

# The Distribution of Effort-Reward Imbalance in a representative sample of the Danish Workforce

Reiner Rugulies <sup>1</sup>, Birgit Aust <sup>1</sup>, Johannes Siegrist <sup>2</sup>, Olaf von dem Knesebeck <sup>3</sup>,  
Ute Bültmann <sup>4</sup>, Jakob B. Bjorner <sup>1</sup>, Hermann Burr <sup>1</sup>

- 1) National Research Centre for the Working Environment, Copenhagen, Denmark
- 2) Department of Medical Sociology, Heinrich-Heine-University of Düsseldorf, Germany
- 3) Department of Medical Sociology, University Medical Center, Hamburg-Eppendorf, Germany
- 4) Department of Health Sciences, University Medical Center Groningen, The Netherlands



NATIONAL RESEARCH CENTRE  
FOR THE WORKING ENVIRONMENT

Fifth ICOH Conference on Work Environment and Cardiovascular Diseases,  
Krakow, Poland, September 27th to 30th, 2009

# Background

- “ A mismatch between high effort spent and low rewards received at work (effort-reward imbalance, ERI) predicted incident cardiovascular disease in studies in Germany, the United Kingdom, and Finland
- “ However, no study has investigated the distribution of effort-reward imbalance in a national workforce, yet. It remains therefore unclear which jobs groups are in particular exposed to effort-reward imbalance



# The Danish Work Environment Cohort Study (DWECS)

- “ DWECS is a representative sample of the Danish population, 18 to 59 years old, that was established in 1990
- “ The cohort is followed up every 5 years
- “ At each follow-up, the cohort is supplemented with young participants and recent immigrants
- “ We used the DWECS survey from 2000, which had a response rate of 75%
- “ DWECS 2000 consisted of 4,977 employees (48% women), with a mean age of 41 years



# Main measurements in DWECS

- “ Job group: Categorized in accordance with the extended Danish version of the International Standard Classification of Occupations (ISCO)
- “ Effort-reward imbalance: The official ERI-questionnaire is not part of DWECS, therefore we had to construct proxy measures



# Measurement of effort

## One scale consisting of 4 item:

- “ Is your work unevenly distributed so it piles up?
- “ How often do you not have time to complete all your work tasks?
- “ Do you have to work overtime?
- “ Do you have to work very fast?
- “ Response categories:
  - . 1=Never/hardly ever; 2=Seldom; 3=Sometimes; 4=Often; 5=Always



# Measurement of reward

One scale consisting of 7 items from three sub -dimensions

## Financial and status reward:

- " Have you good prospects for the future in your job?
- " How would you assess your salary with regard to your effort and your qualification?

## Esteem reward

- " Is your work recognized and appreciated by management?
- " How often do you receive help and support from your colleagues?
- " How often do you receive help and support from your closest supervisors?

## Job security reward

- " Are you worried about becoming unemployed?
- " Are you worried about being transferred to another job against your will?
- " Different types of response categories for the different items.



