicidal behavior (Oreland & Hallman, 1995). Studies show that MAO is an indicator of serotonic function.

Two central research questions concern:

1. **The longtime stability of MAO and the relationships between MAO and fundamental individual characteristics.** Information on this point is lacking for women in the general population. New IDA data combined with already collected information from IDA can be used to elucidate this issue. It is fundamental as a background to understanding the mechanism that couples MAO to behavior and personality.
2. **Biochemical markers and patterns of social competence.** Within the IDA program there exists comprehensive knowledge in almost a life-span perspective about the women concerning social competence, antisocial behavior and personality. We now have a solid basis for finding stable patterns of individual personal characteristics and then identifying their couplings to the biochemical markers, primarily MAO. In this way we hope to come one step further than has been achieved by ordinary correlational studies.

Memory: Relation to other personality characteristics, aging and dementia

(Professor Lars-Göran Nilsson, Department of Psychology, Stockholm University, has the main responsibility for this area.)

There is a consensus in memory research that memory functioning is best understood with reference to a classification of the memory into different memory systems with different functions. In the dominating system of classification a separation is made between one short term memory system and four long term memory systems (procedural, perceptual, semantic and episodic). Nilsson et al. (1996) have shown in the so called Betula study that all these five types of memory, except the procedural memory, can best be studied longitudinally for clarifying how memory change in a developmental perspective and how memory relates to a variety of psychological, biological and social variables.

The above mentioned four types of memory functioning were measured in the new IDA data collection. The access within IDA to comprehensive early information about cognitive functioning but also to other personal characteristics establish a basis for understanding the developmental background of individual differences in memory functioning. These results can then be integrated with ongoing research within the Betula program about memory development into old age. By combining results from the IDA program and the Betula program, a life-span perspective can be applied and early signs of dementia can be studied. We know of no other sets of data in the world that can be used for this purpose.

Integrating studies: The application of an interactionistic approach to obtain a broad perspective

(Professor Lars R. Bergman and professor David Magnusson, both at the Department of Psychology, Stockholm University, have the main responsibility for this area.)

Most research within the IDA-program is carried out within the holistic-interactionistic paradigm (Magnusson, 1988) but normally focuses on very limited aspects of an individual's functioning. This is often necessary to reach a sufficient depth in the analysis - you have to blow up a part to see the small details. What is said here, of course, also largely applies to the projects briefly presented in this application. But this "low key" interactionistic approach needs to be complemented by studies trying to take a birds' eye view of the issues and understand the major inter-connected paths in which development occurs. Therefore, we also want to find models for the simultaneous illumination of the major dimensions of adjustment (including health) and social competence and the processes that regulate their interactive development (Magnusson & Stattin, 1998; Susman, 1993). Such an overall picture, albeit incomplete, can also be useful as a way of uniting the multitude of results that will emerge from the different projects.

The IDA-data base will be used for this integrative purpose and analyses will be carried out using techniques for pattern analysis and models for the study of nonlinear dynamic systems (Bergman, 1991, 1998; Bergman & Magnusson, 1997; Magnusson, 1998). In addition to the theoretical and methodological work that was described under the heading of the IDA- program, this line of research is exemplified in the project "Factors and processes in the development of good adjustment as contrasted to those leading to bad adjustment".

