



Occupational exposures and the dynamics of working life patterns: a scoping review of the literature

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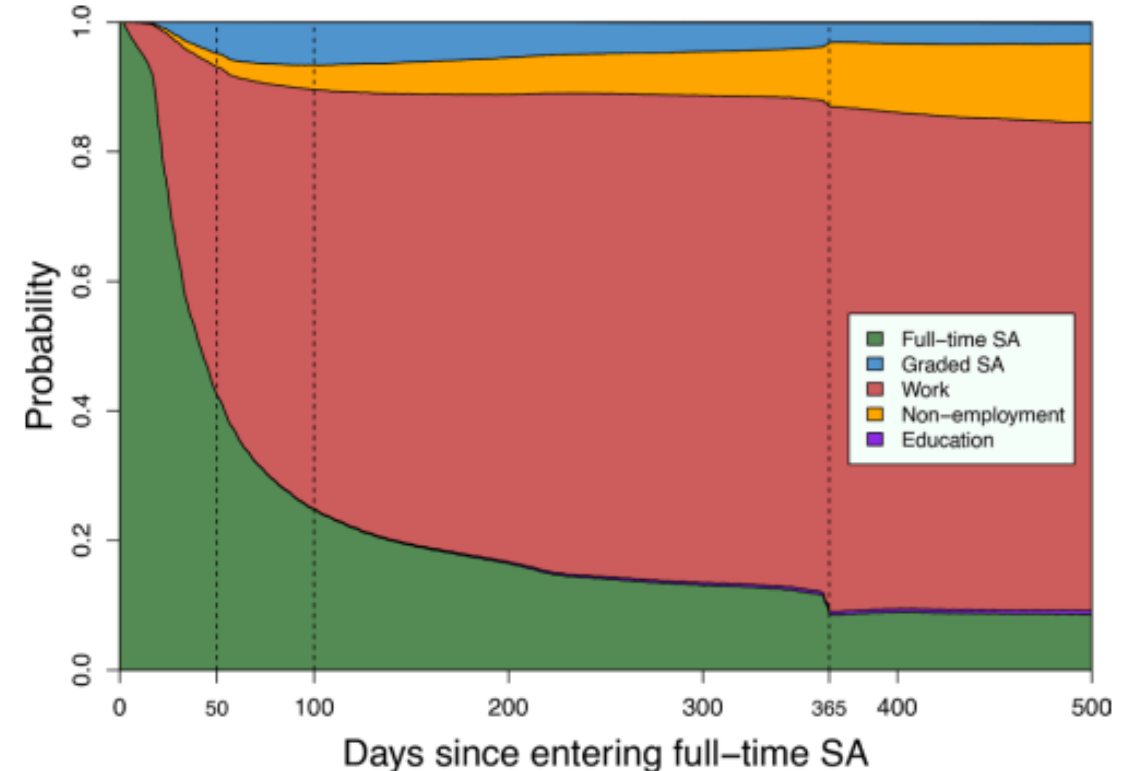
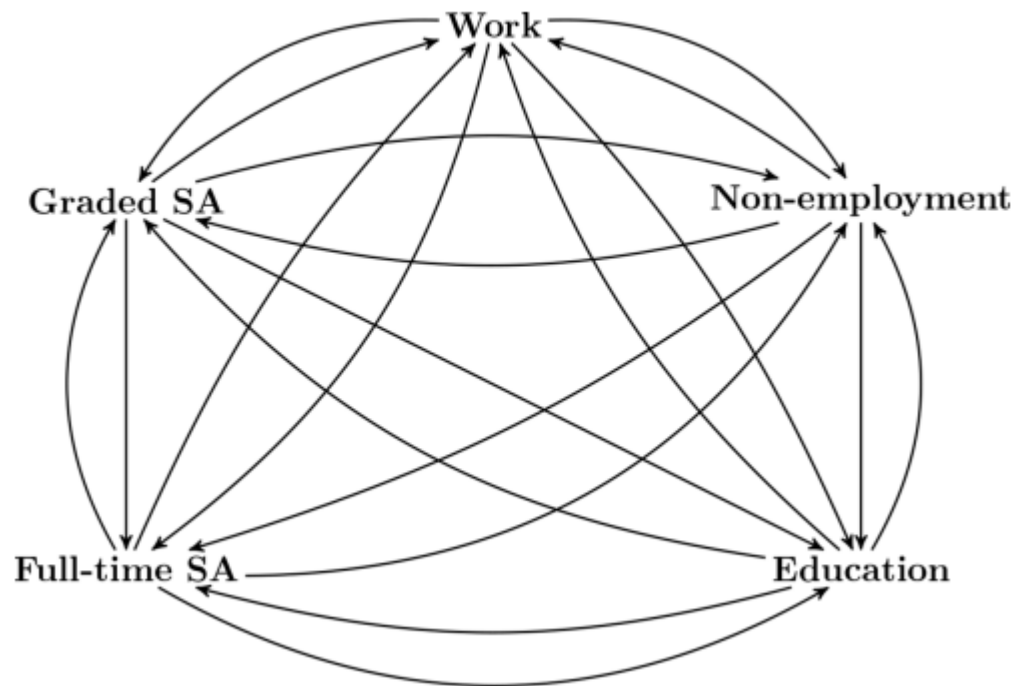
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Dynamics of working life patterns

