

Does job control contribute to differences in physician-certified sickness absence across office concepts?

Randi Hovden Borge

National Institute of Occupational Health

Norway

Study aim

- / **Previous research:** Higher sickness absence risk in shared and open workspaces compared to private offices (Mauss et al., 2023)
- / **Knowledge gap:** Few (if any) have attempted to study why these differences occur (Bennis et al., 2022)
- / **This study:** Propose and test job control as a plausible mechanism underlying differences in sickness absence between private offices and shared and open workspaces

Conceptual foundations

Linking office concepts and job control

/ Job control

Perceived control over timing, methods, and decisions at work (Huth & Chung-Yan, 2023)

/ Privacy regulation theory

Through pacing and regulating interactions with others we can set favourable conditions for goal-directed behaviour (Altman, 1975; Johnson, 1974)

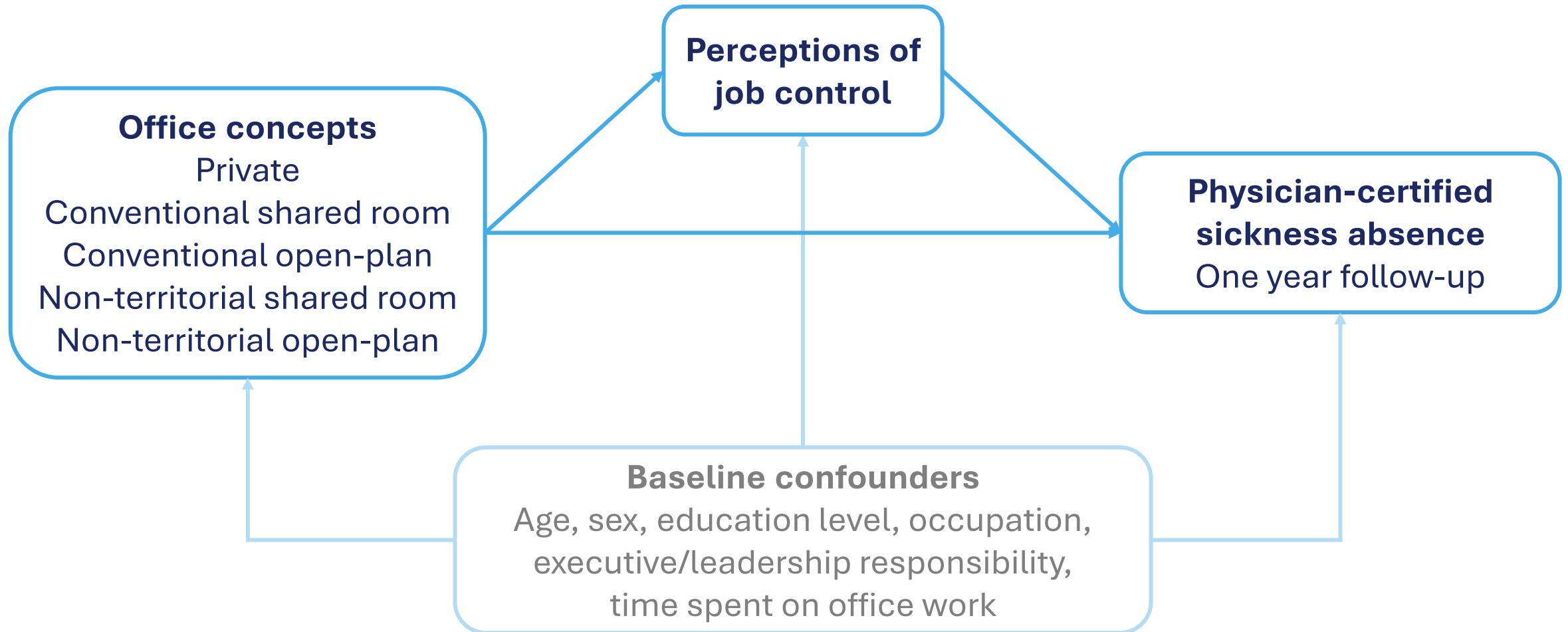
/ Office concepts

Privacy lower in shared and open workspaces (James et al., 2021; Masoudinejad & Veitch, 2023)

