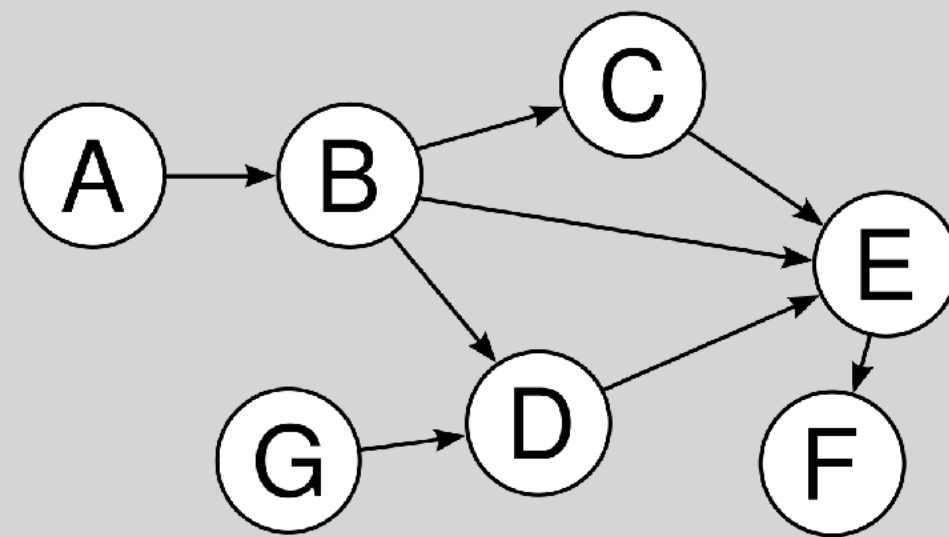
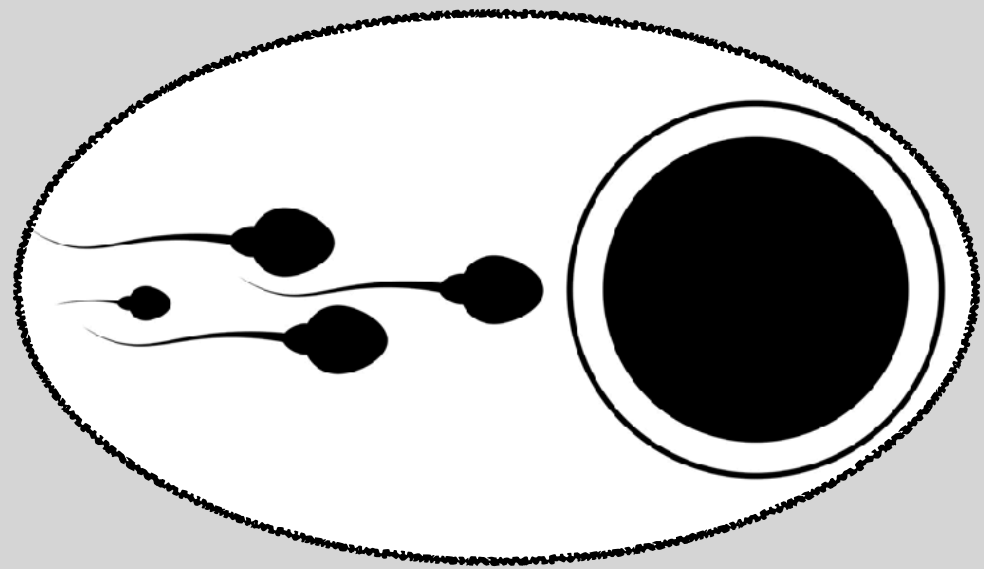
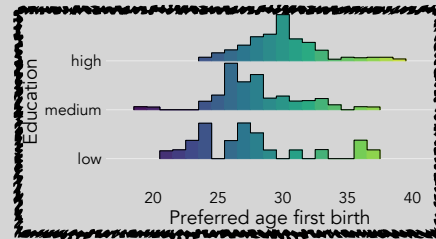
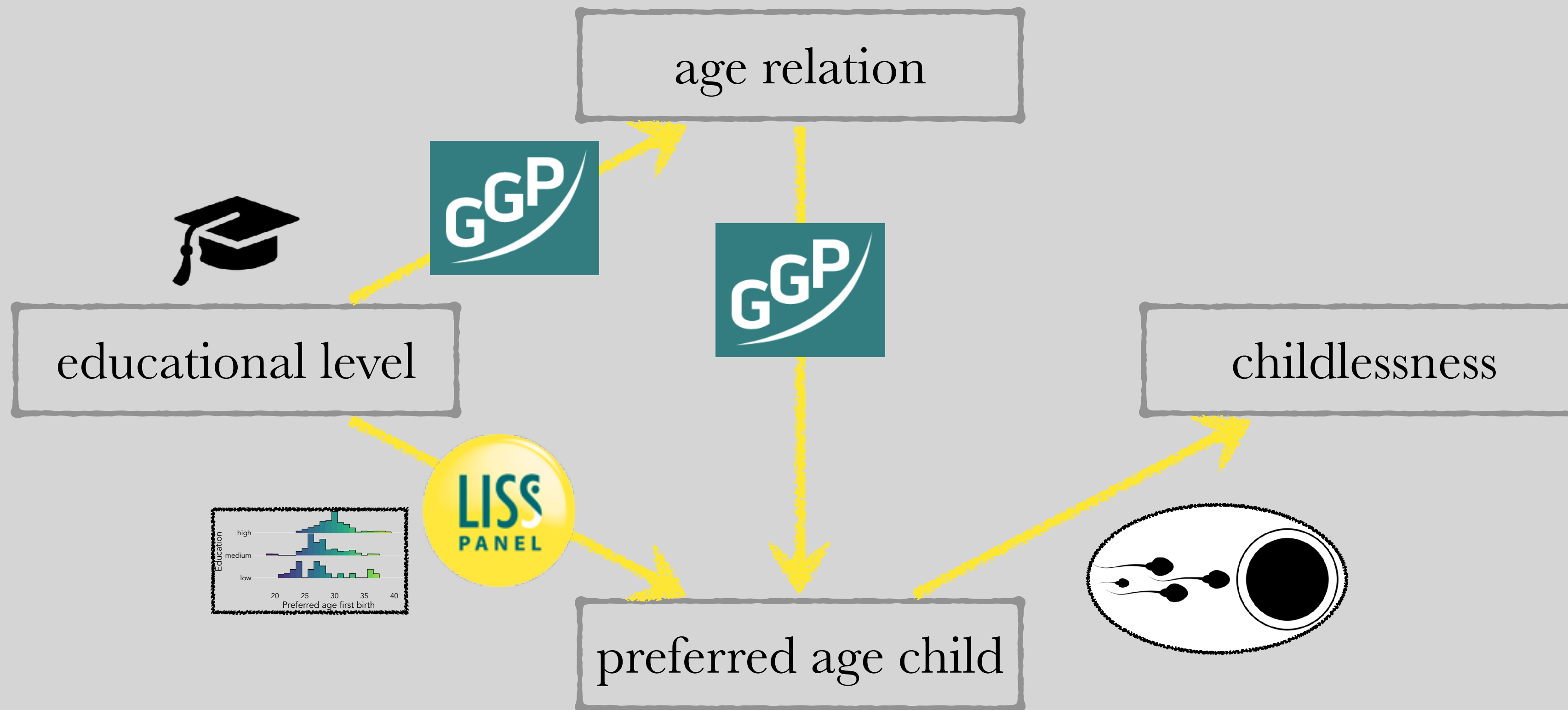


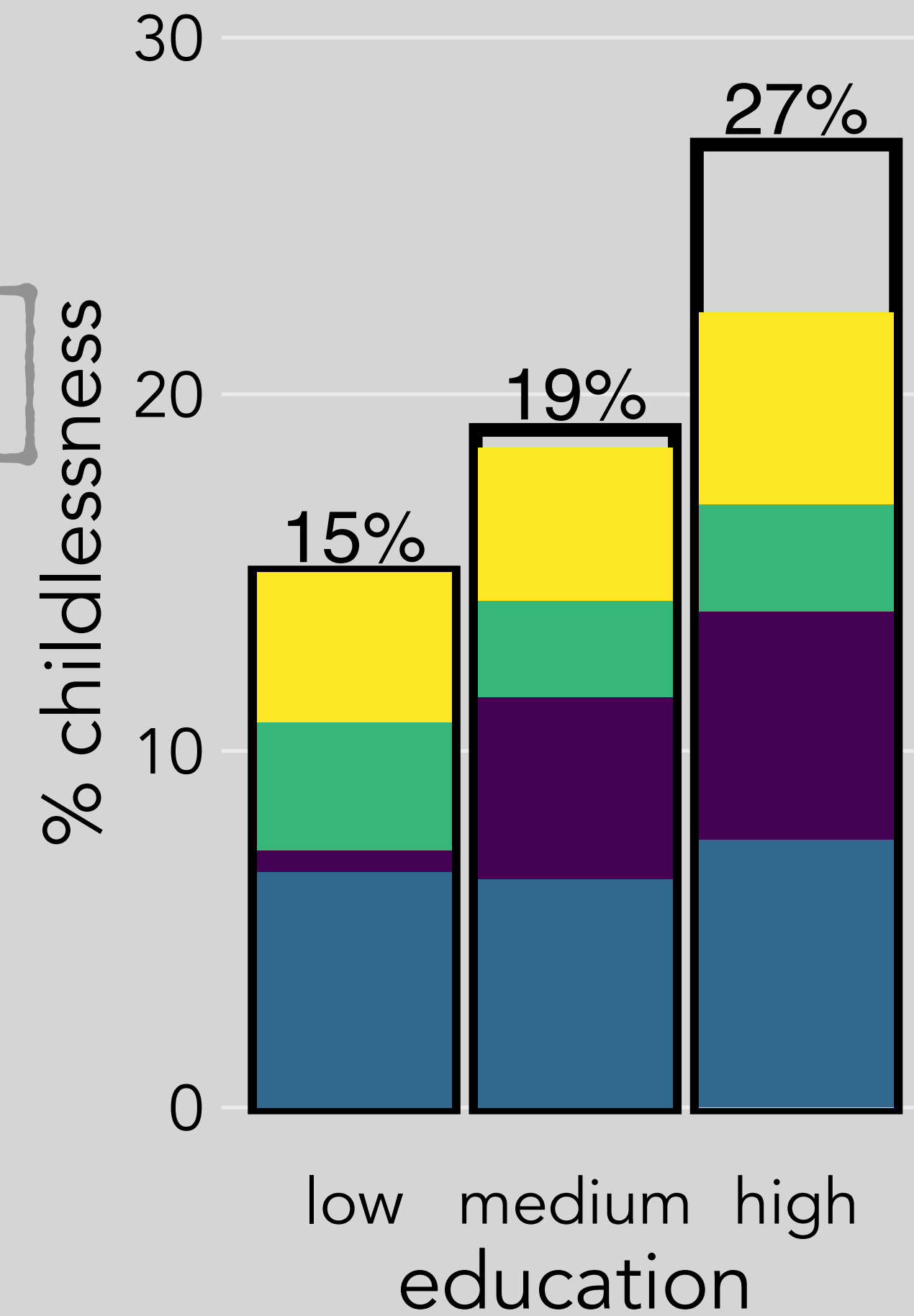
A microsimulation model of fertility shows that preferences cannot explain why highly educated women remain childless more often



{ ABC }

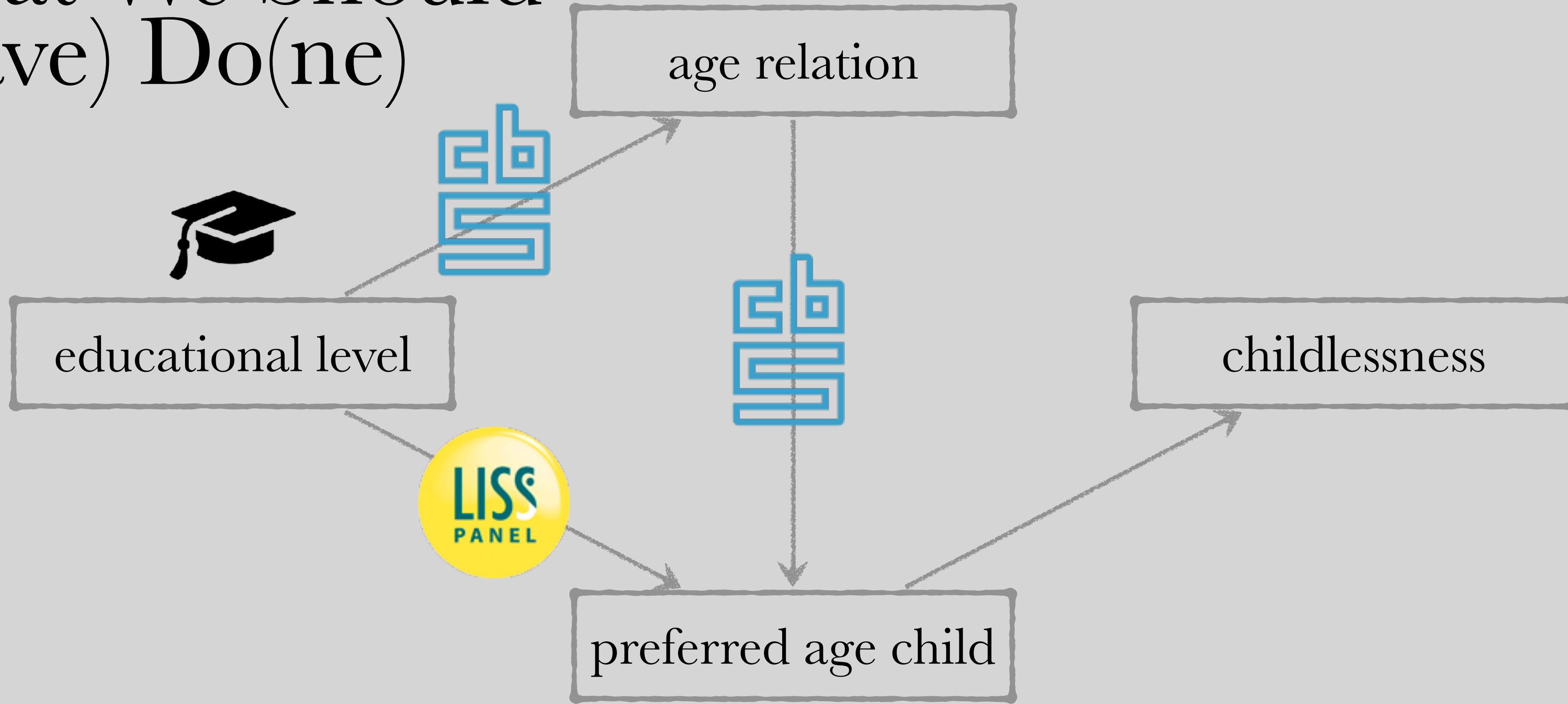


- preferences + cohab ABC
- preferences + cohab
- cohabitation
- preferences

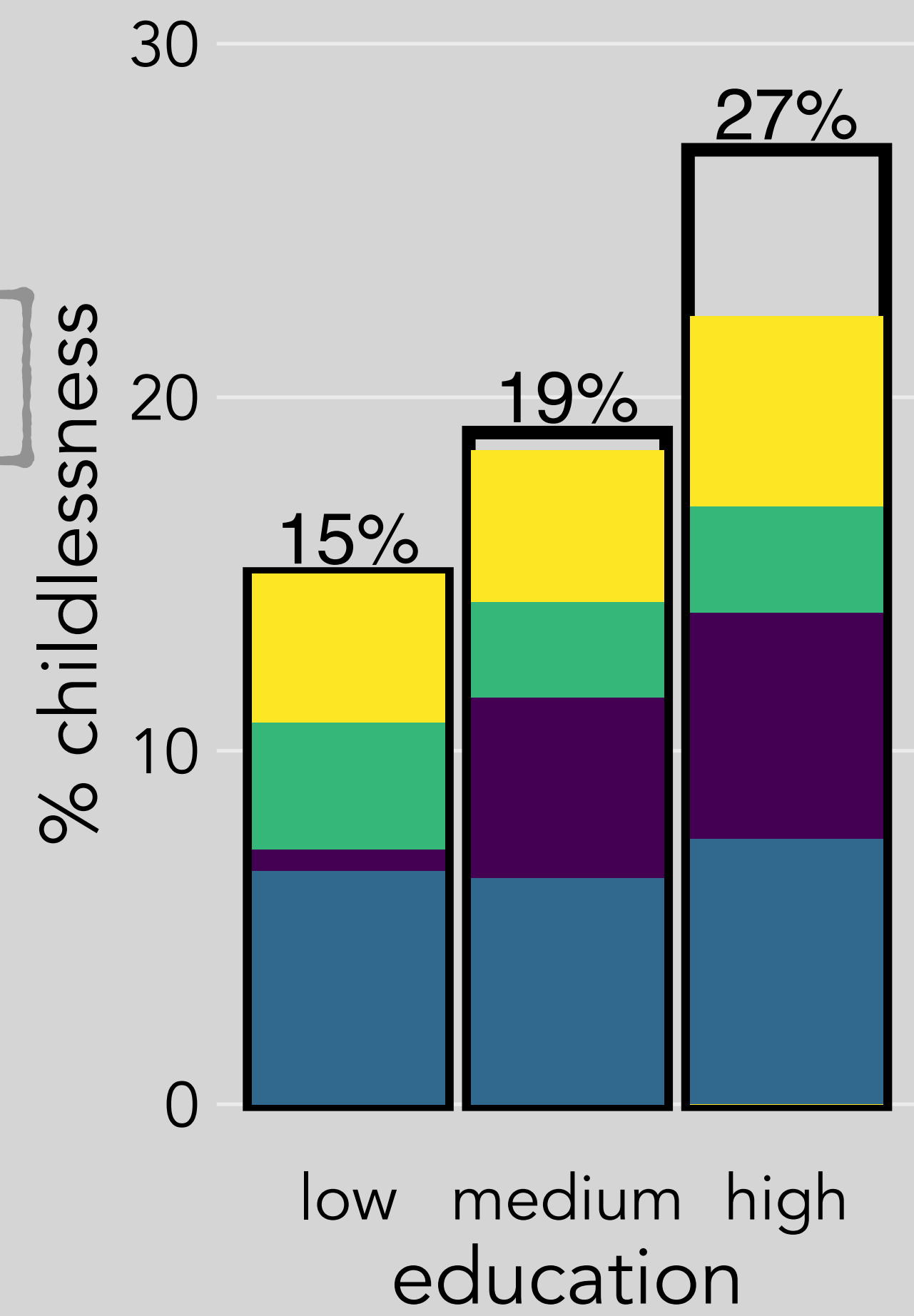


16 june 2022
Dag van Sociologie

What We Should (Have) Do(ne)

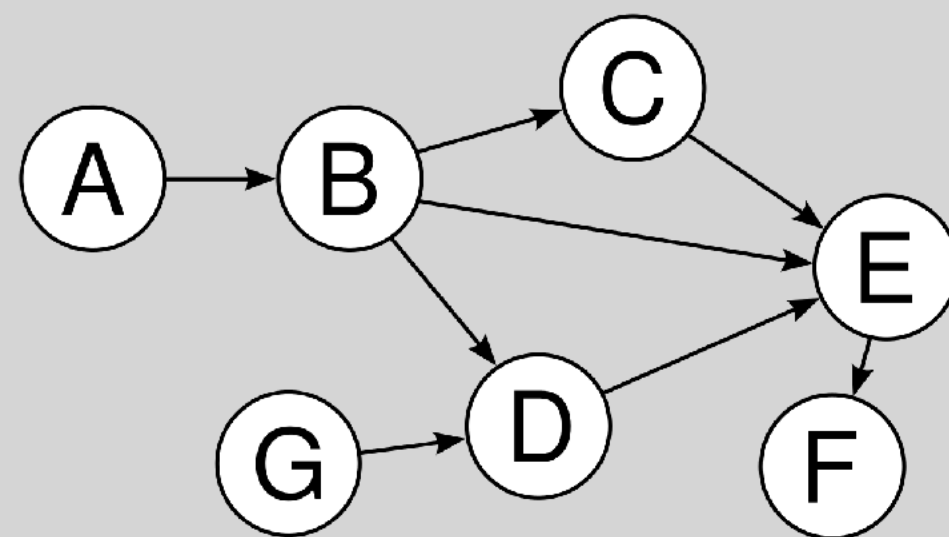
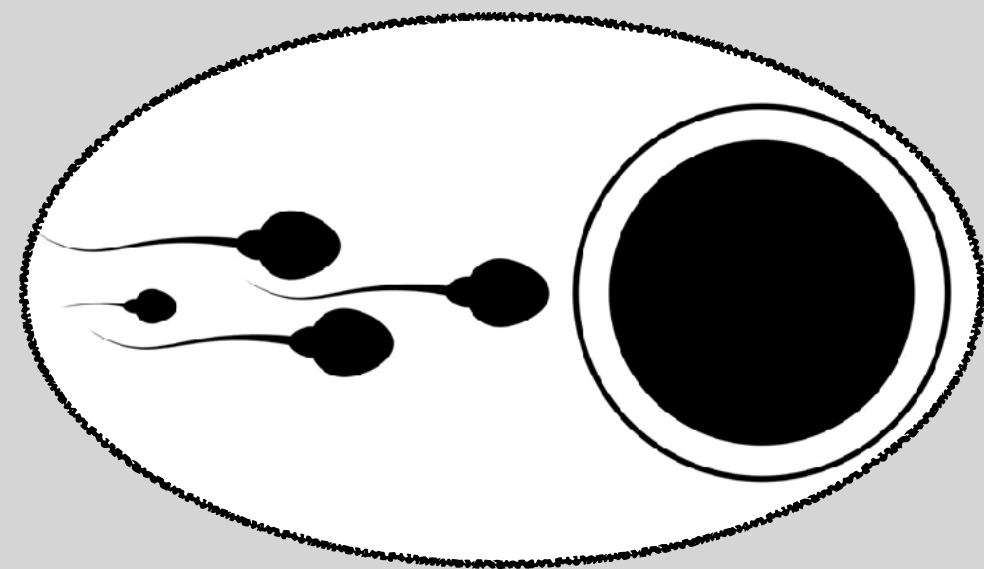