- How individuals participate in the labour market over a given period of time



From Hoff et al (2022)

Working life trajectories

- Most common working life patterns among population

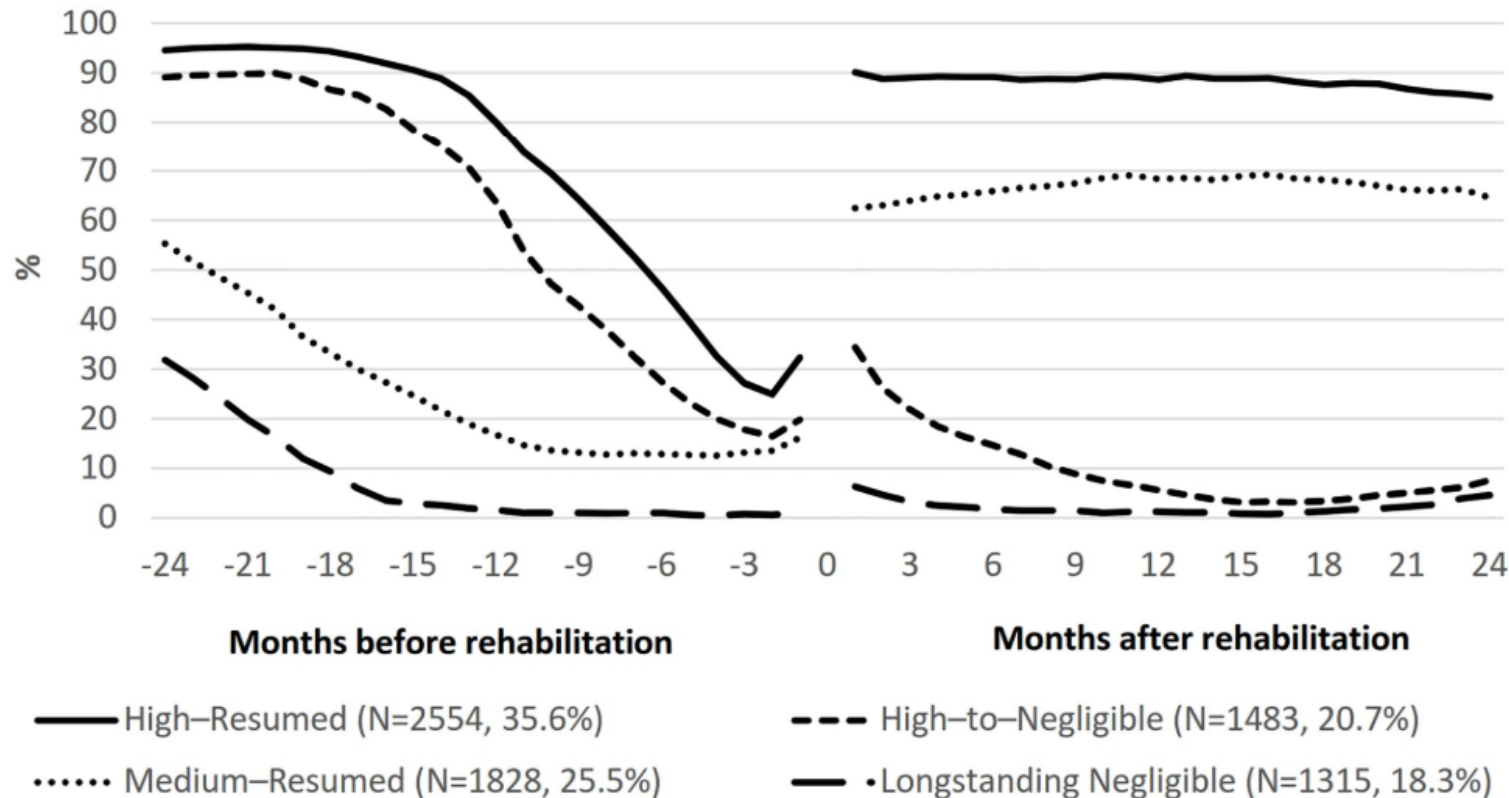


Fig 1. Four identified trajectory groups of work participation over the period of two years before and two years after vocational rehabilitation.