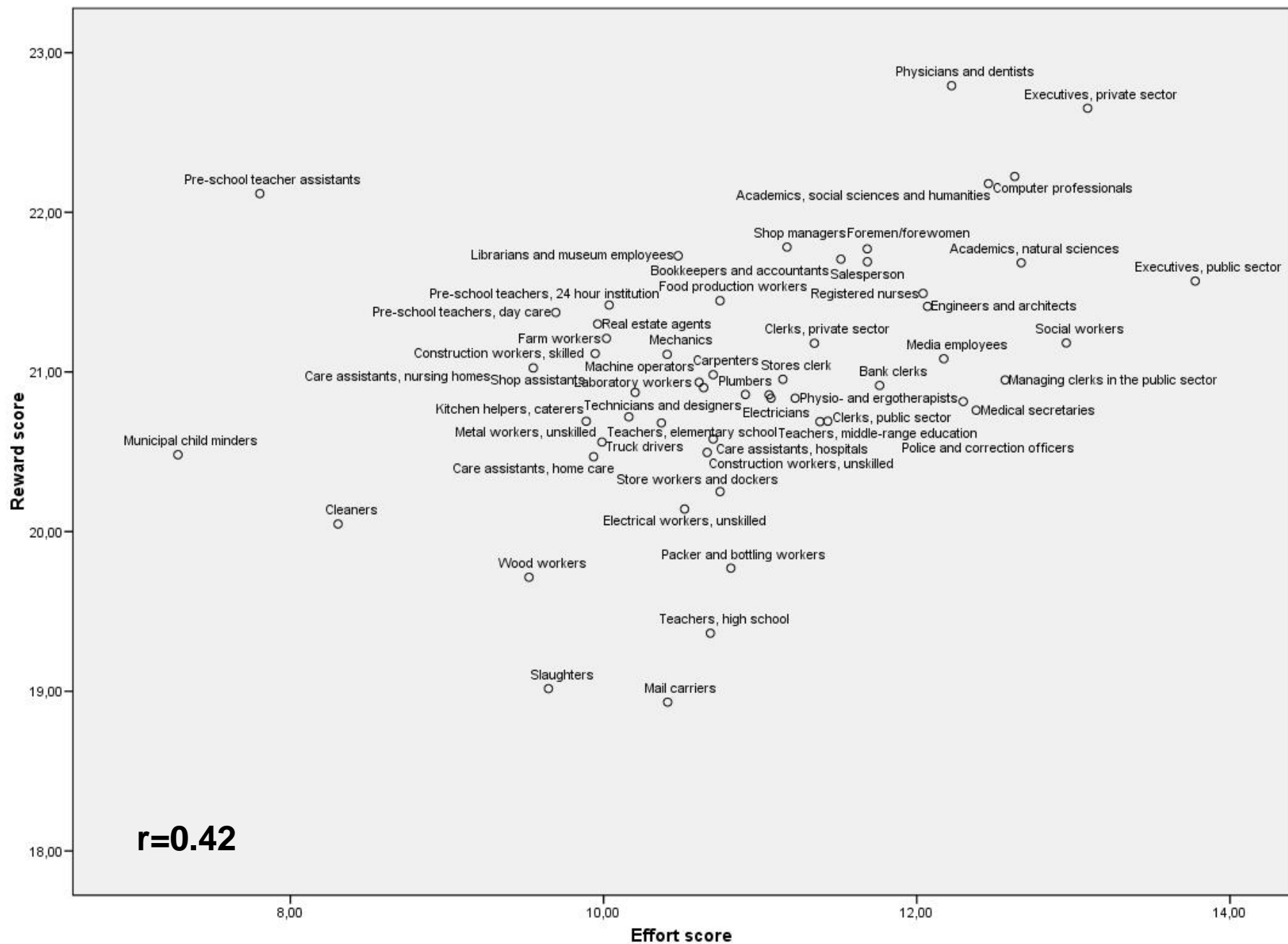


Figure 1: Effort and reward scores by job group in DWECs 2000

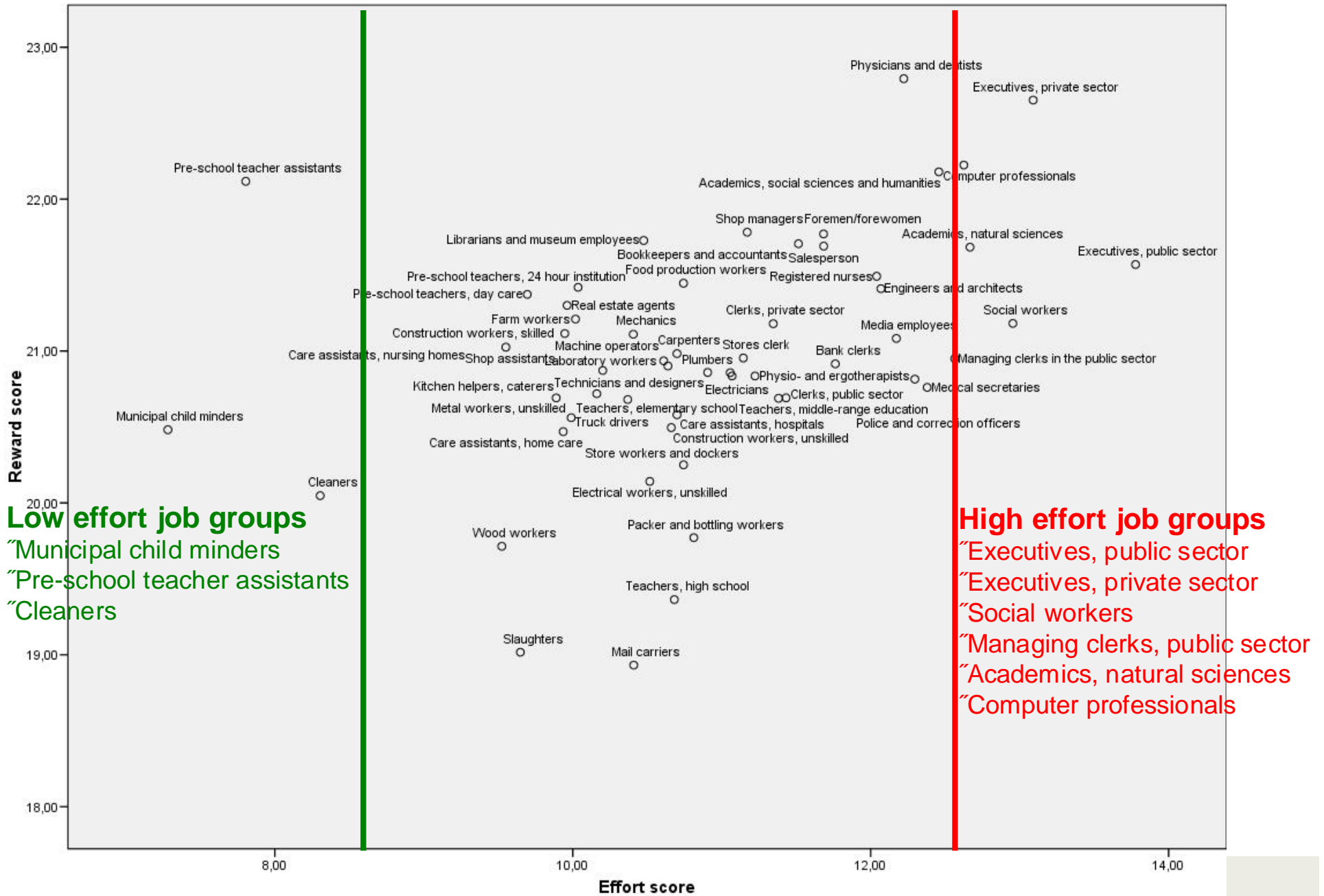