- preferences + cohab ABC
- preferences + cohab
- cohabitation
- preferences

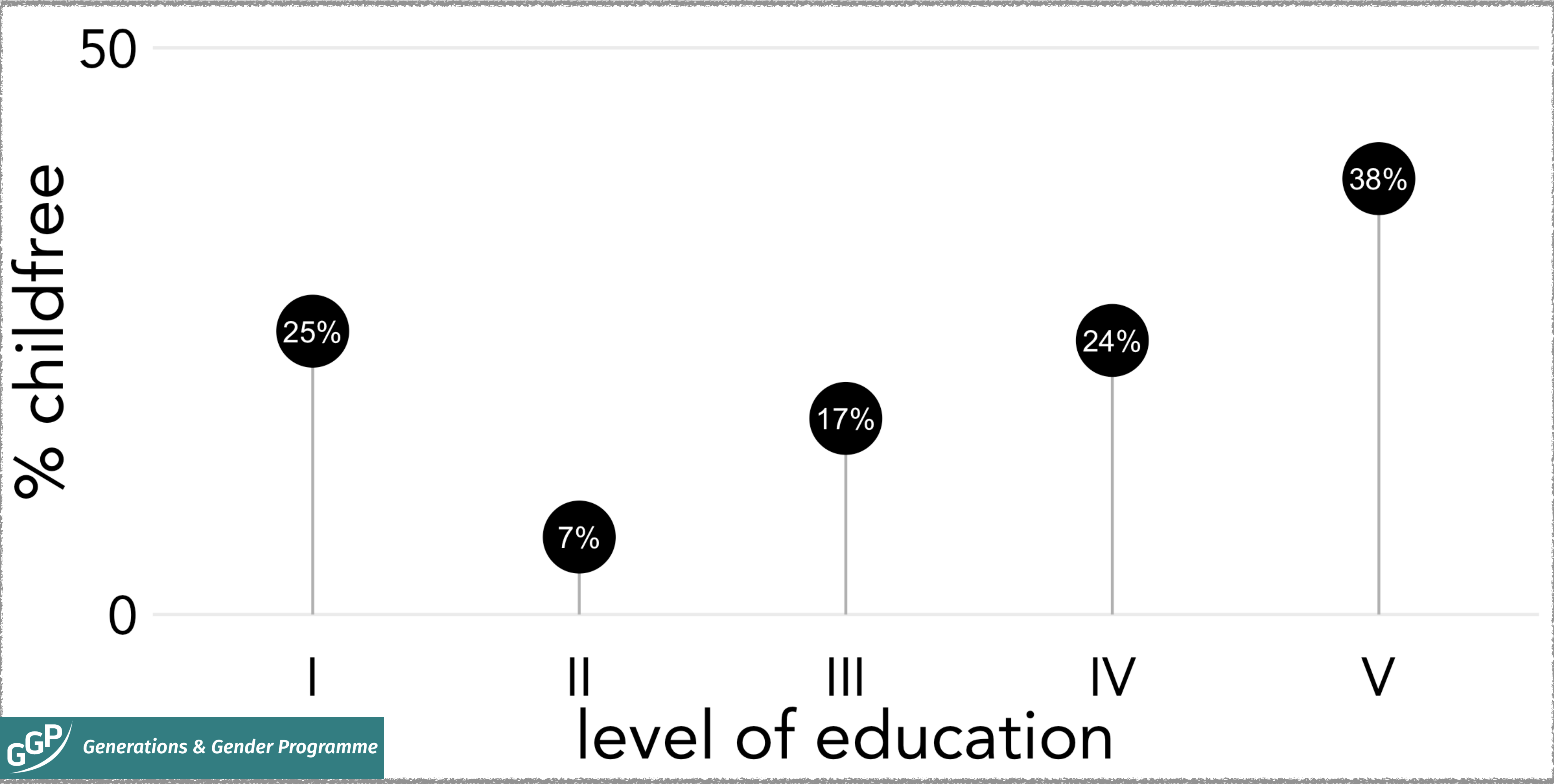


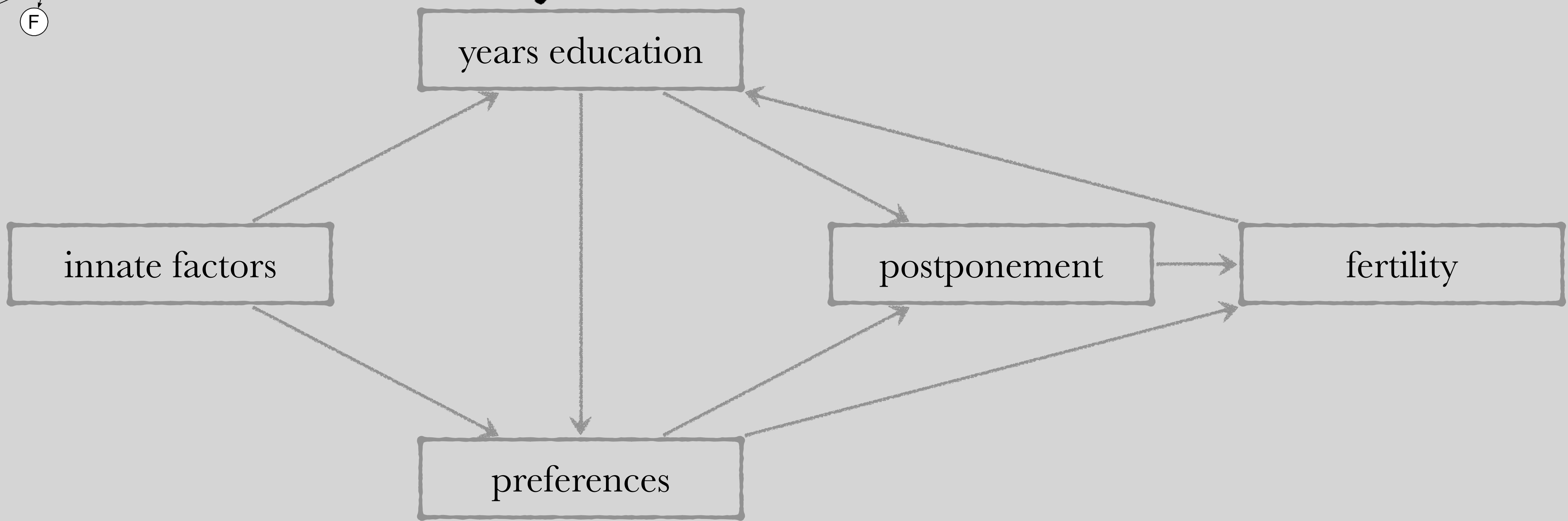
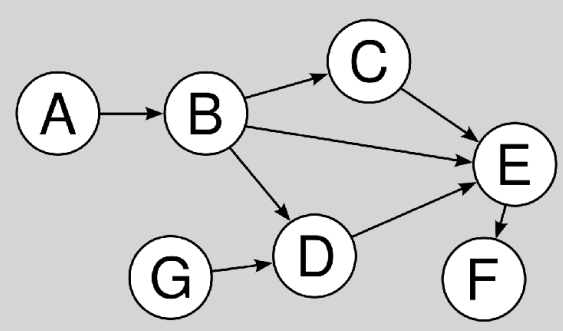
16 june 2022
Dag van Sociologie

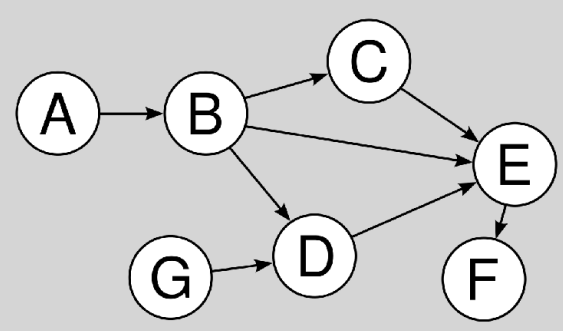
Using microsimulation, administrative data,
and supercomputers to realistically model
fertility behaviour: the case of fertility
preferences and childlessness



{ ABC }







years education

childbearing hinders education

preference theory

role conflict

innate factors

socialisation

postponement

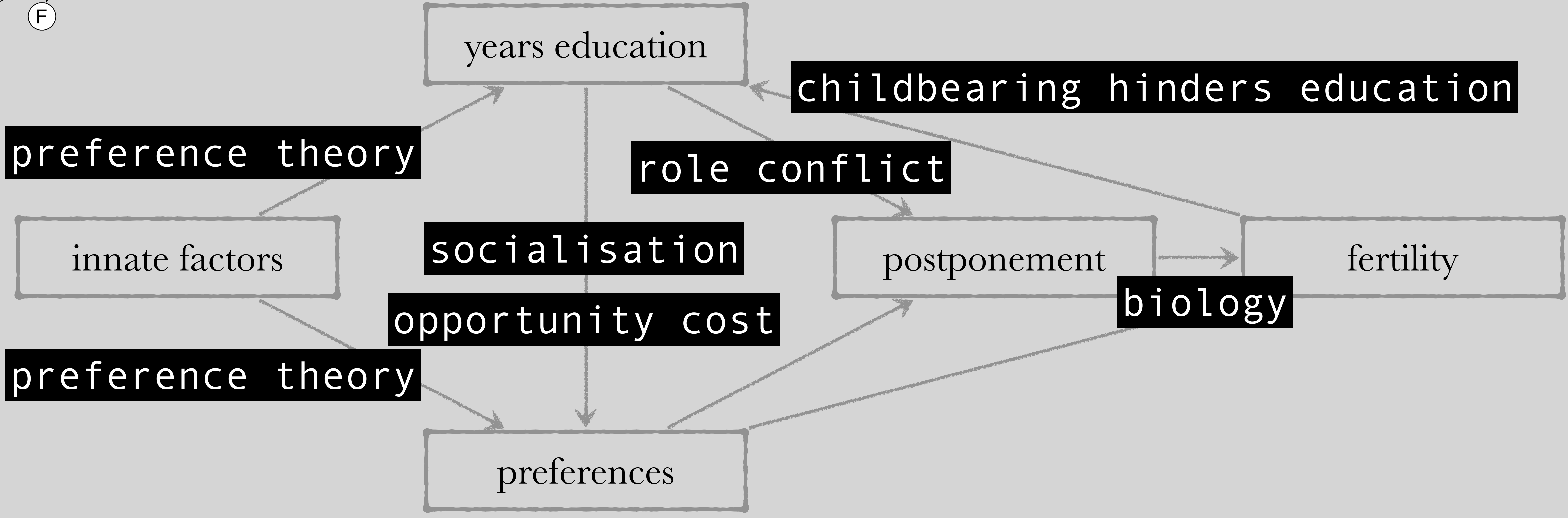
fertility

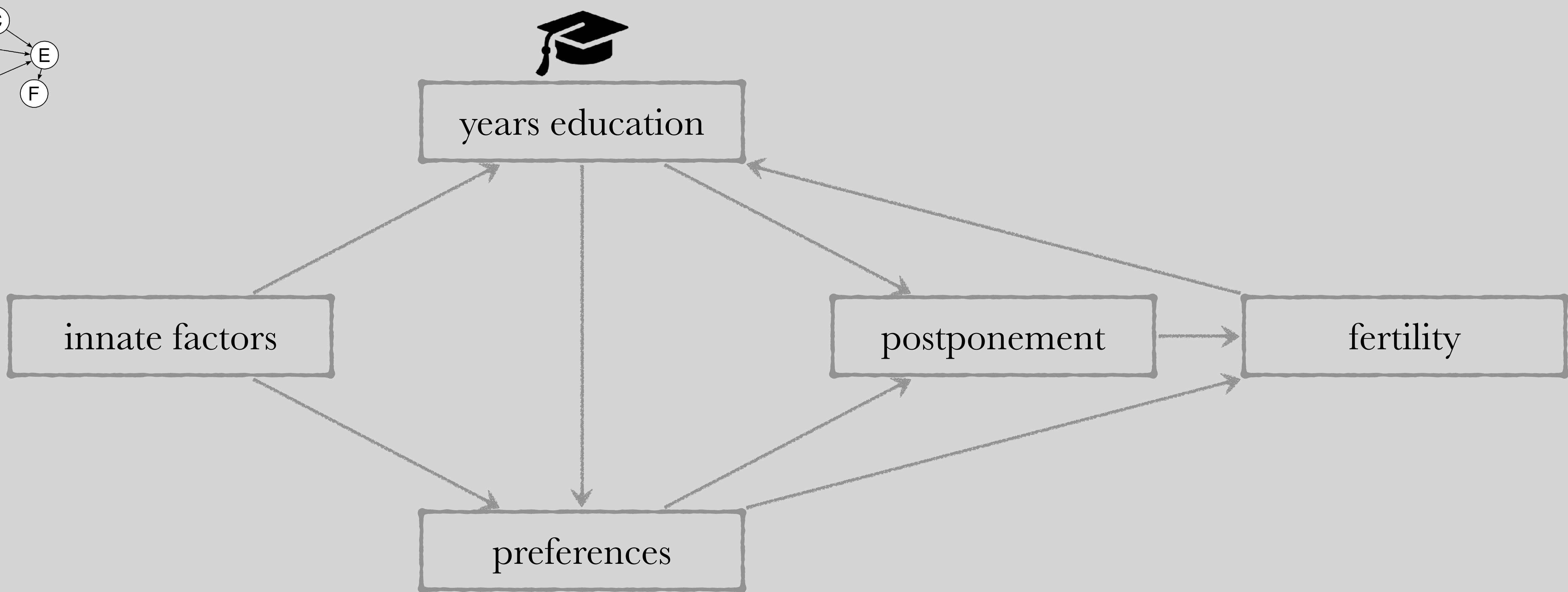
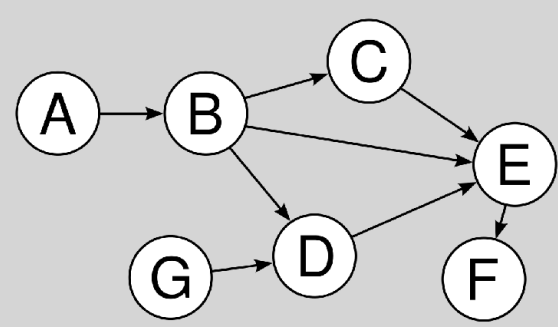
opportunity cost

biology

preference theory

preferences



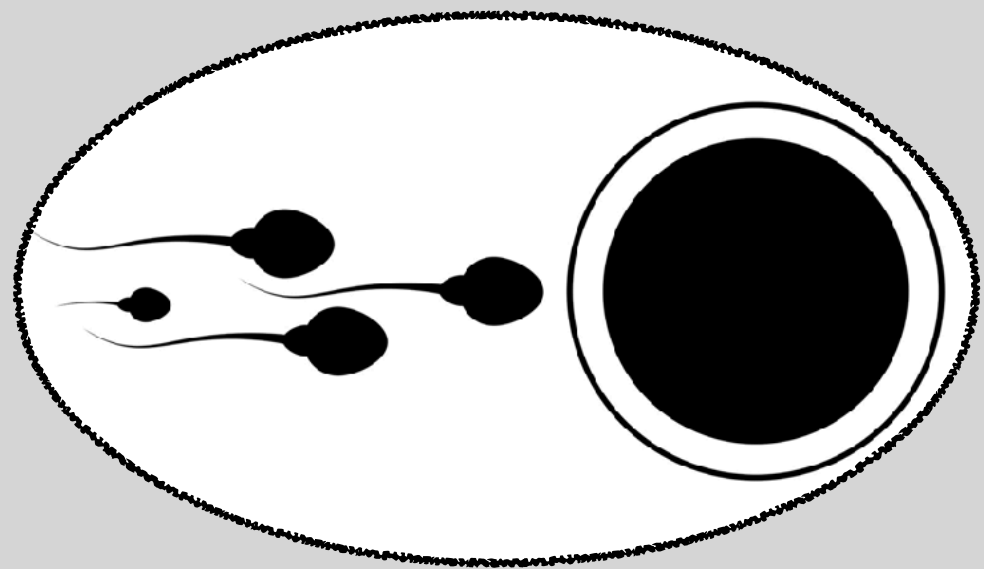


What Kind of Data
Would We need to
Address This Model?

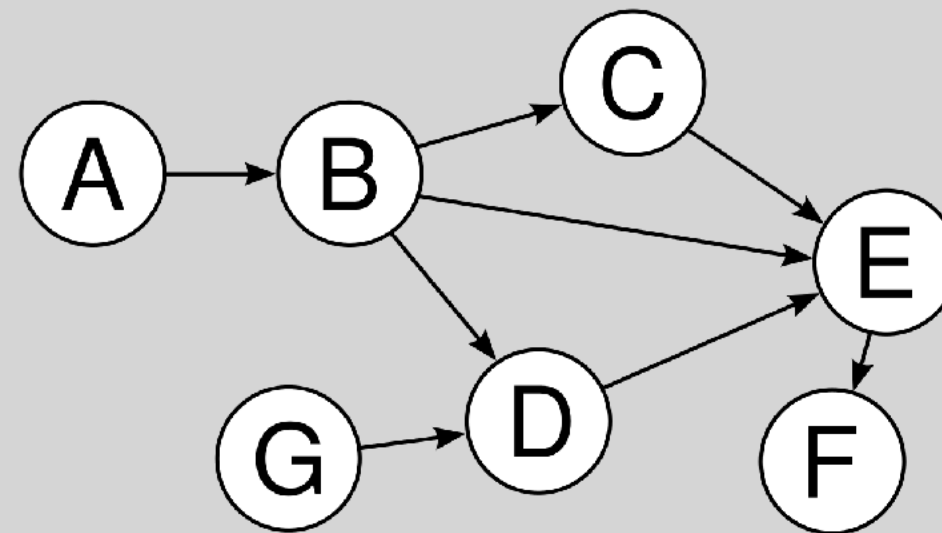
Take-Home Messages

microsimulation
can advance
sociological research

microsimulation can:



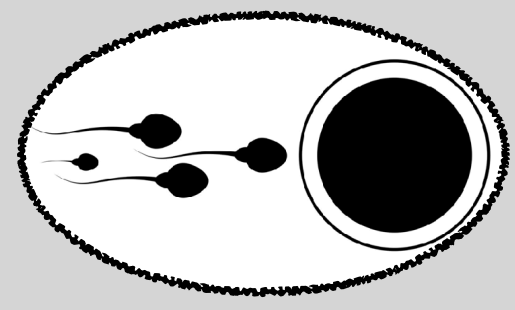
include
biological
information

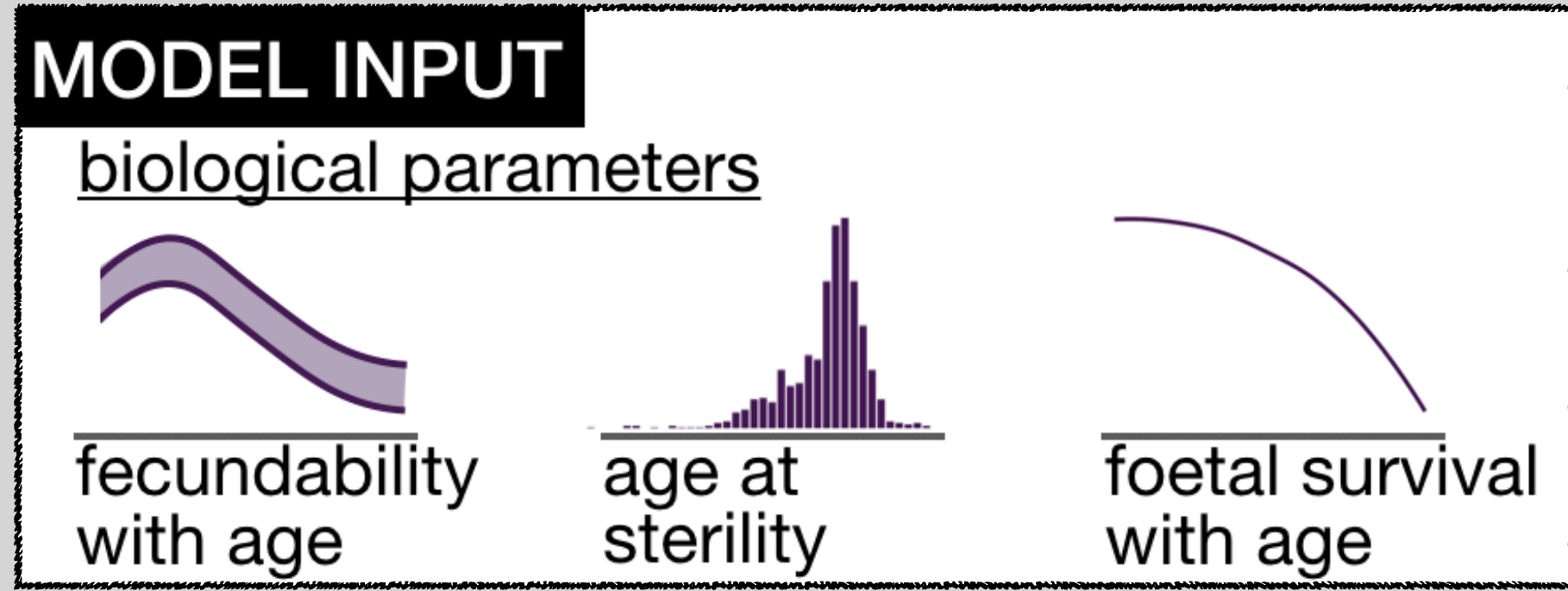
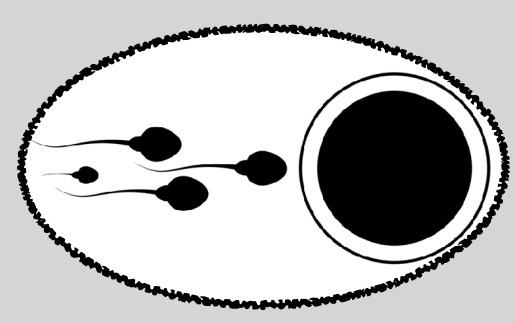


