Development of Educational Segregation Measured using Longitudinal Population Scale Network Data

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Educational segregation

Educational level important predictor of socio-economic success.

Segregation:

- Polarization and mutual misunderstanding
- Reinforce inequality

How does the segregation change during a persons life time and how does this change in time?

Person Network of the Netherlands

2009–2020 (this study 2013–2020)

Five layers:

- **Household**: persons living at the same address
- **Family**: 3rd degree + partner + inlaw + step parents/children
- **Neighbours**: 10 closest households + 20 random persons within 200m
- **Work**: max. 100 closest persons at same company
- **School**: same school, location, study, year.

Dense network: $17 \cdot 10^6$ persons, $2 \cdot 10^9$ labelled relations

Exposure

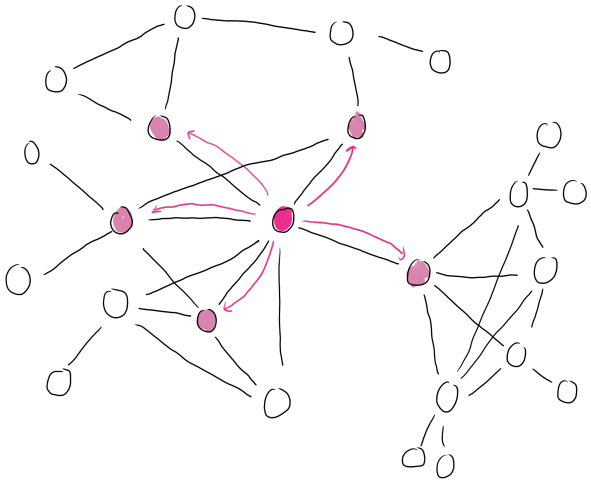
To what extent is a person exposed to the different educational levels?

Not only direct contacts relevant, but also indirect contacts.

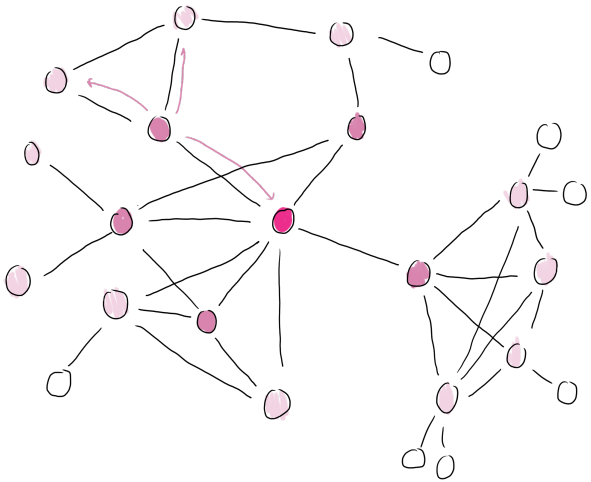
Localised random walk / localised page rank ($\alpha = 0.4$).

Ballester and Vorsatz (2014); Van der Laan et al. (2022); **De Jonge *et al.* Thursday @ IC2S2**

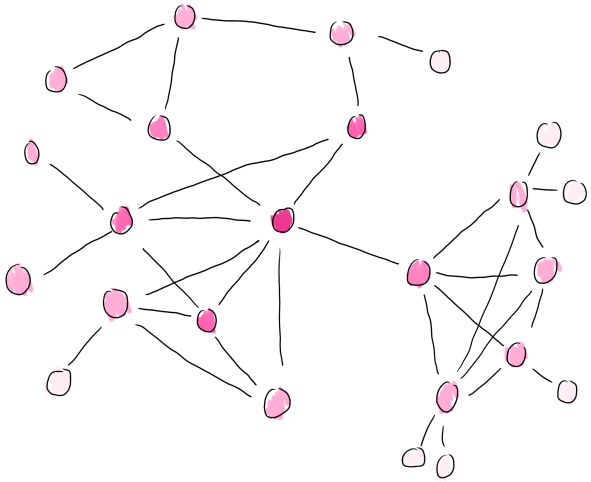
Person transfers some of their values to contacts



Part of updated values transfered again



Etc



Segregation

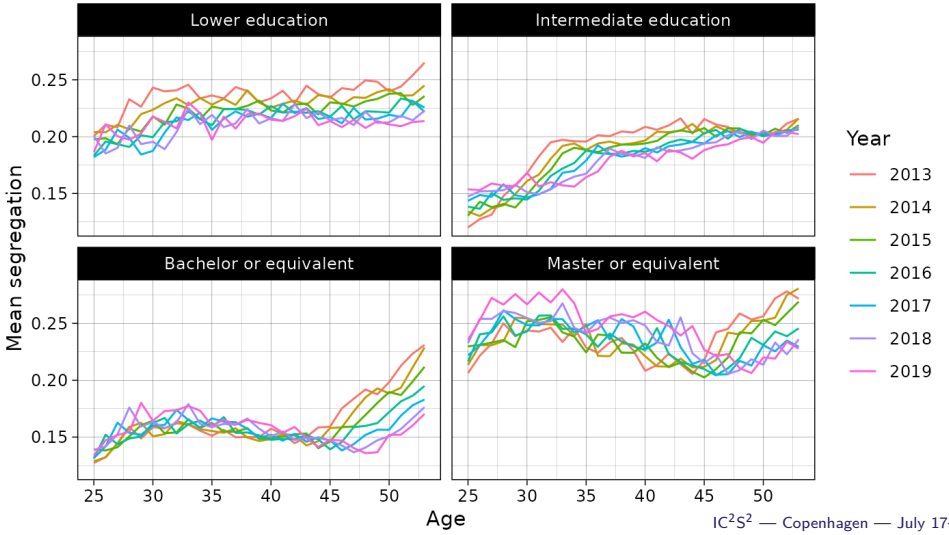
Exposure to own educational level corrected for expected exposure

