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Salutogenic childhood factors reported by middle-aged individuals

Follow-up of the children from the Lundby study grown up in families experiencing three or more childhood psychiatric risk factors

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Abstract This study is salutogenic (= causes of health), focusing on factors which corresponded to good mental health in subjects who had been exposed to at least three child psychiatric risk factors when growing up. The material was drawn from a prospective, longitudinal population study on mental health, the Lundby Study, which was performed in three waves in 1947, 1957 and 1972. In 1988/89, 148 individuals then 42–56 years of age, were re-visited and interviewed about their life span experiences. Factors previously found to increase stress resilience in children and adolescents were identified. The personal dispositions during childhood found to be associated with adult positive mental health were childhood positive self-esteem, successful coping, internal locus of control and intellectual capacity. Childhood family factors, such as trusting relations with a parent and shared values, were also important. Antonovsky's sense of coherence model can be used to explain the mechanisms by which the different variables can lead to health through increasing an individual's capacity for comprehensibility, manageability and meaningfulness, the three concepts of sense of coherence.

Key words Salutogenesis · The Lundby-study · Stress resilience · Mental health · Childhood factors

Introduction

Since the 1970s many researchers studying children of psychotic parents, mainly schizophrenics, have shifted their focus from looking at risk factors to looking at factors explaining stress resilience. (Bleuler 1978; Kauffman et al. 1979; Anthony 1974; Garmezy 1974, 1981; Graham et al. 1973; Fischer et al. 1987; Musick et al. 1987; Worland et al. 1987; Seifer et al. 1992): Interest in stress resilience was expanded to studies of children growing up in other high risk environments like inner city slums (Garmezy and Nuechterlein 1972; Garmezy 1987; Wyman et al. 1992; Gribble et al. 1993), children from low socioeconomic groups (White 1985), children at risk for abuse and neglect (Farber and Egeland 1987) and children from multi-problem families (Lösel et al. 1992).

Two early studies starting in the 1950s on normal children also described stress-resilience and coping (Murphy and Moriarty 1976; Werner et al. 1977, 1982, 1989, 1992). In her later studies, Werner focused on the 30% of her cohort who were considered at risk, because they had experienced four or more child psychiatric risk factors before the age of 2 years. She followed her cohort longitudinally until the age of 32. The other studies were either cross-sectional or else followed the children at most until they were 20 years of age.

Two longitudinal studies of men from teenage until late adulthood were carried out by Vaillant and co-workers. One was conducted when the subjects, the Core City sample, were between 14 and 47 years of age (Felsman and Vaillant 1987). The other group, "the Grant men", was followed between the age of 18 and 65 years (Vaillant 1977; Vaillant and Vaillant 1990).

The studies on resilient children in high-risk environments covered several factors proposed to be protective. Many variables recurred in the different studies but a theory unifying the various protective factors has not yet been developed. Vaillant and Werner used Homburger Erikson's epigenetic model of psycho-social development (Erikson 1980) as an underlying theory in their works. Most other authors have mentioned "coping" as an important concept. This was first described by Murphy and Moriarty (1976) who wrote "the term coping includes cognitive functioning as well as normal defensive strategies. Children who are good copers are able to mold and manipulate the environment assertively, to deal with its pres-

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sures successfully and to comply with its demands passively and dependently. Good copers have the capacity to tolerate frustration, to handle anxiety and to ask for help when they need it." Many of the various concepts studied in investigations of stress resilience in childhood and adolescence can be interpreted as "coping resources". They can be divided into two groups:

Individual factors increasing resilience in children and adolescents found by different investigators are:

A good social capacity (= sociability) described as being socially open, cooperative and having an open, kind and calm behaviour. (Rutter 1979; Rutter et al. 1979; Garmezy 1981, Garmezy and Rutter 1983; White 1985; Werner 1989). Many researchers proposed positive self esteem (Bleuler 1978; Rutter 1979; Garmezy 1981; Garmezy and Rutter 1983; Werner 1985) and autonomy to be phenomena furthering stress resilience (Garmezy 1981; Anthony 1974; Werner 1985).

Successful coping i.e. the capacity to solve problems and handle developmental and traumatic crises, has been stressed by many authors (Garmezy 1981; Murphy and Moriarty 1976; Rutter 1979; Anthony 1974; Werner 1985; Lösel et al. 1992). Intelligence and creativity have been put forth (Garmezy 1981, 1987; Rutter 1979; White 1985; Anthony 1974; Lösel et al. 1992; Offord 1974). The development of special interests and hobbies during childhood has been mentioned (Werner 1985). An inner locus of control and good impluse control were stated by Werner (1985, 1989) and Garmezy (1981; Garmezy, Rutter 1983). High activity and energy were pointed out by Murphy and Moriarty (1976) and Werner 1985).