REFERENCES

- Adelson, J., & Doerhman, M.J. (1980). The psychodynamic approach to adolescence. In J. Adelson (Ed.), *Handbook of adolescent psychology* (pp. 97-117). New York, NY: Wiley.
- Allport, G.W. (1937). *Personality: A psychological interpretation*. New York, NY: Holt, Rinehart and Winston.
- Andersson, T. (1988). *Alkoholvanor i ett utvecklingsperspektiv*. Psykologiska Institutionen, Stockholms Universitet.
- Baltes, P.B., & Nesselroade, J.R. (1979). History and rationale of longitudinal research. In J.R. Nesselroade & P.B. Baltes (Eds.), *Longitudinal research in the study of behavior and development* (pp. 1-39). New York, NY: Academic Press.
- Bengtsson, C. (1994). *Livsvillkor, levnadsvanor och hälsa i Örebro län*. Samhällsmedicinska enheten, Befolkningssenkäten, 1994.
- Bergman, B. (1987). *Battered wives, why are they beaten and why do they stay?* Akademisk avhandling. Stockholm: Karolinska Institutet.
- Bergman, L.R. (1988). You can't classify all of the people all of the time. *Multivariate Behavioral Research*, 23, 425-441.
- Bergman, L.R. (1991). Studying change in variables and profiles. In J.B. Asendorpf & J. Valsiner (Eds.), *Framing stability and change: An investigation into methodological research*. Newburg, CA: Sage.
- Bergman, L.R. (1991). Sex differences in vulnerability: A commentary to Nordberg et al.'s article. *Acta Paediatrica Scandinavica*, 80, 1250-1252.
- Bergman, L.R. (1993). Some methodological issues in longitudinal research: Looking ahead. In D. Magnusson & P. Casaer (Eds.), *Longitudinal research on individual development: Present status and future perspectives* (pp. 217-241). Cambridge: Cambridge University Press.
- Bergman, L.R. (1995). Pretesting procedures at Statistics Sweden's Measurement, Evaluation and Development Laboratory. *Journal of Official Statistics*, 11, 309-323.
- Bergman, L.R. (1998). A pattern-oriented approach to studying individual development: Snapshots and processes. In R.B. Cairns, L.R. Bergman, & J. Kagan (Eds.), *Methods and models for studying the individual* (pp. 83-121). Thousand Oaks, CA: Sage.
- Bergman, L.R. (in press). A person approach in research on adolescence: Some methodological challenges (Special Issue). *Journal of Adolescent Research*.
- Bergman, L.R., & El-Khoury, B.M. (1998). *SLEIPNER. A statistical package for pattern-oriented analyses*. Version II. Stockholm University: Department of Psychology. (Manual)

- Bergman, L.R., & El-Khoury, B.M. (1999). Studying individual patterns of development using I-states as object analysis (ISOA). *Biometrical Journal*, 41, 753-770.
- Bergman, L.R., & Magnusson, D. (1983). Analys av deltagande och bortfall i intensivundersökningarna i 27-årsåldern (An analysis of participation and drop-out in the biological subsample at age 27). Psykologiska Institutionen, Stockholms Universitet. Projektet "Individuell Utveckling och Miljö", Nr. 53.
- Bergman, L.R., & Magnusson, D. (1987). A person approach to the study of the development of adjustment problems: An empirical example and some research strategy considerations. In D. Magnusson & A. Öhman (Eds.), *Psychopathology: An interactional perspective* (pp. 383-401). Orlando, FL: Academic Press.
- Bergman, L.R., & Magnusson, D. (1990). General issues about data quality in longitudinal research. In D. Magnusson & L.R. Bergman (Eds.), *Data quality in longitudinal research* (pp. 1-31). Cambridge: Cambridge University Press.
- Bergman, L.R., & Magnusson, D. (1991). Stability and change in patterns of extrinsic adjustment problems. In D. Magnusson, L.R. Bergman, G. Rudinger, & B. Törestad (Eds.), *Problems and methods in longitudinal research: Stability and change* (pp. 323-346). Cambridge: Cambridge University Press.
- Bergman, L.R., & Magnusson, D. (1997). A person-oriented approach in research on developmental psychopathology. *Development and Psychopathology*, 9, 291-319.
- Bergman, L.R., Kristiansson, K.E., Olofsson, A., & Säfström, M. (1994). Decentralised CATI versus paper and pencil interviewing: Effects on the results in the Swedish Labour Force Surveys. *Journal of Official Statistics*, 10, 181-195.
- Bergman, L.R., & Wärneryd, B. (1982). *Om datainsamling i survey-undersökningar. Vilken metod är bäst och vad får vi egentligen veta?* (Data collection in surveys.) Stockholm: Liber.
- Björntorp, P. (1993). Visceral obesity: A "Civilization Syndrome". *Obesity Research*, 1, 206-222.
- Björntorp, P. (1996). The regulation of adipose tissue distribution in humans. *International Journal of Obesity*, 20, 291-302.
- Block, J. (1971). *Lives through time*. Berkeley, CA: Bancroft Books.
- Bongers, P.M., de Winter, C.R., Kompier, M.A.J., & Hildebrandt, V.H. (1993). Psychosocial factors at work and musculoskeletal disease. *Scandinavian Journal of Work Environment, & Health*, 19, 297-312.
- Cairns, R.B. (1979). *Social development: The origins and plasticity of interchanges*. San Francisco, CA: Freeman.
- Cairns, R.B., Elder, G.H., Jr., & Costello, E.J. (1996). *Developmental science*. Cambridge: Cambridge University Press.
- Cafferata, G.L., Kasper, J., & Bernstein, A. (1983). Family roles, structure, and stressors in relation to sex differences in obtaining psychotropic drugs. *Journal of Health and Social Behavior*, 24, 132-143.
- Caron, C., & Rutter, M. (1991). Comorbidity in child psychiatry: Concepts, issues and research strategies. *Journal of Child Psychology and Psychiatry*, 32, 1063-1080.
- Collins, L.M., & Wugalter, S.E. (1992). Latent class models for stage-sequential dynamic latent variables. *Multivariate Behavioral Research*, 27, 131-157.
- Cowen, E.L. (1991). In pursuit of wellness. *American Psychologist*, 46, 404-408.

