

## Background

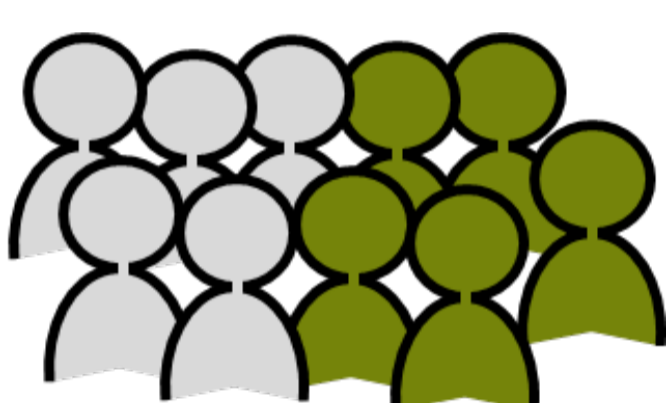
Inverse Odds Weighting (IOW) overcomes drawbacks of traditional mediation approaches by allowing to investigate the contribution of multiple mediators (M) to the effect of an exposure (X) on the outcome (Y) in non-linear models and in the presence of X-M interactions. However, X-induced M-Y confounding poses a challenge for IOW estimation.

**Objectives:** a) to investigate the contribution of work factors and health behaviours to social inequalities in physical health among older German workers, b) to present methodological challenges of studying health inequalities using IOW

## Data

- Data:**
- German lidA (leben-in-der-Arbeit) study
  - Wave 1-3 (2011,  $t_0$ ; 2014,  $t_1$ ; 2018,  $t_2$ )
  - Employees aged 46 or 52 at baseline
  - Sample: N = 2 653 (total); N = 1 248 (male)
- Measures**
- Y: physical health (SF-12)
  - X: scholarly and vocational education combined
  - M<sub>1</sub>: physical demands, influence at work, possibilities for development, leadership quality, rewards at work
  - M<sub>2</sub>: physical activity, smoking, BMI

