Editorial

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On effort-reward imbalance and depression

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The review by Rugulies et al (1) in this issue of the *Scandinavian Journal of Work, Environment & Health* is published almost at the same time as a Dragano et al article (2) in the journal *Epidemiology* on effort–reward imbalance (ERI) at work and incident coronary heart disease. The latter is based on the European collaborative individual participant data (IPD) cohort. Both articles are based exclusively on prospective studies with information about work environment and health status at one point and illness at a later point. Moreover, both illustrate that it is possible to identify increased near-future illness risk (depression in Rugulies et al and coronary heart disease in Dragano et al) by asking employees about perceived effort devoted to work and perceived degree of reward for that effort combining it into a measure of the balance between effort and reward.

In the early 1990s, Siegrist (3) introduced the ERI model in epidemiology. The most updated summaries of its theory and epidemiological findings can be found in the recently published book edited by Siegrist & Wahrendorf (4). It postulates that lack of reciprocity between high "costs" (spending high effort at work) and low benefits (such as salary, possibility for promotion and positive feedback) produces emotional distress affecting both mental and physical health. At the time of its introduction, many researchers perceived this theoretical model as competing with the demand–control model that Karasek had introduced 15 years earlier (5). However, it was shown that the two models supplemented each other because higher risk estimates were found when they were combined (6, 7); in addition, there were interesting gender differences in the way the risk patterns featured. Therefore epidemiologists in the field have mostly decided to retain both models in their studies. The Dragano article actually again shows that combining the two models provides higher estimates of heart disease risk than the use of one alone.

In the early stages, Siegrist proposed two aspects of effort, namely intrinsic and extrinsic, that were combined in one measure of effort. The intrinsic aspect was presented as a personal inner drive and has later been re-labelled "over-commitment". In the contemporary version of the model, the commitment dimension is regarded as a mediator and the Rugulies et al and Dragano et al studies only include the extrinsic aspect of effort. Over-commitment is regarded as a personality trait by some authors, but according to Siegrist's original theory, over-commitment arises in subjects who are exposed to long-lasting underreward for high extrinsic effort. It is logical to regard over-commitment as a mediator. To combine them leads to interpretation difficulties since they are on different levels in a theoretical chain of causal factors.

Rugulies et al make several citations to a systematic review and meta-analysis on work environment factors and depression from Sweden, utilizing the GRADE system to evaluate evidence (8). As the authors point out, two years have elapsed since the Swedish study was published. One original article filling quality criteria had been published more recently. But the two review groups have also differed with regard to quality criteria. For instance, there were differences in the way in which duplicates (two or more articles based on approximately the same cohort study) were treated. In addition, Rugulies et al decided that consumption of antidepressive medication (in the Danish study by Nielsen et al) could be accepted as an outcome. In the Stockholm group, it was reasoned that consumption of such medication is determined by many factors, not all of them related to the depressive state itself. Rugulies et al acknowledged this difficulty but still accepted it as an outcome. This turned out to be a very important decision since the risk estimate in that study was the only one clearly (but not significantly) <1.0. This considerably decreased the global risk estimate for depressive symptom development associated with low ERI. If this study is excluded, the risk estimate is very similar to the estimate in the Swedish review (1.78). It may very well be that the likelihood of obtaining antidepressive medication could be associated per se with a

pronounced ERI. When the climate in a worksite is not rewarding employees for high effort, there may also be high thresholds for medication. If there is such a systematic bias, the association between poor ERI and development of depressive symptoms may be underestimated and more so for ERI than other aspects of the psychosocial work environment.

It is clear that – despite the fact that the review and meta-analytical study of the association between poor ERI and depressive symptoms is based on prospective studies only – we can only draw conclusions about the predictive power, not causality, of ERI. This caution is necessary in all epidemiological research using exposure assessment based upon self-ratings. There is clearly such an element in ERI assessment since ratings of both effort and reward are to some extent influenced by previous experiences and constitutional factors. However it is also argued that the only relevant estimation of work conditions is the one provided by the employee him or herself. Predictions based upon ERI assessments using standard questionnaires therefore reflect the reality of the employees. The parallel research on the demand–control model raises the same discussion although the concept's psychological demands and decision latitude may be less subjectively colored. It is of interest that twin research on the demand–control model has shown that the relationship between perceived psychological demands and decision latitude on one hand and depressive symptoms on the other hand is not explained away to any significant degree by the genetic influence on both these exposure factors and the depressive symptom outcome (9). The corresponding question has not yet been examined for ERI.

