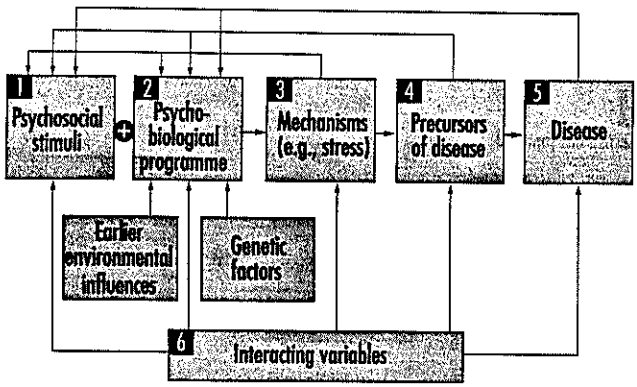
Figure 34.4 • Components of stress in the stress-disease model of Kagan and Levi (1971).



Source: Kagan and Levi 1971.

The risk of dying if one was in the lower tertile was four to five times higher than in the other tertiles, although many other factors might explain this association such as the fact that increasing age is associated with higher risk of dying. Also, as one ages the number of social contacts decrease. If one is sick and disabled, mortality risk increases and it is likely that the extent of the social network decreases. Morbidity and mortality are also higher in lower social classes, and social networks are also smaller and social contacts less abundant. Thus, controlling for these and other mortality risk factors is necessary in any analysis. Even when these factors were taken into account, a statistically significant 40% increase in risk was found to be associated with a sparse social network among those in the lowest third of the population. It is interesting to note that there was no additional health-promoting effect of being in the highest as compared to the middle tertile. Possibly, a great number of contacts can represent a strain on the individual as well as protection against harmful health effects.

Thus, without even knowing anything further about the stressors in the lives of these men and women we were able to confirm a health-promoting effect of social networks.

Social networks alone cannot explain the health effects observed. It is probable that the way in which a social network functions and the basis of support the network members provide are more important than the actual number of people included in the network. In addition, an interactive effect of different stressors is possible. For example the effects of work-related stress have been found to worsen when there is also a lack of social support and social interaction at work (Karasek and Theorell 1990).

In order to explore the issues of interaction, research studies have been carried out using various measures for assessing both qualitative and quantitative aspects of social support. Several interesting results were obtained which are illustrative of the health effects that have been associated with social support. For example, one study of heart disease (myocardial infarct and sudden cardiac death) in a population of 776 fifty-year-old men born in Gothenburg, randomly selected from the general population and found healthy on initial examination, smoking and lack of social support were found to be the strongest predictors of disease (Orth-Gomér, Rosengren and Wilheemsen 1993). Other risk factors included elevated blood pressure, lipids, fibrinogen and a sedentary lifestyle.

In the same study it was shown that only in those men who lacked support, in particular emotional support from a spouse, close relatives or friends, were the effects of stressful life events harmful. Men who both lacked support and had experienced several serious life events had more than five times the mortality of men who enjoyed close and emotional support (Rosengren et al. 1993).

Another example of interactive effects was offered in a study of cardiac patients who were examined for psychosocial factors such as social integration and social isolation, as well as myocardial indicators of an unfavourable prognosis and then followed for a ten-year period. Personality and behaviour type, in particular the Type A behaviour pattern, was also assessed.

The behaviour type in itself had no impact on prognosis in these patients. Of Type A men, 24% died as compared to 22% of Type B men. But when considering the interactive effects with social isolation another picture emerged.

Using a diary of activities during a regular week, men participating in the study were asked to describe anything they would do in the evenings and weekends of a normal week. Activities were then divided into those that involved physical exercise, those that were mainly involved with relaxation and performed at home and those that were performed for recreation together with others. Of these activity types, lack of social recreational activity was the strongest predictor of mortality. Men who never engaged in such activities—called socially isolated in the study—had about three times higher mortality risk than those who were socially active. In addition, Type A men who were socially isolated had an even higher mortality risk than those in any of the other categories (Orth-Gomér, Undén and Edwards 1988).

These studies demonstrate the need to consider several aspects of the psychosocial environment, individual factors as well as of course the physiological stress mechanisms. They also demonstrate that social support is one important factor in stress-related health outcomes.