One of the protective *environmental factors* proposed was: being the only child in the family during the first 4 years of life (Hirschi 1969). Werner (1985) also stated that "having four or less children spaced more than 2 years apart in the family" was a protective factor. Werner also listed "mother has some steady employment outside of household" as a protective factor. Bleuler (1978) and Rachman (1979) have proposed that "required helpfulness" was a protective factor, since it allowed the child to develop a feeling of self-worth, self-reliance and autonomy. Many authors have pointed out that having a "trusting and intimate relationship" with at least one parent was a protective factor (Anthony 1974; White 1985; Rutter 1979; Beardslee 1989; Seifer et al. 1992). A "significant other" (Mead 1962, Rutter 1979; Garmezy 1981; Garmezy, Rutter 1983; Kauffman 1979) has been shown to be important, i.e. an adult outside the family that the child could connect with and identify with, who could be a role model, a source of support and a compensation for insufficient parenting. Werner also pointed out as protective factors that there had been additional caretakers besides the mother. Care by siblings and grandparents and availability of kin and neighbours for emotional support were important in her study. Certain qualities of the inner life of the family have also been pointed out. Clearly defined delineation of subsystems within the family (Garmezy 1981; Garmezy, Rutter 1983) and structured rules in the household (Coopersmith 1967; West 1973; Werner 1985; Garmezy 1987; Grinker 1963; Wyman et al. 1992) increased stress resilience, while a high degree of involvement in family entanglement was destructive (Hoover and Franz 1972).

The importance of a positive parent/child relation in early childhood characterised among other things by open and trustful communication has been pointed out by Werner (1985), Garmezy and Rutter (1983), Garmezy (1987) and Gribble et al. (1993).

Shared values between the generations have also been stressed by Werner who also pointed to the importance of availability of counsel by teachers and/or ministers and access to special services (health, education, social services).

Vaillant and Vaillant (1990) studied the development of subconscious defense mechanisms and how his subjects handled the different stages of Homburger Erikson's (1980) epigenetic model. He was also interested in the importance of individual characteristics like intelligence and temperament for a healthy development. He did not, however, focus on coping, which can be defined as conscious behavioural and emotional attempts to deal with a stressor.

In reference to the subjects studied in this paper, we have previously shown (Dahlin et al. 1990, Dahlin and Cederblad 1993) that certain concepts, which we propose increase the capacity for successful coping, were correlated to positive mental health. One finding was a moderately high correlation with an internal locus of control and mastery. The other finding was a moderately high correlation with a sense of coherence. This concept was developed by Antonovsky (1979, 1987) in the framework of what he called "the salutogenic model". "Salutogenesis" is the concept he proposed to be used for the orientation which seeks to understand the emergence of health. The sense of coherence, he hypothesized, is the answer to the salutogenic question, and defined it (Antonovsky 1987) as:

"a global orientation that expresses the extent to which one has a pervasive, enduring though dynamic feeling of confidence that

1. the stimuli deriving from one's internal and external environments in the course of living are structured, predictable, and explicable;

2. the resources are available to one to meet the demands posed by these stimuli; and

3. these demands are challenges, worthy of investment and engagement".

The person with a strong sense of coherence, Antonovsky hypothesized, confronting stressors, is capable of clarifying and structuring the nature of the stressor, believes that the appropriate resources are available and can be mobilized to deal successfully with the challenge, and is motivated to deal with it. Such an orientation to life, he pro-

posed, allows the selection of appropriate coping strategies and provides a solid base for maintenance and strengthening of health and well being.

Aims of this study

1. To investigate whether those individual dispositions and environmental factors shown to promote stress resilience during childhood and adolescence would still be of importance in adulthood.

2. To study if those individual dispositions and environmental factors also were associated with different measures of adult behaviours which are assumed to promote successful coping.

Material

This study was carried out within the framework of the Lundby project, which is an extensive, longitudinal population study on mental health originating in 1947. It covered all persons, living in a geographically defined area incorporating two adjoining parishes in southern Sweden (Essen-Möller et al. 1956; Hagnell 1966, 1986; Hagnell et al. 1990). Of the total population, 2550 persons, 590 (23%; 292 boys and 298 girls) had been born between 1 July, 1932 and 30 June, 1947, i.e. were between 0 and 15 years of age at the time the original data were obtained (mean year of birth 1939, SD 4).

In 1988, all information on these 590 persons was scrutinized. The data had been collected in personal interviews with all family members in 1947 and 1957 by psychiatrists during home visits. There was also information from key informants as well as from various registers such as temperance boards, the criminal register, social insurance offices and hospital records. These data were used to identify childhood psychiatric risk factors in order to select a subgroup, which, as children and adolescents, had grown up "at risk" for a negative social and psychological development (Cederblad et al. 1988). A review of the literature led to the specification of 44 variables about which data were available in our combined family records from the subjects' childhoods (Dahlin and Cederblad 1986) (Fig. 1).

Many of these risk factors, such as mental and somatic illness, alcoholism, criminality, perinatal complications, divorce, deaths and child placements, were documented in our various records. Socio-economic conditions, the psychiatric state, intelligence and temperaments, parental rearing behaviour, parent – child relations and the child's own behaviour were observed and registered during the home visits. Even if the focus of the Lundby study was not on childhood risk factors, there was exhaustive documentation on each child. The two raters, who jointly judged the presence or absence of risk factors, considered the material sufficient.

For the present substudy, a cut-off point of three or more childhood psychiatric risk factors was set. While this was somewhat arbitrary and the data indicated that there was a significant association between childhood risk factors and mental disturbance in adulthood when a cut-off point of two or more risk factors was used (Cederblad et al. 1988), we chose to take a more conservative position. Of the 590 children in the 1947 study, the records showed that 221 (38%) had as children been subject to three or more risk factors. These constitute the total initial population of the present study.