Figure 1: Effort and reward scores by job group in DWECs 2000

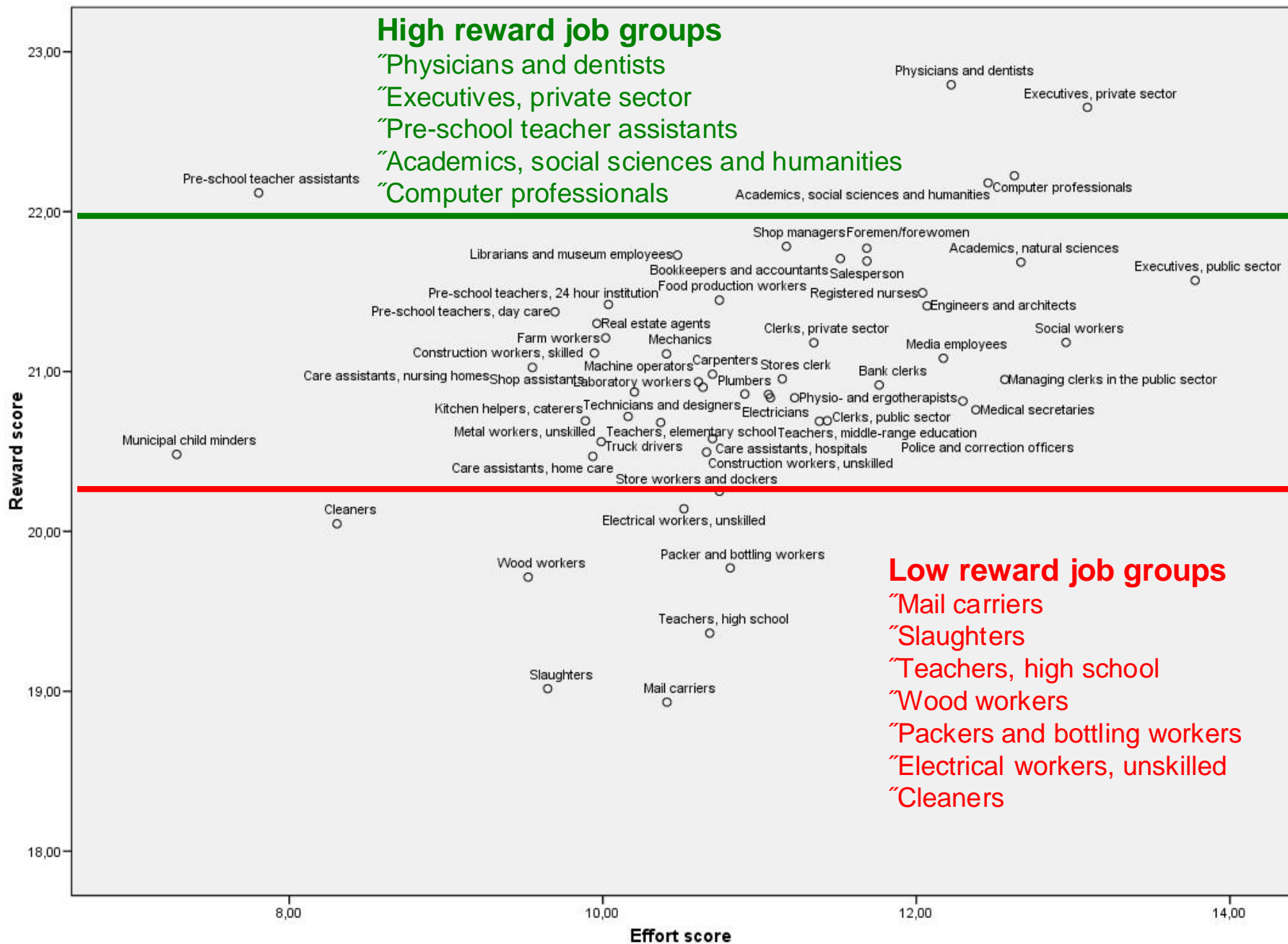