FACTORS INTRINSIC TO THE JOB

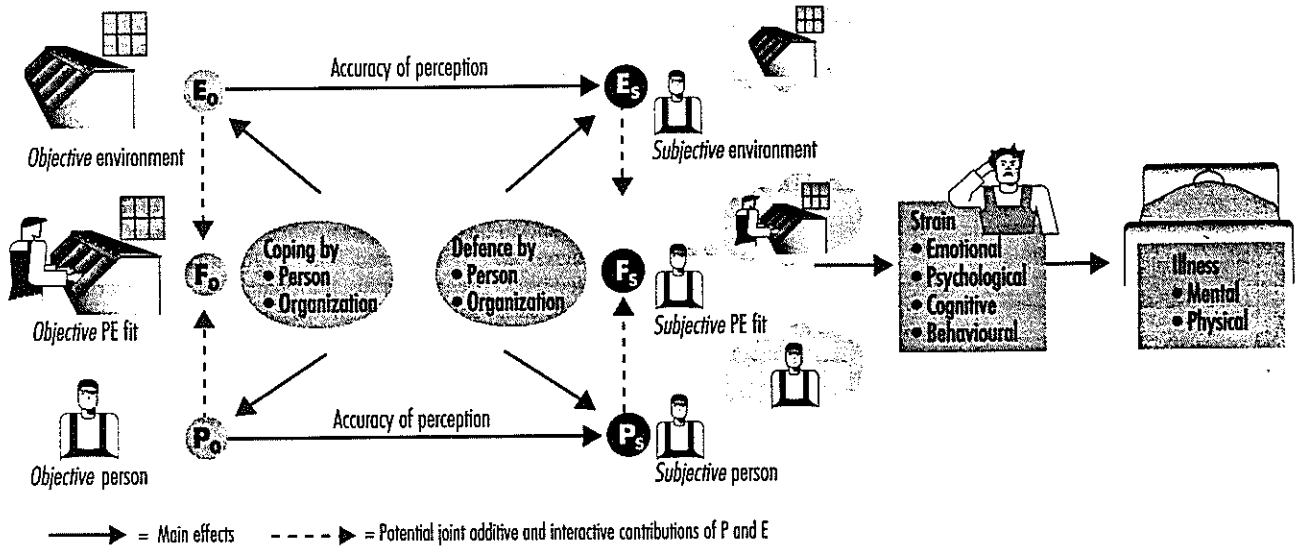
• PERSON–ENVIRONMENT FIT

Robert D. Caplan

Person–environment fit (PE) theory offers a framework for assessing and predicting how characteristics of the employee and the work environment jointly determine worker well-being and, in the light of this knowledge, how a model for identifying points of preventive intervention may be elaborated. Several PE fit formulations have been proposed, the most widely known ones being those of Dawis and Lofquist (1984); French, Rodgers and Cobb (1974); Levi (1972); McGrath (1976); and Pervin (1967). The theory of French and colleagues, illustrated in figure 34.5, may be used to discuss the conceptual components of PE fit theory and their implications for research and application.

Poor PE fit can be viewed from the perspectives of the employee's needs (*needs–supplies fit*) as well as the job–environment's demands (*demands–abilities fit*). The term needs–supplies fit refers to the degree to which employee needs, such as the need to use skills and abilities, are met by the work environment's supplies and opportunities to satisfy those needs. Demands–abilities fit refers to the degree to which the job's demands are met by the employee's skills and abilities. These two types of fit can overlap. For

Figure 34.5 • Schematic of French, Rogers and Cobb's theory of person-environment (PE) fit.



Source: French, Rogers and Cobb 1974; figure adopted from Harrison 1978.

example, work overload may leave the employer's demands unmet as well as threaten the employee's need to satisfy others.

Conceptualizing Person (P) and Environment (E)

Characteristics of the person (P) include needs as well as abilities. Characteristics of the environment (E) include supplies and opportunities for meeting the employee's needs as well as demands which are made on the employee's abilities. In order to assess the degree to which P equals (or fits), exceeds, or is less than E, the theory requires that P and E be measured along commensurate dimensions. Ideally, P and E should be measured on equal interval scales with true zero points. For example, one could assess PE fit on workload for a data-entry operator in terms of both the number of data-entry keystrokes per minute demanded by the job (E) and the employee's keystroke speed (P). As a less ideal alternative, investigators often use Likert type scales. For example, one could assess how much the employee wants to control the work pace (P) and how much control is provided by the job's technology (E) by using a rating scale, where a value of 1 corresponds to no control, or almost no control and a value of 5 corresponds to complete control.