Thus, condition-setting control and job control may differ from private offices



Hypothesised model



Data and sample

- / Level of Living Survey on Working Conditions (Statistics Norway, 2022)
- / Nationally representative survey (2016)
- / Survey data: office concepts and job control
- / Registry data: physician-certified sickness absence

- / Final sample: 5512 participants
 - Aged 17-67, paid work, all or parts of work in an office, not self-employed

Study variables

/ Office concepts

Five categories based on layout, number of occupants, and territoriality

/ Job control

Sum scale of four questions

/ Sickness absence

Physician-certified from national registry, one-year follow-up (2017)

Analysis

/ Counterfactual mediation analysis

/ Regression-based approach and direct imputation of counterfactuals (Valeri & VanderWeele, 2013; VanderWeele & Vansteelandt, 2014)

- Outcome model: Log-linear regression (risk ratios)
- Mediator model: Linear regression

/ Bootstrapping for standard errors and confidence intervals

/ R 4.2.1; CMAverse package (Shi et al., 2021)

Counterfactuals

Two-way decomposition of total effects

/ **Natural direct effects (NDE)**

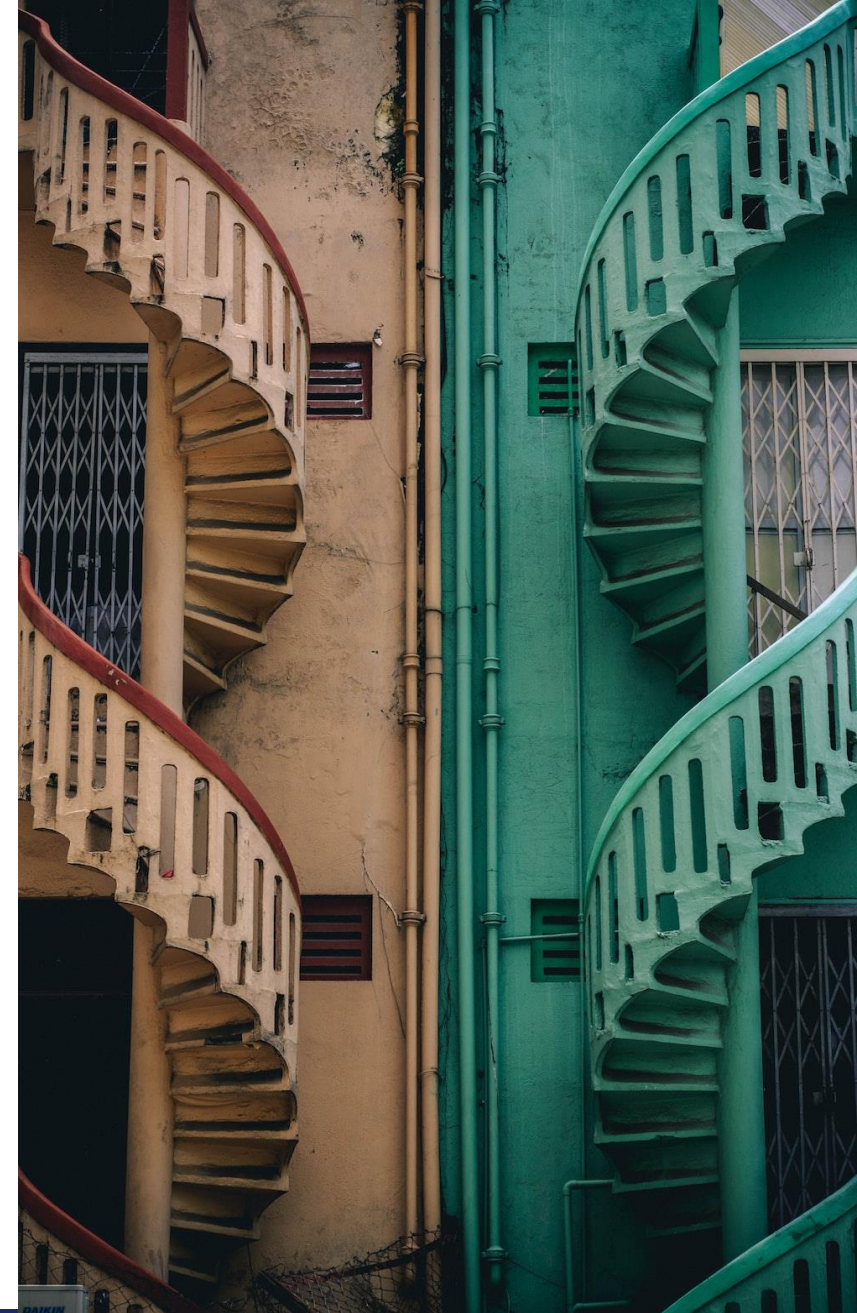
Average effect of exposure fixing the mediator