Many measures of ERI have been used in the past but, in the end, more scientific rigor has been developed. However, in Rugulies et al review there is still diversity in the methodology for assessing ERI, which has been discussed as a problem in the estimation of magnitude of risk. Choi et al (10) criticized the IPD group for accepting too much diversity in ERI assessment (11) in its study and pointed at the risk of underestimation of true risk.

The review by Rugulies et al is a very valuable contribution to the literature and helps the researchers in the field find an insightful discussion of this subject.

References

1. Rugulies R, Aust B, Madsen IE. Effort reward imbalane at work and risk of depressive disorders. A systematic review and meta-analysis of prospective cohort studies. Scand J Work Environ Health. 2017;43(4):294–306 http://dx.doi.org/10.5271/sjweh.3632
2. Dragano N, Siegrist J, Nyberg ST, Lunau T, Fransson EI, Alfredsson L et al for the IPD-Work consortium. Effort-reward imbalance at work and incident coronary heart disease: a multi-cohort study of 90,164 individuals. Epidemiology. In press, 2017.
3. Siegrist J. Adverse health effects of high-effort/low-reward conditions. J Occup Health Psychol 1996 Jan;1(1):27–41. http://dx.doi.org/10.1037/1076-8998.1.1.27
4. Siegrist J, Wahrendorf M, editors. Work stress and health in a globalized economy – the model of effort-reward imbalance. 2016 CHAM: Springer International Publishing, London
5. Karasek RA. Job demands, job decision latitude, and mental strain: implications for job redesign. Adm Sci Q 1979;24:285–307. http://dx.doi.org/10.2307/2392498
6. Bosma H, Peter R, Siegrist J, Marmot M. Two alternative job stress models and the risk of coronary heart disease. Am J Public Health 1998 Jan;88(1):68–74. http://dx.doi.org/10.2105/AJPH.88.1.68
7. Peter R, Siegrist J, Hallqvist J, Reuterwall C, Theorell T; SHEEP Study Group. Psychosocial work environment and myocardial infarction: improving risk estimation by combining two complementary job stress models in the SHEEP Study. J Epidemiol Community Health 2002 Apr;56(4):294–300. http://dx.doi.org/10.1136/jech.56.4.294
8. Theorell T, Hammarström A, Aronsson G, Träskman Bendz L, Grape T, Hogstedt C et al. A systematic review including meta-analysis of work environment and depressive symptoms. BMC Public Health 2015 Aug;15:738. http://dx.doi.org/10.1186/s12889-015-1954-4
9. Theorell T, De Manzano Ö, Lennartsson AK, Pedersen NL, Ullén F. Self-reported psychological demands, skill discretion and decision authority at work: A twin study. Scand J Public Health 2016 Jun;44(4):354–60. Epub 2016 Jan 29. http://dx.doi.org/10.1177/1403494815626610

10. Choi B, Ko S, Landsbergis P, Dobson M, Juárez Garcia A, Schnall P et al. Re: Siegrist J, Dragano N, Nyberg ST et al. validating abbreviated measures of effort-reward imbalance at work in European cohort studies: the IPD-Work consortium. Int Arch Occup Environ Health 2014 Jan;87(1):111–2. http://dx.doi.org/10.1007/s00420-013-0908-3
11. Siegrist J, Dragano N, Nyberg ST, Lunau T, Alfredsson L, Erbel R et al. Validating abbreviated measures of effort-reward imbalance at work in European cohort studies: the IPD-Work consortium. Int Arch Occup Environ Health 2014 Apr;87(3):249–56. Epub 2013 Mar 2. http://dx.doi.org/10.1007/s00420-013-0855-z

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