Distinguishing Subjective from Objective Fit

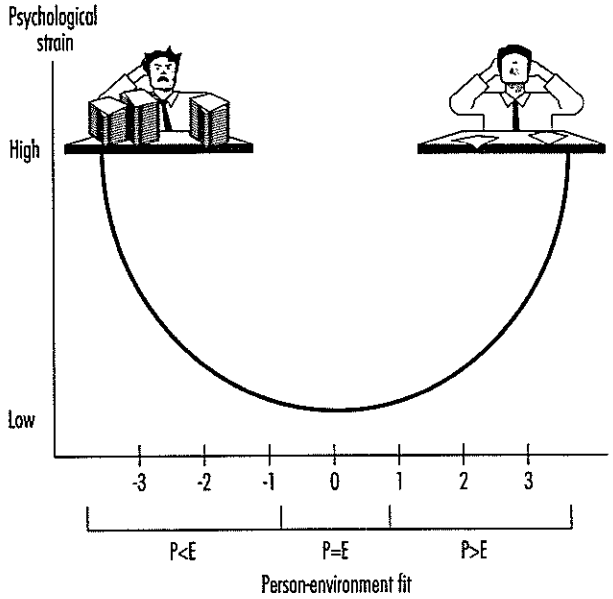
Subjective fit (F_S) refers to the employee's perceptions of P and E, whereas objective fit (F_O) refers to assessments that are, in theory, free of subjective bias and error. In practice, there is always measurement error, so that it is impossible to construct truly objective measures. Consequently, many researchers prefer to create a working distinction between subjective and objective fit, referring to measures of objective fit as ones which are relatively, rather than absolutely, immune to sources of bias and error. For example, one can assess objective PE fit on keystroke ability by examining the fit between a count of required keystrokes per minute in the actual workload assigned to the employee (E_O) and the employee's ability as assessed on an objective-type test of keystroke ability (P_O). Subjective PE fit might be assessed by asking the employee to estimate per minute keystroke ability (P_S) and the number of keystrokes per minute demanded by the job (E_S).

Given the challenges of objective measurement, most tests of PE fit theory have used only subjective measures of P and E (for an exception, see Chatman 1991). These measures have tapped a variety of dimensions including fit on responsibility for the work and well-being of other persons, job complexity, quantitative workload and role ambiguity.

Dynamic Properties of the PE Fit Model

Figure 34.5 depicts objective fit influencing subjective fit which, in turn, has direct effects on well-being. Well-being is broken down into responses called strains, which serve as risk factors for

Figure 34.6 • Hypothetical U-shaped relation of person-environment fit to psychological strain.



subsequent illness. These strains can involve emotional (e.g., depression, anxiety), physiological (e.g., serum cholesterol, blood pressure), cognitive (e.g., low self-evaluation, attributions of blame to self or others), as well as behavioural responses (e.g., aggression, changes in lifestyle, drug and alcohol use).

According to the model, levels of and changes in objective fit, whether due to planned intervention or otherwise, are not always perceived accurately by the employee, so that discrepancies arise between objective and subjective fit. Thus, employees can perceive good fit as well as poor fit when, objectively, such is not the case.

Inaccurate employee perceptions can arise from two sources. One source is the organization, which, unintentionally or by design (Schlenker 1980), may provide the employee with inadequate information regarding the environment and the employee. The other source is the employee. The employee might fail to access available information or might defensively distort objective information about what the job requires or about his or her abilities and needs — Taylor (1991) cites such an example.

French, Rodgers and Cobb (1974) use the concept of defences to refer to employee processes for distorting the components of subjective fit, P_S and E_S, without changing the commensurate components of objective fit, P_O and E_O. By extension, the organization can also engage in defensive processes—for example, cover-ups, denial or exaggeration—aimed at modifying employee perceptions of subjective fit without concomitantly modifying objective fit.