test (causal)
mechanisms

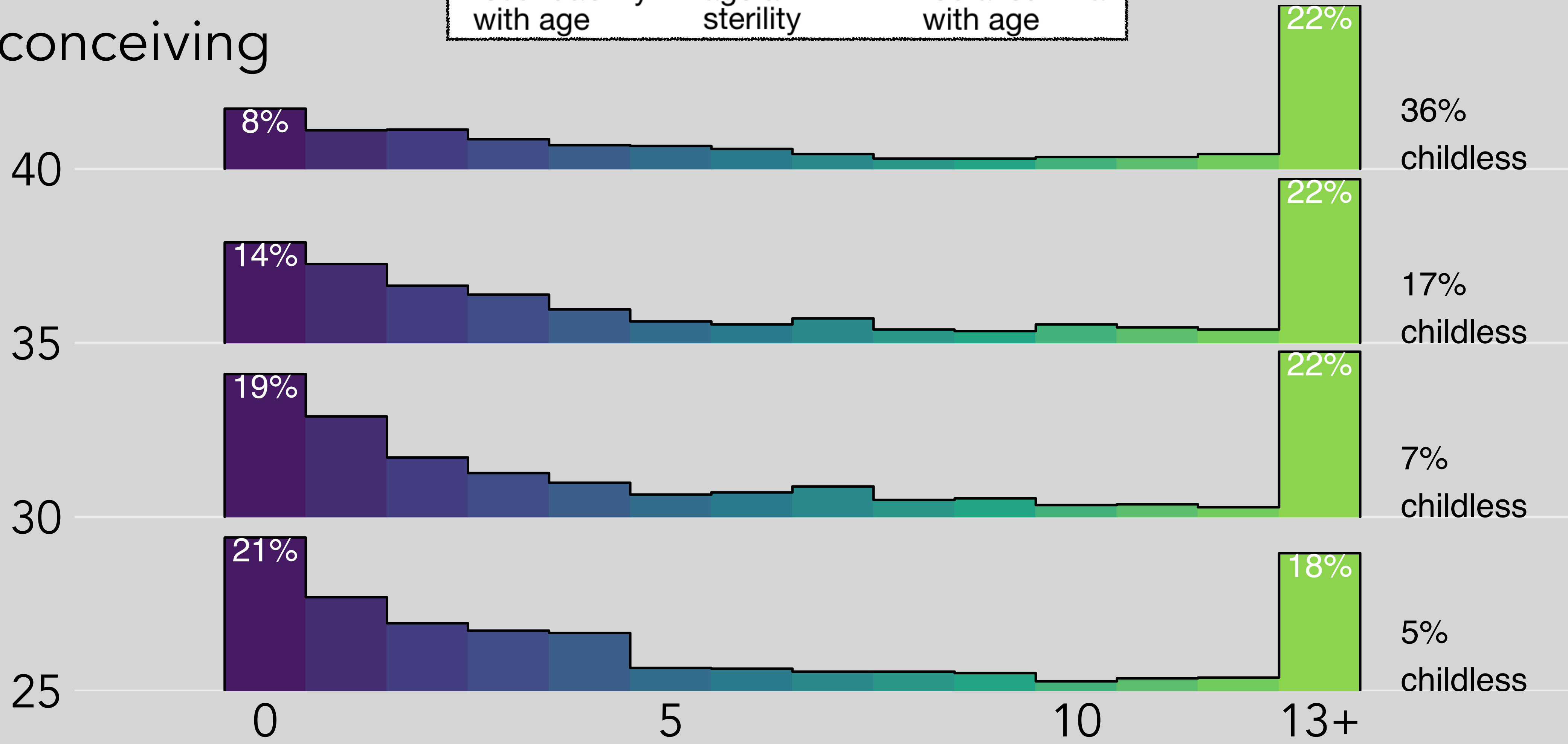
{ ABC }

estimate unknown
parameters

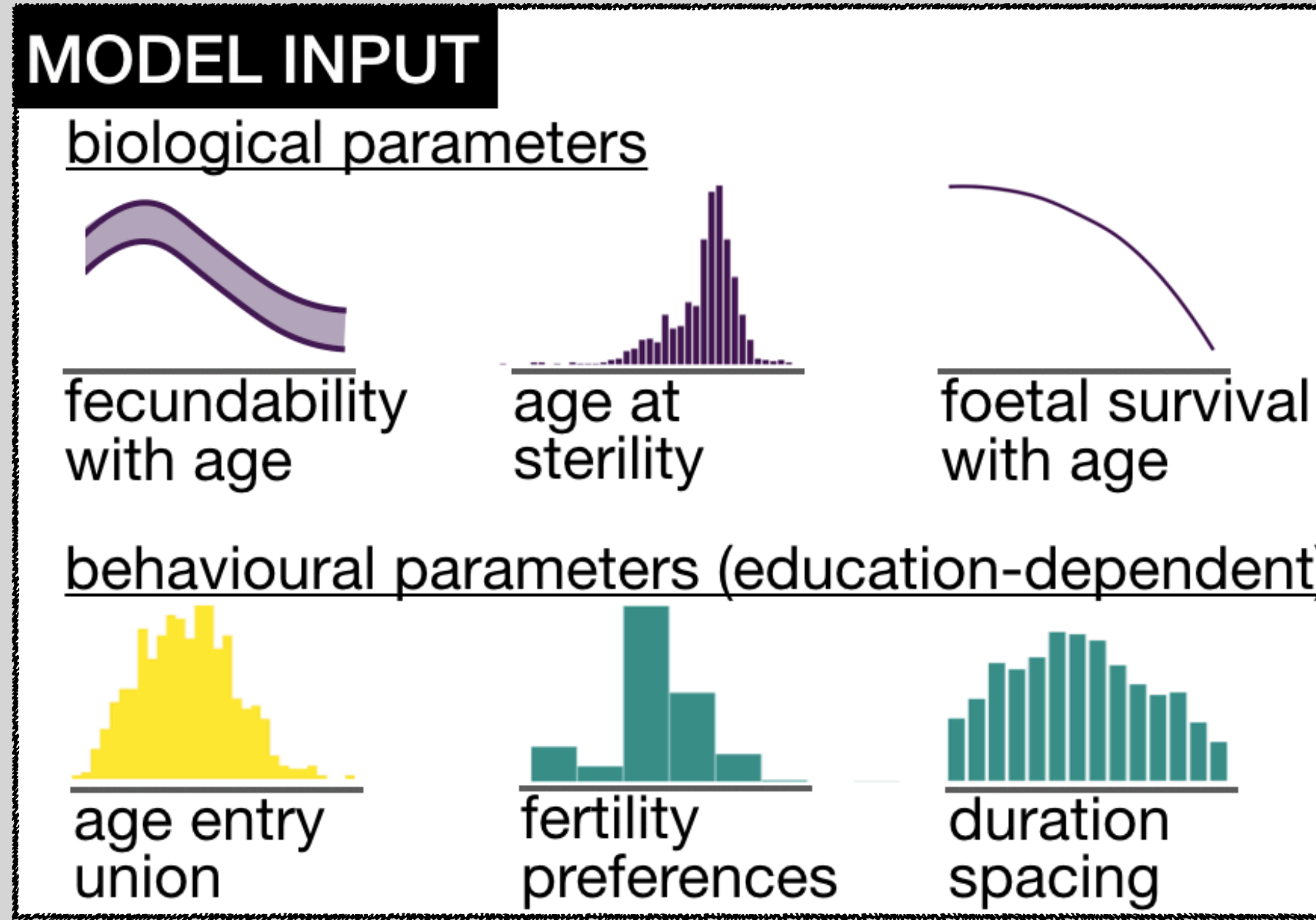
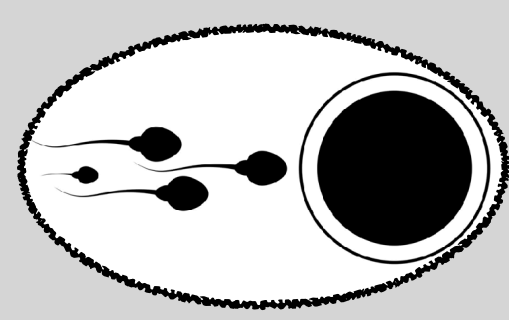




Age start
conceiving



Months until conception of child



determines whether and when people would like to conceive

determines whether and when people conceive

MODEL INPUT

biological parameters

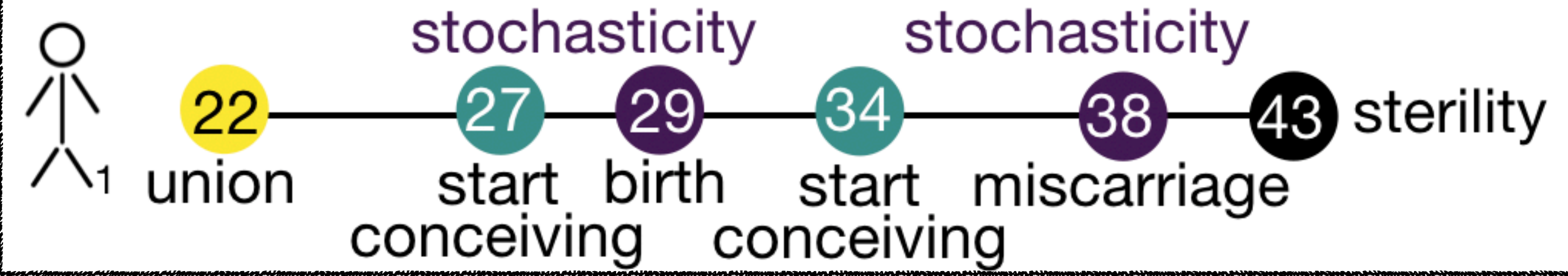


behavioural parameters (education-dependent)



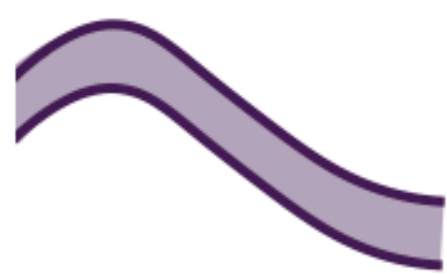
MODEL RUN

Randomly determined traits individual 1
in union =22 | spac. =5 | pref. =2 | fecund. =0.3 | steril. =43 | edu. =high

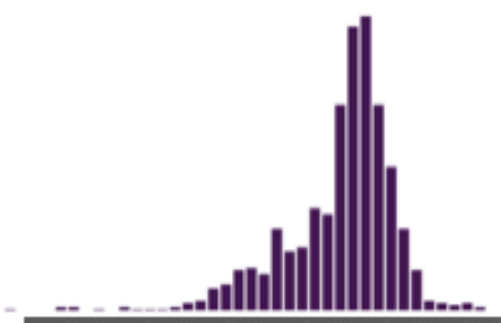


MODEL INPUT

biological parameters



fecundability with age



age at sterility

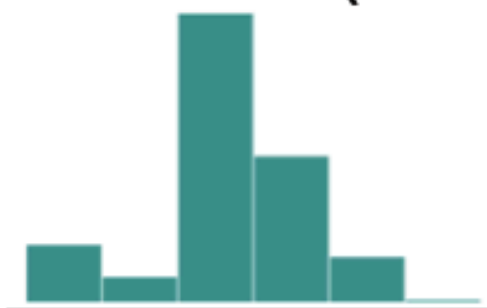


foetal survival with age

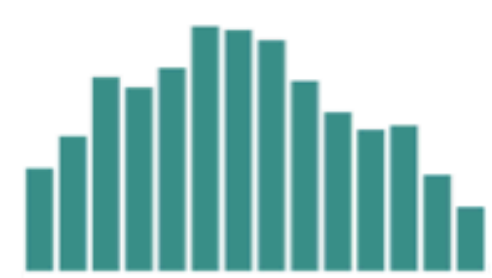
behavioural parameters (education-dependent)



age entry union



fertility preferences

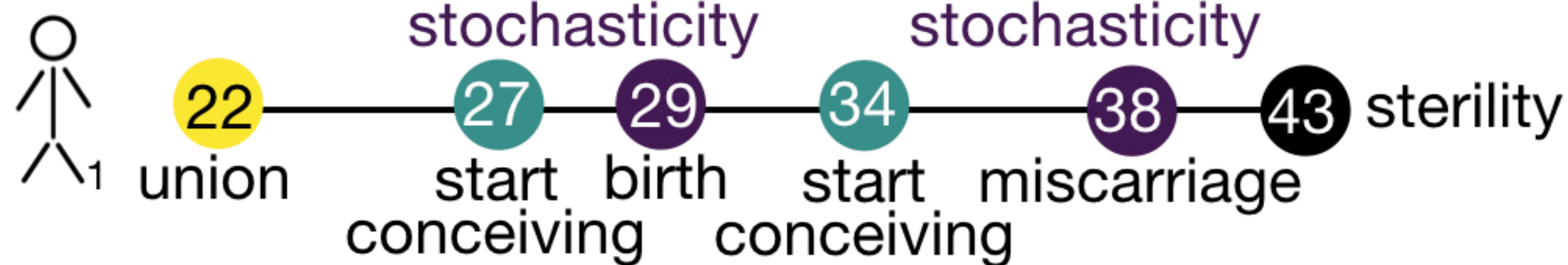


duration spacing

MODEL RUN

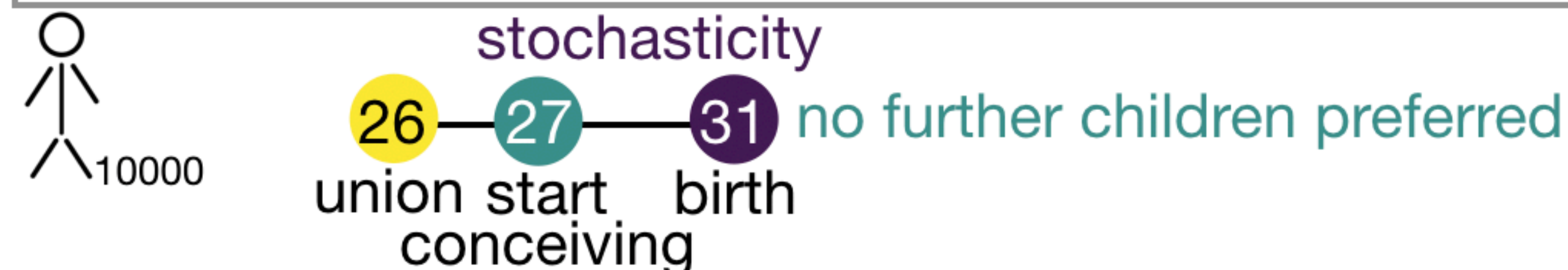
Randomly determined traits individual 1

in union =22 | spac. =5 | pref. =2 | fecund. =0.3 | steril. =43 | edu. =high



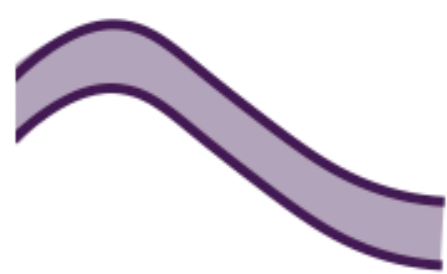
Randomly determined traits individual 10000

in union =26 | spac. =1 | pref. =1 | fecund. =0.1 | steril. =45 | edu. =low

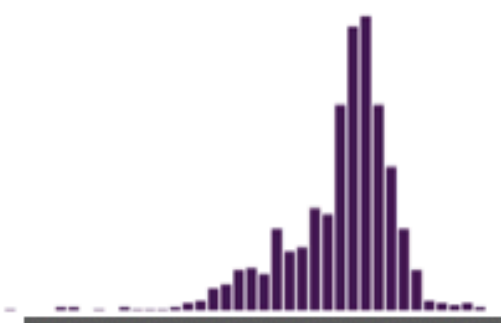


MODEL INPUT

biological parameters



fecundability with age



age at sterility

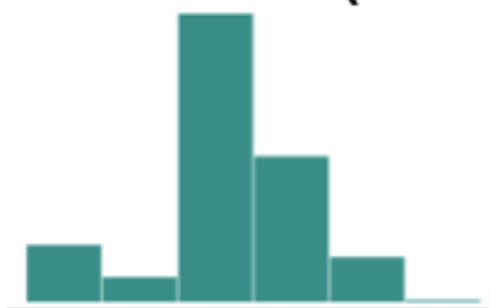


foetal survival with age

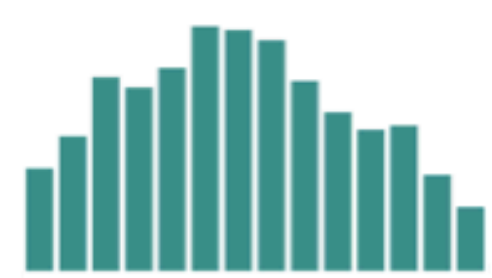
behavioural parameters (education-dependent)



age entry union



fertility preferences

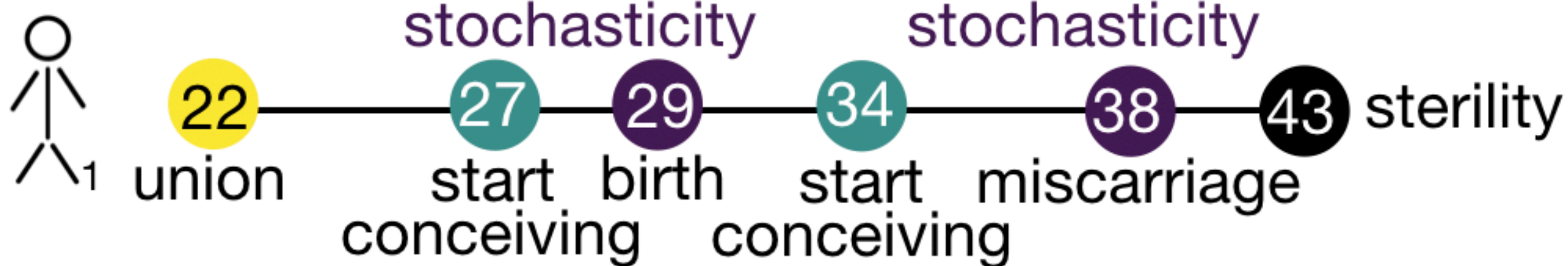


duration spacing

MODEL RUN

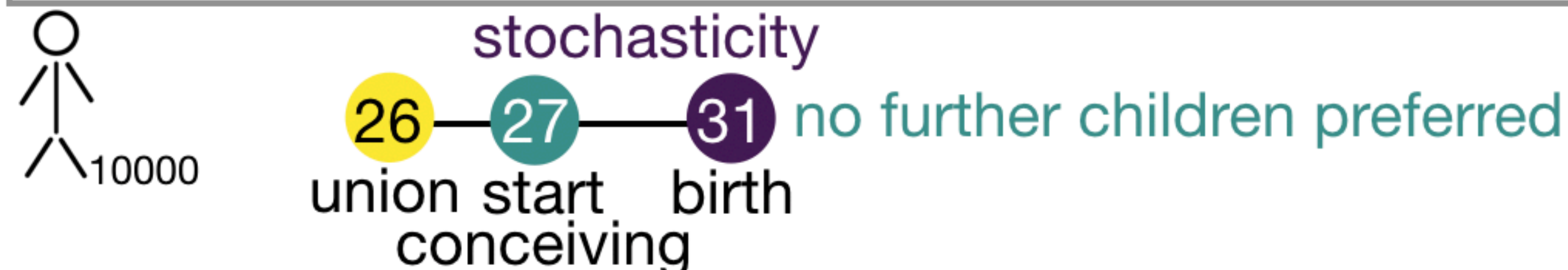
Randomly determined traits individual 1

in union =22 | spac. =5 | pref. =2 | fecund. =0.3 | steril. =43 | edu. =high



Randomly determined traits individual 10000

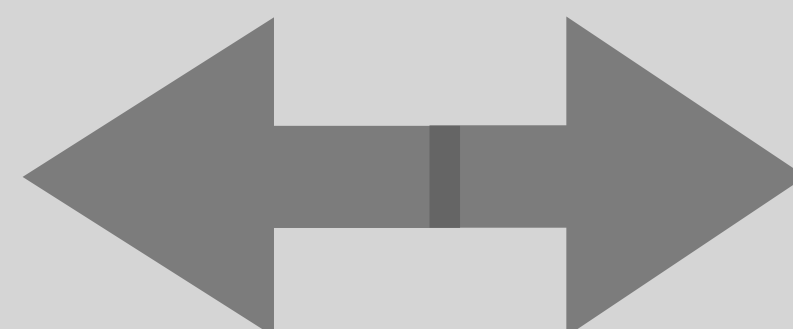
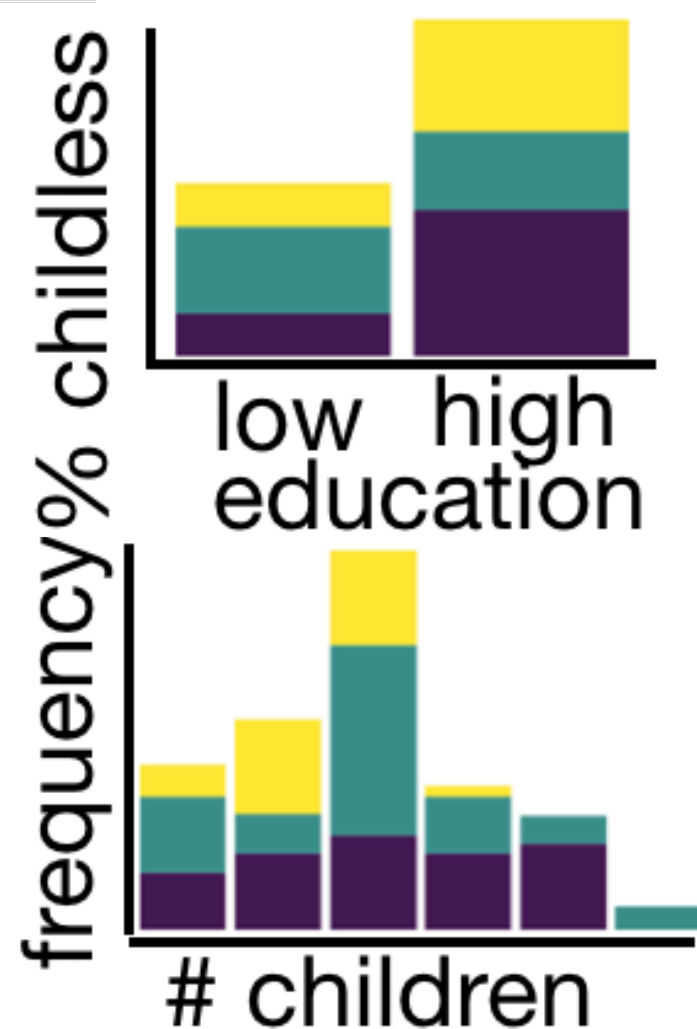
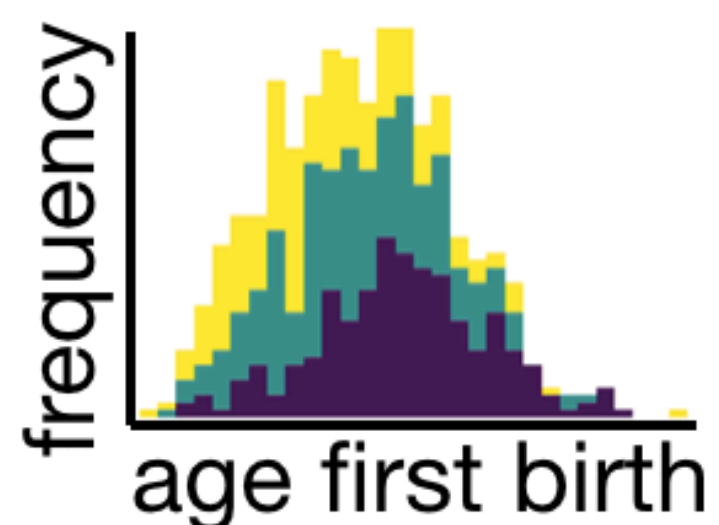
in union =26 | spac. =1 | pref. =1 | fecund. =0.1 | steril. =45 | edu. =low



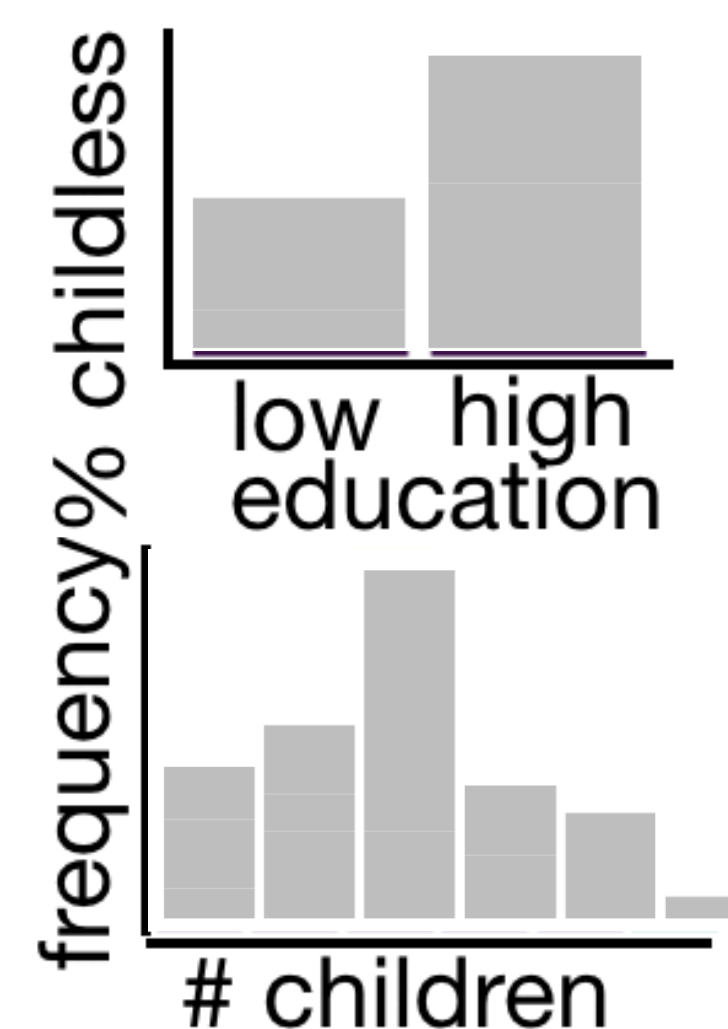
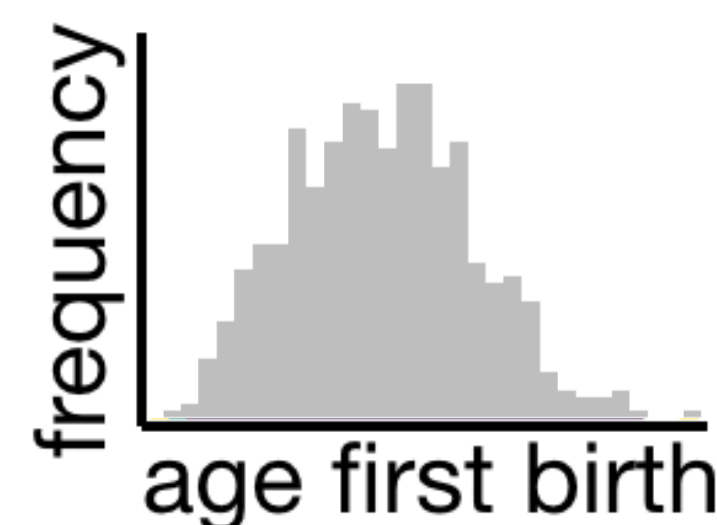
MODEL OUTPUT

due to:

- partner status
- preferences
- stochasticity



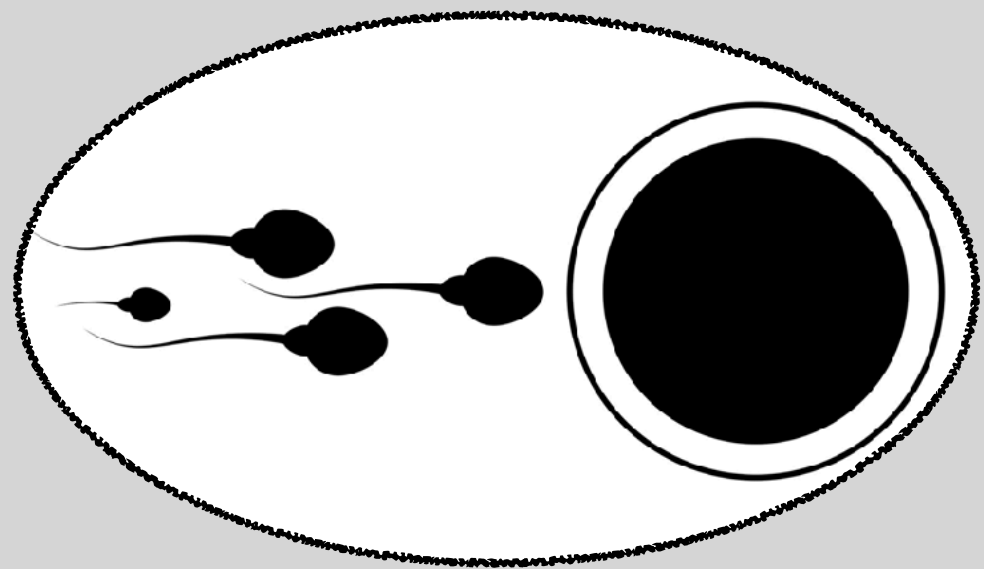
'TRUTH'



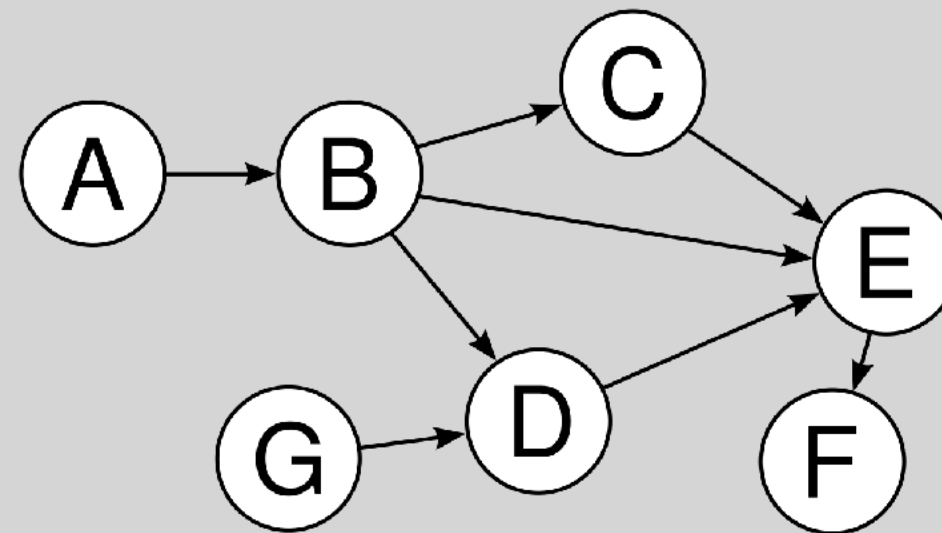
Take-Home Messages

microsimulation
can advance
sociological research

microsimulation can:



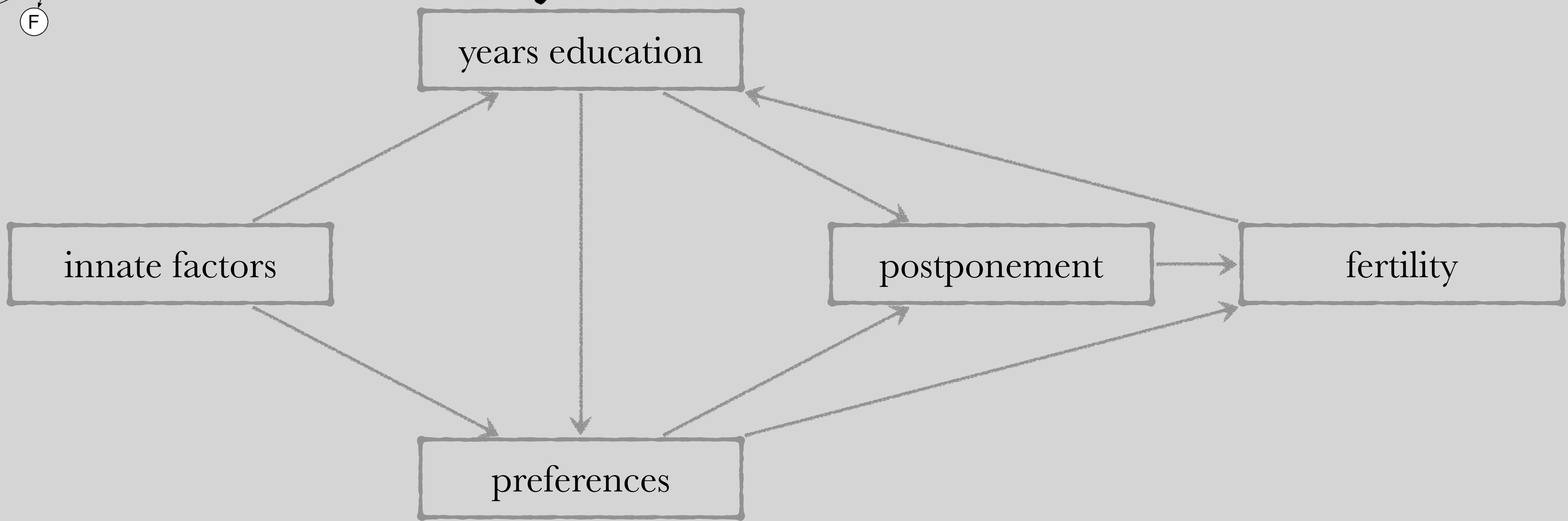
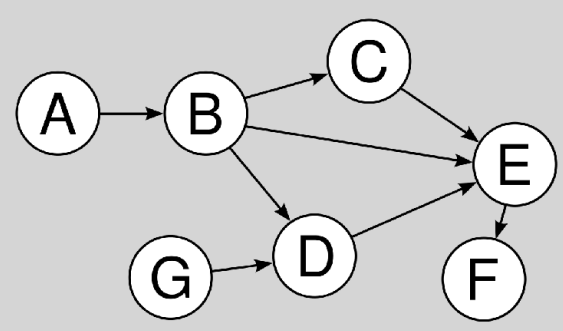
include
biological
information



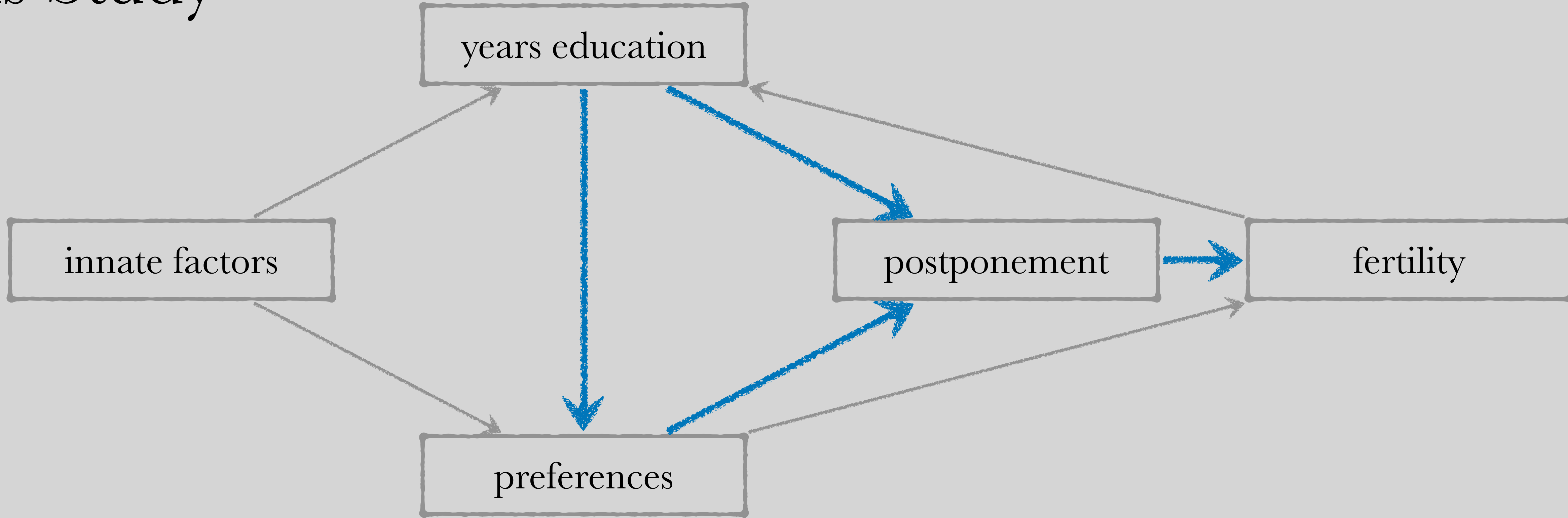
test (causal)
mechanisms

{ ABC }

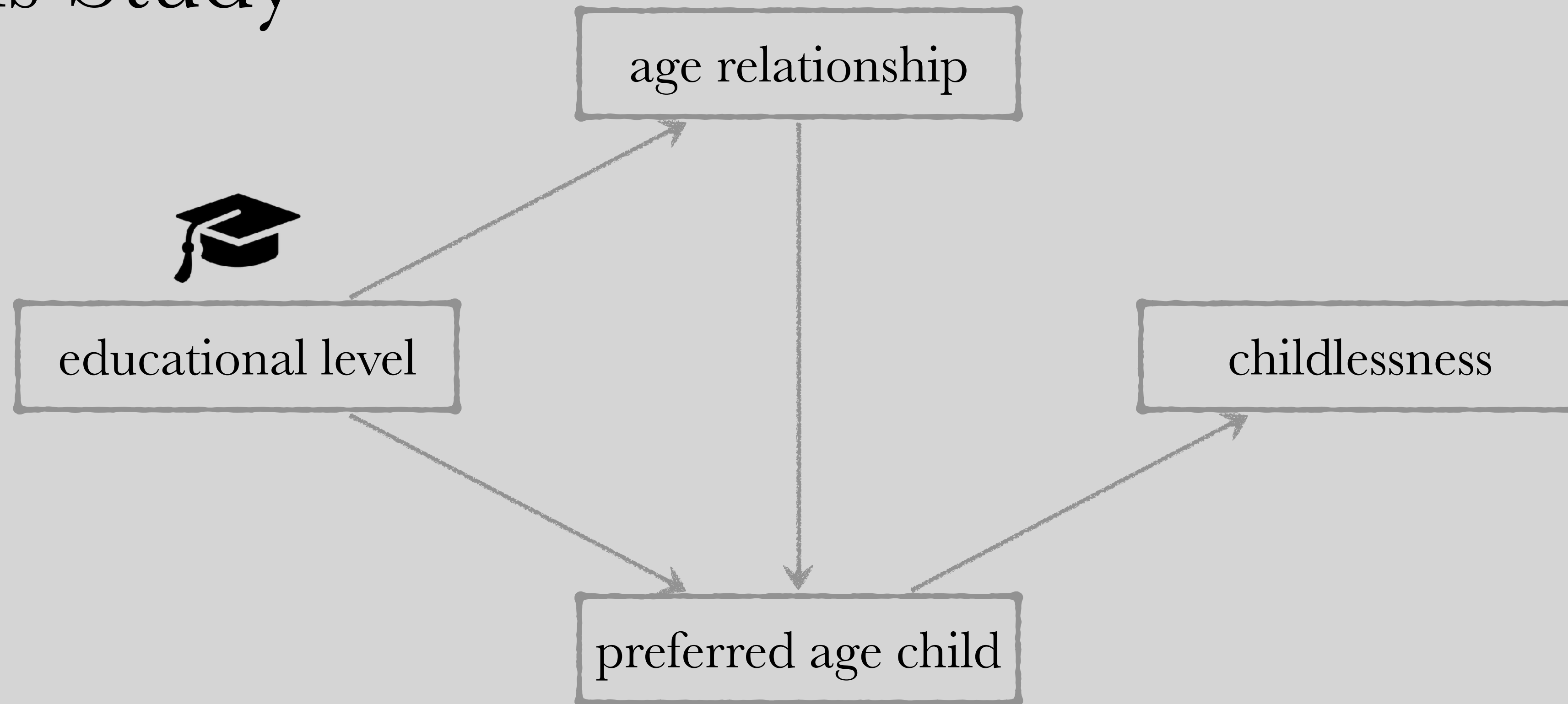
estimate unknown
parameters

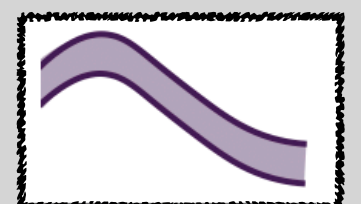
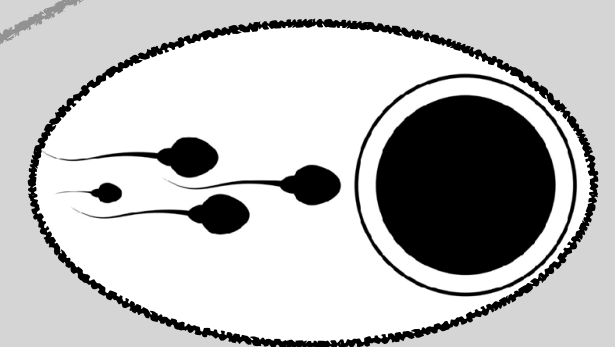
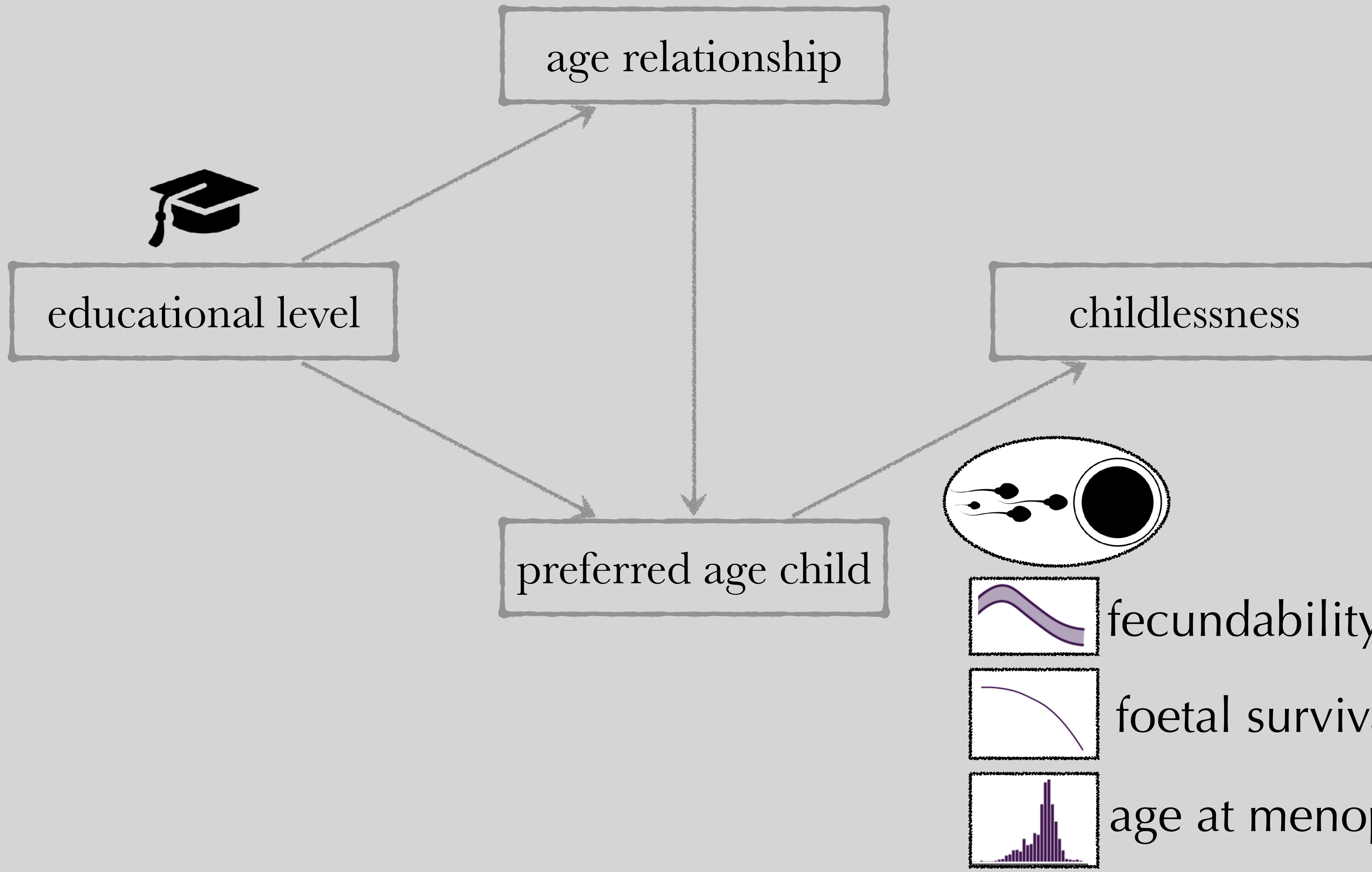


