



# Social reciprocity and health: New scientific evidence and policy implications

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**Summary** The work contract is based on the norm of social reciprocity where appropriate rewards are provided for efforts and achievements at work. The effort-reward imbalance model of work stress maintains that contractual non-reciprocity in terms of high efforts spent and low rewards received is frequent if people have no alternative choice in the labour market, if they are exposed to heavy competition or if they are intrinsically motivated to engage in excessive work-related commitment. According to the model, long-term exposure to effort-reward imbalance increases the risk of stress-related disorders. An overview of results from prospective epidemiological investigations testing the model is given. Overall, people who experience failed reciprocity at work are twice as likely to suffer from incident cardiovascular disease, depression or alcohol dependence compared to those who are not exposed. Associations are stronger for men than for women. Policy implications of findings for improved worksite health promotion are discussed.  
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## 1. Introduction

It is almost a hundred years since psychosomatic medicine evolved as a scientific programme. Over the century different paradigms shaped psychosomatic research, among them, most obviously, psychoanalysis, behaviourism, stress research, medical sociology and epidemiology. Today, molecular biology and genetics offer tempting new transdisciplinary research perspectives. Despite this diversity there is also a continuity of fundamental inquiry into psychosomatic topics. The

mind-body problem and the potential discrepancy between people's self perceived ill health and biomedically assessed diagnosis are two such topics. It is probably accurate to state that Holger Ursin has made original contributions to both problems. First, in the frame of ecologically valid experimental stress research, he and his colleagues showed that environmental challenges adversely affect bodily systems only if they produce sustained autonomic arousal. Sustained autonomic arousal is contingent on the absence of coping in terms of positive outcome expectancy (Ursin and Eriksen, 2004). More recently, Ursin focussed on the socio-behavioural consequences of self-rated ill health and perceived pain-in particular back pain-in the absence of objectively diagnosed lesions.

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These patient-based decisions in terms of sick leave and early retirement have far reaching economic and psychosocial implications (Eriksen and Ursin, 2002).

Psychobiology and behavioural medicine have contributed—and continue to contribute—a lot to the growth of psychosomatic medicine. A more modest role in this regard is played by health-related social sciences, in particular medical sociology and social epidemiology. Yet, in this contribution an example is given on how a sociological hypothesis can cross-fertilize psychosomatic and behavioural medicine by linking the structure of social opportunities with well-being and biological functioning via distinct types of stressful everyday experiences.

These links between the structure of social opportunities and health are mediated in large part by the quality of self-experience that is available from core social roles in adult life, such as the marital and parental role, the work role, or relevant civic roles. Having access to, and acting successfully in these social roles is important for individual need fulfilment.

In addition to meeting goals such as securing income, comfort, social stability and support these roles offer opportunities of positive self-experience, in particular self-efficacy and self-esteem. Positive experience of self is contingent on opportunities of belonging, acting or contributing, and of receiving favourable feedback. Take for instance the work role where opportunities of learning new skills, of mastering difficult tasks, or of meeting demands with a sense of responsibility and commitment may produce favourable effects on self-efficacy. Self-efficacy has been defined as the belief a person has in his or her ability to accomplish tasks, based on a favourable evaluation of one's competence and of expected outcomes (Bandura, 1985). Similarly, the work role can act as a source of recurrent positive experience of self-esteem. This is the case when achievements that meet or even exceed expectations are reciprocated by equitable rewards or when collaboration occurs in an atmosphere of mutual respect and trust. Though it is not exclusive, the work role offers particularly strong and important incentives of positive self-experience.

Conversely, lack of positive self-experience at work can be detrimental to health and well-being. We tested this hypothesis in extensive studies in the frame of a newly developed theoretical model, effort-reward imbalance at work (Siegrist, 1996). This model builds on the notion of social reciprocity, a fundamental principle of interpersonal behaviour and an 'evolutionary old' grammar of social exchange. Social reciprocity is characterized

by mutual cooperative investments based on the norm of return expectancy where efforts are assumed to be equalized by respective rewards (Gouldner, 1960). Failed reciprocity resulting from a violation of this norm elicits strong negative emotions and sustained stress responses because it operates against this fundamental principle.

