

Psychosocial environmental factors and psychosocially mediated effects of physical environmental factors

by Lennart Levi¹

Levi L. Psychosocial environmental factors and psychosocially mediated effects of physical environmental factors. Scand J Work Environ Health 1997;23 suppl 3:47—52.

The great difficulty with psychosocial environmental factors and psychosocially mediated effects of physical environmental factors is their great complexity. They finally produce stimuli that act on an organism. The organism is characterized by psychobiological programming determined by genetic factors and by earlier environmental influences. The interaction between these factors causes the organism to react. In some cases the reaction manifests itself as a disease, in some as a psychosomatic symptom. The task is to identify critically important system components that are necessary or sufficient or contributory in causing disease or accelerating its course or triggering its symptoms. It is not just causation in the strict sense of the word; a broader concept is needed to identify these components so that something can be done about them.

Key terms health effects, stress.

Some points deserve to be added to the discussion of the environmental syndrome. One concerns the targets of the World Health Organization for Health for All by the Year 2000 and their four dimensions.

The first dimension is “ensuring equity in health by reducing gaps in health status between countries and between groups within countries”. Very much remains to be done in respect to this dimension because these inequities are enormous. Their existence, when they are not conditioned by age or biological gender differences, also points to the potential to do something about them.

The second dimension concerns adding life to years by helping people achieve, and use, their full physical, mental, and social potential. One can argue that it is not the task of the physician to make people happy. On the other hand, no harm comes from attempting to contribute to the endeavors of other actors.

The third dimension is adding health to life by reducing disease and disability. The need of this is obvious. So is that of the fourth dimension of adding years to life by increasing life expectancy. I think that this list nicely summarizes what our challenge is all about.

Unemployment

Unemployment has been dealt with elsewhere in this proceedings. Here I present some complementary information. In 1990 there were 24.5 million unemployed people in the 24 OECD countries. Two years ago, in 1993, we had 35 million unemployed persons. That is a very dramatic increase. In 1994 there were 36 million unemployed, of whom a high proportion had been unemployed for a long period of time, one year or more. A very brief period of unemployment does not matter very much. One year or more certainly does, especially this concerns young and prime aged workers.

In addition to the aforementioned figures we can mention that there are 4 million discouraged workers. They have asked, they have tried, they have done everything possible—at least they think so and the authorities think so—but they are still unemployed.

The 9 million involuntary part-time workers should also be mentioned. They work half-day or even less. They have great difficulties to support their families on

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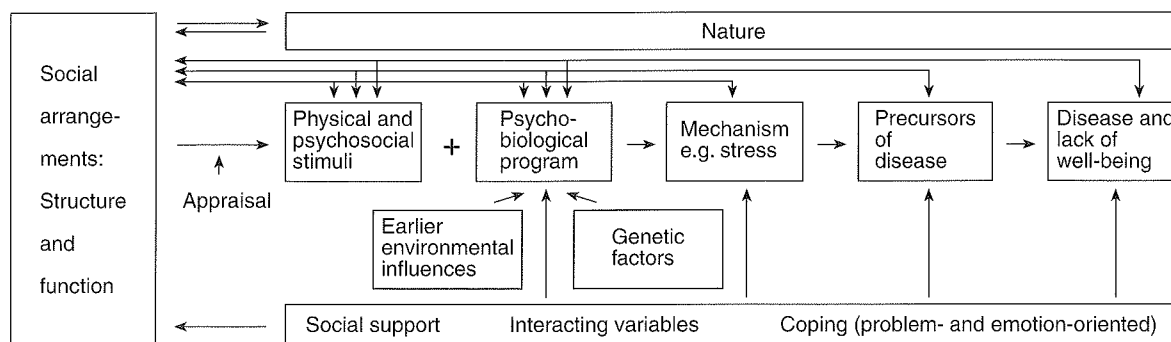


Figure 1. Interactions between psychosocial environmental factors and health.

the meager income their work provides, and they live in a situation which is not very amiable.

There are 18 million temporary workers—and this figure is rapidly rising. There is even a new verb—to “temp”—which does not mean taking one’s temperature, but, instead, refers to working 1 month here, being unemployed for a couple of weeks, working 2 months there, then again being unemployed, and so on ... The situation is characterized by very insecure employment indeed.