## Methods & Results [1]



**NDE** describes the effect of X on Y with the pathway through M deactivated; indicates reduction of inequality

Male sample: n = 1 248

56% of health inequalities at follow-up were explained by baseline health

additional 5% by work factors



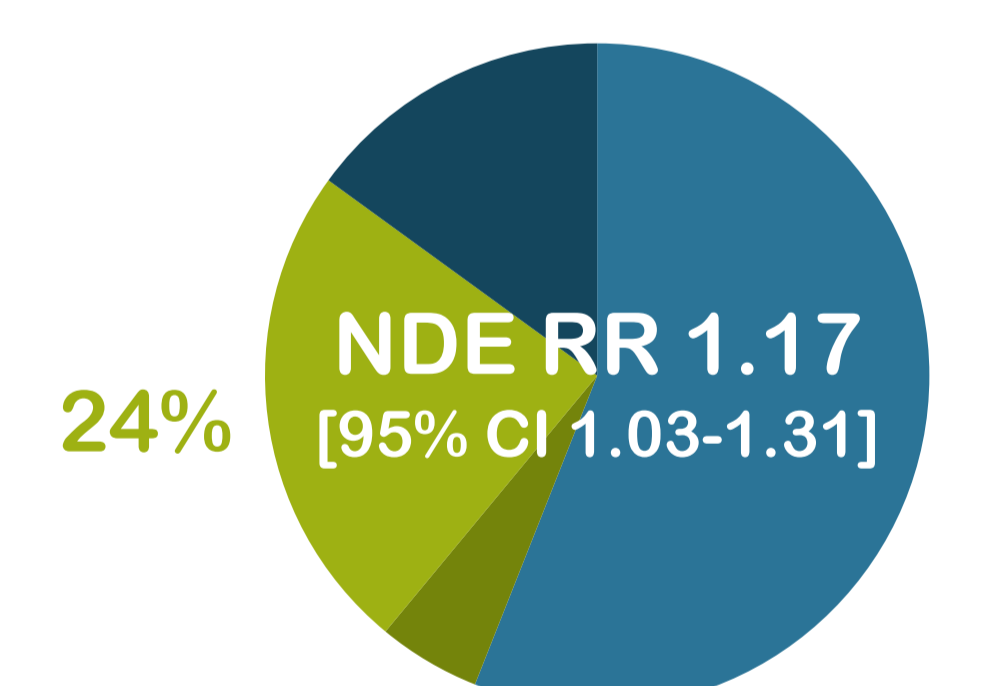
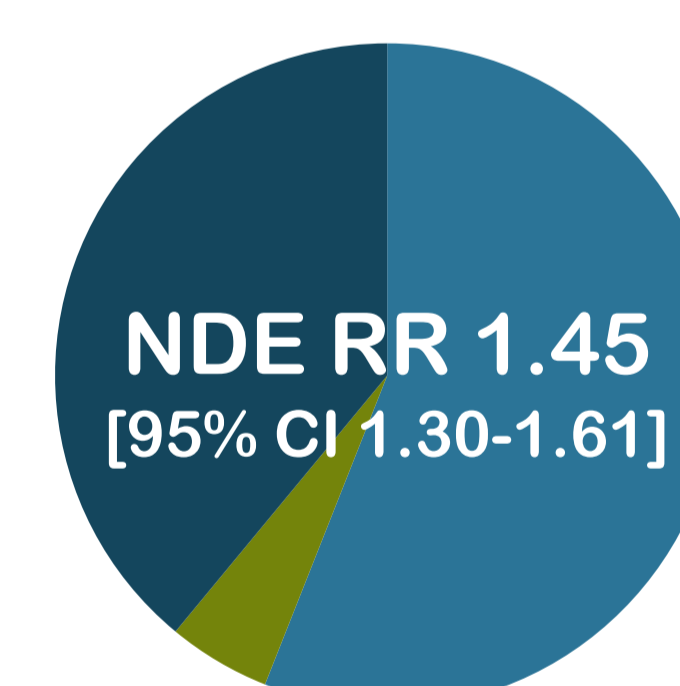
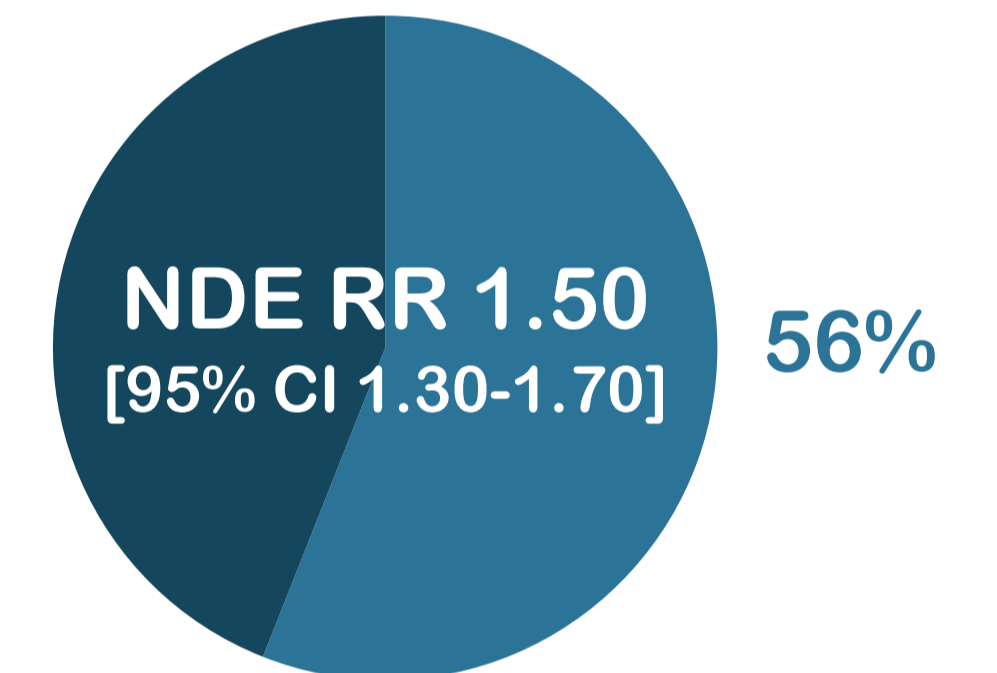
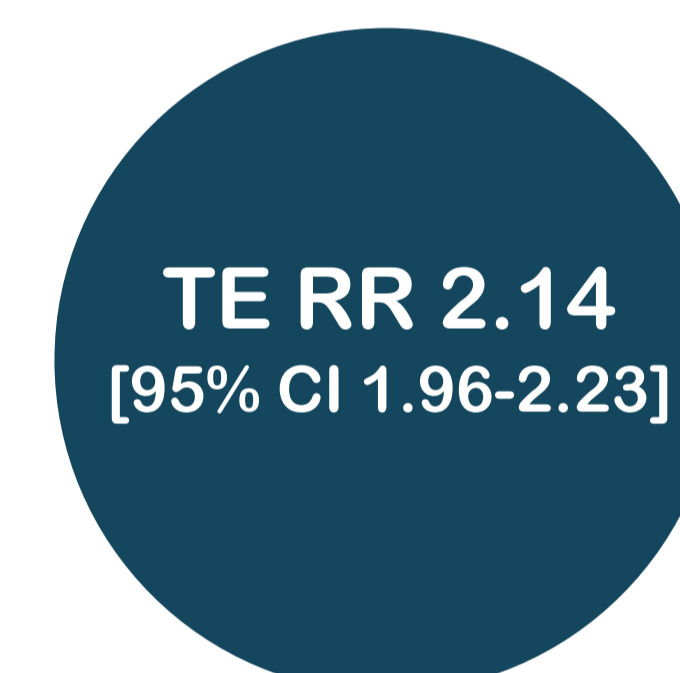
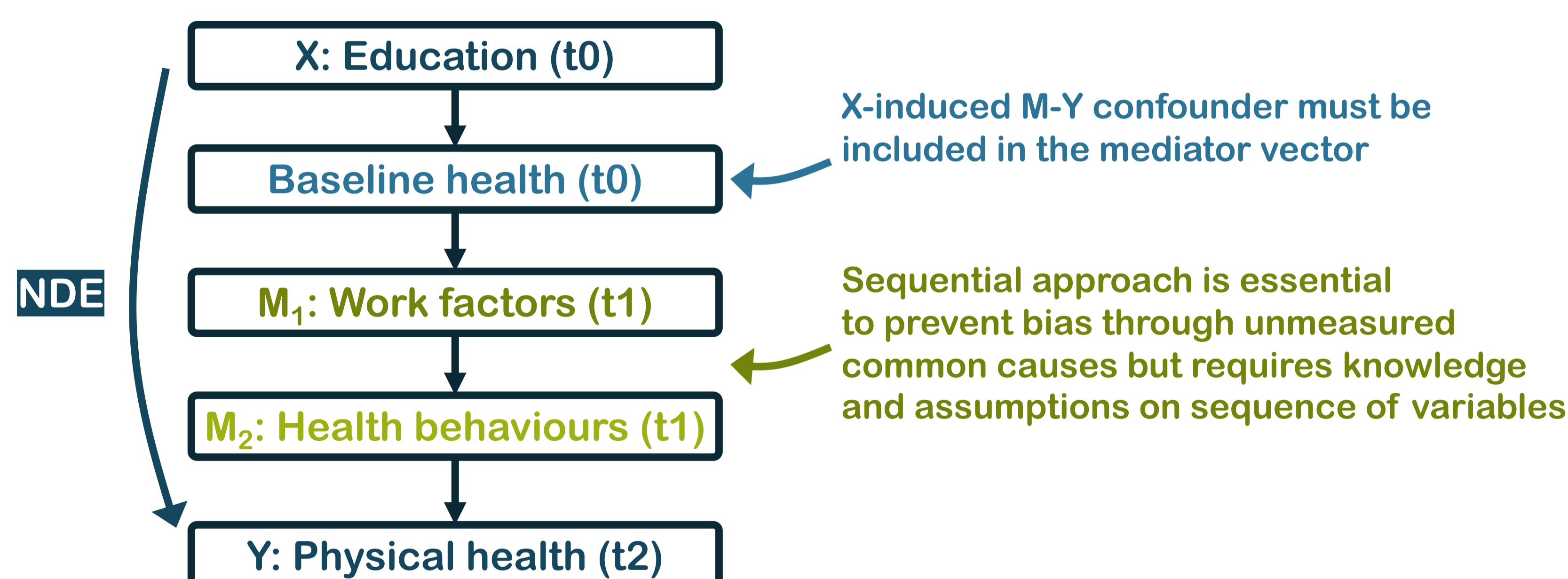
link to study