- Eye, A. von (1990a). Configural frequency analysis of longitudinal multivariate responses. In A. von Eye (Ed.), *Statistical methods in longitudinal research*, Vol. 2 (pp. 545-570). New York, NY: Academic Press.
- Eye, A. von (1990b). *Introduction to configural frequency analysis. The search for types and antitypes in cross-classifications*. Cambridge: Cambridge University Press.
- Frankenhaeuser, M. (1991). A biopsychosocial approach to work life issues. In J.V. Johnson & G. Johansson (Eds.), *Work organization, democratization and health* (pp. 49-60). Baltimore, MD: Baywood Publications.
- Frankenhaeuser, M., & Gardell, B. (1976). Underload and overload in working life: Outline of a multidisciplinary approach. *Journal of Human Stress*, 2, 35-46.
- Gilligan, C. (1988). Adolescent development reconsidered. In C. Gilligan, J.V. Ward, J.M.Taylor, & B. Bardige (Eds.), *Mapping the moral domain: A contribution of women's thinking to psychological theory and education* (pp. vii-xxxix). Cambridge, MA: Harvard University Press.
- Gustafson, J.-E. (1996). *Nytt program för multivariat analys-STREAMS Structural equation modeling made simple*. Gothenburg University: Multivariate Ware.
- Hemminki, E., Terdock, M.J., Rahkonen, O., & Mc Kinlay, S.S. (1989). Clustering and consistency of use of medicines among mid-aged women. *Medical Care*, 27, 859-867.
- Hodgins, S. (1995). *Une recension des écrits portant sur les facteurs de risque des troubles mentaux graves*. Report commissioned by the Conseil québécois de la recherche sociale.
- Husén, T., with Emanuelsson, I., Fägerlind, I., & Liljefors, R. (1969). *Talent, opportunity and career. A twenty-six year follow-up of 1500 individuals*. Stockholm: Almqvist & Wiksell.
- Hydén, M. (1992). Woman battering as a marital act: The construction of a violent marriage. *Stockholms Studies in Social Work*, 7.
- Isacsson, D., & Haglund B. (1988). Psychotropic drug use in a Swedish community: The importance of demographic and socioeconomic factors. *Social Science and Medicine*, 26, 477-483.
- James, W. (1890). *The principles of psychology*. New York: Holt.
- Jessor, R., Bos, J. van den, Vanderryn, J., Costa, F.M., & Turbin, M.S. (1995). Protective factors in adolescent problem behavior: Moderator effects and developmental change. *Developmental Psychology*, 31, 923-933.
- Jöreskog, K.G., & Sörbom, D. (1989). *LISREL 7: A guide to the program and applications*. SPSS Publications.
- Kellam, S.G., & Rebok, G.W. (1992). Building developmental and etiological theory through epidemiologically based preventive intervention trials. In J. McCord & R.E. Tremblay (Eds.), *Preventing antisocial behavior: Interventions from birth through adolescence* (pp. 162-195). New York, NY: Guilford Press.
- Kelso, J.A.S. (in press). Principles of dynamic pattern formation and change for a science of human behavior. In L.R. Bergman, R.B. Cairns, L.-G. Nilsson, & L. Nystedt (Eds.), *Developmental science and the holistic approach*. Mahwah, NJ: Erlbaum.
- Kessler et al. (1994). Lifetime and 12-month prevalence of DSM-III-R psychiatric disorders in the United States. *Archives of General Psychiatry*, 51, 8-19.
- Klerman, G.L., & Weissman, M.M. (1992). The course, morbidity, and costs of depression. *Archives of General Psychiatry*, 49, 831-834.