<https://doi.org/10.1371/journal.pone.0212498.g001>

From Leinonen et al (2019)

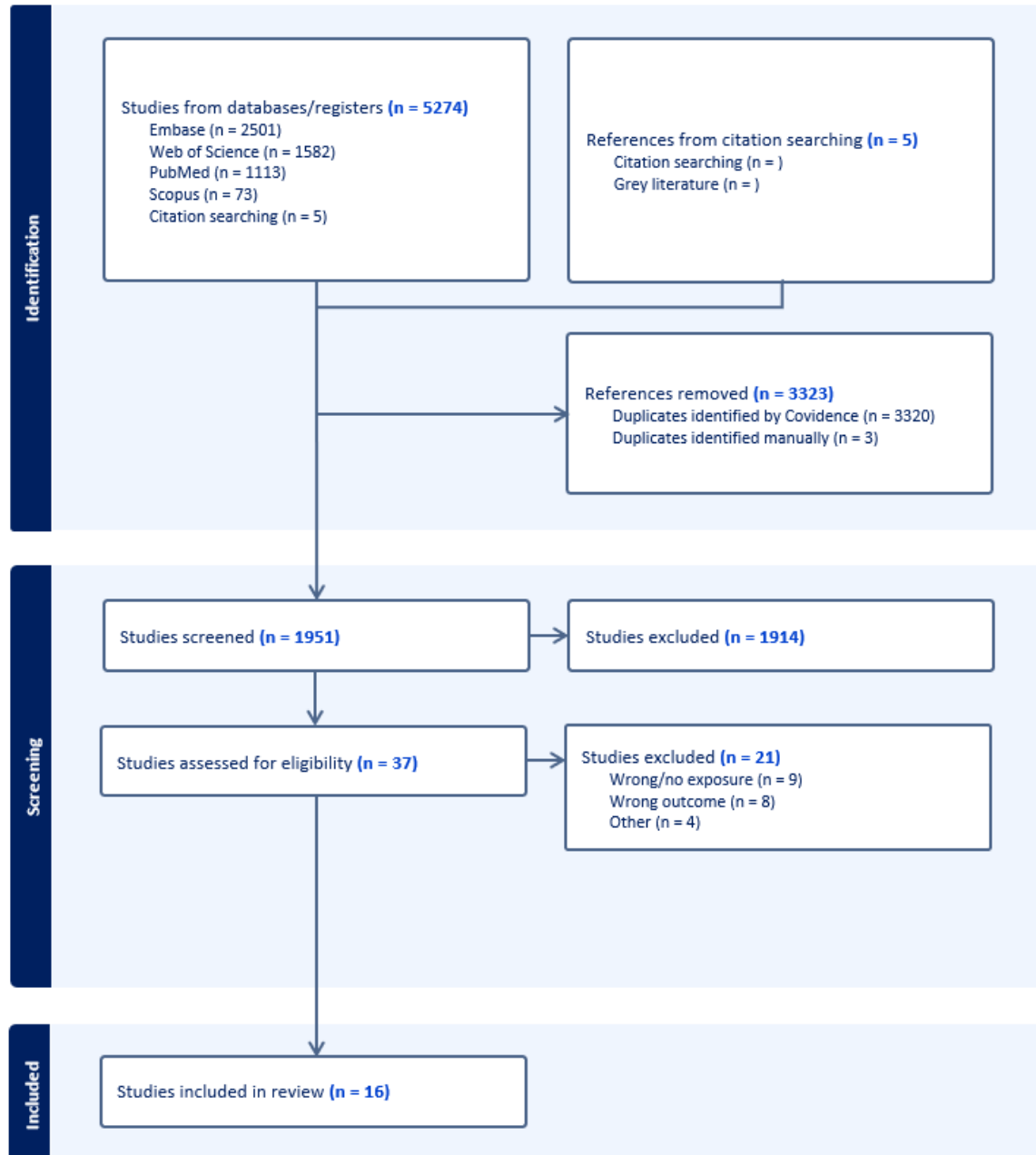
Work Participation definitions

- **Working life patterns:** an individual's labour market participation during the period they are of working age
- **Labour market participation trajectories:** patterns in employment, work disability, unemployment, and/or non-employment over time
- **Working life expectancy (WLE):** how many years an individual is expected to be in paid employment, given age-specific employment and mortality rates
- **Working years lost (WYL):** how many years an individual is expected to be out of paid employment, which could be further split into reasons why (unemployment, early retirement, work disability/illness)

How do occupational exposures influence these patterns?