Change in sickness absence risk when office concept is changed from private offices to conventional open-plan offices with job control fixed at the level observed in private offices

/ **Natural indirect effects (NIE)**

Average effect of mediator fixing the exposure

Change in sickness absence risk when office concept is fixed at private offices and job control is changed from the level observed in private offices to the level observed in conventional open-plan offices



Results

/ Significant **total** and **indirect** effects

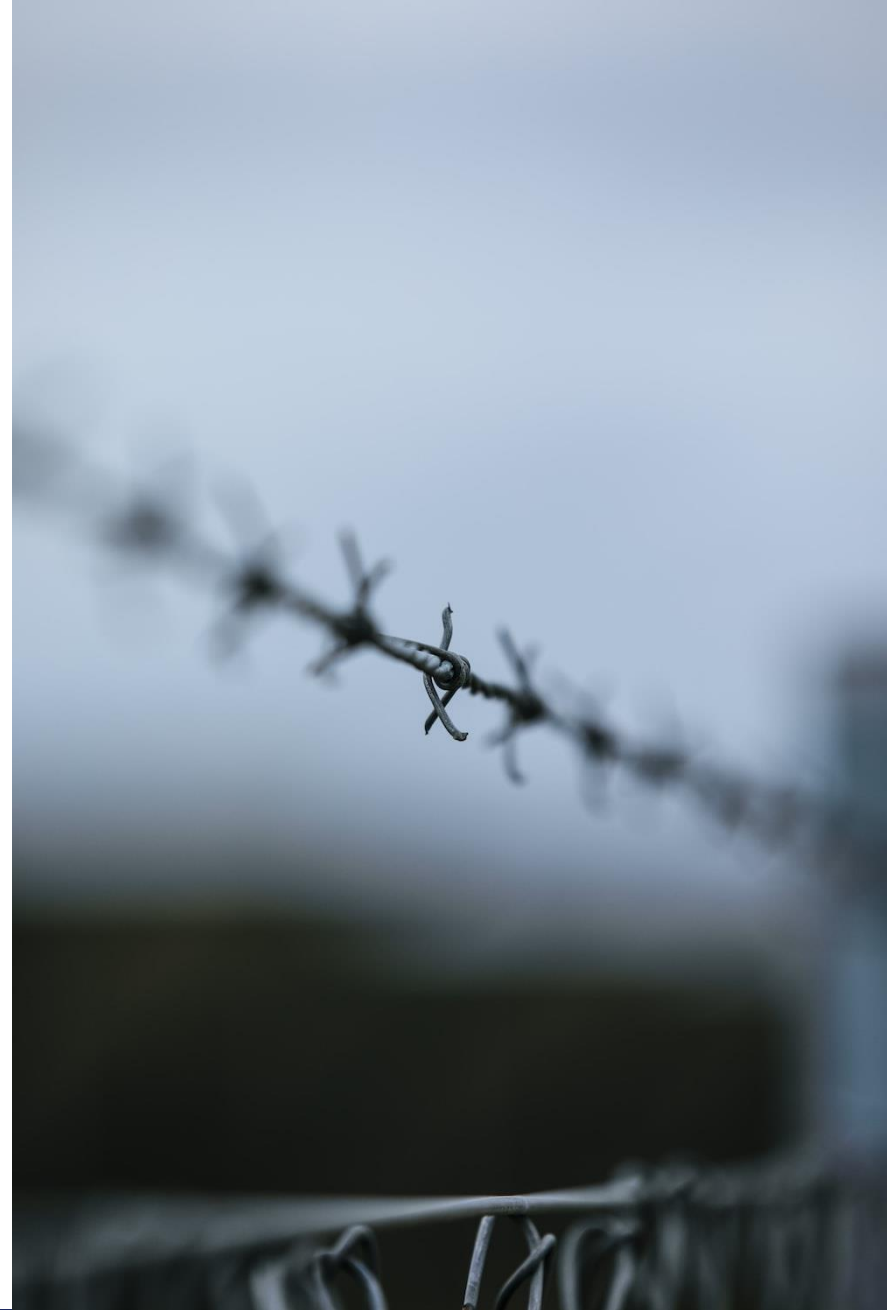
/ Proportions mediated ranged from 19 to 34 percent