This principle of social reciprocity lies at the core of the employment contract which defines distinct obligations or tasks to be performed in exchange with equitable rewards. The model of effort-reward imbalance is based on the assumption that efforts spent at work are not reciprocated by equitable rewards under specific conditions. These rewards include money, esteem and career opportunities, including job security. The model of effort-reward imbalance claims that lack of reciprocity between the costs and gains (i.e. high cost-low gain conditions) elicits negative emotions with special propensity to sustained autonomic and neuroendocrine activation.

In structural terms, this imbalance results from the fact that the social exchange between employee and employer is based on an incomplete contract. An incomplete contract does not specify the full range of detailed obligations and benefits (Fehr and Gächter, 2000). In incomplete contracts, assumptions of trust in mutual commitment are made. However, under the following conditions incomplete contracts are likely to result in high cost-low gain conditions. First, the risk of non-reciprocity in exchange is particularly high if employees have no alternative choice in the labour market. This is the case, for instance, if their skills are poor or if they subscribe to short-term contracts. Less frequently non-reciprocity at work is experienced by workers as a negative life event, as contract violation or failed contract.

Secondly, employees themselves may contribute to effort-reward imbalance at work either intentionally or unintentionally. For instance, they may accept job arrangements that are considered unfair for a certain time for a strategic reason, as they tend to improve their chances or career promotion and related rewards at a later stage. This pattern is often observed in early stages of professional careers, among others. Failed success after long lasting investment is particularly harmful to a person's well-being and health.

Third, there are psychological reasons of a continued mismatch between efforts and rewards at work. People characterized by a motivational pattern of excessive work-related overcommitment and a high need for approval may suffer from inappropriate perceptions of demands and their own coping resources more often than their less involved colleagues (Siegrist 1996, 2002). Perceptual

distortion prevents them from accurately assessing cost-gain relations. As a consequence, they underestimate the demands, and overestimate their own coping resources while not being aware of their own contribution to non-reciprocal exchange.

In summary, the proposed theoretical model is based on the sociological hypothesis that structured social exchange, as mediated through core social roles (the work role), is rooted in contracts of reciprocity of cost and gain. Conditions of failed social reciprocity are in part structural (or extrinsic) and in part personal (or intrinsic). Structural conditions of recurrent experience of high effort and low reward at work include lack of alternative choice in the labour market, lack of mobility, low level of skills and confinement to a short-term contract. Personal conditions include strategic choices of the workers (although these often may be induced by social pressure) and characteristics of individual coping with the demands and rewards at work (overcommitment).

Three hypotheses are tested: 1. People characterized by an imbalance between (high) effort and (low) reward (failed reciprocity) are at elevated risk of stress-related diseases (over and above the risk associated with each one of the components). 2. People scoring high on 'overcommitment' are at elevated risk of stress-related diseases. 3. Relatively highest risk of stress-related diseases is expected in people who are characterized by the co-manifestation of conditions (1, 2).

In the following section a test of these hypotheses is presented although not in a systematic way as most of the evidence relates to the first hypothesis. Details on the measurement of effort-reward imbalance at work can be found elsewhere (Siegrist et al., 2004). However, it should be mentioned that 'effort' and 'reward' are measured by two uni-dimensional scales containing 6 and 11 Likert-scaled items respectively. Imbalance is assessed by applying a standardized algorithm (ratio effort/reward). 'Overcommitment' is equally measured by a Likert-scale containing 6 items in its short version. Reliability, factorial structure and different types of validity (convergent, discriminant, criterion validity) of these scales were analysed, including comparison of self-report data with contextual information (where available) (Siegrist, 1996; Siegrist et al., 2004).

## 2. Scientific evidence

Several sources of information on associations between psychosocial stress at work and health

are available, such as data from cross-sectional and case-control studies, from prospective epidemiological observational investigations, from studies using ambulatory monitoring techniques or experimental designs and from intervention trials. The prospective epidemiological observational study is considered a gold standard approach in this field because of its temporal sequence (exposure assessment precedes disease onset), its sample size (based on statistical power calculation and allowing for adjustment for confounding variables in multivariate analysis) and the quantification of subsequent disease risk following exposure (relative risk of exposed vs. non-exposed subjects). The following selective presentation of associations between effort and reward imbalance at work (exposure) and different types of disease is restricted to prospective studies for these methodological reasons. To further explore the validity of reported findings, some ambulatory monitoring data are included whereas the absence of evidence from intervention studies reflects a lack of research of this type in the field.