In 1988–89, attempts were made to reach these 221 persons, of these 15 had died, 10 were too severely ill or handicapped to be interviewed and 4 had emigrated, leaving 192 potential respondents. Successful interviews were completed with 148 of them (77%). Of the others, 18 did not respond to letters and telephone calls and 26 refused to participate. It is our impression that a fair number of these were self- or socially-defined "failures", e.g. in prison, alcoholic, etc.

There were no differences between participants and drop-outs as to age, sex or number of childhood risk factors. This does not mean that the drop-outs could not influence the results, even if it is not probable.

Risk factor group		Risk factors
I	Mental strain	Psychiatric problems in mother or father
II	Alcoholism	Alcoholism or problems with alcohol in mother or father
III	Criminality	Criminality in mother or father
IV	Socioeconomic strain	Crowded living conditions, many children, child born out of wedlock, promiscous parent, social degradation, poverty
V	Disturbed relations	Discrepancy in parents' ages, elderly parents, marital problems, death of first child, psychical abuse, poor contact, child neglect
VI	Separation	Child taken into custody, divorce, death of parent, early separation, child in foster care, many moves, step-child
VII	Physically ill parent	Mother or father physically ill
VIII	Low IQ in parents	Poor intellectual capacity in mother or father
IX	Child factors	Perinatal complications, developmental retardation, aggressive temperament, low IQ, early delinquency

Fig. 1 Childhood psychiatric risk factors used to define our "at risk" group

Data collection

Following letters explaining the study and requesting informed consent and phone calls for appointments, personal interviews were conducted with the 148 subjects, most often in their homes. All interviews were conducted by one of us (L.D.), a trained clinical psychologist. The interview was based on a flexible schedule guide, designed to obtain a picture of the person's life course and an assessment of his or her present situation. Interviews were audio-taped with the consent of the respondent and lasted between 1.5 and 4 hours. The subjects were also asked to fill in five self-rating questionnaires.

Outcome measures (Table 1)

The Symptom Check List (SCL-90) (Derogatis et al. 1977), a widely used measure that contains a series of 90 items referring to expressions of psychosomatic and emotional distress, was completed by 146 subjects. A low score on this questionnaire was considered to be an indication of "good mental health". Cronbach's alpha was 0.79. The product-moment correlation coefficients with Luborsky's Health-Sickness Rating Scale (HSRS) was 0.52.

One hundred and forty-eight subjects also filled in a quality of life (QOL) scale (Kajandi et al. 1983) which measures satisfaction

in different areas of life: material conditions (work, housing), interpersonal relations (spouse and children, friends and parents) and inner feelings (energy, self-image, mood). Cronbach's alpha was 0.89. The product-moment correlation coefficient was 0.50 with HSRS and 0.64 with SCL-90.

Based on the in-depth interview, two raters made a consensus assessment of the level of mental and somatic health using a definition by Werner and Smith (1982) who defined health as "worked well, played well, loved well and expected well". The score was made without any knowledge of how the respondent had answered on the self-reporting questionnaires (Dahlin et al. 1990). A 5-point "rated health" global scale was constructed. A person rated to have "excellent health" should have reported only trifling psychiatric, psychosomatic or somatic symptoms. The person should also hold a permanent job judged appropriate to his intellectual capacity and training. He should be living in a satisfying marriage/relationship. If he had children, they should have developed well. He should also have some hobby or spare time activity, which he considered satisfying and stimulating, and he should have an optimistic outlook on his future life. To be rated as "good health", a subject might have one negative deviation from the requirements for "excellent health". Our concept "rated health" was validated by calculating the product-moment correlation coefficients with the other health measurements. The correlation with HSRS was 0.68, with SCL-90 0.55 and QOL 0.35, which we considered acceptable. The concepts covered partly the same and partly different aspects of health and mental health and a medium high correlation was therefore expected.

All material collected at the time of the interview was also evaluated by another "blind" rater according to HSRS (Luborsky 1975; Armelius et al. 1985). Of the interviews, 10% were rated independently by the researcher, who introduced HSRS in Sweden. The inter-rater reliability was 0.88 (product-moment correlation).

Coping measures (Table 1)

One hundred and forty-eight subjects filled in the sense of coherence scales (SOC), a 29-item, 7-point semantic differential scale (Antonovsky 1991). It consists of three parts measuring comprehensibility, manageability and meaningfulness. Cronbach's alpha was 0.89. The product-moment correlation coefficient between SOC and Locus of Control (LOC) was 0.44, between SOC and Mastery (MA) 0.59. This shows that they measure related but not identical concepts.

One hundred and forty-eight subjects filled in the self-rating measurements of LOC (Rotter 1966) and mastery (MA) Pearlin et al. 1981). They measure similar but not identical experiences of being in control of one's life (= inner locus of control) and being a master of one's fate. Cronbach's alpha was 0.71 for LOC and 0.74 for MA. The product-moment correlation between them was 0.50.

Salutogenic predisposing measures (Table 2).

The interviews were typed and any material indicating the present psychiatric and somatic health of the subject was deleted. One of us (MC) who was unaware of the outcome of the study as far as mental and somatic health was concerned, rated the interview material with regard to possible salutogenic factors. One of us (KH) rated 10% of the interviews independently. The inter-rater reliability was 0.82 (product-moment correlation).