This Study

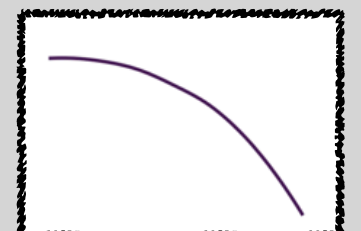


This Study

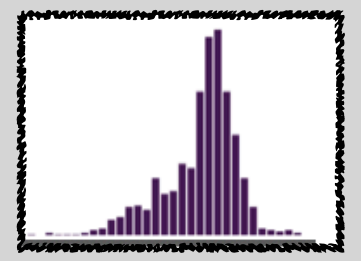




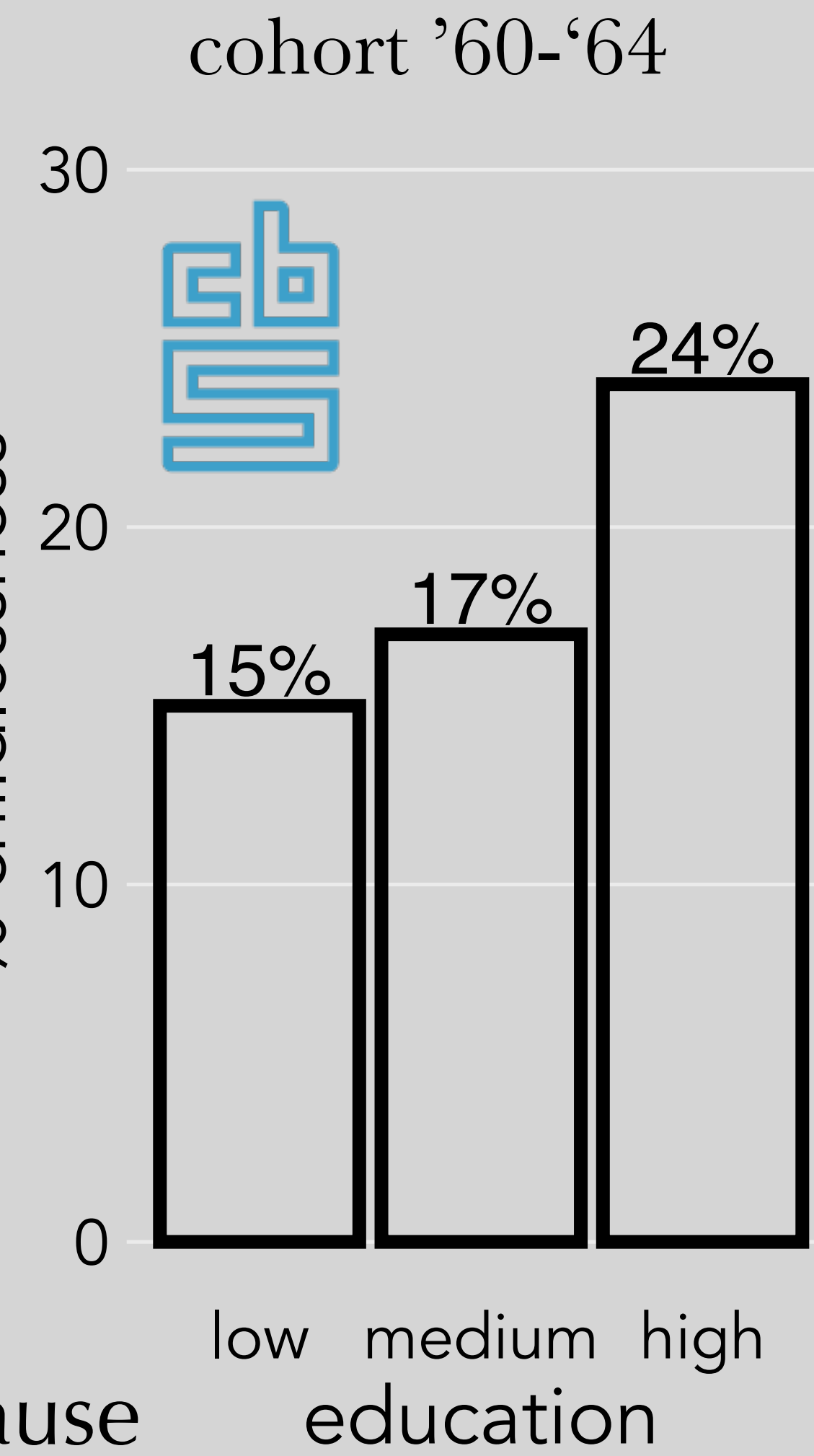
fecundability

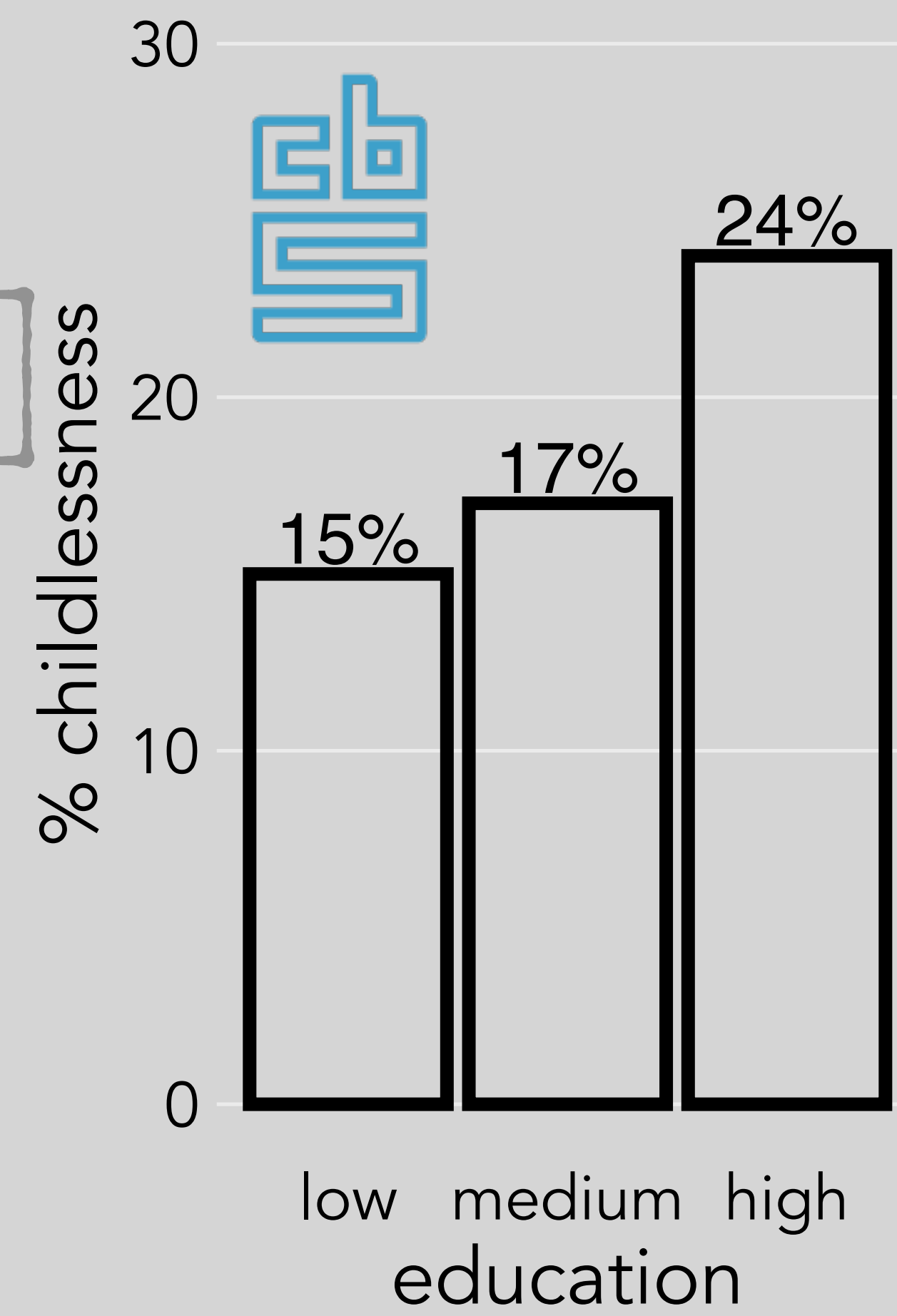
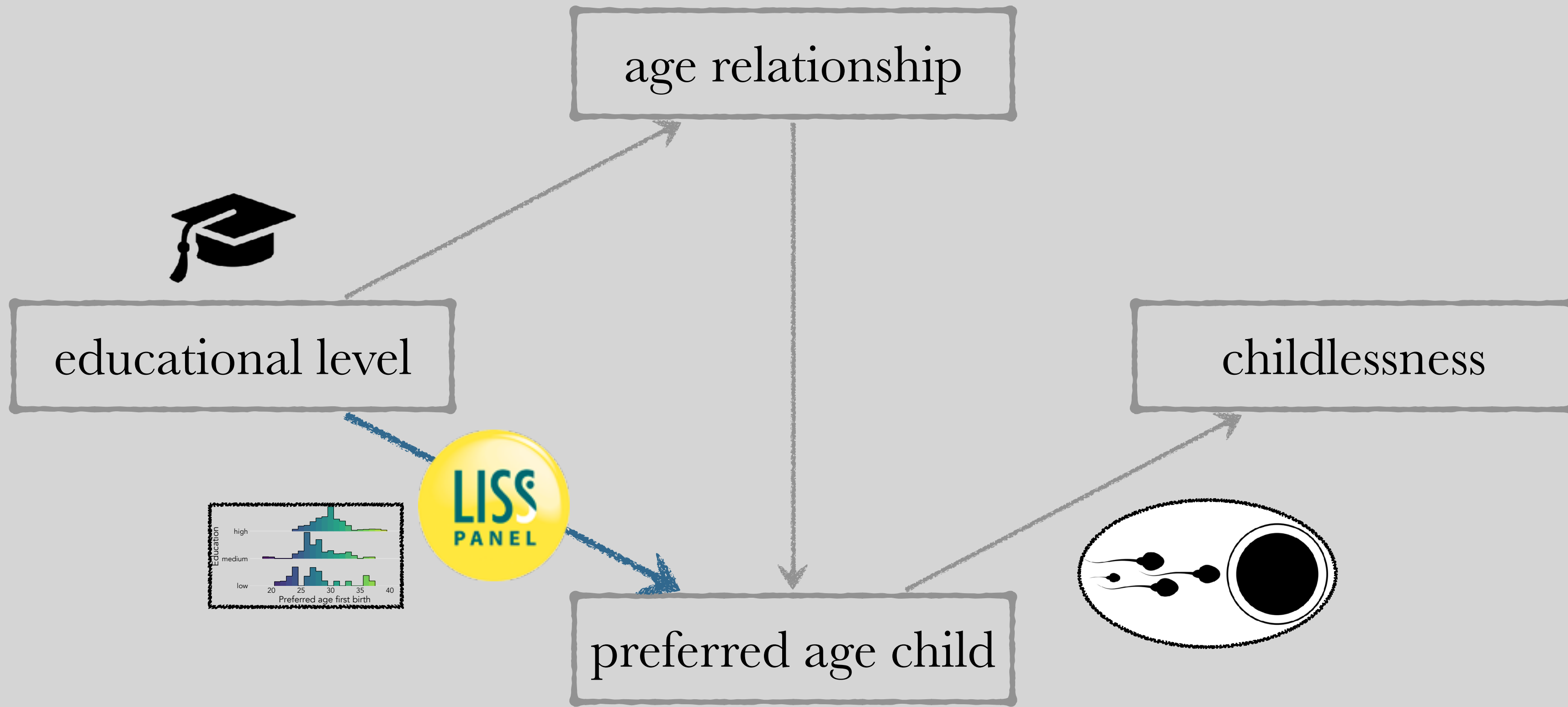


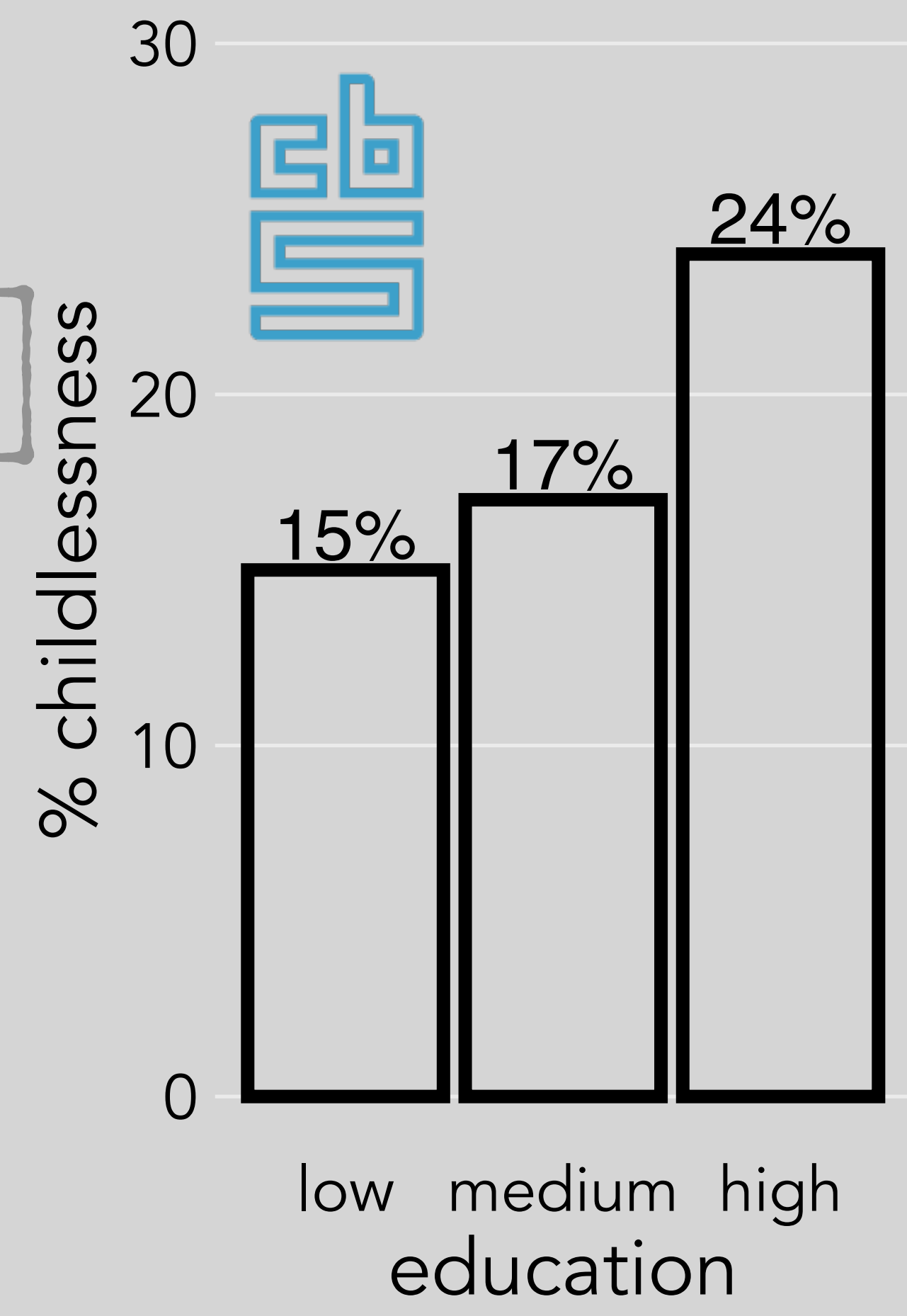
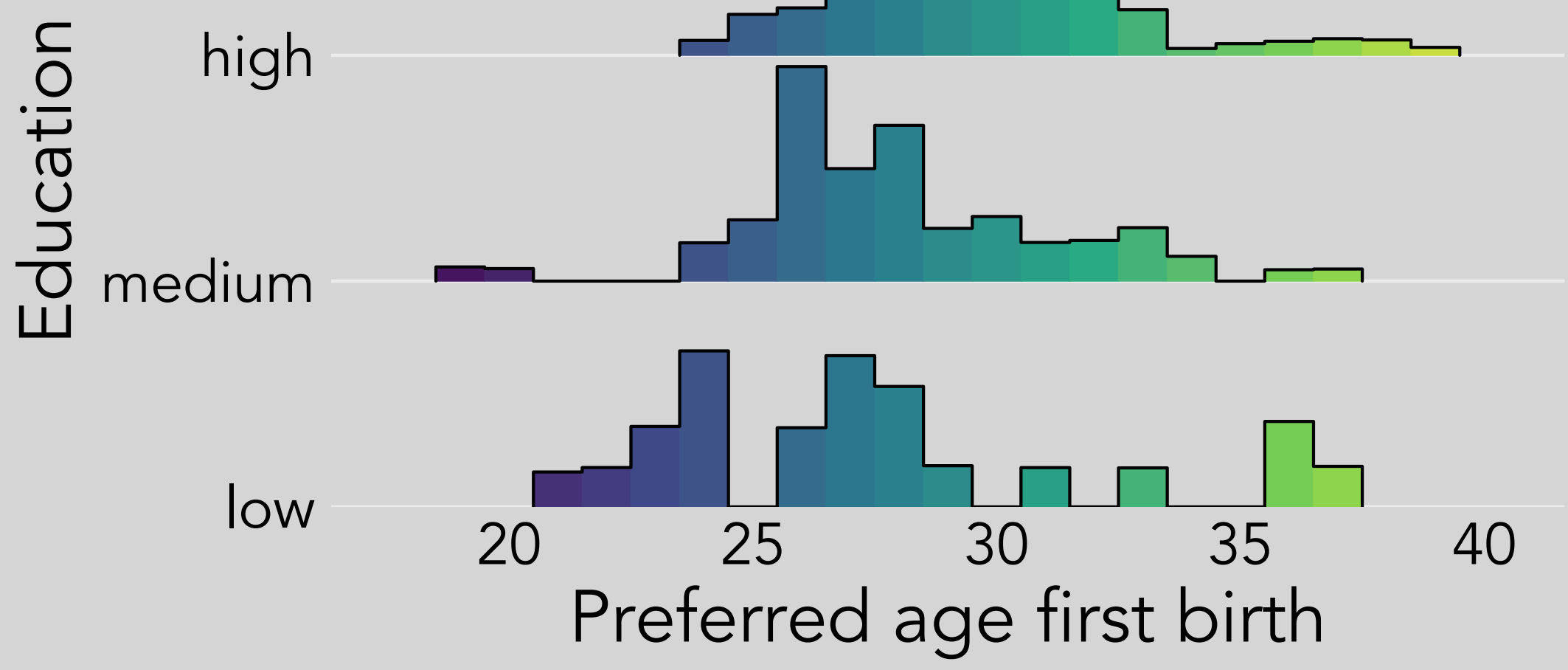
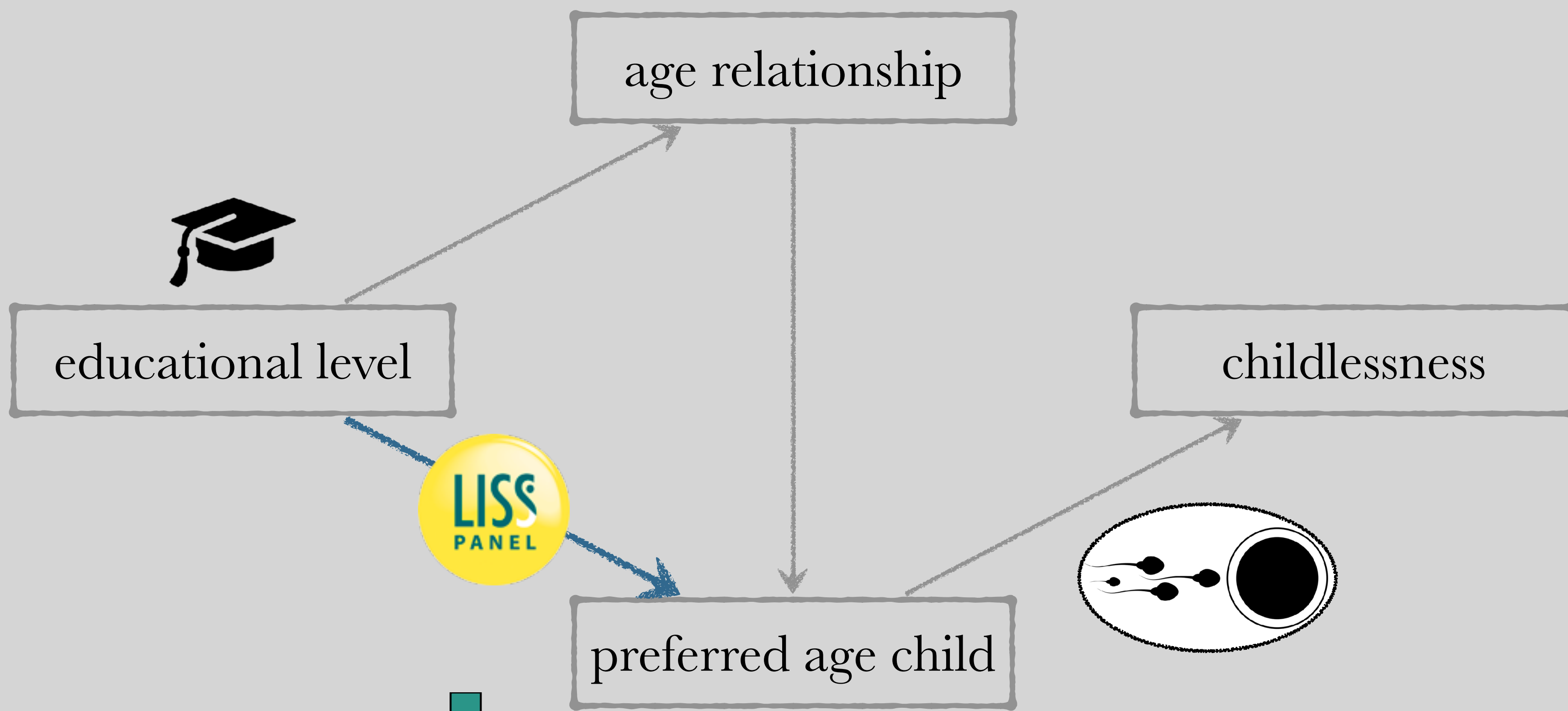
foetal survival

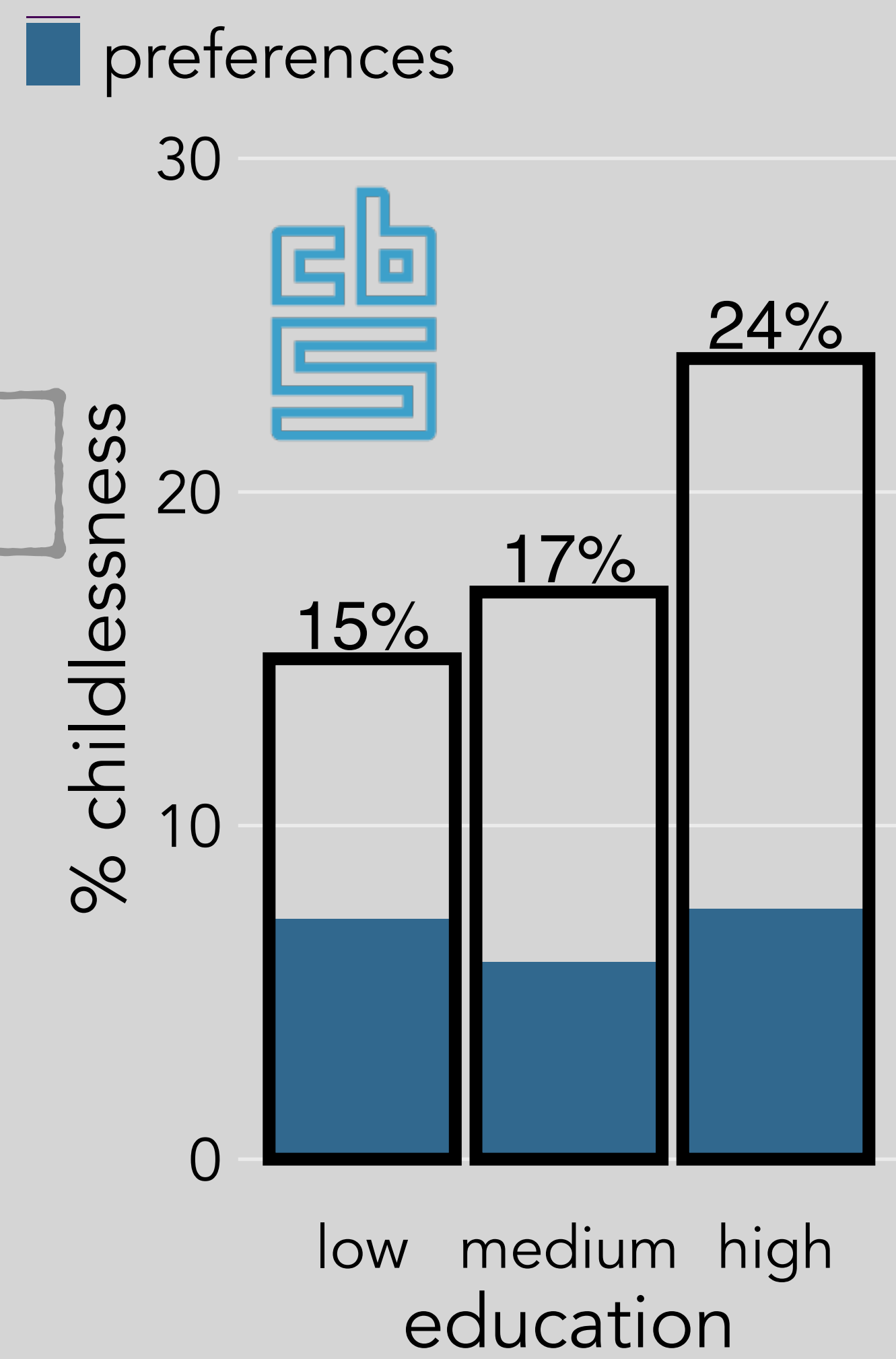
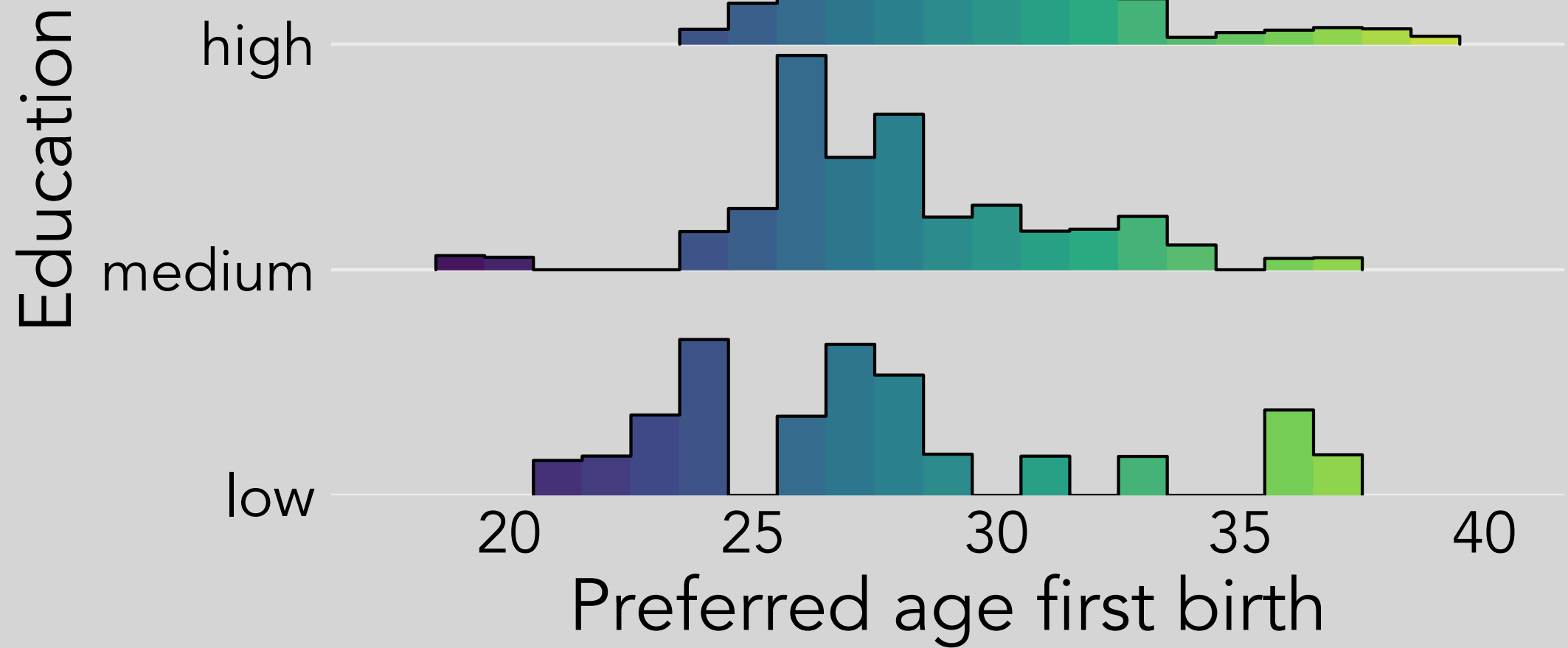
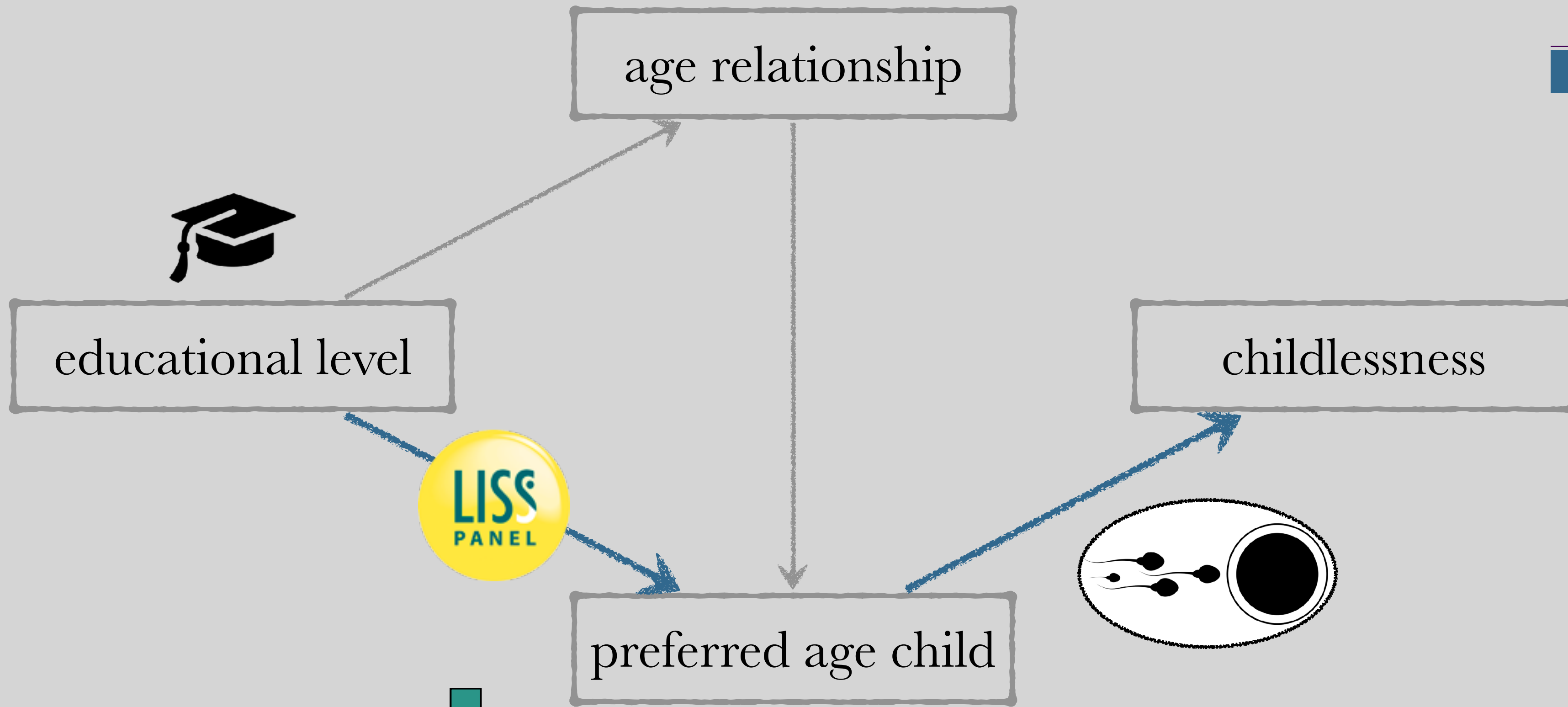