An unknown number of millions have been forced into involuntary retirement. I stress “involuntary”—if it is voluntary it makes quite a difference. Equally unknown millions live in constant fear of unemployment. I think that at present it is characteristic of worklife that people do not know how long they will be allowed to keep their job. Many of these people have substandard or insecure employment. Thus we have created a situation where we have disposable, throwaway workers, an “industrial reserve army”—a new lower class. This situation is not God-made; it is man-made and accessible to change by human action—not necessarily medical action, but human action nevertheless.

The dynamics of this process can be summarized as follows. It means exposure to the following factors:

1. Threat of unemployment. Each brown envelope that comes by mail may mean that you are sacked—you have lost your job. Each wrinkle on the face of the boss may have the same implication.
2. Actual loss of job.
3. Actual unemployment of longer or shorter duration.
4. Options for retraining.
5. “Survivors’ guilt” in those who did not lose their jobs, but thought that it was unfair that they kept their jobs while others did not.
6. So-called “lean production” which is not just rational production, but, in many cases, means the squeezing of people harder and harder, demanding more and more work out of people already working at top speed. Until the work organization becomes “anorectic”.

7. Frustrating search for a new job. Imagine yourself after your 52nd attempt to get a job. You are turned down, and it happens again and again. Finally you lose your self-confidence.
8. The underutilization of skills, which is particularly common in the United States. People have to accept any job. People who are university-trained have to work at a gas station or in a hamburger joint.
9. The discouragement—which means that you eventually become unemployable.
10. Economic stress with very low, insecure, or no wages. This situation forces people to sell their cars or their houses often to prices so low that they cannot even pay the debts caused by the purchase of the items.

The complexity of the process

The great difficulty with all these and related phenomena is their complexity. The American James Grier Miller, the author of the wonderful book *Living Systems* once said: “We should simplify as much as possible—but not more”. I will try to do just that. It means presenting models. Every model is a simplification—in some cases an oversimplification—and it is a matter of taste which is to be preferred.

Figure 1 presents such a model. We modify nature by social arrangements, that is, by social structures and social processes. The family, for example, is a social structure. The meeting at which this paper was presented was a social structure. The interventions at the meeting were social processes, as are rearing children, providing care for the aged, providing education, and so on. These things, physical and social, are appraised: “What does this mean to me?” There is a fallout reported from Chernobyl. There is a leak of chemical substances. Is it a threat, does it mean anything, or is it an advantage?

Depending on the result of such an appraisal, psychosocial stimuli that act on a human organism are pro-

duced. The organism is characterized by psychobiological programming determined by genetic factors and by earlier environmental influences. The interaction between all these factors causes the organism to react. Some of the reactions are of particular interest to us because many of us are doctors. Others are of no pathogenic or salutogenic importance and can be left out of this discussion. Some are specific and others are nonspecific. According to Hans Selye, the originator of the biological stress concept, the latter should be referred to by the term "stress", and the stimuli that cause stress should be called stressors. (See the following discussion.) These mechanisms can lead to precursors of disease or to disease itself. The system has many feedback loops because once people have developed ill health or disease their environment is affected. The way they interpret the environment is affected, and the psychosocial program is affected, because people who are ill usually change their propensity to react. This flow of events is also modified by interacting variables, the most important being social support and the ability to cope with stressors and stress by using problem-oriented coping and emotion-oriented coping. We then need to know what is in each box, the relation between the different boxes and the dynamics of the entire system. Once we know that, we also know if, where, and how to intervene therapeutically or preventively.

We can intervene against high risk situations, for example, by reducing unemployment, by changing the propensity of some persons to work much more than normal worktime and the propensity of others to remain unemployed. We can change their appraisal of the situation. We can influence their psychobiological program. We can intervene with the mechanisms and try to trace the precursors of disease at an early stage, and we can introduce therapy or prevention and rehabilitation. We can promote social support and coping ability. There are thus many approaches that can also be combined.

Our task is therefore to identify critically important system components that are necessary, or sufficient, or contributory, in causing disease or accelerating its course or triggering its symptoms. It is not just causation in the strict sense of the word, it is a broader concept with the aim to identify these components in order to intervene therapeutically or preventively.

Which then are the stressors? In general terms they can be summarized under three headings. The first is a poor person-environment fit, like the fit between a foot and a shoe. This includes the fit between environmental demands and human ability, between environmental opportunities and human needs, and between the outcome as perceived and human expectations.

Examples of a misfit are threat to survival, health, and well-being. If you lose your job, it usually means a considerable loss of well-being and self-esteem; it is also

a threat to close attachment with significant others, for example, fellow workers. Threat to the sense of belonging to a valued group again is a component of the unemployment situation. Threat to personal development and to self-realization are other common threats.