Table 1 summarizes the results of 11 independent epidemiological reports on associations of effort-reward imbalance at work and disease onset that are available to date. Relative risks of health outcomes are calculated by estimating odds ratios (OR) or hazard ratios (HR), based on multivariate logistic regression analysis. The confidence intervals of these risks are not reported here, but all except two ratios are statistically significant in the expected direction: the higher the ratio, the more powerful the risk factor.

Significantly elevated odds ratios or hazard ratios vary between 1.3 (lowest) and 4.5 (highest), with an overall mean of about 2.0. This means that people who experience failed reciprocity at work (high effort and low reward) are twice as likely to suffer from one or more of the health risks under study in the near future, compared to people who are free from this type of chronic psychosocial stress. Elevated risks cannot be attributed to the influence of relevant confounding factors.

The observation period in these studies varies widely from 1 year to about 25 years (mean 8 years) and in most studies, the measurement of exposure (effort-reward imbalance) is restricted to baseline assessment. We now know that cumulative or chronic effort-reward imbalance over a longer period of time is associated with higher risk, compared to single (baseline) assessment (Chandola et al., 2005). It is therefore possible that the relative risks indicated in Table 1 represent conservative estimates. However, it must be noted that in some studies proxy-measures

**Table 1** Effort-reward imbalance at work and health outcomes: review of prospective epidemiological studies.

First author (year)	Total sample (per cent women)	Country	Observation period (years)	Health outcome	Relative risk (odds ratio [OR], hazard ratio [HR])	
Siegrist et al., 1990	416 (0)	Germany	6.5	Incident fatal or non-fatal CHD	OR 4.5	
Lynch et al., 1997a	2297 (0)	Finland	8.1	Incident CHD (myocardial infarction)	HR 2.3	
Bosma et al., 1998	10308 (33)	UK	5.3	Incident CHD including angina	OR 2.2	
Kuper et al., 2002	10308 (33)	UK	11.0	Incident CHD	HR 1.3 (1.8 <sup>a</sup> )	
Kivimäki et al., 2002	812 (32)	Finland	25.6	Cardiovascular disease mortality	HR 2.3	
Kumari et al., 2004	8067 (30)	UK	10.5	Incident type II diabetes	OR 1.6 men	OR 0.9 <sup>b</sup> women
Stansfeld et al., 1999	10308 (33)	UK	5.3	Mild to moderate psychiatric disorder (mostly depression)	OR 2.6 men	OR 1.6 women
Kuper et al., 2002	6918 (33)	UK	11.0	Poor self-rated functioning (SF36)	<i>Physical</i> OR 1.4 <i>mental</i> OR 2.3	
Stansfeld et al., 1998	10308 (33)	UK	5.3	Poor self-rated functioning (SF 36)	OR 1.4 men	OR 2.0 women
Niedhammer et al., 2004	6286 (30)	France	1.0	Poor self-rated health	OR 1.8 men	OR 2.2 women
Head et al., 2004	8280 (31)	UK	5.3	Alcohol dependence	OR 1.9 men	OR 1.2 <sup>b</sup> women

CHD, coronary heart disease; SF 36, short form 36 health survey; UK, United Kingdom.

<sup>a</sup> Effort-reward imbalance in combination with low social support at work.

<sup>b</sup> Statistically non-significant.

of effort-reward imbalance were used as the original scales were not yet available at study onset.

As can be seen from Table 1, available evidence is stronger for men than for women, and it is stronger for coronary heart disease than for other health outcomes. Yet, evidence is of similar strength independent of whether self-reported 'soft' endpoints or clinically defined 'hard' endpoints are used. Seven out of 11 studies rely on data from the United Kingdom, the Whitehall II study of British civil servants (Marmot et al., 1991). Two studies come from Finland (different samples) and the remaining investigations are from France and Germany.

In summary, there is solid evidence indicating that failed reciprocity in a core social role, the work role, represents an independent risk factor of a variety of highly prevalent diseases, especially so among middle-aged men. Supporting data come

from laboratory and ambulatory monitoring research on male employees with continuous cardiovascular and hormonal data monitoring over one or several working days. They indicate elevated cardiovascular activation and increased cortisol secretion under high psychosocial work-related stress. These effects are attributed in part to the extrinsic (effort-reward ratio), in part to the intrinsic (overcommitment) component of the theoretical model (Vrijkotte et al., 2000; Steptoe et al., 2004).