Figure 1: Effort and reward scores by job group in DWECS 2000

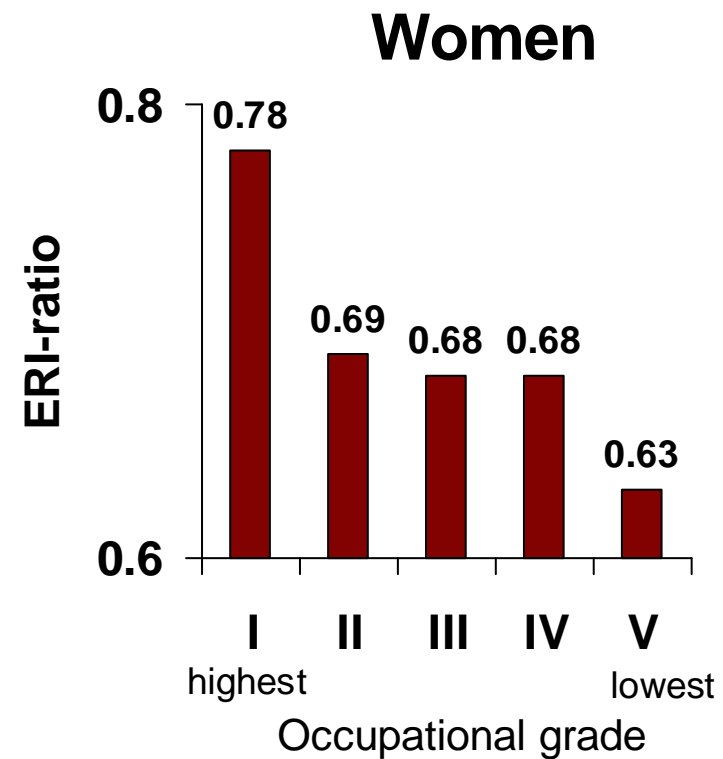
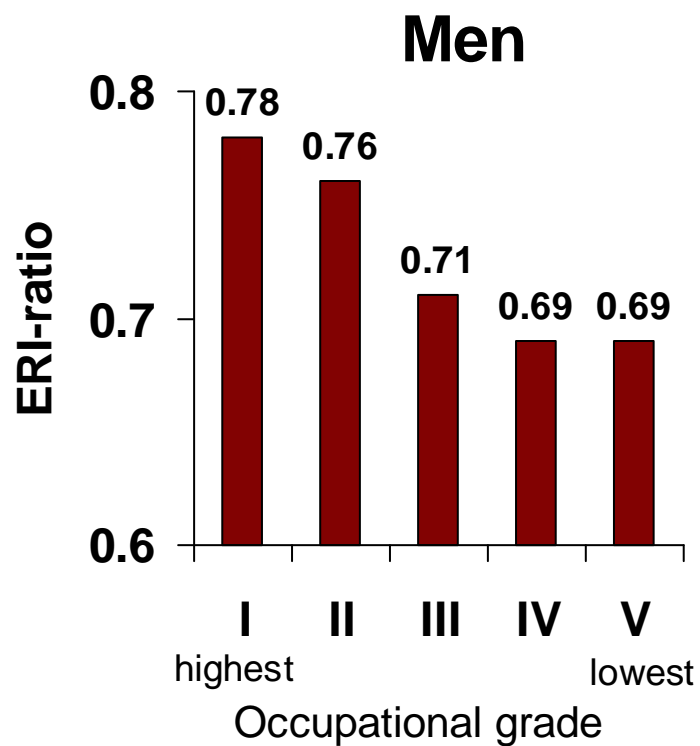