Second on the list is the lack of control. We cannot influence what we are exposed to. We become powerless; we are the passive recipients of what is happening to us.

The third and final heading concerns role conflicts, for instance, the conflict that arises from being both a parent and a full-time worker. Sometimes these roles are difficult to combine.

I would now like to bring up examples from the former Soviet Union and some of its neighbors. Rapid changes are taking place in these countries, particularly in the Russian Republic. There has been a very sharp increase in unemployment and poverty. Migration is increasing; divorces are more common. Loss of relatives due to premature death is common. Loss of hope is increasing, as so is loss of self-esteem. People have repeatedly been promised this, that and something else—and these promises never seem to materialize. There is an increasing fear of the future and of criminal offenses. There are more conflicts at work and in the family.

These are facts, the situation is actually happening. It has been documented in reports from UNICEF (1994) and from the Russian Ministry of Health. When people are exposed to these hardships they react, and some of the reactions are pathogenic. These pathogenic mechanisms can be classified into four types, emotional mechanisms, cognitive reactions, behavioral factors, and physiological reactions

Emotional mechanisms

Emotional mechanisms include, for example, anxiety, depression, hypochondriasis, insecurity, hopelessness, and helplessness.

I regard hypochondriasis as especially important. We all regard hypochondriasis as especially important. We all have proprioceptive impulses telling us that we have a body. If one starts to interpret these impulses and stimuli as symptoms of disease it is conducive to problems. "Doctor, I feel pressure in my head", "Doctor, I have a funny feeling in my throat", "Doctor I have difficulties in breathing", "Doctor, my heart beats so fast and so strongly". And the doctor investigates and finds nothing. Everything is as it should be, but on the level of the patient's experience it is not. The problem can be caused by a misinterpretation of normal proprioceptive stimuli. Some people might say: "Is not that part of ordinary, normal life"—and to a certain extent it is. However, if these reactions are very strong or often repeated or long-lasting, they can very effectively destroy the only life we will ever have.

Cognitive reactions

Cognitive reactions include a restriction of the scope of perception, difficulties to concentrate and learn new things, disturbed memory function, hesitation in decision making, and lowered creativity. When we need our faculties, our abilities at their best, stress may deprive us of some of these abilities.

Behavioral factors

The third type of pathogenic mechanisms is probably the most important, but was not considered by Hans Selye when he described the stress concept in 1936. These are behavioral reactions comprising the use and abuse of alcohol and tobacco, dietary habits, exercise, non-compliance with medical instructions, and self-destructive behavior. People exposed to stressful life conditions are more prone to self-medication with alcohol or tobacco, or even food. Why do these people eat the wrong kind of food in the wrong amounts? Partly because food, rich in fat and poor in nutritional fibers, happens to be an excellent source of oral gratification because its fat carries the taste. Do try to make a nice gravy based on water or skimmed milk. If, on the other hand, you use oil, butter or margarine, or other fats, it works beautifully. Some people console themselves by eating fat food which they should avoid. All these behaviors have secondary negative effects on health, quite significant ones in the long run. Physical exercise is often neglected; these persons do not exercise. They neglect their health care, they do not comply with their doctors' orders, and they are prone to self-destructive behavior.

Here are a few figures regarding the latter. In Sweden, every year (1996) there are about 80 fatal accidents at work and about 520 fatal traffic accidents. But there are 1800 suicides and 18 000 suicide attempts annually. These figures illustrate how important behavior can be for health and disease, for life and death.

Physiological reactions

The physiological reactions to stressors include endocrine, nervous, and immunologic reactions. The human brain signals to the rest of the body preparing it for fight, or flight, to promote survival in a way which was adequate in the stone age, but which today usually is not. Secondary to these reactions we have cardiovascular, gastrointestinal, genitourinary, respiratory, and other reactions that, in the longer perspective, can cause disease. These are mechanisms, not diseases per se, but they often lead to diseases.

Figure 2 shows the changes in crude death rates during a period of 4 years in three countries in central and eastern Europe. In Poland no major changes occurred between 1989 and 1993. In Bulgaria a moderate increase occurred in the death rate, whereas in Russia there was a dramatic increase. There are some likely explanations.

According to UNICEF (1994) and the Russian Ministry of Public Health, the excess mortality of Russian men between 35 and 39 years of age is mostly caused by alcohol poisoning and alcohol psychosis, homicide, suicide, and accidents. In the age group of 55–59 years, the causes of death are cardiovascular diseases, cancer, and pneumonia. It seems likely that a considerable proportion of this excess mortality is stress-related.