Methods: IOW to decompose the Total Effect (TE) of X on Y into...

- Natural Direct Effect (NDE): effect of X on Y with M deactivated by setting them to the level they would have been in the absence of the exposure
- Natural Indirect Effect (NIE): effect of X on Y through M

Results: Proportion of the effect of low vs. high education (X) on physical health (Y) mediated through...

### Assumed causal model



\*RR: Relative Risk

## Conclusions

- Temporal ordering of X-M-Y is essential in Causal Mediation approaches such as IOW, but increase the risk of X-induced M-Y confounding
- NDE and NIE identification in the presence of a X-induced M-Y confounder is only possible by including the confounder in the mediator vector [2]
  - Baseline health as an X-induced M-Y confounder may reflect unobserved lifetime exposures from the work and private domain
- Contribution of M is path-specific and need(s) to be interpreted in view of Y, X, and M measures, model specification and context (e.g., late career)

### Sources:

- [1] Rohrbacher, M., & Hasselhorn, H. M. (2023). The contribution of work and health-related lifestyle to educational inequalities in physical health among older workers in Germany. A causal mediation analysis with data from the lidA cohort study. *PLOS ONE*, 18(8), e0285319. <https://doi.org/10.1371/journal.pone.0285319>;
- [2] VanderWeele, T. J., Vansteelandt, S., & Robins, J. M. (2014). Effect Decomposition in the Presence of an Exposure-Induced Mediator-Outcome Confounder. *Epidemiology*, 25(2), 300–306. <https://doi.org/10.1097/EDE.0000000000000034>

Interested in lidA?



[www.lida-studie.de](http://www.lida-studie.de)