Contrast	Parameter	Risk ratio	SE	95% CI	Proportion mediated
Conventional shared room versus private					
	Total effect	1.02	0.06	0.91, 1.14	
	Natural direct effect	0.99	0.06	0.88, 1.11	
	Natural indirect effect	1.03	0.01	1.01, 1.04	---
Conventional open-plan versus private					
	Total effect	1.12	0.06	1.00, 1.24	
	Natural direct effect	1.09	0.06	0.98, 1.22	
	Natural indirect effect	1.02	0.01	1.01, 1.03	19 %
Non-territorial shared room versus private					
	Total effect	1.29	0.09	1.13, 1.48	
	Natural direct effect	1.23	0.09	1.07, 1.40	
	Natural indirect effect	1.05	0.01	1.03, 1.08	22 %
Non-territorial open-plan versus private					
	Total effect	1.20	0.09	1.04, 1.39	
	Natural direct effect	1.14	0.09	0.98, 1.31	
	Natural indirect effect	1.06	0.01	1.04, 1.09	34 %

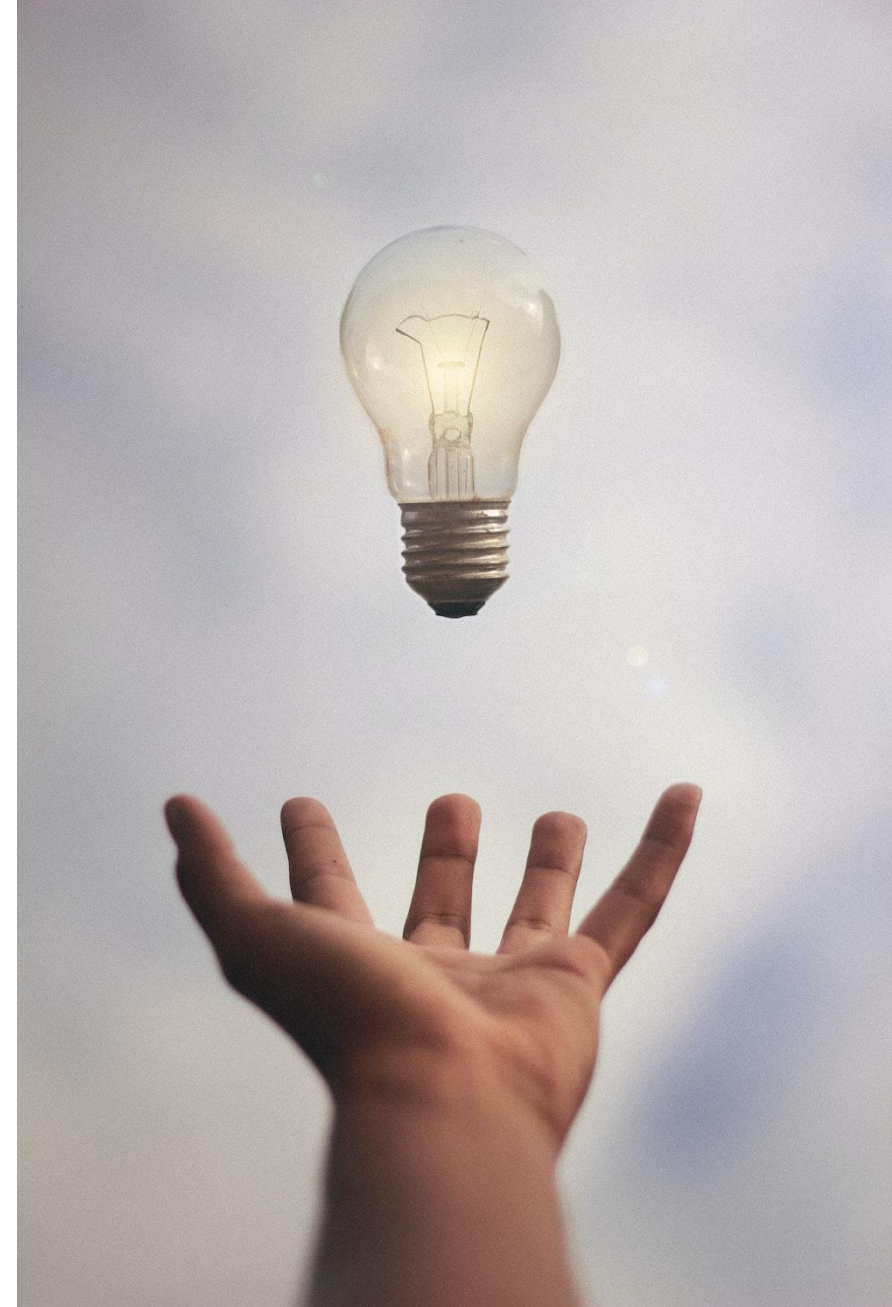
Limitations

- / Unmeasured confounding
- / Temporal ordering
- / Measurement error in job control
- / Limited information about office features
- / Generalizability to other countries



Main contributions

- / Physician-certified sickness absence in a nationally representative sample
- / Propose and test a mediator with clear conceptual foundations
- / Higher sickness absence risk and lower job control in shared and open workspaces
- / Significant indirect effects through job control
- / Job control may be one of several plausible mechanisms



Questions?

References

- Altman, I. (1975). *The environment and social behavior: Privacy, personal space, territory, and crowding*. Brooks/Cole Publishing Company.
- Bennis, W. M., Mayerhoffer, M., Orel, M., & Lukeš, M. (2022). Methodological considerations in the open-plan office paradox: A systematic literature review. *Work, 73*(2), 471–494. <https://doi.org/10.3233/WOR-21082>