- af Klinteberg, B., & Magnusson, D. (1989). Aggressiveness and hyperactive behaviour as related to adrenaline excretion. *European Journal of Personality*, 3, 81-93.
- af Klinteberg, B., & Orelund, L. (1995). Hyperactive and aggressive behaviors in childhood as related to low platelet monoamine oxidase (MAO) activity at adult age: A longitudinal study of male subjects. *Personality and Individual Differences*, 19, 373-383.
- Krauth, J., & Lienert, G.A. (1982). Fundamentals and modifications of configural frequency analysis (CFA). *Interdisciplinaria*, 3, Issue 1.
- Lundberg, U., Granqvist, M., Hansson, T., Magnusson, M., & Wallin, L. (1989). Psychological and physiological stress responses during repetitive work at an assembly line. *Work and Stress*, 3, 143-153.
- Lundberg, U., Kadefors, R., Melin, B., Palmerud, R., Hassmén, P., Engström, M., & Elfsberg Dohns, I. (1994). Psychophysiological stress and EMG activity of the trapezius muscle. *International Journal of Behavioral Medicine*, 1, 354-370.
- Luthar, S.S. (1993). Annotation: Methodological and conceptual issues in research on childhood resilience. *Journal of Child Psychology and Psychiatry*, 34, 441-453.
- Magnusson, D. (1985). Implications of an interactional paradigm for research on human development. *International Journal of Behavioral Development*, 8, 115-137.
- Magnusson, D. (1988). Individual development from an interactional perspective. In D. Magnusson (Ed.), *Paths through life* (Vol. 1). Hillsdale, NJ: Erlbaum.
- Magnusson, D. (1996). *The lifespan development of individuals: Behavioral, neurobiological and psychosocial perspectives*. Cambridge: Cambridge University Press.
- Magnusson, D. (1998). The patterning of antisocial behavior and autonomic reactivity. In D.M. Stoff & R.B. Cairns (Eds.), *The neurobiology of clinical aggression*. Mahwah, NJ: Erlbaum.
- Magnusson, D. (1998). The logic and implications of a person approach. In R.B. Cairns, L.R. Bergman, & J. Kagan (Eds.), *Methods and models for studying the individual* (pp. 33-63). Thousand Oaks, CA: Sage.
- Magnusson, D. (in press). The individual as the organizing principle in psychological inquiry -a holistic approach. In L.R. Bergman, R.B. Cairns, L.-G. Nilsson, & L. Nystedt, *Developmental science and the holistic approach* (pp. 33-47). Mahwah, NJ: Erlbaum.
- Magnusson, D., & Allen V.L. (1983). Implications and applications of an interactional perspective for human development. In D. Magnusson & V.L. Allen (Eds.), *Human development: An interactional perspective* (pp. 369-387). Orlando, FL: Academic Press.
- Magnusson, D., & Bergman, L.R. (1984). On the study of the development of adjustment problems. In L. Pulkkinen & P. Lyytinen (Eds.), *Human action and personality essays in honour of Martti Takala* (pp. 163-171). Jyväskylä, Finland: University of Jyväskylä.
- Magnusson, D., & Bergman, L.R. (1988). Individual and variable-based approaches to longitudinal research on early risk factors. In M. Rutter (Ed.), *Studies of psychosocial risk: The power of longitudinal data* (pp. 45-61). Cambridge: Cambridge University Press.
- Magnusson, D., & Bergman, L.R. (1997). Individual development and adaptation: The IDA program. *Reports from the Department of Psychology*, Stockholm University, No. 841.