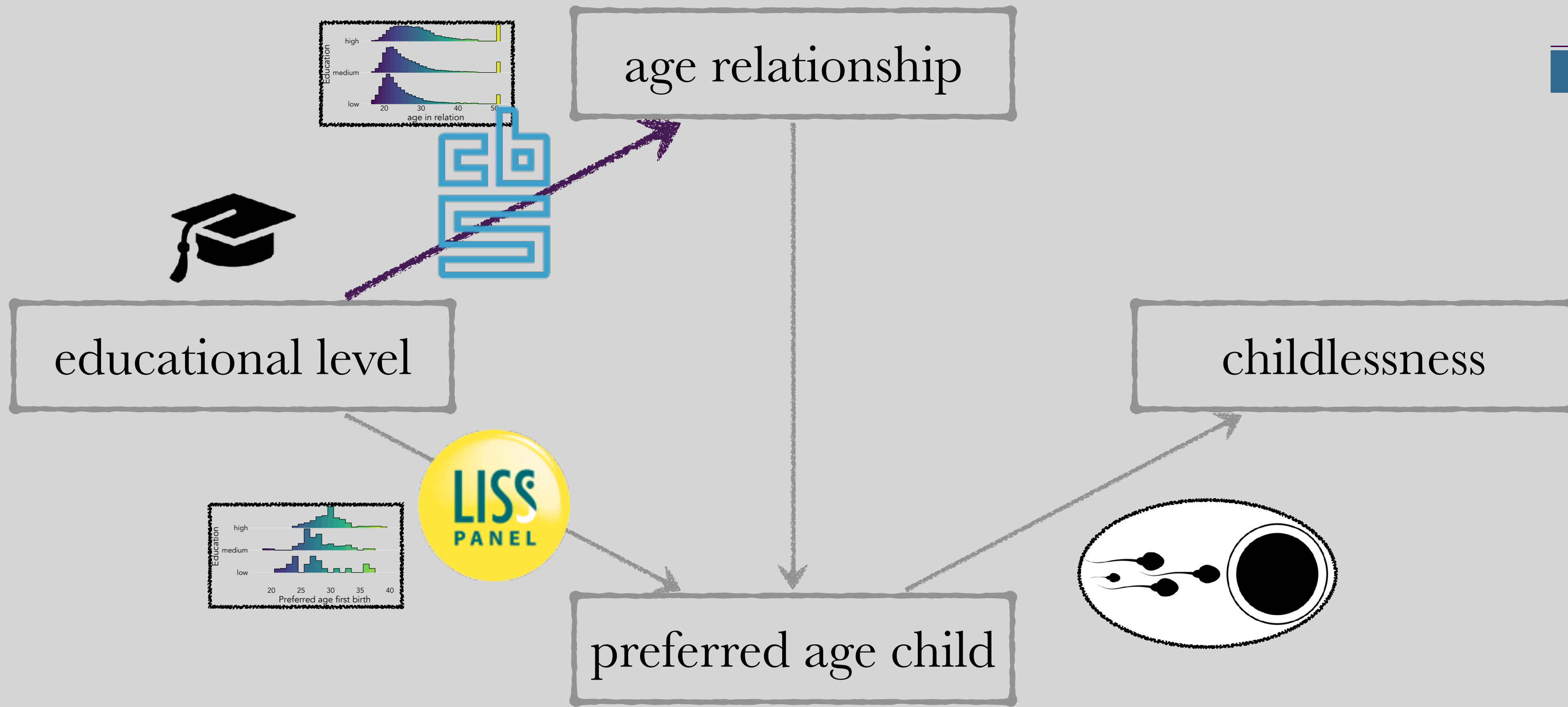
age at menopause



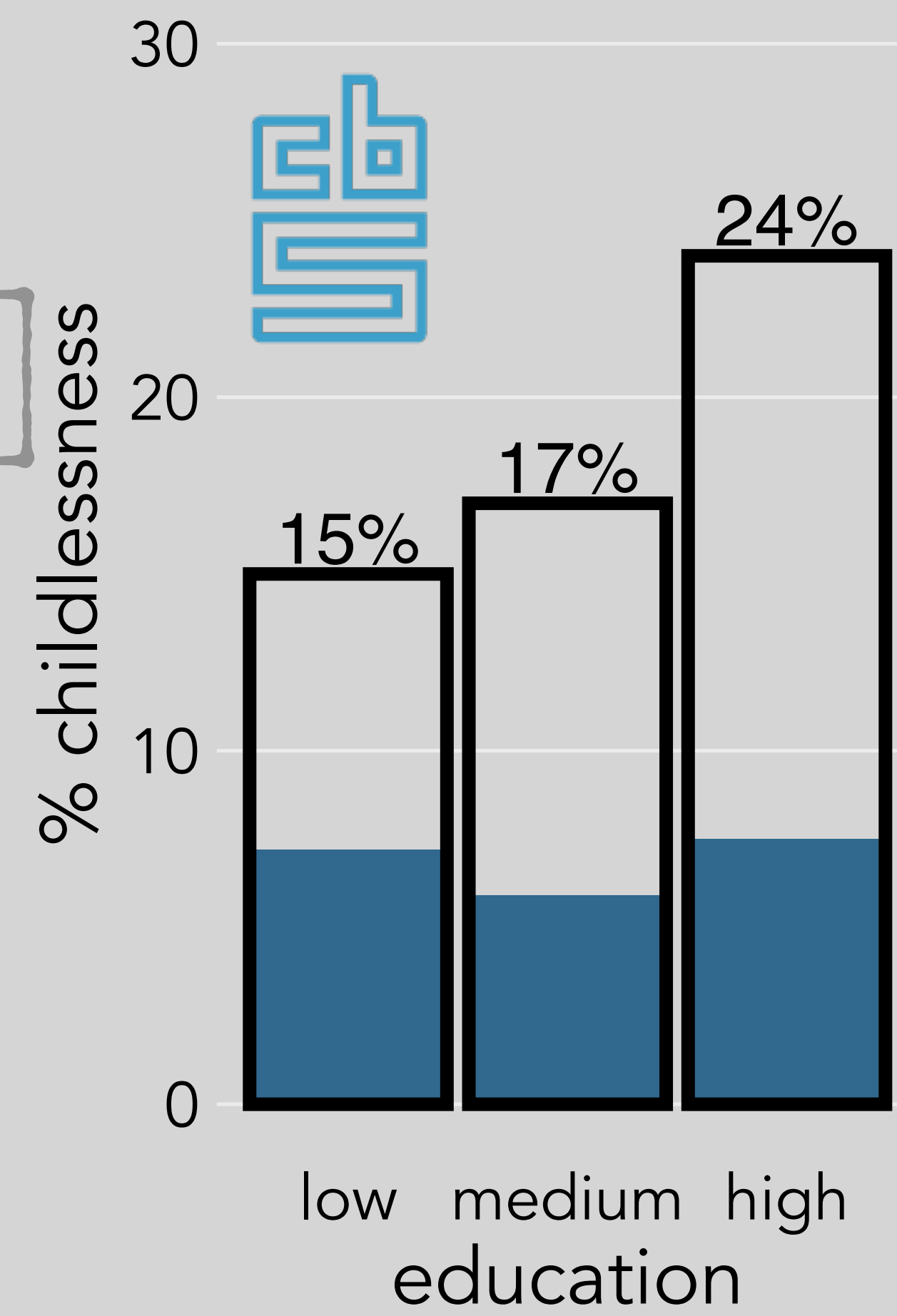


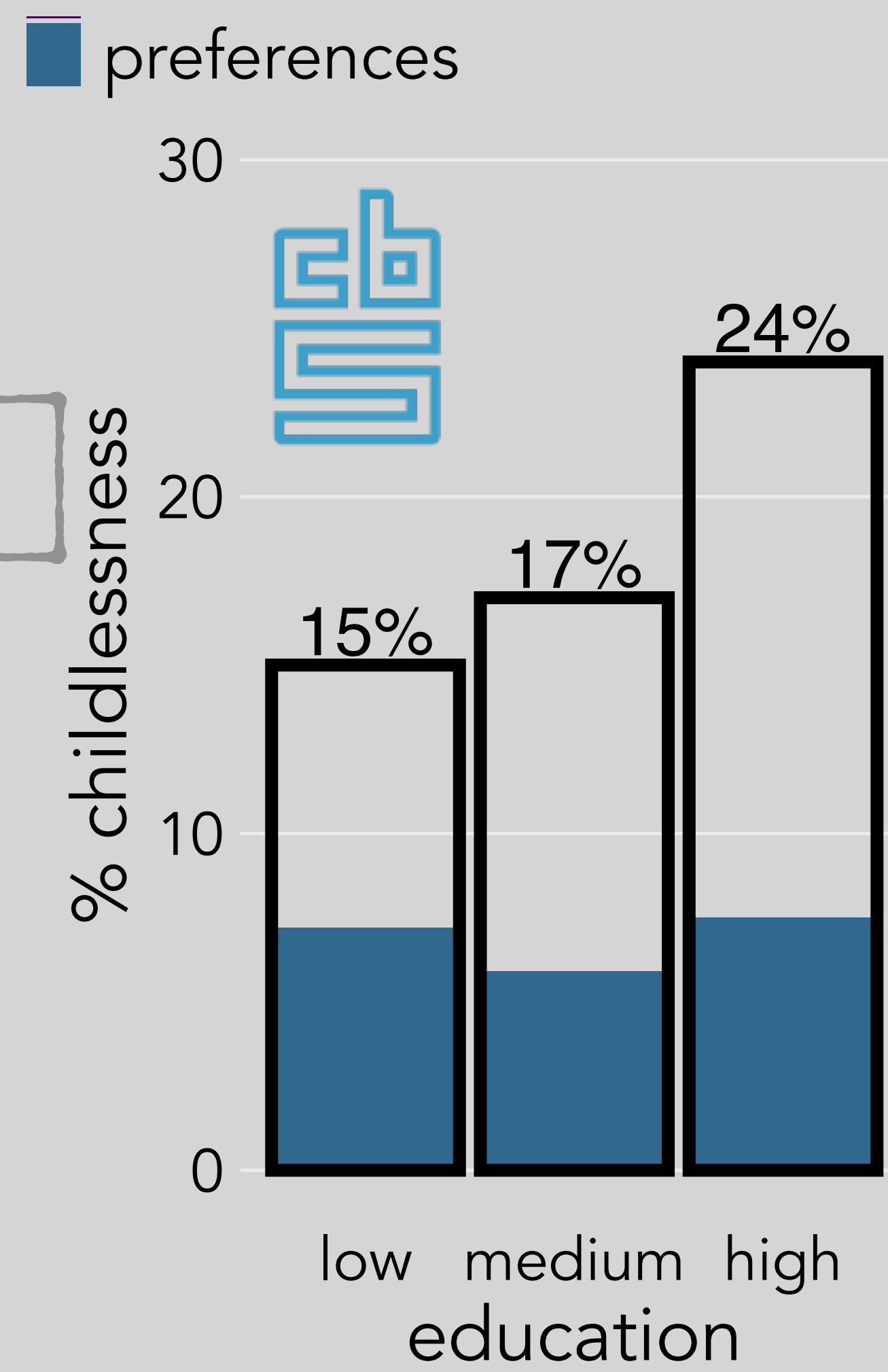
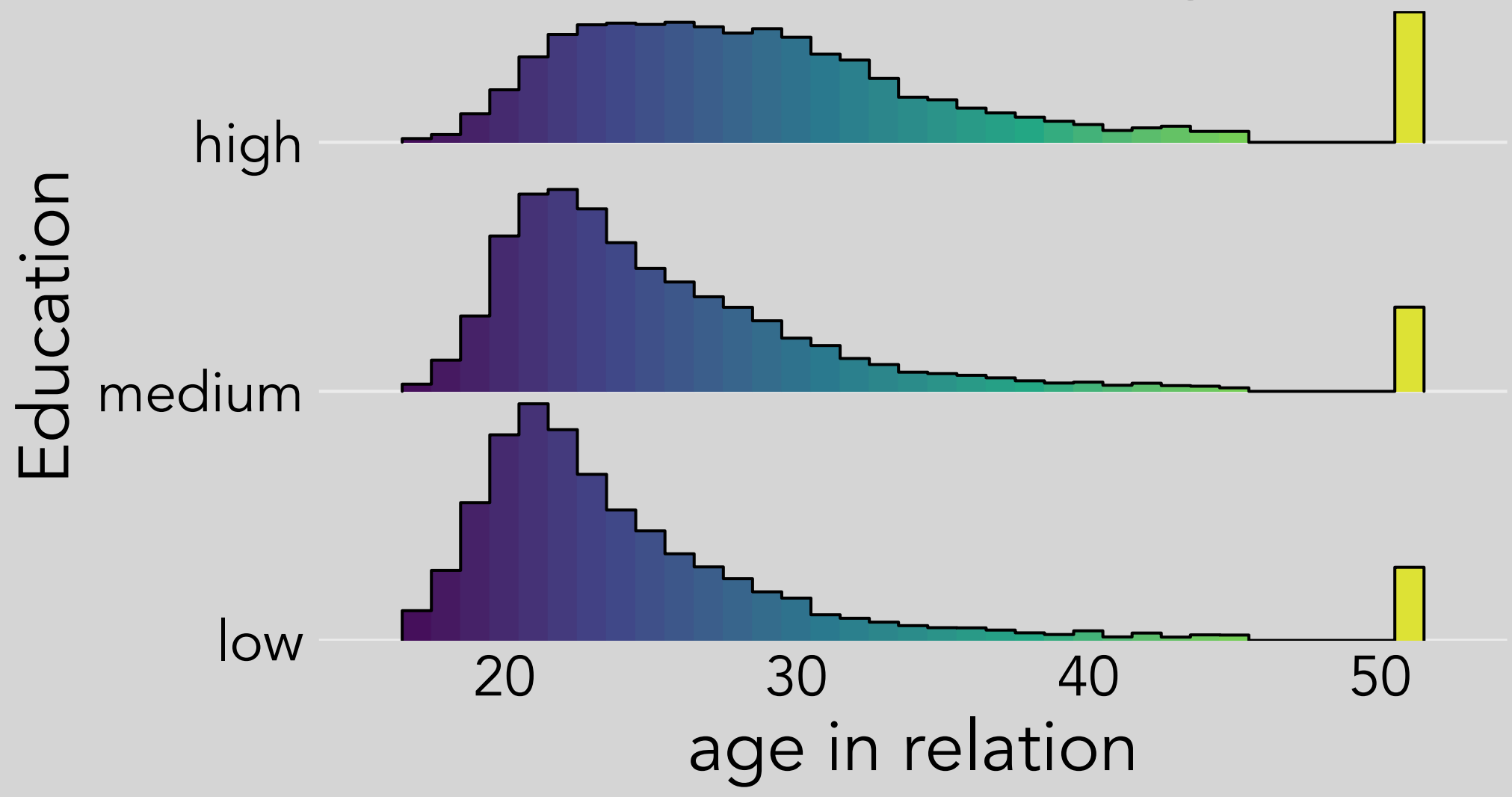
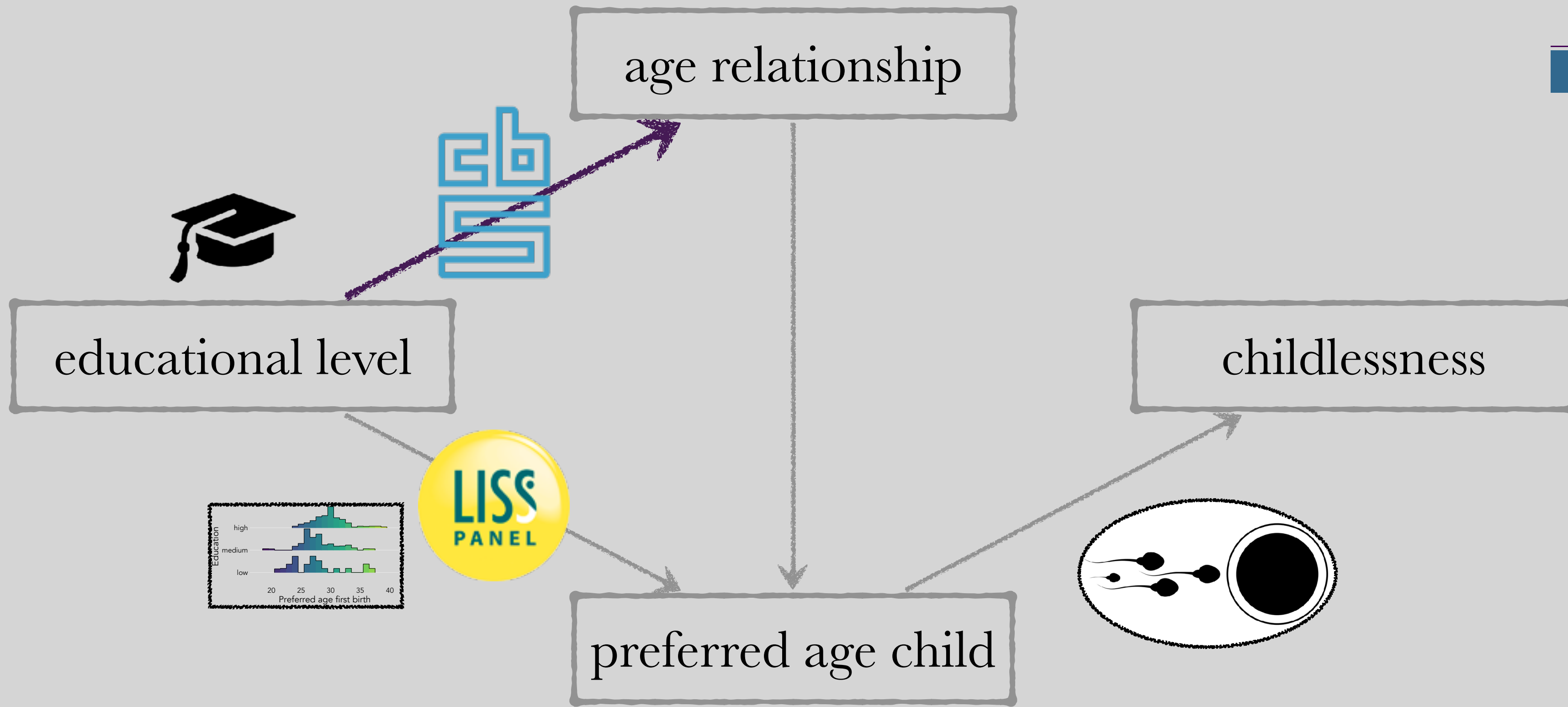