A definition was made for each item as to the kind of information required for an item to be marked as "present". Altogether 11 individual characteristics were noted:

1. Good social capacity; defined as having a capacity for co-operation and having developed positive social relationships with peers and adults during childhood.

Example A: I had many friends during childhood, two have been my life-long friends. There were some older neighbours whom I visited very often during childhood. They had time to sit and chat and were very kind.

Example B: I had some older friends who supported me. My maternal uncle was an important adult. I had friends whom I could stay with when my father was drunk.

2. Positive self esteem; expressed as having had a feeling of being valuable, of being worthy of respect and appreciated during childhood.

Example A: Both my parents showed that they appreciated me. I was my father's favourite child. I was encouraged to continue to further education both by my parents and my teacher in the compulsary school.

Example B: (The subject grew up with his grandmother). My grandmother told me how she had solved her problems during her own life. She created in me a strength, never to let myself be broken down. She said: "Never let anyone sit on your shoulders".

3. Autonomy; described as feeling independent early in life, having a certain distance to their bleak environment, "benign neglect".

Example A: I learnt from childhood to take care of things myself and to solve problems. It is important not only to rely on others, but to know that you can sort things out yourself.

Example B: I made up my mind, when I was 10 years old, never to start drinking alcohol. (His father and stepfather were alcoholics).

4. Successful coping; defined as having had a capacity to solve problems and handle stress without giving up or feeling panicked during childhood and adolescence.

Example A: (The subject had been severely injured in a car accident). The doctors told me that I may have to be on crutches for years and that I could never play football again (which was his main hobby). I started practising to walk secretly and after some time I managed to start playing football again without the knowledge of my parents.

Example B: (His mother died when he was 14 years old). I and my father helped each other, worked together, got closer to each other. We were both also interested in sports. Since then I am not afraid to die.

5. Intellectual capacity; defined as having been good achievers at school i.e. stating that school was easy, that they had good grades and were encouraged by teachers to continue studying.

Example A: I had very good grades, my teacher encouraged me to continue. I took some further training in a business school.

Example B: I had very good grades, I was best in the school in writing compositions.

Example C: I was very, very good at school. When school finished after the 7th grade I cried.

6. Improving one's lot; we also noted continued education or apprenticeships, adult education or striving to get more demanding work, which often required further on-the-job training.

Example A: I liked school and I wanted to continue but my father refused. "Girls get married, it is not necessary". As soon as I had moved from home at the age of 14 and got a job, I started night-school and paid the fees from my own salary.

Example B: I liked school, especially science. I liked radio and technical subjects. I could not continue school due to poverty. I got the chance to do my military service in the signal corps. There I was trained as a radio-mechanic. When my military service was finished, I managed to get a job with a telephone company, where I got further on-the-job training. After some years I opened my own radio workshop and store.

7. Creativity; defined as engagement in some kind of creative activity like painting, playing musical instruments, writing, handicrafts.

Example: I learnt to play the trombone and joined the the Salvation Army Orchestra.

8. Special interests and hobbies; showing a strong engagement in sports, church activities, Red Cross activities, etc. during childhood and adolescence.

Example A: I started in my teens listening to and sending short-wave messages. It has been a life-long hobby, which has gained me friends all over the world.

Example B: I was very interested in athletics. I took part in school competitions in long-jump.

9. Internal LOC; defined as, already in adolescence, having had a strong feeling of being capable to influence what happens in one's life.

Example A: I learnt at home to be a master of my own fate. That is a deep feeling.

Example B: I learnt to assert myself and to adjust, to stand on my own two feat and to speak up for myself.

10. Good impulse control; reports that they were not easily irritated or agitated as children or easily distracted.

Example A: I learnt as a child always to complete what I started. My mother said: "You have to hoe the sugarbeets until the row is finished".

Example B: I have learnt always to pay cash, never to be in debt. I decided very early that I was not going to become pregnant by chance and have to get married because of that.

11. Energetic child; reports of having had a lot of energy and zest in childhood and adolescence. When asking about the two last items the subjects were encouraged to compare themselves with siblings and peers, as they looked back on their behaviour in childhood and adolescence.

Example A: I got a job as a messenger boy after school in order to save money to buy a suit for my confirmation. I was very engaged in sports, especially football, and played in an orchestra.

Example B: I was always working after school; evenings and nights I made sandwiches for my mother's canteen. I delivered newspapers in the afternoon, collected empty bottles, helped farmers during the harvest season. Always on the go. I had a lot of energy and worked hard.

From the records of the data collection in 1947 and 1957, information was secured on family composition and occupation of the mother: *1. oldest child, 2. only child, 3. four or less children in the family spaced more than 2 years apart, 4. mother has some steady employment outside the household.* A further eight environmental factors were rated from the interviews:

5. Required helpfulness; subjects described that during childhood they often helped other relatives (not only younger siblings) or other people like neighbours in various ways.

Example A: (Her mother was severely handicapped). I had to nurse my mother. I had to take care of the household, clean, wash, cook. I matured early because of that.

Example B: I often went to help a neighbour who was a farmer. I started seeing him daily, when I was 5 or 6 years old. I helped him with different things according to my age. I liked helping that man.