### 3. Policy implications and conclusions

In view of the fact that coronary heart disease, depression, and Type II-diabetes are likely to become leading causes of premature death and of

life years defined by disability worldwide, and in view of the fact that alcohol dependence is one of the most important addiction-related public health problems the policy implications of the findings presented in Section 2 deserve special attention. Measures to improve the balance between effort and reward and, hence, to improve reciprocity and contractual fairness at work can be implemented at three levels. The first level relates to the individual worker. Increasing awareness of failed reciprocity at work among employees, informing them about possible health effects, and providing cognitive-behavioural interventions in high risk groups to reduce the intensity of stressful experience (relaxation response, stress inoculation, self-instruction, reducing high level of overcommitment) are examples of this approach. For instance, in a stress prevention trial among inner-city bus drivers a significant and clinically relevant reduction of mean scores of overcommitment was achieved within twelve two-hour expert-guided group sessions (Aust et al., 1997).

A related second level of health promotion at work, the interpersonal level, concerns the training of leadership skills, the handling of conflicts, or the improvement of communication and cooperation in everyday work settings. Providing appropriate esteem and recognition was shown to be an important component of the balance between effort and reward at work, and this target can be met by focussed leadership training. A recent intervention study in Sweden has documented health benefits of this measure, as evidenced by reduced cortisol secretion among those employees who worked under newly trained supervisors (Theorell et al., 2001).

However, to produce a lasting impact, these 'human relations' measures need to be supplemented by evidence-based organizational and structural changes in the work environment. Such changes concern the division of work, its quantity and quality, the work schedules and their flexibility, monetary incentives, tailored promotion opportunities, including investment into training and re-qualification on the job, and, most importantly, enhanced job security.

Resistance against such changes is expected from decision makers where the main argument points to the negative cost-benefit relation of respective investments. In contrast to this argument, preliminary evidence suggests substantial medium-term cost savings of evidence-based investments in organizational and personnel development. For instance, in a recent economic study that aimed at exploring common organizational features of those companies that were most

successful in terms of shareholder value over a number of years, the following characteristics were identified: 1. employment security; 2. selective hiring of new personnel; 3. self-managed teams and decentralized decision making as the basic principles of organizational design; 4. comparatively high compensation contingent on organizational performance; 5. extensive training; 6. reduced status distinctions and barriers across levels; 7. extensive sharing of financial and performance information throughout the organization (Pfeffer, 1998).

Although this study was not directed towards occupational health and worksite health promotion it is evident that several of the features of economically successful organizations are similar to those which result as recommendations from the scientific findings presented above. In other words, improving social reciprocity at work in terms of effort-reward balance might produce considerable return-on-investment.

Apart from these policy implications further scientific research questions need to be addressed. One important question concerns the generalization of the theoretical model of failed social reciprocity beyond the work role. A first test of applying the model to other core social roles in adult life, such as the marital and parental roles or civic roles, was recently performed in our group. In three cross-sectional studies associations of failed reciprocity in these roles and depressive symptoms were analysed. We found consistently increased odds ratios of depressive symptoms that remained statistically significant after adjustment for age, gender, socioeconomic status, and level of social support (Knesebeck and Siegrist, 2003). Along these lines, additional constructs can be explored that may modify effects of failed reciprocity on health, such as spill-over between work and home or cumulation of psychosocial stress at work in terms of a co-manifestation of effort-reward imbalance and conditions of high demand/low control (Karasek and Theorell, 1990).

In conclusion, failed social reciprocity in core social roles, in particular the work role (effort-reward imbalance model), is an independent risk factor of several stress-related chronic diseases and disorders that show a substantial prevalence in modern societies. Available evidence suggests that critically altered autonomic/neuroendocrine regulation is involved in linking this risk condition with disease development (Lynch et al., 1997b; Vrijkotte et al., 2000; Steptoe et al., 2004). Based on currently available scientific information distinct intervention measures seem justified in an attempt to improve social reciprocity at work.

These measures can be conceptualised at three levels, the personal, interpersonal and organizational or structural level. Medical sociology, despite its rather peripheral role in psychosomatic and behavioural medicine, can develop valuable contributions to our common goal, the strengthening of a biopsychosocial approach to health and disease, both in theory and in practice.

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