- Huth, K. B. S., & Chung-Yan, G. A. (2023). Quantifying the evidence for the absence of the job demands and job control interaction on workers' well-being: A Bayesian meta-analysis. *The Journal of Applied Psychology, 108*(6), 1060–1072. <https://doi.org/10.1037/apl0001066>
- James, O., Delfabbro, P., & King, D. L. (2021). A Comparison of Psychological and Work Outcomes in Open-Plan and Cellular Office Designs: A Systematic Review. *SAGE Open, 11*(1). <https://doi.org/10.1177/2158244020988869>
- Johnson, C. A. (1974). Privacy as personal control. In S. T. Margulis (Ed.), *Man-environment interactions: Evaluations and applications: Part 2, Vol.6* (pp. 83-100). Environmental Design Research Association.
- Masoudinejad, S., & Veitch, J. A. (2023). The effects of activity-based workplaces on contributors to organizational productivity: A systematic review. *Journal of Environmental Psychology, 86*, 101920. <https://doi.org/10.1016/j.jenvp.2022.101920>
- Mauss, D., Jarczok, M. N., Genser, B., & Herr, R. (2023). Association of open-plan offices and sick leave—A systematic review and meta-analysis. *Industrial Health, 61*(3), 173–183. <https://doi.org/10.2486/indhealth.2022-0053>
- Shi, B., Choirat, C., Coull, B. A., VanderWeele, T. J., & Valeri, L. (2021). CMAverse: A Suite of Functions for Reproducible Causal Mediation Analyses. *Epidemiology, 32*(5), e20. <https://doi.org/10.1097/EDE.0000000000001378>
- Statistics Norway. (2022). *Level of Living Survey on Working Conditions, 2016-2019*. Sikt - Norwegian Agency for Shared Services in Education and Research.
- Valeri, L., & VanderWeele, T. J. (2013). Mediation analysis allowing for exposure-mediator interactions and causal interpretation: Theoretical assumptions and implementation with SAS and SPSS macros. *Psychological Methods, 18*(2), 137–150. <https://doi.org/10.1037/a0031034>
- VanderWeele, T. J., & Vansteelandt, S. (2014). Mediation Analysis with Multiple Mediators. *Epidemiologic Methods, 2*(1), 95–115. 2012-0010