The Chernobyl accident

Another example of environmentally induced morbidity in Russia, Ukraine, and Belorussia is provided by the Chernobyl accident. I served as chairman of a WHO mission to Chernobyl in 1990. We interviewed groups of doctors, decision makers, and ordinary citizens. We found that there were seven likely mechanisms to consider in analyzing the recent dramatic increase in mortality and morbidity (WHO/EUR/ICP/CEH 093, 1990).

First, there was the sociopsychological dimension—the perception of the risk involved in radiation, as well as the part played by information policy. During the first few years after the accident, the press printed what the government told them to print. The government misinformed systematically for several years. Thus the population showed distrust for all information even when it later became reliable.

Second, there was the sociocultural dimension of the displacement and consequent social disruption of entire communities. The Soviet government denied that there were any risks to the population but at the same time ordered 120 000 people to be evacuated immediately from the Chernobyl area. The people had to move away immediately; many farmers and peasants had to leave

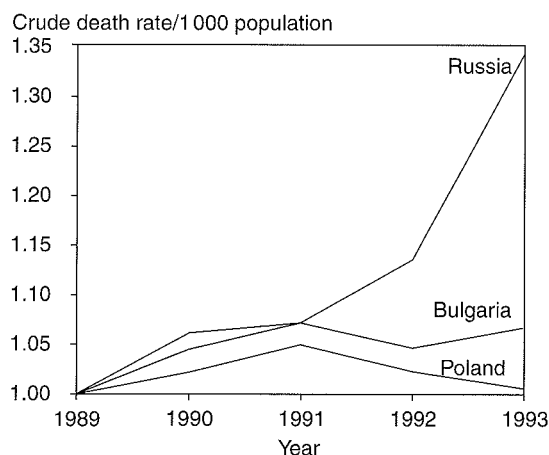


Figure 2. Changes in crude death rates during 1989–1993 in Russia, Bulgaria and Poland (UNICEF 1994).

their cattle and their belongings. Families were split. People living together were translocated to different villages. A major social disruption occurred. It is likely that this situation led to medical consequences.

Third and fourth, there was the general pathogenic factor relating to physiological stress reactions and to changes in life-style, such as dietary habits and the consumption of alcohol and tobacco. If people are afraid, as these people were, their heart beats faster, they hyperventilate, they tense their muscles. All these reactions create symptoms that are reported to physicians, who do not know how to interpret them.

The life-style changes also had a strong impact on children. Parents did not allow their children to play outdoors. Children were kept indoors all year round. They were not exposed to sunlight; they were not given fresh vegetables to eat for fear of contamination. They had to eat canned food day after day, and eventually some of them probably acquired vitamin deficiency.

Fifth, there was the medicosociological dimension comprising changes in the illness behavior of the population, and in the diagnostic behavior of the doctors. In the Chernobyl region people attributed everything to the accident. Every cold was relabeled "Chernobyl AIDS"; every myocardial infarction was attributed to radiation; every case of high blood pressure was claimed to be caused by the accident. Similarly, the physicians were afraid of missing anything so they looked more carefully than ever and consequently diagnosed more symptoms than ever before. In such a situation it is natural to inquire more in detail; eventually you have only patients and no healthy subjects left.

Sixth, there was the socioeconomic dimension related to the large-scale effects of the Chernobyl accident, such as the closure of nuclear plants and the reversion to other sources of energy. If a nuclear plant that produces sorely needed electricity is closed down, factories must also be closed, and many people lose their jobs. Unemployed people become poor; they cannot eat adequately or live adequately.

Eventually, there was the radiopathological dimension with nonstochastic and stochastic effects. Some 30 people were killed in the Chernobyl accident due to the blast and to the fire in the fourth reactor. Some 140 acquired acute radiation sickness. However, virtually millions, if not tens of millions, suffered from ill health, probably mediated by the aforementioned mechanisms, singly or combined.

Optimizing the approach

The prevailing way to tackle such complex issues is the "fragmented approach". In other words, a psychiatrist is

interested only in psychiatry, an economist only in economy, a sociologist is concerned only with sociology, and so on. The situation is similar in all (sub)specialties. We treat people as if they were salami sausages, cutting them into thin slices and saying that this slice is economy, this slice is sociology, and this slice is medicine. But this is not the optimal solution. One of the great merits of the Gyllenberg Foundation is that it has pointed this fact out very effectively for many years.