6. Trusting and intimate relationship with at least one parent; This should be clearly described in the interview.

Example A: My mother was warm and caring. She hugged me a lot, took me in her lap. Although she had a lot of work, she always had time for her children.

Example B: I, my brother and my mother had a lot of fun together. We played a lot, although the economy was very tight. I felt a strong "we"-feeling. When my mother re-married, I and by brother felt that "we" were also marrying.

7. A significant other; reports that some other adult outside the family was important to the child, compensating a poor relationship with the parents.

Example A: My teacher was an important person. She was fair and I liked her a lot.

Example B: A lorry-driver, who often let me accompany him in the car, when I was 12–13 years old, was a very important person. That man showed that he liked me. We had a mutual trust. This was a great contrast to the relations in my home, where I was neglected and severely beaten. I saw that someone could like me.

8. Additional caretakers beside the parents; these could be other relatives, neighbours and foster parents.

Example A: My stepfather was an angel. He was always kind and understanding.

Example B: My paternal aunt was very important to me. I stayed with her, when my mother was treated in a mental hospital for depression. I was 7 years old, when I stayed at her house for the first time. She is also my god-mother. I loved her very much. We still have a lot of contact.

9. Consistent and clear rules and norms in the family; which were described in the interview.

Example A: My mother was very strict. Everyone knew what chores he was supposed to do. Law and order was taught. I admired my mother tremendously. It was a hard school, which has helped me all my life.

Example B: My mother wanted us to be law-abiding people. We always had to be tidy and clean. It was important that we fullfilled our duties.

10. Open communication; the subject should state that he/she could talk openly about important things with one or both parents.

Example A: It was important that I had trust in my parents. I dared to tell them everything.

Example B: My mother always wanted to chat, when I and my siblings had been out dancing. She made coffee and invited our friends in. We could tell her everything. She was always there to listen.

11. Shared values; defined as a statement by the subject that he, as an adult, has taken over and cherishes values and norms taught by his parents during childhood.

Example A: I learnt from home to be dependable, conscientious, not to lie. Those values have been important. I have taught my children the same things.

Example B: I have taken after my mother when bringing up my own children. I see them as capable people, who should take part in decisions about economy and such things.

12. Finally, it was recorded if any kind of assistance by *various helping agencies* such as doctors, nurses, teachers, social agencies, clergymen etc., had been given during childhood and adolescence.

Example A: I was worried because my maternal grandfather, with whom I lived, had silicosis and asthma. I had stomachache every day at school. I talked to the district doctor about my worries. That helped a little.

Example B: I could go every summer to summer camp (for poor children). Those periods were wonderful experiences. I got lots of good food and had lots of fun with other children.

Results

In earlier papers (Cederblad et al. 1988), we have shown that the cumulative frequencies of some psychiatric diagnoses from 1947 to 1972 in our "at risk" group of 221 subjects were higher than in the rest of the 590 individuals and that the diagnoses showed statistical associations with different childhood risk factors. We have thus shown that the childhood psychiatric risk factors were still influencing the rate of psychiatric morbidity in these subjects, when they had reached adulthood.

Table 1 shows the distribution of the different health variables in the "at risk" group in 1988/89. Of this group 69% had "average" health or better according to "rated health", while 77% had 80 or more on the HSRS scale, which corresponds to being free from symptoms, well functioning in all aspects and interested and engaged in a number of different activities. The mean of 25 of the SCL-90 was substantially lower than the reported mean for several patient samples (Derogatis et al. 1977). No comparisons of the QOL index and data from other studies are available. However, the mean of 53.9, when 65 would show total, universal satisfaction, pointed to a contented population. The mean score on the sense of coherence (SOC) compared favourable with the scores of even middle class samples reported by Antonovsky (1987), while LOC and MA were close to average on their range of scores.

Of the 148 persons, 103 (70%) have been clearly socially mobile upwards. These included those with white-collar occupations (71 persons), those with skilled manual occupations (21 persons), the 6 persons who were farm owners or with military occupations, and the 5 housewives whose family status allowed them not to be in the labour force. Only the 32 unskilled manual workers could be said not to have gone beyond their parents' status, and 13 were "social failures" (early pension or sheltered work).

Table 2 shows the distribution of the potential salutogenic childhood variables which were rated. Not all variables were possible to rate in all interviews, due to lack of adequate information. Autonomy, for example, was only possible to rate in 131 cases, while trusting relationships with a parent and intellectual capacity was assessed in all 148 interviews. The presence of potentially salutogenic conditions varied. The lowest was creativity, only 6%. Very few subjects had expressed artistic, musical or literary activities. Probably such abilities were not encouraged by their parents. Only one in five subjects had developed a hobby during childhood, probably for the same reason. These children generally came from poor families, where children were expected to help in the household, in the fields of the surrounding farms, or to tend to older relatives. They did not have the means to develop either creative talents or special hobbies. The highest frequencies among the environmental factors were noted for trusting relationships with parents, shared values and clear rules. Obviously, many of these children grew up in families

Table 1 Description of the subjects regarding mental health and some personal dispositions regarded as coping resources. Rated health = love well, work well, play well and expect well. HSRS = Health-Sickness Rating Scale, SCL-90 = Symptom Checklist-90 questions, QOL = Quality of Life, SOC = Sense of Coherence, LOC = Locus of Control, MA = Mastery

