



## Differences in heart rate reserve during occupational and leisure time physical activity in Danish blue-collar workers

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## Background

- Physical activity (PA) is important in the prevention of (e.g., Sofi e.a., 2008)
  - CVD
  - Mortality
- Effects of different domains (e.g., work and leisure time) are considered positive and alike

## Background

- Recent surprising evidence suggests a *PA health paradox* (e.g., Clays e.a., 2014; Hu e.a., 2014; Harari e.a., 2015):
  - Positive health effects of leisure-time PA (LTPA)
  - Negative health effects of occupational PA (OPA)
- Paradox varies by sex and fitness
- Even when adjusted for PA (and other relevant factors)!

## Possible explanation

Difference intensity of OPA and LTPA

LTPA	OPA
High intensity activities	Manual handling, repetitive work, static postures
Performed in short bouts, allowing for recovery	Long periods, not allowing for recovery
Fitness improvements	No fitness improvement
Chronic decrease in BP and HR	Chronic increase in BP and HR

## Aims

To assess:

- Differences in intensity (%HRR) between OPA and LTPA
- Whether possible differences are affected by
  - Sex
  - Cardiorespiratory fitness

## Methods – Study sample

- NOMAD study: Danish blue-collar workers (e.g., Gupta e.a., 2015)
  - 7 different companies
  - 18-65 yo
  - $\geq 20$  hours work/week
- 259/391 invited workers agreed to participate
- 4 consecutive 24h days of objective measurements

## Methods – Objective measurements

- Physical activity
  - 2 Actigraph accelerometers: thigh & trunk
  - Sitting, Standing, Moving, Walking, Stairs (skotte e.a., 2014)
  - Stratified by work and leisure (excluding sleep)
- Heart rate
  - Actiheart



## Methods – Analyses

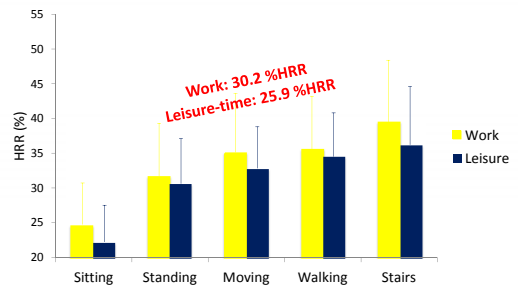
HRR in each of the activities (OPA and LTPA)

- Q1
  - Dependent variable: Domain (work vs leisure-time)
  - Independent variable: %HRR during various activities
  - Confounders: Sex, age, BMI, alcohol consumption, fitness (Astrand test), smoking, heart/lung medication, influence at work and carrying/lifting at work
- Q2
  - Domain\*sex
  - Domain\*fitness

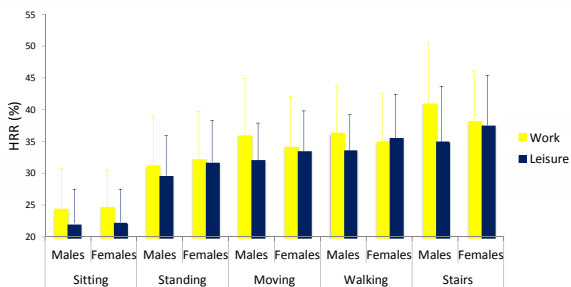
## Results

- n=124
- 49% female, age 46.6 (9.1) yo
- 61% smokers, 2.6 beverages daily
- BMI: 26.0 (4.6), heavy lifting: 61%

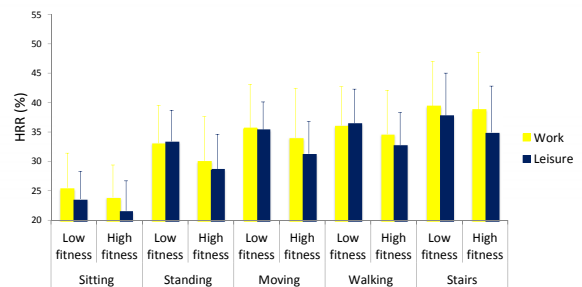
## Results



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## Discussion

- Intensity of OPA higher than that of LTPA
- Activities at work may have other demands
  - Manual handling or other upper limb movements
  - Mental strain
- Explanation for the PA health paradox
  - Possible unhealthy intensity OPA levels (acc. to ILO recommendations)
- Methodological implication
  - Don't just consider one dimension of PA

## Discussion - Explanations

- More pronounced in men than women
  - Sex differences in work intensity
- Different in workers with lower fitness
  - Higher intensity at work and during leisure

## Discussion - Limitations

- We don't know much about temporal patterns
- Only blue-collar workers were studied
  - Broader evidence is needed
- Only workdays were studied
  - Broader evidence is needed

## Conclusions

- Higher intensity of OPA than LTPA explains the PA health paradox
- For CVD prevention aim at OPA, in particular in:
  - Men
  - Workers with lower fitness

## Thanks

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