

Physiological reactions to creative and less creative environments

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As a physician my basic training was in cardiology where I spent many hours following electrocardiograms on video screens. On several occasions I noticed irregular heart rhythm and rushed into the patient's room where I found him/her quarrelling with the spouse. It was a surprise to me that spouses could not abstain from quarrelling even when the patient was in such a serious bodily condition. When I prepared myself for this conference it struck me that a more reassuring room might have prevented some of these quarrels – a boring and depressing room may on the other hand increase the likelihood of such bad events.

Another cardiological observation was that certain conversation topics could trigger serious irregularities in the heart rhythm. An example was the 45-year-old salesman in a department store. He developed serious arrhythmias when we started discussing a certain situation in his job. It had to do with the fact that there had been thefts in his division. Being the foreman he had been responsible for finding out who was the thief – they knew it must be somebody belonging to the staff of that division. Merely thinking about this distressing situation triggered so called ventricular tachycardia episodes that may be life-threatening. Who knows what a better physical situation in his department store could have meant to his heart?

The first scientific psychosocial evaluation study that I was part of as a researcher was a study of elderly people in a service home in Stockholm. The buildings were only two years old when we started our study (Arnetz, B., Theorell, T., Levi, L., Kallner, A., and Eneroth, P. 1983). Our goal was to evaluate whether social and/or cultural activities in the service home would be able to im-

prove the health of these elderly men and women. Two wards were selected for the study. They were as far away from one another as possible (because we wanted to prevent overflow of the processes we studied) and they had different groups of staff. All participants were above 70 years old. In the experimental ward the staff explored all the interests of the inhabitants. This made it possible to combine groups focused on subjects of special interest to some subjects. Some examples: One group of elderly found it meaningful to construct a joint piece of art. Another group studied gardening during the winter and practiced it during the summer. A third group studied the history of the neighbourhood during the winter period and made long walks



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visiting the interesting places during the summer etc. These are activities that the staff would not have recommended without the exploration of the interests of the inhabitants. In the control group only “normal” activities were ongoing.

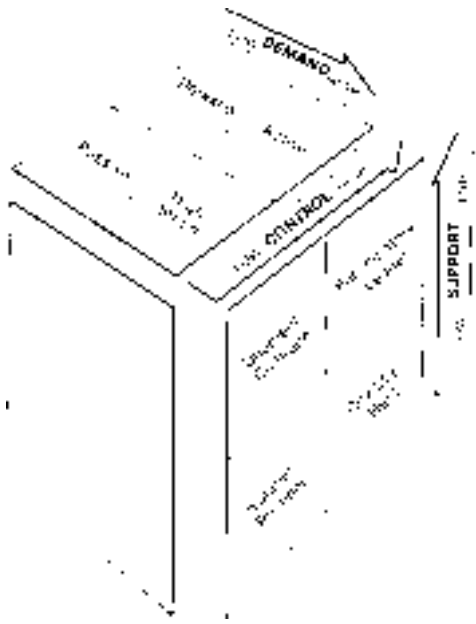
The two groups (intervention and control) were followed for six months, and there were several differences between them in the development of physiological, psychological and social variables during the study period. Among the physiological variables a better development of anabolism (as reflected in the steroid hormone DHEA) and carbohydrate metabolism was observed as well as less shrinking of height than in the control group. Reduced shrinking should be interpreted against the background of a relatively rapid “normal” reduction of height in the ages above 70. This reduction is influenced by age factors that reduce the activity of the anabolic processes. Such processes reduce the risk of fractures of the vertebrae and also increase the volume of the intervertebral discs. It is also possible that an improved posture (because they more proud and happy in the intervention group) may have contributed to the observed difference in height development. Coping and signs of self-esteem improved more in the intervention group, and social activities also increased in a better way in the intervention ward than in the control ward. This experiment illustrates that activities which engage the inhabitants in such a way that they partially change their own environment may have profound beneficial psychosocial effects which may also influence physiological parameters.

A similar experiment was performed on elderly women (Wikström, B-M., Theorell, T., Sandström, S. 1993). The focus was on pictures of fine pieces of art that had been selected because they would be able to arouse interesting thoughts. It was believed that such pictures could be used in order to stimulate elderly women mentally in a service home. A controlled evaluation was designed. A random half of the participants saw pictures and discussed them with a nurse every week during four months. The other

half of the ladies had the same number of sessions of the same duration with the same nurse during the same period. A number of parameters were followed in both groups. The results showed that the picture group of ladies had developed more creativity in relation to picture, improved emotions and coping patterns and a number of improvements of health parameters (for instance blood pressure and consumption of laxatives) in comparison to the control group. This experiment seems to indicate that high quality visual art may stimulate important thoughts that could improve quality of life for elderly people. It is likely that the combination of picture-viewing and discussion of their contents is the effective ingredient.

In general the experiments described so far illustrate that cultural activities in general could have profound effects on bodily and mental functions. The key element in such processes may be that the feeling of mastery and interpretability of life may improve. A simpler way of saying this is that the individual’s feeling of control may increase and that this has salutogenic effects. My own research has been oriented towards the role of control in coping with stressors. In research on critical life events, the salutogenic effects of controllability and predictability of critical events have been emphasised (Theorell, 1996). With regard to the work environment, I have had a long-lasting collaboration with the American sociologist Karasek who introduced the so-called demand-control-support model (Karasek and Theorell 1990). Karasek was initially trained as an architect. This may explain his ability to think along three dimensions, as illustrated by the diagram.