Rated health			HSRS		
Rating	Number	%	Rating	Number	%
Excellent health	21	14	90-100	43	29
Good health	30	20	80- 89	71	48
Average health	51	35	70- 79	10	7
Less than average health	33	22	60- 69	5	3
Poor health	13	9	0- 59	19	13
	148	100		148	100

Self-rating scales				
Scale	Number	Mean	SD	Range
SCL-90	146	25.2	29	0-170
QOL	148	53.9	8	21- 65
SOC	148	152.6	22	64-195
LOC	148	21.3	5	8- 32
MA	148	23.0	4	8- 28

Table 2 Description of the subjects regarding childhood factors proposed to be salutogenic (= causes of health)

	Rated interviews (number)	Salutogenic ratings	
		(number)	(%)
Individual characteristics:			
1. Good social capacity	145	81	56
2. Positive self-esteem	136	66	49
3. Autonomy	131	81	62
4. Successful coping	146	95	65
5. Intellectual capacity	148	66	45
6. Improving one's lot	137	48	35
7. Creativity	141	9	6
8. Hobbies	136	26	19
9. Internal locus of control	143	37	26
10. Good impulse control	137	88	64
11. Energetic child	136	92	68
Environmental factors:			
1. Oldest child	141	49	35
2. Only child	141	23	35
3. Four or less children	141	80	57
4. Mother working	142	57	40
5. Required helpfulness	144	33	23
6. Trusting relations with a parent	148	112	76
7. Significant other	144	63	44
8. Additional caretakers	135	57	42
9. Clear rules	137	92	67
10. Open communication	141	72	55
11. Shared values	138	103	75
12. Help from society	138	30	22

Table 3 Percentage of excellent and good mental health according to rated health = love well, work well, play well and expect well and HSRS = Health Sickness Rating Scale and according to self-rating measurements, SCL-90 = Symptom Checklist -90 questions and QOL = Quality of Life, when different salutogenic (= causes of health) childhood factors were present or not. (Statistical method Chi^2)

Salutogenic childhood factor		Adult functioning											
		Rated health			HSRS			SCL-90			QOL		
		Good	Poor	*P*	High	Low	*P*	Low	High	*P*	High	Low	*P*
Individual characteristics:													
2. Positive self-esteem	Present	33	33	50%	26	38	41%	28	38	42%	29	37	44%
	Not present	15	55	21%***	14	55	20%**	15	54	22%**	13	57	19%***
4. Successful coping	Present	39	56	41%*							35	60	37%
	Not present	11	40	22%							9	42	18%*
6. Improving one's lot	Present	24	24	50%**	22	25	47%						
	Not present	25	64	28%	20	68	23%**						
8. Hobbies	Present	17	9	65%***	12	13	48%						
	Not present	31	79	28%	29	79	27%*						
9. Internal locus of control	Present	19	18	51%	16	20	44%						
	Not present	29	77	27%**	26	77	25%*						
Environmental factors:													
6. Trusting relations with a parent	Present										39	73	35%
	Not present										6	30	17%*
11. Shared values	Present										36	67	35%
	Not present										6	29	17%*

* $P < 0.05$ % = percentage with good health when a salutogenic factor was present or not present
** $P < 0.01$
*** $P < 0.001$

which showed qualities known to be important for a positive psychological development.

Among the individual characteristics "energetic child" was rated as present most frequently.

In Table 3 those who had excellent and good health according to "rated health" (34% of the group) were compared with the rest. Those who had 90 to 100 scores on HSRS (29%) were compared with the rest. The subjects who were among the 30% lowest scores on SCL-90 and those who had the 30% highest scores on QOL, that is those with the best mental health, were also compared with the rest. The Table shows only those proposed salutogenic childhood variables which showed significant association with any of the adult health variables. Positive self esteem, for example, was present in 66 subjects. Of those, 50 % were rated as having excellent or good health according to "rated health". According to the interviews, 70 subjects were rated as not having had positive self-esteem as children. Only 21% of those were rated to have excellent or good health according to "rated health" as adults ($P < 0.001$). Similar differences between these groups were recorded for HSRS, SCL-90 and QOL. Presence of sucessful coping in childhood, "improving one's lot", which was one of the measurements of intellectual capacity, having developed special hobbies and an internal LOC in adolescence were all significantly associated with the health measurements. Those who had been rated to have used successful coping in childhood, those who had had trusting relationships with a parent and who had stated or implied that they shared values with their parents from childhood to their adulthood had rated themselves high on QOL more often (around 35%) than those who had not been rated as having had those childhood variables, (around 17% high QOL).

One could argue that it is sufficient if the mental health of a risk group, such as the one we have examined, is "average" rather than "excellent and good". Because of that, we have also looked at those 69% who had "average health and above" on "rated health" compared to the rest of the group and the 77% who had 80 and above on HSRS. Besides the salutogenic childhood variables reported above we found additional variables with significant associations to mental health either measured as "rated health" or according to HSRS. They were good social capacity, intellectual capacity measured as school performance, creativity, presence of a significant other, open communications between parent and child and growing up in a small family (= only child or or less than four children).

Table 4 shows the statistical associations between the adult coping measures and the proposed salutogenic childhood measures. SOC showed significant association with the individual child characteristics; positive self-esteem, successful childhood coping, good impulse control and being an energetic child. The pattern was similar for adult inner LOC and adult MA. Among the childhood environmental factors a trusting and intimate relationship with a parent and shared values showed significant association with both SOC and LOC.