# Effort-reward imbalance

- “ The mean ERI-ratio (effort/reward) was 0.53 (SD: 0.18)
  - . Note: Not corrected for number of items, so this ratio is NOT comparable with the ratio, which you gain from the official ERI-questionnaire (where 1.00 indicates perfect balance between effort and reward)
  
- “ Job groups with an ERI-ratio at least a ½ standard deviation greater than the mean:
  - . Executives, public sector
  - . Social workers
  - . Managing clerks, public sector
  - . Medical secretaries



# ERI and Occupational Grade



# Effort-reward imbalance and decline in self-rated health. Objectives and Methods

- “ Objective:  
To analyze, whether effort-reward imbalance in DWECS 2000 predicted decline in self-rated health after 5 years of follow-up (DWECS 2005)
- “ Self-rated health: %In general, how would you rate your health?+  
1=Very good, 2=Good, 3=Fair, 4=Poor, 5=Very poor
  - . Good health (good, very good)
  - . Reduced health (fair, poor, very poor)
  - . Decline in health: Moving from the %good health+category to the %reduced health+category
- “ We had follow-up data for 2,935 participants, who all had %good health+at baseline and no missing values on any variable in multivariate analysis



# Effort-reward imbalance and decline in self-rated health. Results

- “ A 1 standard deviation increase in the ERI-ratio at baseline, was associated with a 12% increased risk for experiencing a decline in self-rated health at follow-up (OR=1.12, 95% CI: 1.01-1.24, p=0.03)
- “ Odds ratio was adjusted for gender, age, self-rated health at baseline (good or very good), occupational grade, smoking, alcohol consumption, leisure time physical activity, baseline depressive symptoms, and survey method



# Summary

- “ There is relative good reciprocity between effort and reward in the Danish society
- “ Executives in the public sector, social workers, managing clerks in the public sector, and medical secretaries had the most unfavourable ERI-ratios
- “ People of higher occupational grades had more unfavourable ERI-ratios than people of lower occupational grade
- “ High effort-reward imbalance predicted a decline in self-rated health during the 5-year follow-up, after adjustment for various co-variables



# Thank you!

## The results are published in:

Rugulies R, Aust B, Siegrist J, von dem Knesebeck O, Bültmann U, Bjorner JB, Burr H. Distribution of effort-reward imbalance in Denmark and its prospective association with a decline in self-rated health.

Journal of Occupational and Environmental Medicine 2009;51(8):870-878.

## Contact:

Reiner Rugulies ([rer@nrcwe.dk](mailto:rer@nrcwe.dk))

National Research Centre of the Working Environment, Denmark (NRCWE)

This presentation can be downloaded from the homepage of the research group 'Psychological health and well-being at work' (PIWA) at NRCWE

[www.nrcwe.dk/PIWA/Presentations](http://www.nrcwe.dk/PIWA/Presentations)



NATIONAL RESEARCH CENTRE  
FOR THE WORKING ENVIRONMENT