Why should such issues be addressed? Part of the answer is found in the following four motives for work stress management and prevention, proposed in 1980 by the late Bertil Gardell, professor of social psychology. He spoke of (i) a humanistic or idealistic desire for the good society and good worklife, (ii) a drive for health and well-being, (iii) a belief in citizen participation and control at the level of the individual, and (iv) economic interest in the competitiveness and profits of the business organization and economic system.

Any one, or all four, of the motives can be used as arguments to cope with problems such as the ones already described.

When Sigmund Freud was asked what he thought was conducive to a good life, he said "Lieben und arbeiten". I think it would be difficult to state this in a more concise and correct way. Here are some comments on this aspect. A good family life provides care, attachment, love, control, guidance and norms. In such cases, my guess is that a person is less likely to develop mental or psychosomatic disorders.

A good job provides a person with purpose and direction, regular daily activity, identity and self-respect, companions and friends, and, finally, money. If you have all this, again, it shields you and protects you.

This point can be boiled down to the question of values in life, as proposed by Viktor Frankl, the successor of Sigmund Freud as professor of psychiatry in Vienna. He pointed to three types of values: creating, experiencing and coping. Coping includes both problem-oriented coping and emotionally oriented coping. I believe that the general practitioner can at least help people to consider these values, which help protect them against the "slings and the arrows of outrageous fortune".

You may see your patients as clients who have deficiencies and needs, like a half-empty glass. You may equally see them as citizens with capacities and gifts—a half-full glass. Both formulations are correct, the choice is yours.

The World Health Organization has a program called Healthy Schools. Healthy Schools, among other things, aims to teach young people to protect and promote their health and cope with life, to have competence in life, to learn "life skills". What skills lead to such competence? They can be listed as skills for (i) communication, (ii) decision making, (iii) problem solving, (iv) critical think-

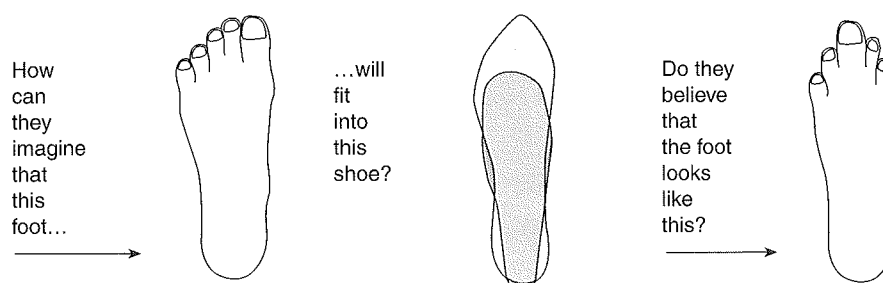


Figure 3. Ways to approach the person-environment fit.

ing, (v), interpersonal activities, (vi) assertiveness, (vii) resisting peer pressure, (viii) coping with emotions, (ix) management of stress and anxiety, (x) social adjustment, and (xi) self-awareness (WHO/EURO/MNH, Skills for life, newsletter no. 1, August 1993). If you have all these skills, you are competent. Whatever happens, you will be able to cope effectively.

So the thing to do is to have a top-down approach, to facilitate the acquisition and practice of all these skills, and a bottom-up approach with which you try to "stimulate the phagocytes". The latter is a quote from George Bernard Shaw, who said "Drugs are a delusion. Stimulate the phagocytes!" I would not agree with the first part of his statement, but I definitely agree with the second and would like to paraphrase it somewhat by saying "Stimulate the grass roots". People are not deaf and dumb. They understand quite a lot. If you show them confidence, if you treat them like adults, if you communicate with them effectively, they can do a great deal to solve their own problems, and those of their fellow human beings.

My final figure (figure 3) does not come from WHO, or from the National Board of Health and Welfare. It comes from the Consumer Authority, and it concerns itself with shoes and feet.

The point is that the foot in figure 3 will eventually look like the one on the right because it gradually becomes deformed. Similarly children become deformed by not being wanted, by not being loved by their parents who have no time for them or knowledge of how to rear them. Children are deformed by schools which prepare them for worklife only and not for life in general. Worklife has been adapted to economic and technical values more than to human values. Elderly people are being left without the love and attention and care they deserve. If that happens, patients are produced—patients with all types of symptoms. Of course you can, and should, treat symptoms. However, you may also wish to enter into a discussion with the policy makers on how to humanize the shoes, how to adjust the shoe to the toes and not the toe to the shoes. And how to empower the grass roots to make such adjustments.

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