Since previous studies have shown that risk factors during childhood have a cumulative effect (Rutter 1979; Seifer et al. 1992), it was assumed that salutogenic childhood factors would have the same effect. Table 5 shows that a simple addition of the number of salutogenic child-

Table 4 Association between salutogenic childhood factors and SOC = Sence of coherence, LOC = Locus of Control and MA = Mastery. (Statistical method Student's *t*-test)

Salutogenic childhood factors	Adult functioning					
	SOC		LOC		MA	
	t	*P*	*t*	*P*	*t*	*P*
Individual characteristics:						
2. Positive self-esteem	2.85	< 0.01	2.84	< 0.01	3.57	< 0.001
4. Successful coping	4.36	< 0.001			2.99	< 0.01
8. Hobbies			1.96 =	0.05		
9. Internal locus of control					2.28	< 0.05
10. Good impulse control	2.80	< 0.01			2.15	< 0.05
11. Energetic child	2.05	< 0.05	2.18	< 0.05		
Environmental factors:						
6. Trusting relations with a parent	3.05	< 0.01	2.03	< 0.05		
9. Clear rules			1.96 =	0.05		
10. Open communications	2.31	< 0.05				
11. Shared values	2.60	< 0.01	2.28	< 0.05		
12. Help from society			2.23	< 0.05	2.01	< 0.05

Table 5 Percentage of excellent and good mental health in groups of subjects exposed to different numbers of salutogenic factors. Rated health = love well, work well, play well and expect well, HSRS = Health-Sickness Rating Scale, SCL-90 = Symptom Checklist -90 questions, QOL = Quality of Life (Statistical method Chi^2)

Number of salutogenic factors	Rated health (%)	HSRS (%)	SCL-90 (%)	QOL (%)
0–1	12	20	19	19
2–3	26	26	25	21
4–5	43	31	45	50
6–8	89	78	44	33
Chi^2 ($df = 3$)	17.8	10.6	6.2	10.4
P	0.001	0.014	0.105	0.015

hood variables present in an individual increased the percentage of subjects in each group having good mental health and a high QOL.

A multi-factorial analysis of variance was used to investigate the association between the different adult health concepts and rated childhood salutogenic factors. In this analysis we have included those variables which previously (Table 3) have been associated to respective concepts.

Of the variance in rated health, 21% was explained in descending order by positive self esteem and hobbies. Of the variance in HSRS, 16% was explained in descending order by positive self-esteem, hobbies and improving one's lot. Of the variance in SCL-90, 11% was explained in descending order by positive self-esteem and coping. Of the variance in QOL, 18% was explained in descending order by coping, trusting relations and positive self-esteem. A multi-factorial analysis of variance was also used for investigation of the associations between adult SOC, LOC and MA and the rated salutogenic childhood factors. In this analysis, we have included those variables which previously (Table 4) have been associated to respective concepts.

Of the variance in SOC, 32% was explained in descending order by coping, impulse control and trusting relations. Of the variance in LOC, 18% was explained mainly by energetic child. Of the variance in MA, 25% was explained in descending order by coping and impulse control.

Discussion

The mental health was unexpectedly good in the high-risk-group in 1988/89. The difference between those who had grown up under adverse conditions and the rest of the population was small. Evidently, there have been compensatory factors in the environment or in personal dispositions during childhood or later in life, some of which we have explored in earlier papers (Dahlin et al. 1990; Cederblad et al. 1993).

The salutogenic childhood variables were rated from the life-span interviews in 1988/89. Many circumstances can influence the reliability of this kind of retrospective data. Simple forgetfulness can make a subject omit important facts. Repression and suppression can distort the narrative, especially with respect to frightening and shameful happenings. But even if a person's recollections of his childhood are not completely objectively true, they are psychologically interesting as a construction of that person's inner representation of his childhood and an important part of his lifescript or narrative. Both transactional analysists and psychodynamic psychotherapists work mainly with these internalized childhood memories (Spence 1982). Radical constructivism, a base for the recent development of family therapy, has claimed that our subjective reality is the only reality we can experience, and hence the most powerful determinant of our world-view (Glasersfeld 1984; Bateson 1979). Rutter (1989)

also suggested that the way one conceptualizes earlier adverse experiences is important in determining later sequelae.

Our study showed that salutogenic childhood factors indicating a positive family atmosphere, like trusting and intimate relations with a parent, open communication between parents and children and shared values between the generations, which have been found to be important in studies on high-risk children and adolescents, were also associated with positive adult mental health in our group of late middle-aged persons who had grown up under adverse conditions. This is in contrast to Vaillant and Vaillant (1990) who found that positive childhood factors, recorded at the time of their subjects' adolescence, did not influence the rate of mental health when they examined their 65-year-old subjects. However, more individual characteristics seemed to be important. These characteristics described a person who during childhood and adolescence was already someone with good self-esteem, who believed that he could influence what happened to him, and who was intelligent, active and a successful coper. These findings are very similar to those of Werner and Smith (1992) in their follow-up of the high risk group in the Kauai study, when the subjects were 32 years old. Almost the same childhood personal dispositions and environmental factors were associated with our adult coping measures SOC, LOC and MA.