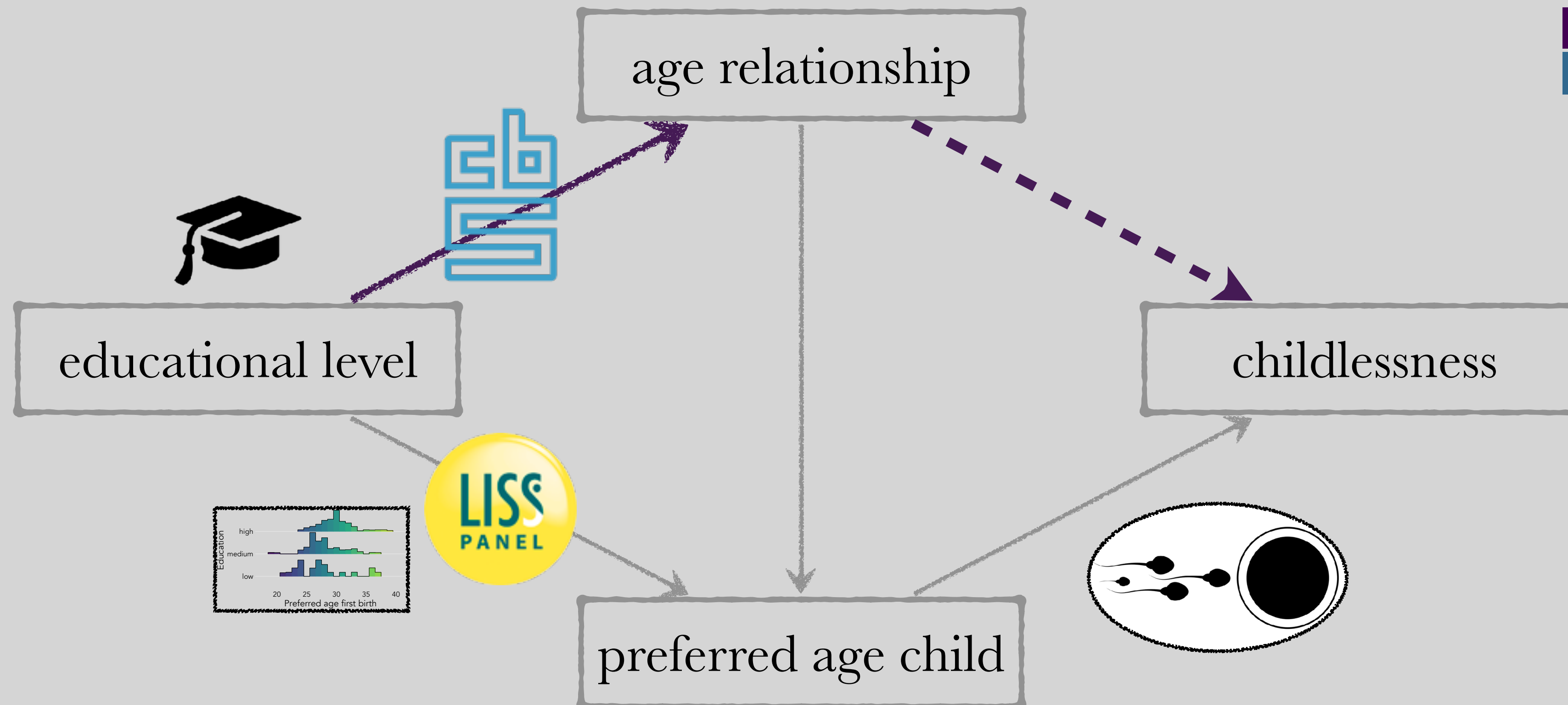




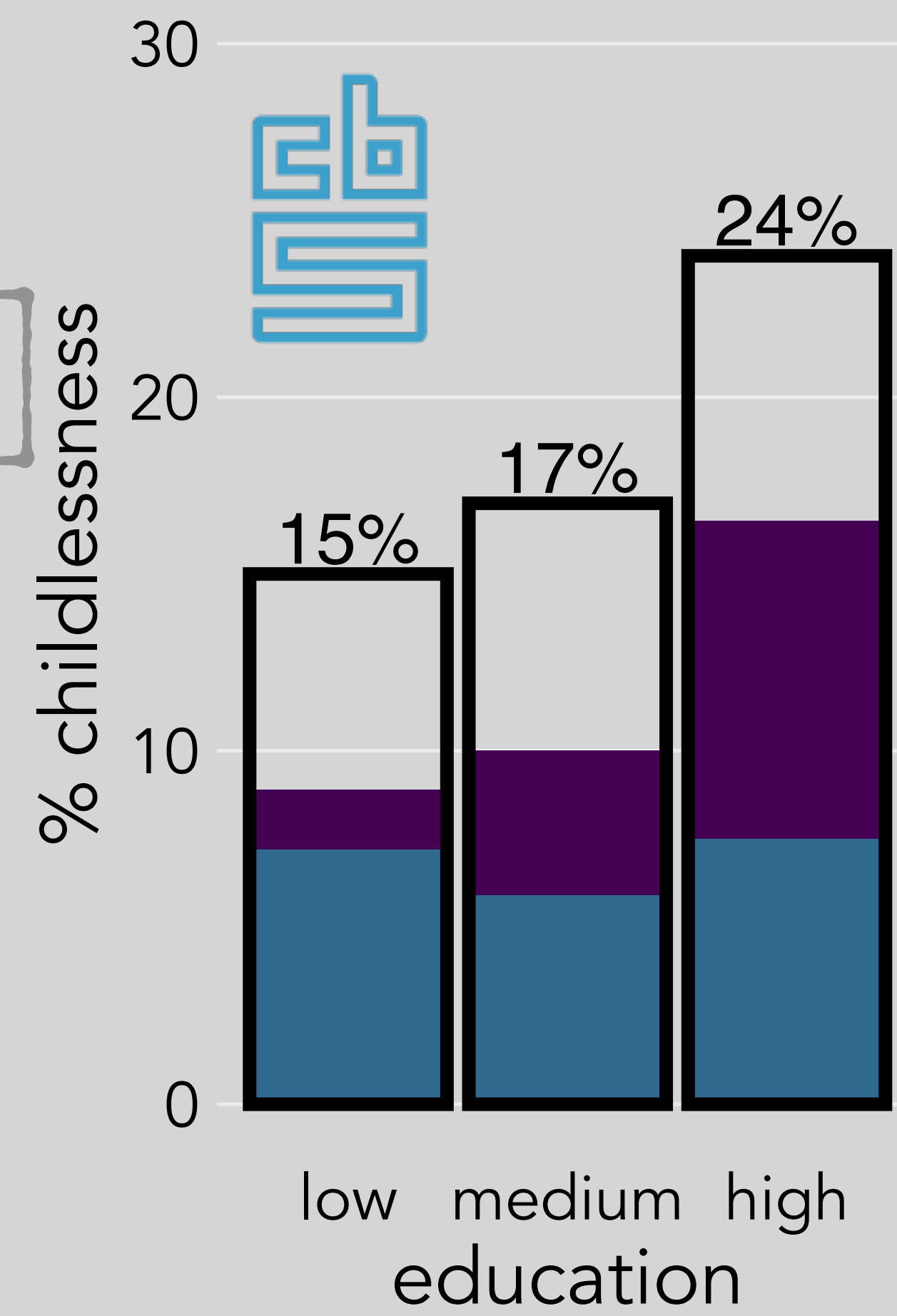
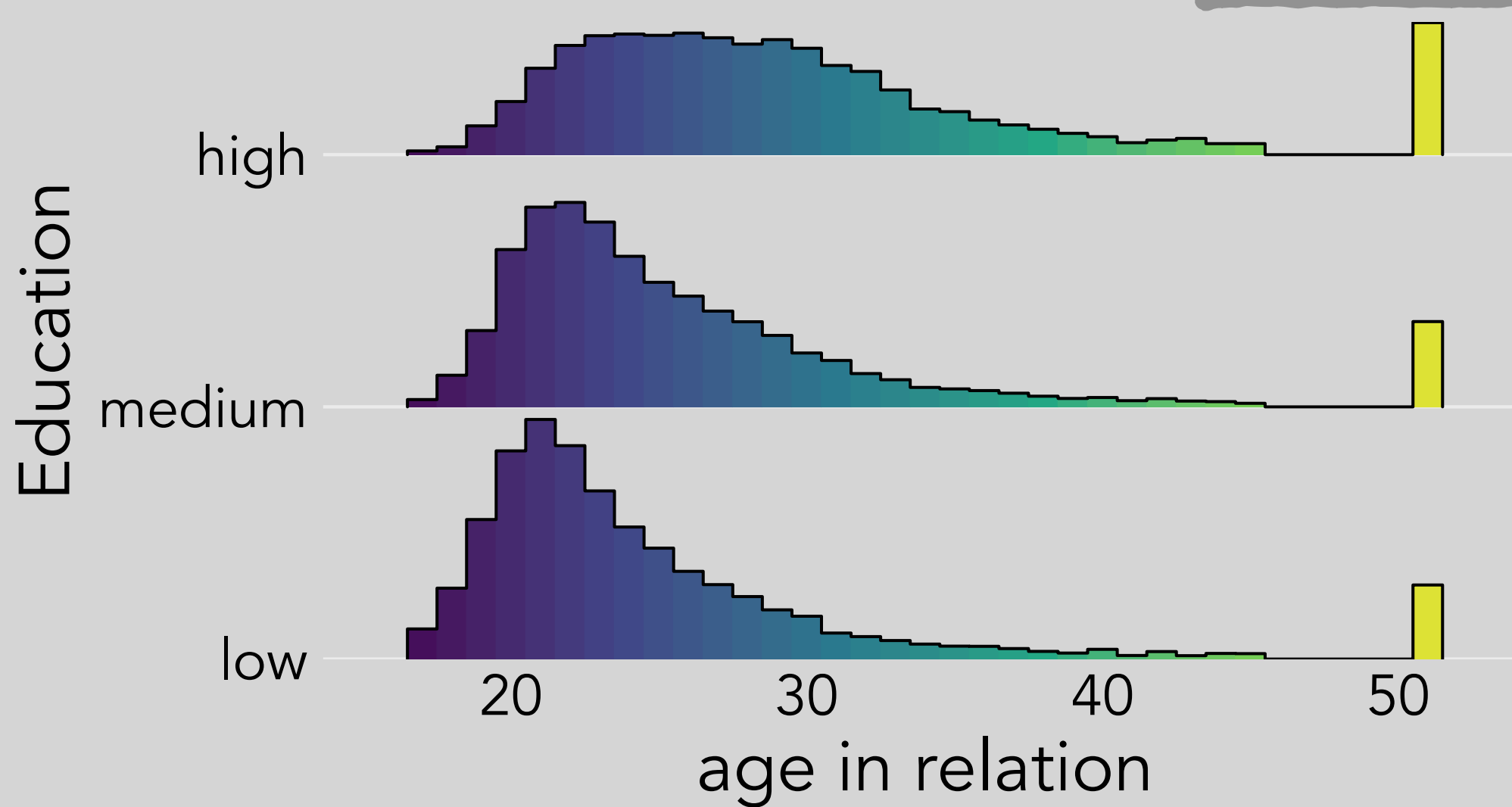
■ preferences

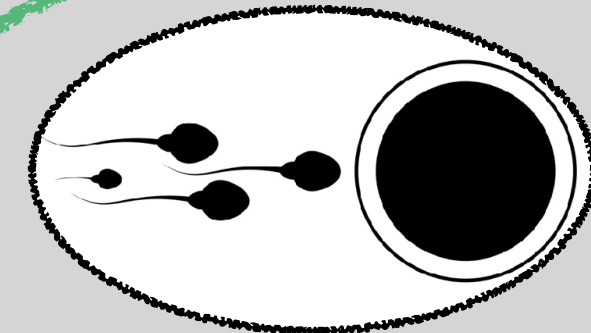
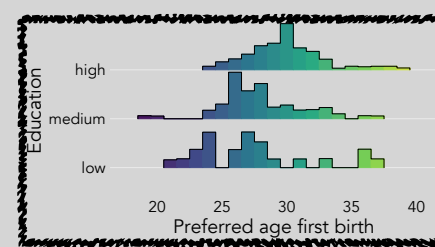
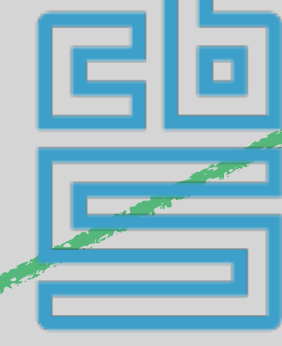
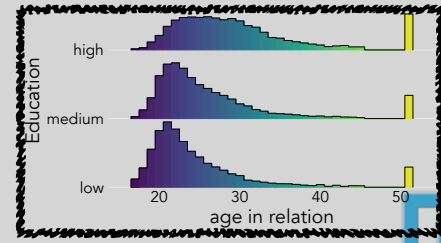
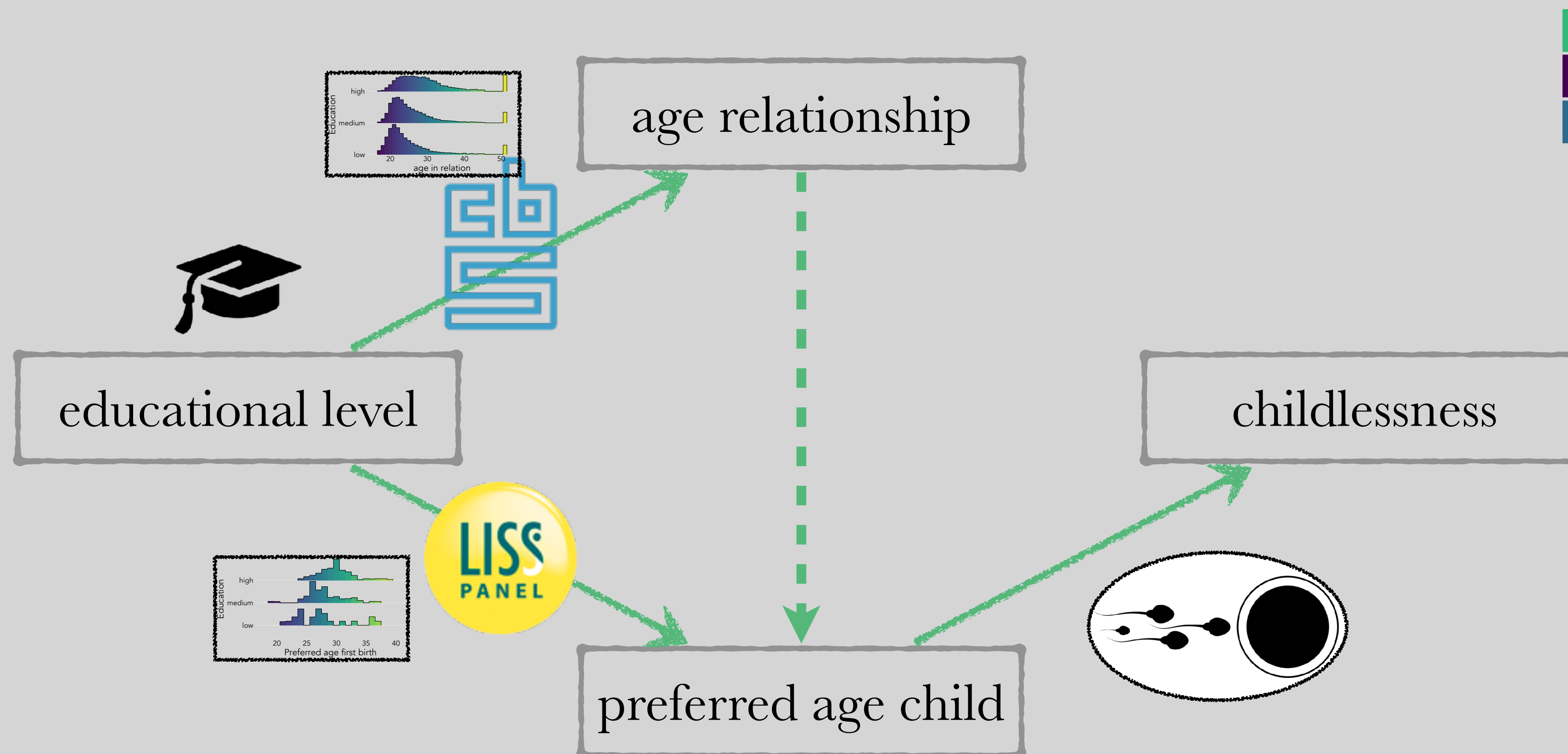




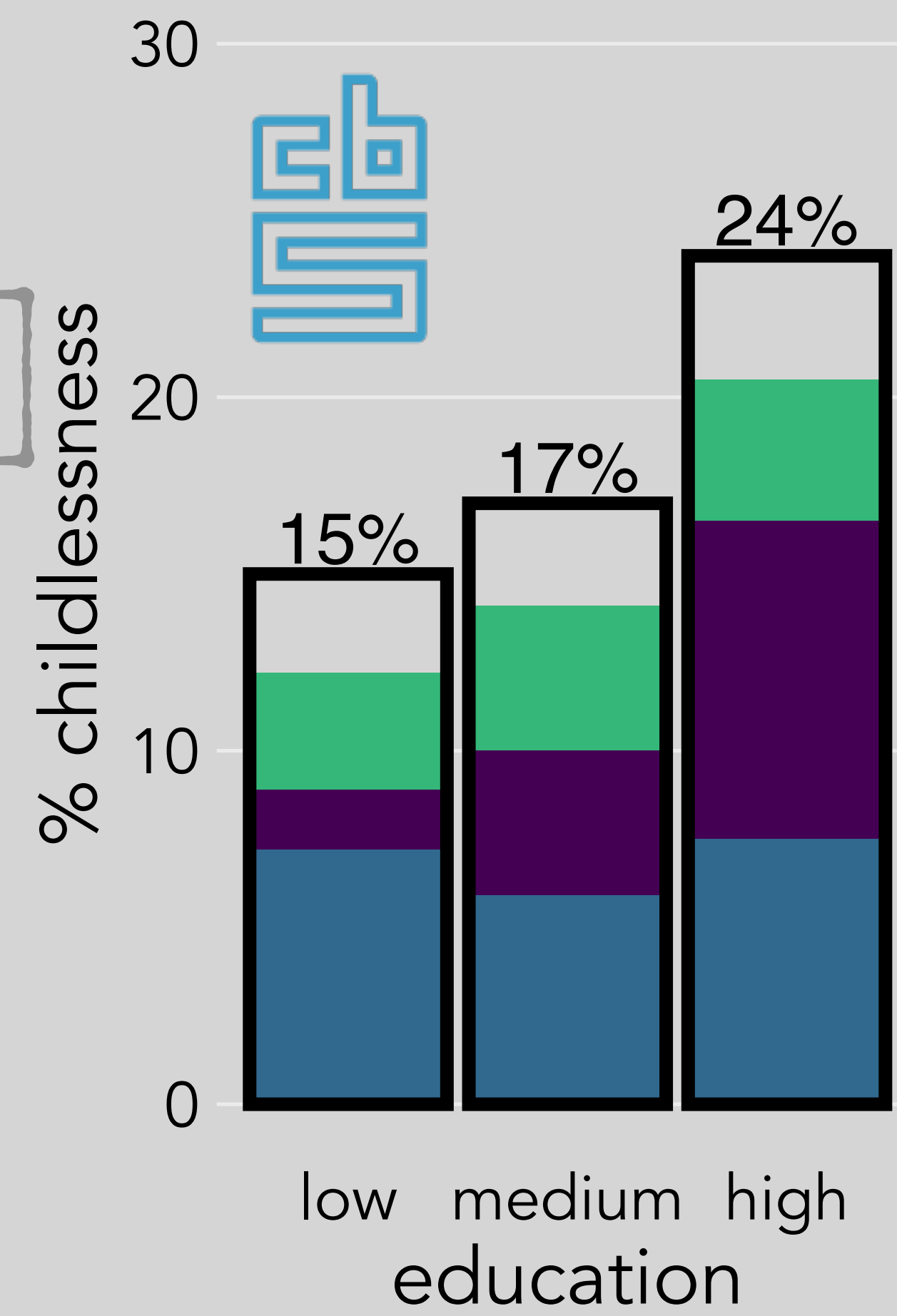


relation
preferences

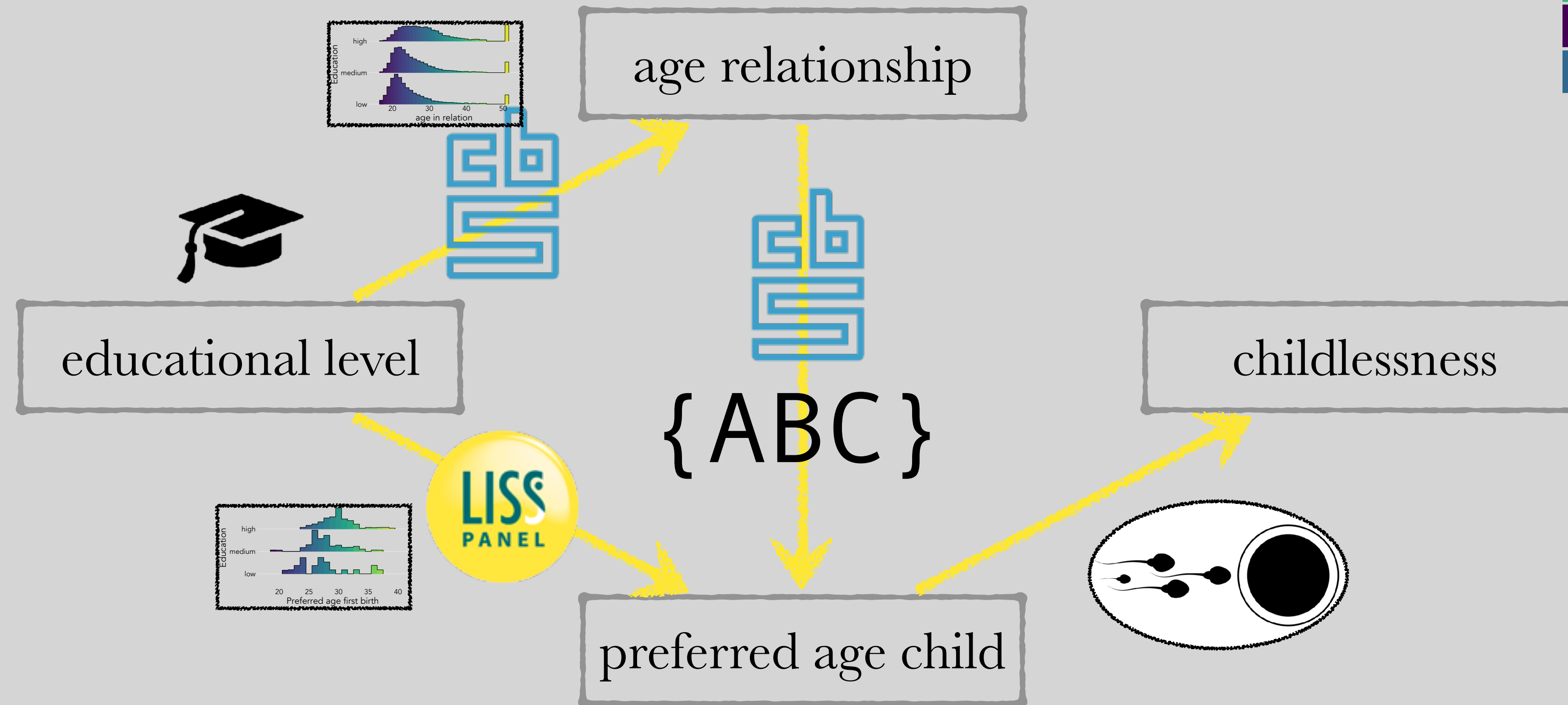




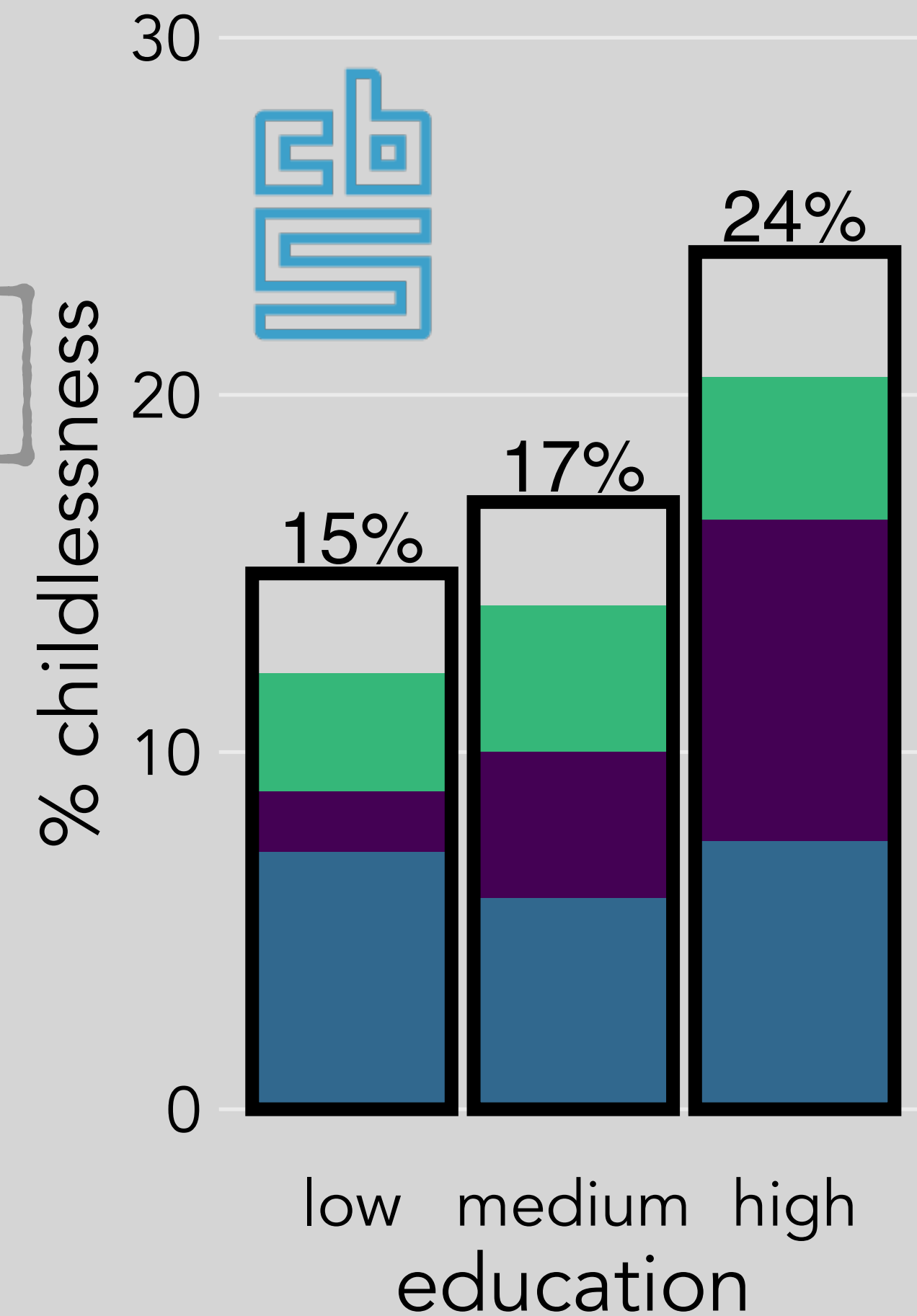
■ preferences + relation
■ relation
■ preferences