- Magnusson, D., & Stattin, H. (1998). Person-context interaction theories. In R.M. Lerner (Ed.), *Theoretical models of human development*. Vol. 1: Handbook of child psychology (5th ed.) New York, NY: Wiley.
- Magnusson, D., & Törestad, B. (1992). The individual as an interactive agent in the environment. In W.B. Walsh, K. Craig, & R. Price (Eds.), *Person-environment psychology: Models and perspectives* (pp. 89-126). Hillsdale, NJ: Erlbaum.
- Magnusson, D., Dunér, A., & Zetterblom, G. (1975). *Adjustment: A longitudinal study*. Stockholm: Almqvist & Wiksell.
- Mayer, K.U., & Brandon Tuman, N. (1990). *Event history analysis in life course research*. Wisconsin: The University of Wisconsin Press.
- McArdle, J.J., & Epstein, D. (1987). Latent growth curves within developmental structural equation models. *Child Development*, 58, 110-133.
- McCall, R.B. (1977). Challenges to a science of developmental psychology. *Child Development*, 48, 333-344.
- Nesselroade, J.R., & Featherman, D.L. (1989). Intraindividual variability in older adults' depression scores: Some implications for developmental theory and longitudinal research. In D. Magnusson, L.R. Bergman, G. Rudinger, & B. Törestad (Eds.), *Problems and methods in longitudinal research. Stability and change* (pp. 47-66). Cambridge: Cambridge University Press.
- Nesselroade, J.R., & Ford, D.H. (1987). Methodological considerations in modeling living systems. In M.E. Ford & D.H. Ford (Eds.), *Humans as self-constructing living systems. Putting the framework to work* (pp. 47-79). Hillsdale, NJ: Erlbaum.
- Nilsson, L.-G., Bäckman, L., Nyberg, L., Erngrund, K., Adolfsson, R., Bucht, G., Karlsson, S., Widing, G., & Wilblad, B. (1996). The Betula prospective cohort study: Memory, health, and aging. *Aging and Cognition*.
- Oreland, L., & Hallman, J. (1995). The correlation between platelet MAO activity and personality - a short review of findings and discussion on possible mechanisms. In P.M. Yu, K.F. Tipton, & A.A. Boulton (Eds.), *Progress in Brain Research: Vol. 106 "Current neurochemical and pharmacological aspects of biogenic amines: their function, oxidative deamination and inhibition"* (pp. 77-84). New York, NY: Elsevier.
- Raykov, T. (1996). *Strukturgleichungsmodelle zur Veränderungsmessung in der Psychologie*. Berlin: Humboldt Universität, Mathematisch-Naturwissenschaftlichen Fakultät II.
- Rönka, A., & Pulkkinen, L. (1995). Accumulation of problems in social functioning in young adulthood: A developmental approach. *Journal of Personality and Social Psychology*, 69, 381-391.
- Rutter, M. (1988). *Studies of psychosocial risk: The power of longitudinal data*. Cambridge: Cambridge University Press.
- Schaie, K.W. (1965). A general model for the study of developmental problems. *Psychological Bulletin*, 64, 92-107.
- Schaie, K.W. (1983). *Longitudinal studies of adult psychological development*. New York, NY: Guilford.
- Spak, F., & Hallström, T. (1995). Prevalence of female alcohol dependence and abuse in Sweden. *Addiction*, 90, 1077-1088.
- Spitzer, R.L., Williams, J.B.W., Gibbon, M., & First, M.B. (1992). The structural clinical interview for DSM-III-R (SCID). I. History, rationale, and description. *Archives of General Psychiatry*, 49, 624-629.

- Stattin, H., & Magnusson, D. (1990). *Pubertal maturation in female development*. Hillsdale, NJ: Erlbaum.
- Stattin, H., & Magnusson, D. (1996). Antisocial behavior - a holistic perspective. *Development and Psychopathology*, 8, 617-645.
- Susman, E.J. (1993). Psychological, contextual, and psychobiological interactions: A developmental perspective on conduct disorder. Toward a developmental perspective on conduct disorder (Special Issue). *Development and Psychopathology*, 5, 181-189.
- Thelen, E., & Smith, L.B. (1998). Dynamic systems theory. In R.M. Lerner (Ed.), *Handbook of child psychology. Theoretical models of human development* (pp. 563-634). New York, NY: Wiley.
- Vaillant, G.E. (1977). *Adaptation to life*. Boston: Little, Brown & Co.
- Wilsnack, W., & Wilsnack, S. (1992). Woman, work, and alcohol: Failures of simple theories. *Alcoholism, Clinical and Experimental Research*, 16, 2:172-179.
- Wohlwill, J.F. (1973). *The study of behavioral development*. London: Academic Press.
- World Health Organization (1958). *The first ten years of the World Health Organization*. Geneva: World Health Organization.