The concept of coping is, by contrast, reserved for responses and processes that aim to alter and, in particular, improve objective fit. The employee can attempt to cope by improving objective skills (P_O) or by changing objective job demands and resources (E_O) such as through a change of jobs or assigned responsibilities. By extension, the organization can also apply coping strategies to improve objective PE fit. For example, organizations can make changes in selection and promotion strategies, in training and in job design to alter E_O and P_O.

The distinctions between coping and defence on the one hand and objective and subjective fit on the other can lead to an array of practical and scientific questions regarding the consequences of using coping and defence and the methods for distinguishing between effects of coping and effects of defence on PE fit. By derivation from the theory, sound answers to such questions require sound measures of objective as well as subjective PE fit.

Statistical Models

PE fit can have non-linear relations with psychological strain. Figure 34.6 presents a U-shaped curve as an illustration. The lowest level of psychological strain on the curve occurs when employee and job characteristics fit each other (P = E). Strain increases as the employee's abilities or needs respectively fall short of the job's demands or resources (P<E or exceed them (P>E). Caplan and colleagues (1980) report a U-shaped relation between PE fit on job complexity and symptoms of depression in a study of employees from 23 occupations.

Efficacy of the Model

A variety of different approaches to the measurement of PE fit demonstrate the model's potential for predicting well-being and performance. For example, careful statistical modelling found that PE fit explained about 6% more variance in job satisfaction than was explained by measures of P or E alone (Edwards and Harrison 1993). In a series of seven studies of accountants measuring PE fit using a card-sort method, high-performers had higher correlations between P and E (average $r = 0.47$) than low performers (average $r = 0.26$; Caldwell and O'Reilly 1990). P was assessed as the employee's knowledge, skills and abilities (KSAs), and E was assessed as the commensurate KSAs required by the job. Poor PE fit between the accountant's values and the firm's also served to predict employee turnover (Chatman 1991).

WORKLOAD

Marianne Frankenhaeuser

Workload and Brain Function

Knowledge about human needs, abilities and constraints provides guidelines for shaping psychosocial work conditions so as to reduce stress and improve occupational health (Frankenhaeuser 1989). Brain research and behavioural research have identified the conditions under which people perform well and the conditions under which performance deteriorates. When the total inflow of impressions from the outside world falls below a critical level and work demands are too low, people tend to become inattentive and bored and to lose their initiative. Under conditions of excessive stimulus flow and too high demands, people lose their ability to integrate messages, thought processes become fragmented and judgement is impaired. This inverted U-relationship between workload and brain function is a fundamental biological principle with wide applications in working life. Stated in terms of efficiency at different workloads, it means that the optimal level of mental functioning is located at the midpoint of a scale ranging from very low to very high work demands. Within this middle zone the degree of challenge is "just right", and the human brain functions efficiently. The location of the optimal zone varies among different people, but the crucial point is that large groups spend their lives outside the optimal zone that would provide opportunities for them to develop their full potential. Their abilities are constantly either underutilized or overtaxed.

A distinction should be made between quantitative overload, which means too much work within a given time period, and qualitative underload, which means that tasks are too repetitive, lacking variety and challenge (Levi, Frankenhaeuser and Gardell 1986).

Research has identified criteria for "healthy work" (Frankenhaeuser and Johansson 1986; Karasek and Theorell 1990). These criteria emphasize that workers should be given the opportunity to: (a) influence and control their work; (b) understand their contribution in a wider context; (c) experience a sense of togetherness and belonging at their place of work; and (d) develop their own abilities and vocational skill by continuous learning.

Monitoring Bodily Responses at Work

People are challenged by different work demands whose nature and strength are appraised via the brain. The appraisal process involves a weighing, as it were, of the severity of the demands against one's own coping abilities. Any situation which is perceived as a threat or challenge requiring compensatory effort is accompanied by the transmission of signals from the brain to the adrenal medulla, which responds with an output of the catecholamines epinephrine and norepinephrine. These stress hormones make us mentally alert and physically fit. In the event that the situation induces feelings of uncertainty and helplessness, the brain messages also travel to the adrenal cortex, which secretes cortisol, a hormone which plays an important part in the body's immune defence (Frankenhaeuser 1986).

With the development of biochemical techniques that permit the determination of exceedingly small amounts of hormones in blood, urine and saliva, stress hormones have come to play an increasingly important role in research on working life. In the

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