Methods

- Scoping review – Arksey & O'Malley (2005) framework used
- Inclusion criteria:
 - Conducted in the working-age population
 - Longitudinal studies
 - Included at least one occupational exposure (any kind)
 - Included one of the following dynamic outcomes: working life expectancy, working years lost, labour market participation trajectories
 - Peer-reviewed, original article



16 original studies included

1 study from 2013, rest from 2019 onwards

Overrepresentation of studies from the Nordic countries (81%)

- Only one study conducted outside Europe (USA)

Job Exposures

- Physical workload (12 studies), psychosocial (13 studies), organisational (2 studies), chemical/physical (3 studies)
- Exposure definition varied widely, only one study included a measure of cumulative exposure
 - Usually measured at baseline
 - Obtained through self-reports (9 studies) and JEMs (7 studies)

Work Participation Outcomes

- Varied outcomes considered
 - WLE/WYL (five studies)
 - Several labour market participation states (four studies)
 - Sickness absence and disability pension (three studies)
 - Sickness absence only (four studies)

Results – Physical Workload Exposures



Exposure	Working life patterns based on one or two states	Working life patterns based on multiple states, trajectories	Working life patterns based on multiple states, (H)WLE/WYL
Physically demanding work (generic)	Hallman et al., 2019; Haukka et al., 2013; Lallukka et al., 2019; Leino-Arjas et al., 2021	Gémes et al., 2023; Leinonen et al., 2019; Hartikainen et al., 2023	Pedersen et al., 2020; Pedersen et al., 2022; Schram et al., 2021; Schram et al., 2022
Force	Hallman et al., 2019; Lallukka et al., 2019; Shiri et al., 2021		
Posture	Lallukka et al., 2019; Leino-Arjas et al., 2021; Shiri et al., 2021	Leinonen et al., 2019	
Repetition	Lallukka et al., 2019	Leinonen et al., 2019	
Prolonged sitting, keyboard use, using a vibrating tool	Lallukka et al., 2019		

High physical work demands associated with higher rate of sickness absence/disability pension, lower WLE, and higher number of WYL

Awkward working postures had a limited association with absence from work and a lower rate of labour market participation, but definition of this exposure varied widely.

Results - Psychosocial Exposures

Exposure	Working life patterns based on one or two states	Working life patterns based on multiple states, trajectories	Working life patterns based on multiple states, (H)WLE/WYL
Job demands	Haukka et al., 2013; Leino-Arjas et al., 2021	Gémes et al., 2023	Schram et al., 2022
Job control	Hallman et al., 2019; Leino-Arjas et al., 2021	Gémes et al., 2023; Hartikainen et al., 2023	Lynch et al., 2024; Schram et al., 2022
Job demands/control combined	Farrants & Alexanderson, 2022; Salonen et al., 2020; Shiri et al., 2021	Leinonen et al., 2019	
Monotonousness	Haukka et al., 2013; Leino-Arjas et al., 2021	Gémes et al., 2023	Schram et al., 2022

No clear associations, results conflicting

Weak positive association between low job control or high job strain and increased absence from work (more WYL and higher rate of sickness absence)

Results - Organisational Exposures

Exposure	Working life patterns based on one or two states	Working life patterns based on multiple states, trajectories	Working life patterns based on multiple states, (H)WLE/WYL
Hectic work schedule		Gémes et al., 2023	
Support at work	Hallman et al., 2019; Haukka et al., 2013		Lynch et al., 2024

Lack of support at work associated with fewer healthy working years

Results – Physical/Chemical Exposures

Exposure	Working life patterns based on one or two states	Working life patterns based on multiple states, trajectories	Working life patterns based on multiple states, (H)WLE/WYL
Noise		Gémes et al., 2023	
Air pollution		Harrati et al., 2019	
Physical & chemical	Leino-Arjas et al., 2021		

Noise positively associated with lower risk of unemployment and sickness absence/disability pension in men

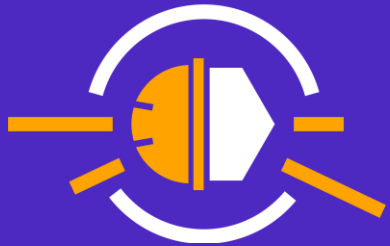
Air pollution associated with short-term absence from work

Discussion and recommendations

- Study design may affect results – definition of exposures and outcomes, methodological approaches
- What should we be adjusting for? Total versus direct effect
- Little usage of cumulative/multiple exposures
- Lack of studies outside of the Nordic setting

Conclusions

- New and emerging research area – still lots of potential
- Main consistent association between physically demanding work (generic) and lower work participation
 - Difficult to conclude for other exposures
- Researchers can consider utilising multiple/cumulative exposures more actively
- Clear and transparent definitions and justifications will help with replication and comparison of results across studies



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