The demand-control-support model states that psychological demands imposed by the environment have different effects on health depending on the balance between these external demands and the resources available in the form of possibility to influence decisions regarding the work situation (decision latitude) and social support from workmates and superiors. As illustrated in the figure, a combination of high psychological demands and a low level of decision lati-



A 3-dimensional model of the psychosocial work environment.

tude is labelled *job strain* whereas the combination of high psychological demands and a high level of decision latitude is labelled *active work*. Similarly, the combinations of low demands and low decision latitude and low demands and high decision latitude are labelled *passive work* and *relaxed work* respectively. Extensive research on this model in several countries (Karasek and Theorell 1990 and Schnall et al 2000) has documented that there are more adverse effects on cardiovascular risk in the job-strain situation than in the other quadrants of the demand-control model and that such effects are amplified by lack of support from work mates and superiors. There are also other effects on health risks, for instance on functional gastrointestinal disorders (Westerberg and Theorell 1997). Physiological pathways from the model to cardiovascular illness have also been explored. It is known for instance that blood pressure levels are elevated during working days with pronounced job strain, that the blood concentration of anabolic hormones is lowered during periods of job strain (Theorell, Karasek, and Eneroth 1990, Grossi, G., et al.1999) and that the

carbohydrate metabolism and the coagulation system are affected by job strain (Theorell 2000). Conversely, when decision latitude and support increase, blood-pressure levels decrease and anabolic functions improve.

According to research published so far the decision-latitude part of the model is more important than the other dimensions. Decision latitude has two basic components, *authority over decisions* and *intellectual discretion*. The first component is related to the democracy in the work place, how information is distributed, how decisions are taken etc. The other component is related to the use of skills and development of competence in the employees. Is there possibility for the employees to develop skills so that they can take control in unexpected situations?

The knowledge obtained in demand-control-support research could easily be applied to salutogenic architecture! It has been emphasised by Ulrich and other authors of chapters in this book that increased decision latitude and support are central in the planning of physical environments for care. Considering the two components of decision latitude it is obvious that environments that stimulate democracy – authority over decisions – in the treatment wards (facilitating access to ward staff for instance) could be designed in hospitals. In a similar way the other component – intellectual discretion – could also be stimulated by means of environments that stimulate the development of patient capacities (artistic environments that stimulate the imagination of the patients without making them upset or worried). Social support obviously benefits from sociable rooms for patient and staff gatherings.

The last point that I would like to emphasise is that patients with chronic disease do benefit from cultural experiences. This has been exemplified in our research on the use of art psychotherapy in cases of long-lasting pain (Theorell, T., Karasek, R.A., and Eneroth, P. 1990). A therapeutic program was organised for patients who had had total or partial work incapacity lasting for at least a year. All of them had long lasting pain in the musculoskeletal system or headache. They also

had at least one more psychosomatic or somatic disorder. The pain was judged to be more psychosocially paralyzing than it should be according to the objective findings. The patients who were referred to us had been judged by rehabilitation teams to be likely to benefit from an art therapy program.

The underlying theory in the art psychotherapy program is related to alexithymia - inability to interpret and/or express emotions. This is more common among patients with long lasting psychosomatic disorders than among others. Alexithymic patients would benefit from art experiences as an addendum to other kinds of therapy. The patients participated in the program every week. They were told that the treatment would take at least two years. There were individual music, dance and picture therapies as well as psychodrama groups. Each patient followed one of these four alternatives throughout the period of treatment. The therapists were experienced in psychotherapy and also had formal training in their respective arts. They supported one another in weekly group meetings during which the individual therapies were discussed, and they also had individual therapy counselling since the patients were difficult.

Results showed that patients had to spend the first weeks creating a trusting contact with the therapist. Once such a contact had been established the art experiences were very important in triggering important memories. In verbal psychotherapy, patients are mostly watching their words and they are prepared to defend themselves when they are attacked. Art experiences on the other hand are often surprising and could trigger memories that could be very important. During the course of the therapies, patients frequently encountered memories of incest or violence in their childhood or adolescence. It could be a frightening dark rhythm in music production together with the therapist. Or a picture that the patient had drawn illustrating childhood experiences. Some of the turning points during the therapies were obtained during passive experiences (listening to music that the therapist had selected

or a dance that the dance therapist performed) or active production of music or pictures.

The evaluation was not conclusive since there was no control group. The benefits that the patients had of the program were related to psychological status and social activities. After one year of treatment, the mental status of these patients was significantly improved. After two years a tendency towards decreased somatic symptoms was observed as well. Social activities related to work and hobbies increased. A physiological analysis (serum uric acid) showed significant changes during the course of the treatment – indicating increased energy level during the crisis phase of the therapy when most of the turning points were reported.

The art psychotherapy study indicates that long-lasting exposure to important art experiences could significantly and beneficially affect the psychosocial course of chronic disease. An important point in several of our studies seems to be that there has to be human communication surrounding the experiences. Accordingly, patients should not only be exposed to music and pictures – they should also be given the opportunity to discuss their thoughts about these experiences.

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