In a recent article, Luthar (1993), summarizing recent advances in research on childhood resilience, proposed that attempts should be made to understand moderating effects in terms of underlying processes rather than simply present them as protective or invulnerability factors. We agree with that proposition and also with the opinion of the psychoanalyst Grinker (1963), who 30 years ago, when he studied a group of healthy young collegemen, "the homoclites", drew the conclusion that the study of positive health required the use of theoretical frames of reference other than classical psychoanalysis. Both Vaillant and Werner have used Homburger Erikson's model in their recent works. It is based on psychoanalytical theory but has expanded this to include the social context of the growing individual. It focuses more on the interaction of the child with its parents and other individuals than on the development of drives and defences against internalized conflicts in the growing individual.

Holahan and Moos (1990, 1991), on the other hand, used a coping model. They concluded that stress resistance in their investigation group depended on coping resources like family support and adaptive personality characteristics, which in turn increased their subjects' reliance on approach coping responses. The advantage of this model is that it takes into consideration the conscious, cognitive approach to various external and internal life situations, with which the individual has to deal.

We propose another model, the SOC (Antonovsky 1979, 1987). This model, as has already been described, accounts for coping resources such as appraisal (= comprehensibility) and various ways of dealing with a stressor behaviourally and emotionally either alone or with the help of other individuals at the disposal of the subjects (= manageability). It also contains a third component, meaningfulness, which has to do with the capacity to relate a particular stressor or event to a more overriding life scheme, which organizes the subject's life and provides a perspective. Thus, while the SOC model could be called a coping model and has similarities to other coping models, e.g. that of Lazarus (Monat and Lazarus 1991), it also contains a more general orientation to life, which provides a solid base for maintenance and strengthening of health and wellbeing.

We propose the following relations between the three parts of the sence of coherence model and those childhood factors that were significantly associated with the health variables. (In the model we have included the variables which showed a significant association only with the 69% "average or above" health). Essential to coping is, of course, an adequate appraisal of the stressor (comprehensibility). Those salutogenic childhood variables which could increase this capacity were the two measures of intelligence (improving one's lot and intelligence, measured as school performance). Open communication with parents would create a home situation, in which the child felt free to ask for information when he could not appraise a situation himself. Many of our salutogenic variables could increase the handling of a stressor (manageabiltiy). Thus, successful childhood coping and an internal LOC in adolescence were individual characteristics important for solving difficult life situations. A good social capacity, trusting relationship with a parent and/or availability of a significant other would make it possible to mobilize help to deal with the stressor when a subjects could not solve a situation himself. A childhood salutogenic variable which we propose increases meaningfulness was positive self-esteem, which we suggest is based on a feeling of integrity. We belive creativity and the development of hobbies to be ways of developing this feeling of integrity and purpose in life. Shared values between the generations very clearly contributed to the development of moral, ethical and spiritual commitments. For example, "I have always had a goal in my life". "I wanted revenge for my poor childhood". "I have inherited my capacity to endure from my father". "I learnt to work hard and never ever give in". "I always want to do something purposeful. I can't just relax and lean back". As can be seen in Table 4, five of these salutogenic childhood variables were also significantly associated with the self-rated adult SOC. In addition good impulse control and energetic child were significantly associated with adult SOC. In a previous article (Cederblad et al. 1993), we found that these two concepts, measured using the Sjöbring temperament model. were also significantly associated with positive mental health. Both probably increase the individual's coping resources (manageability).

Fig. 2 displays those childhood salutogenic variables which were statistically associated (Phi coefficients) either with mental health or with adult SOC. It was not possible to correlate the childhood variables to the different parts of SOC. Some individual dispositions and some en-

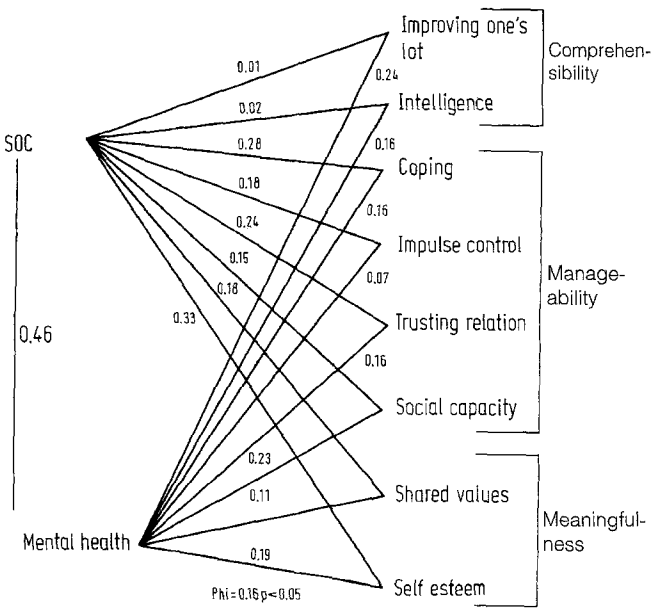

Fig. 2 Statistical associations (Phi coefficients) between childhood salutogenic variables, adult sense of coherence (SOC) and mental health

vironmental variables were associated to both outcome variables, which showed a moderately high correlation with each other (product-moment correlation). This indicates that the SOC model is useful in explaining why certain childhood variables influence adult mental health.

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