$$\text{Segregation}_i = \frac{\text{Exposure}_i - \text{ExpectedExposure}_i}{1 - \text{ExpectedExposure}_i}$$

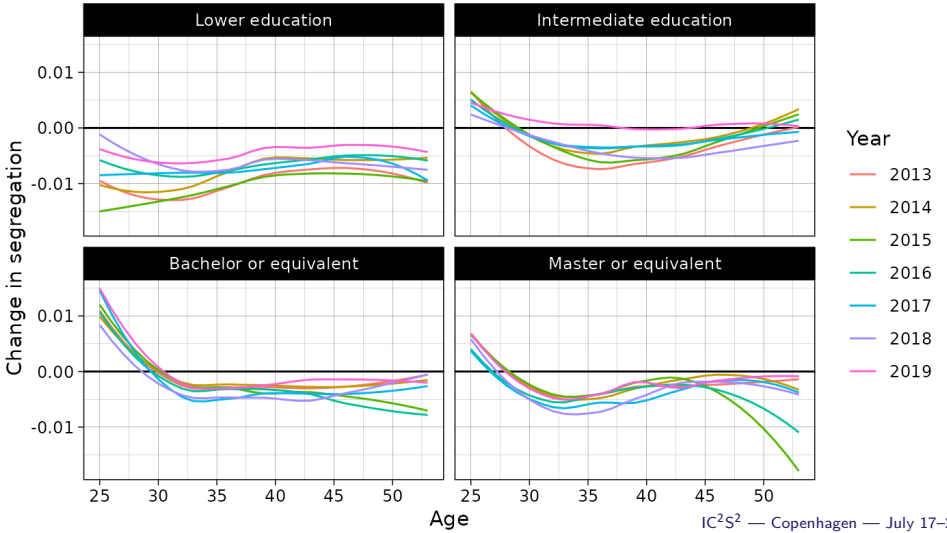
Note: measured at individual level

Range 30 km: freedom of choice for forming connections

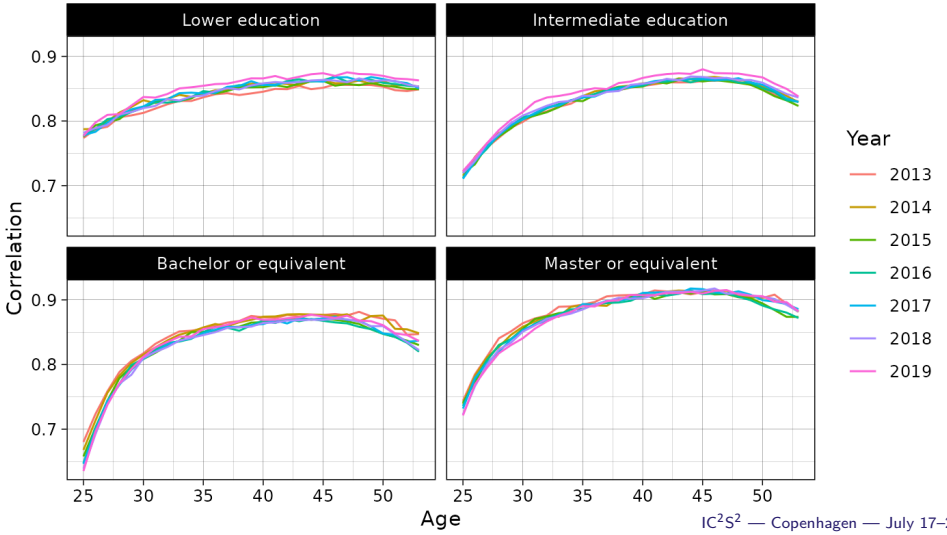
Segregation as a function of age



Average individual year-to-year change



Year-to-year correlation of individual segregation



Conclusion

Segregation develops until approx. the age of 35.

After 35 relatively stable (slow decrease).

For references and data sources see
`https://github.com/djvanderlaan/papers-ic2s2-2023`

C. Ballester and M. Vorsatz, "Random walk-based segregation measures," Review of Economics and Statistics, vol. 96, pp. 383–401, 2014, doi: 10.1162/REST_a_00399.

D. J. van der Laan, E. de Jonge, M. Das, S. Te Riele, and T. Emery, "A whole population network and its application for the social sciences," European Sociological Review, vol. jcac026, 2022, doi: 10.1093/esr/jcac026.