{ABC} Approximate Bayesian Computation

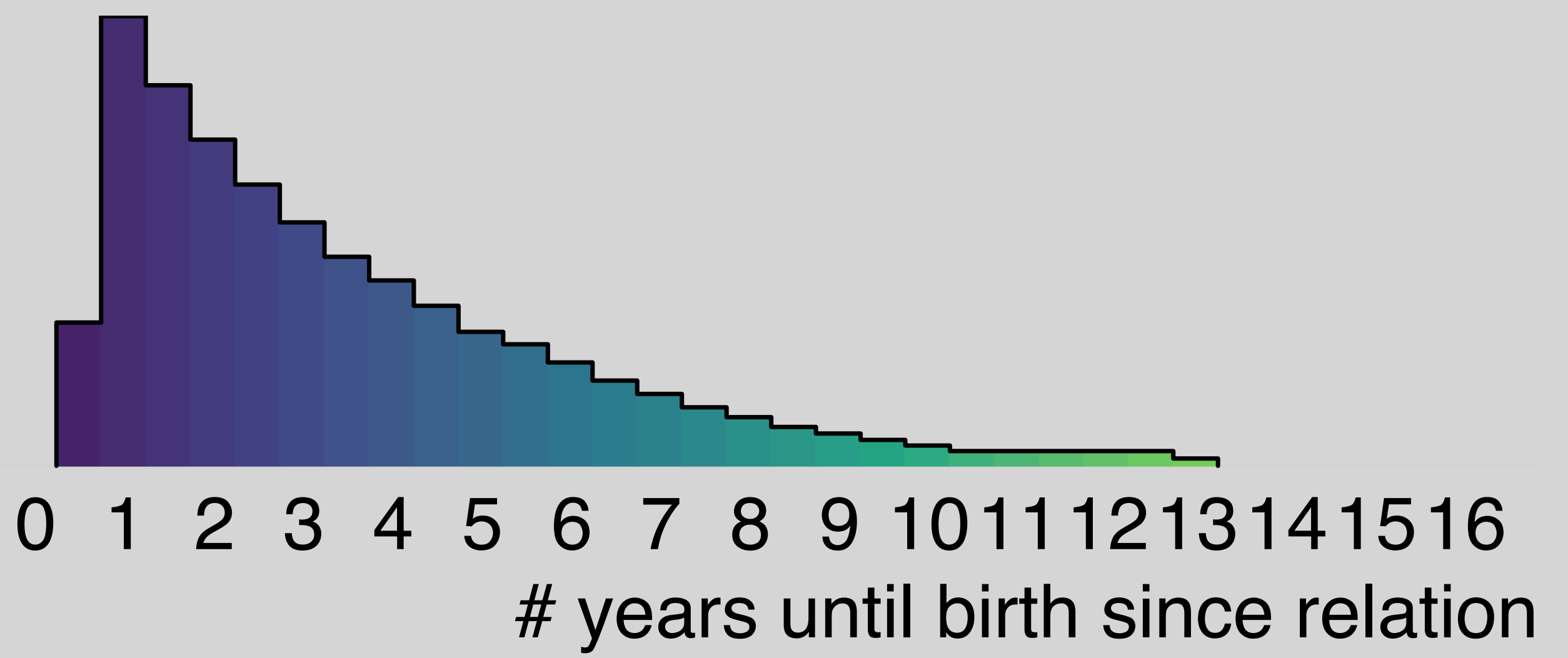
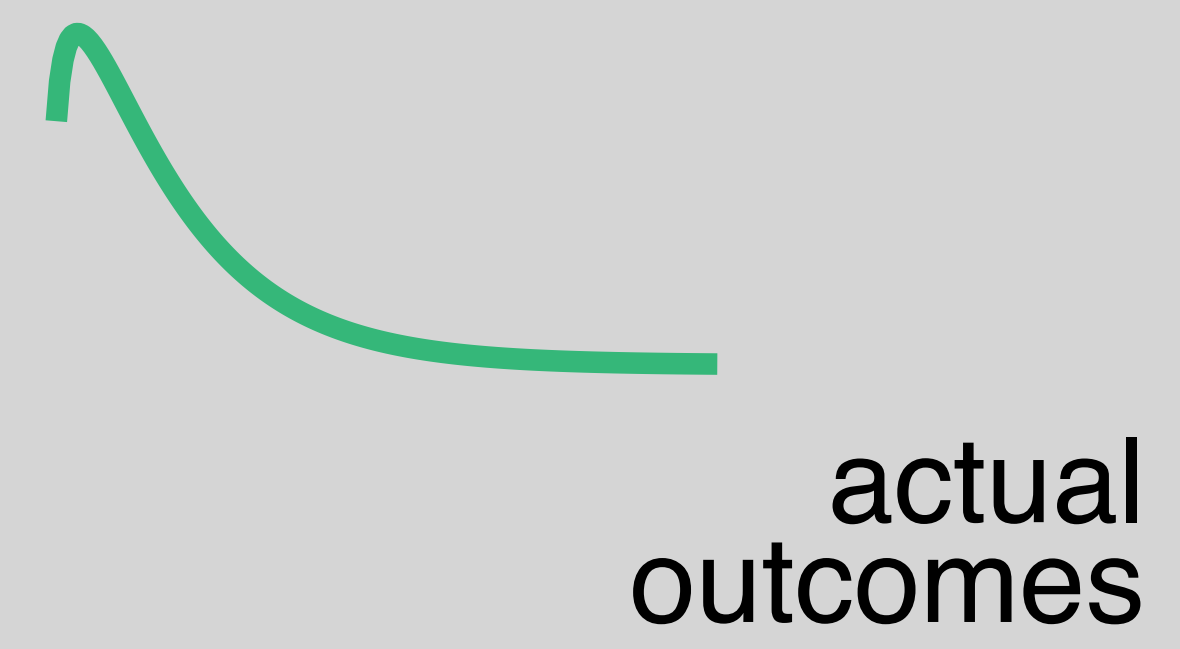


■ preferences + relation
■ relation
■ preferences



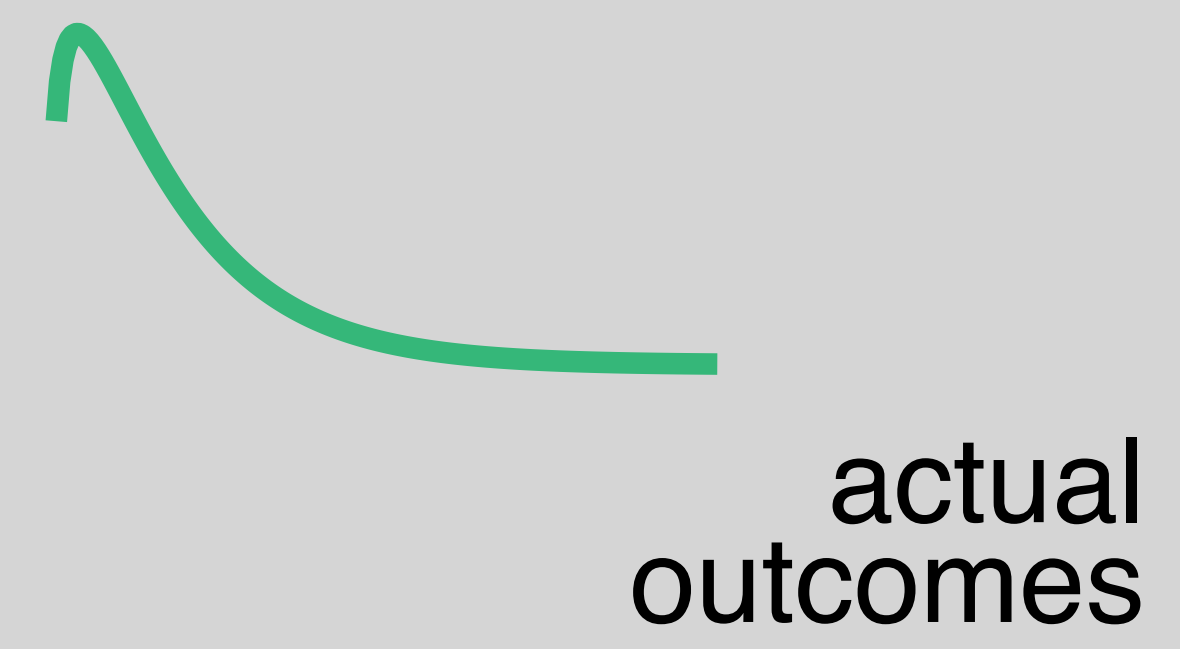
{ABC}

age in relation \propto



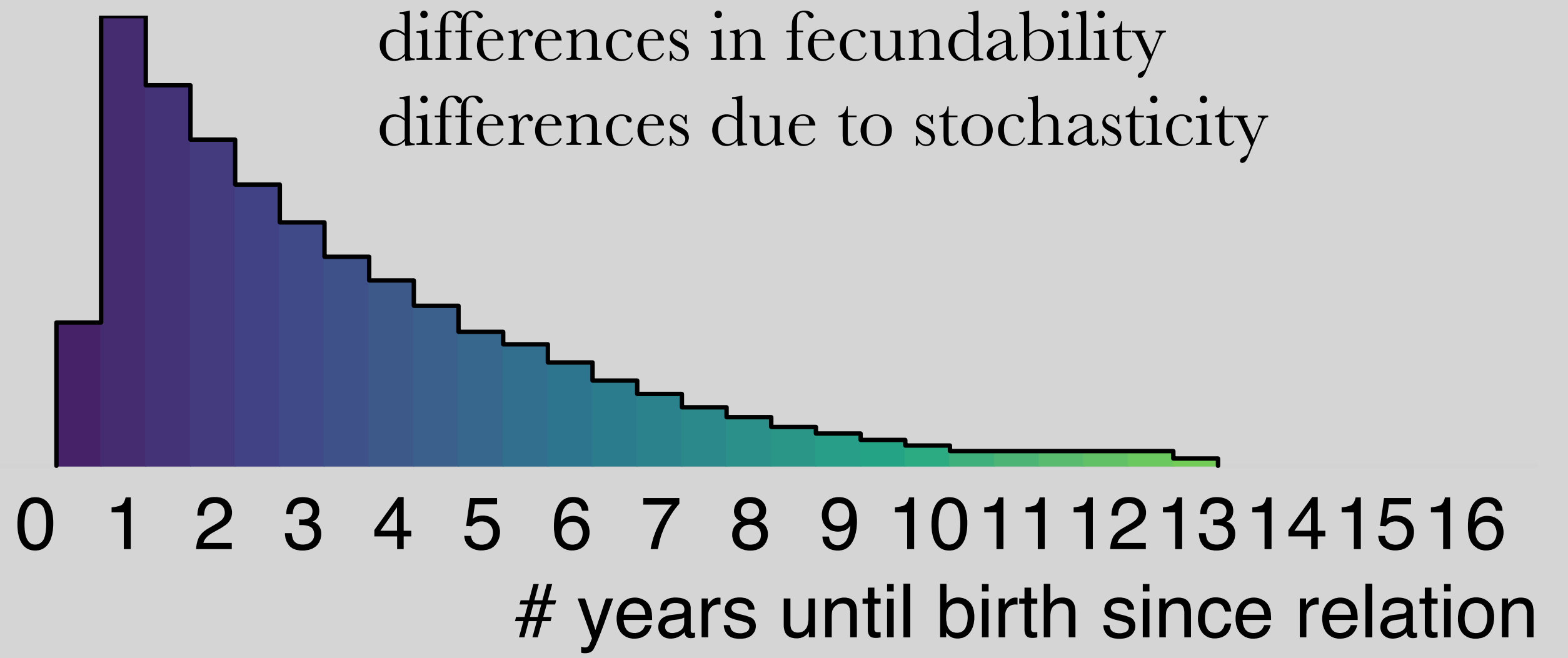
{ABC}

age in relation \propto



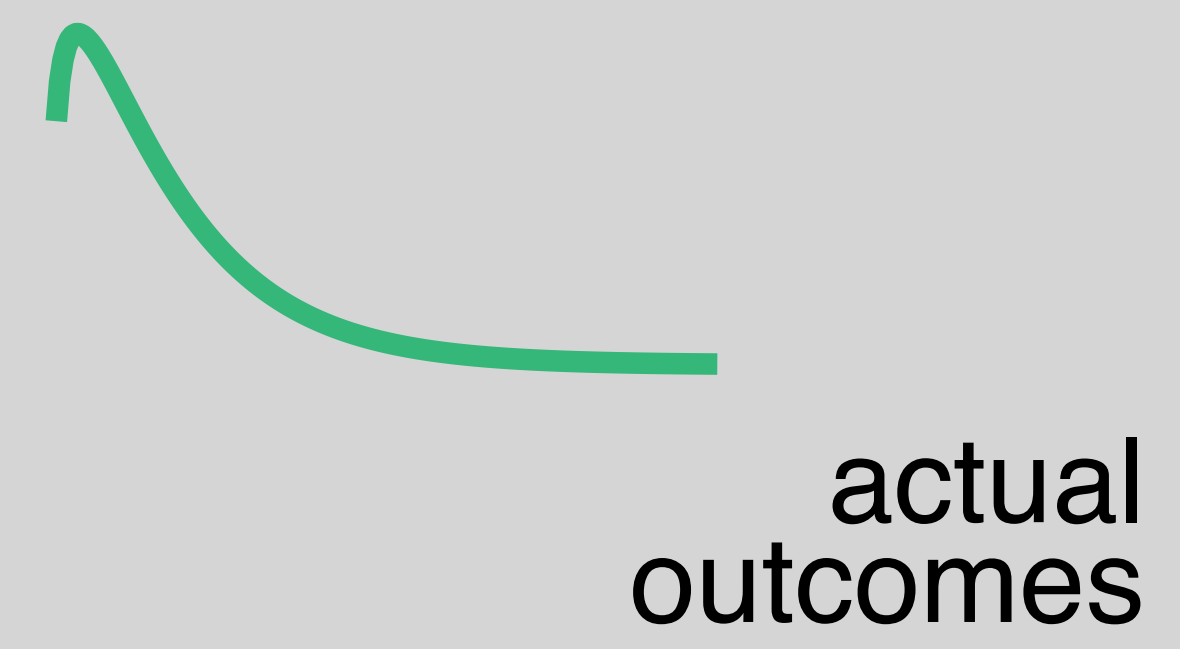
Variation due to:

- preferred waiting time child
- differences in fecundability
- differences due to stochasticity

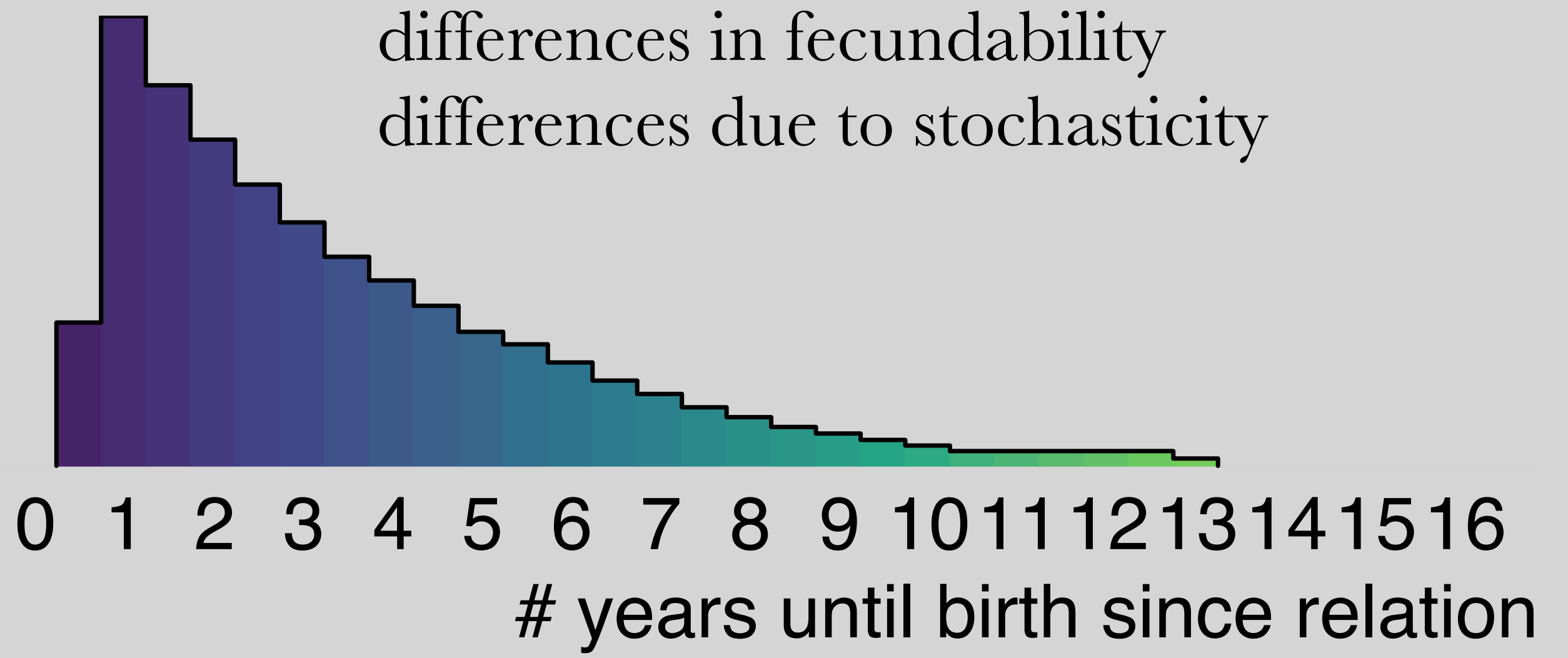


{ABC}

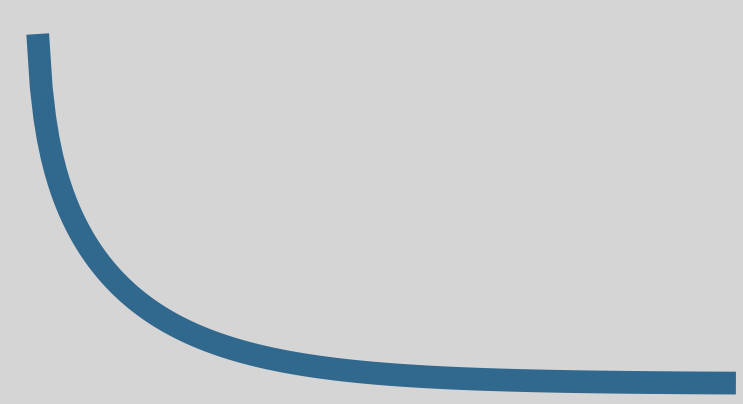
age in relation \propto



Variation due to:
preferred waiting time child
differences in fecundability
differences due to stochasticity



age in relation \propto
fecundability
stochasticity



{ABC}

Bayes

Posterior *Likelihood* x *Prior*

$$P(\theta | \text{data}) \propto P(\text{data} | \theta) \times P(\theta)$$

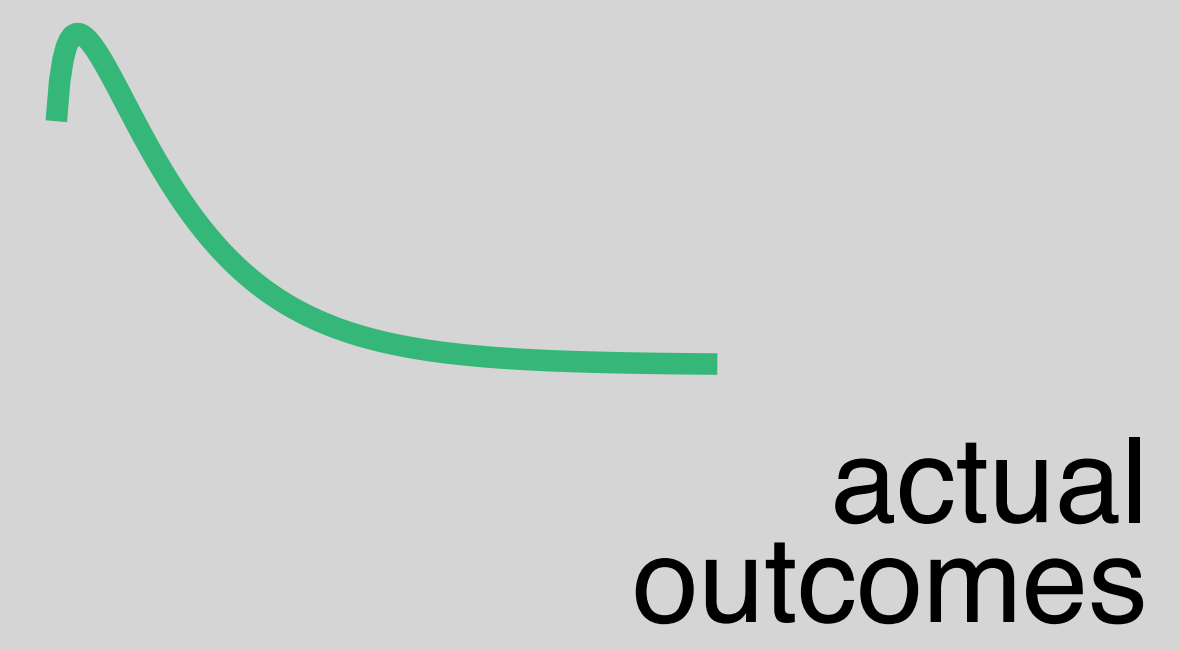
Approximate Bayes

$$\text{data} = 25$$

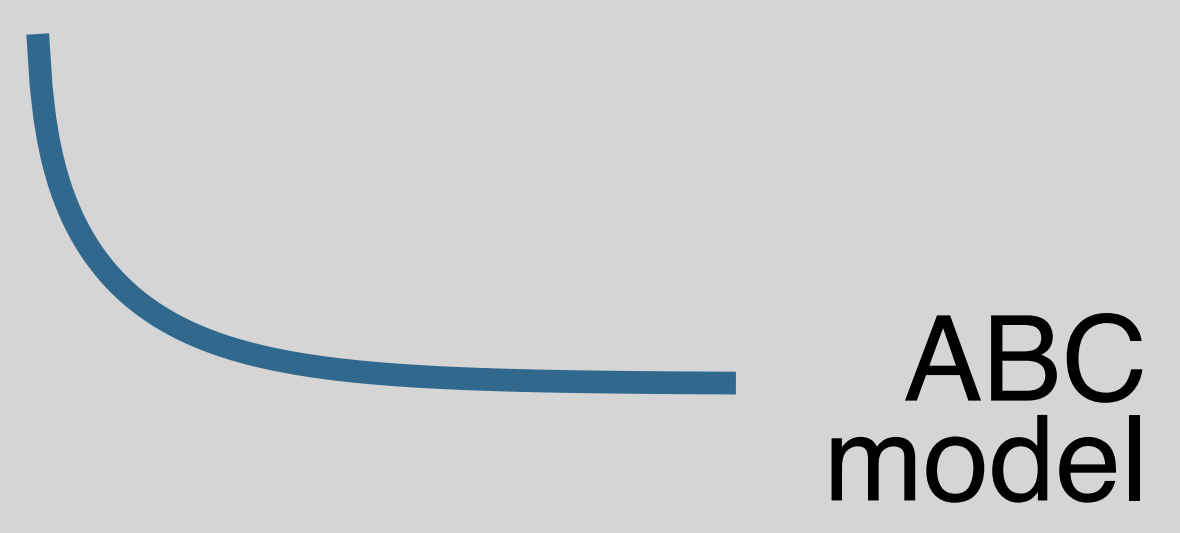
$$\textit{Posterior} \left\{ \begin{array}{l} \text{sim}(\theta_1) = 15 \\ \text{sim}(\theta_2) = 25 \\ \text{sim}(\theta_3) = 30 \\ \text{sim}(\theta_4) = 20 \\ \text{sim}(\theta_5) = 24.9 \end{array} \right.$$

{ABC}

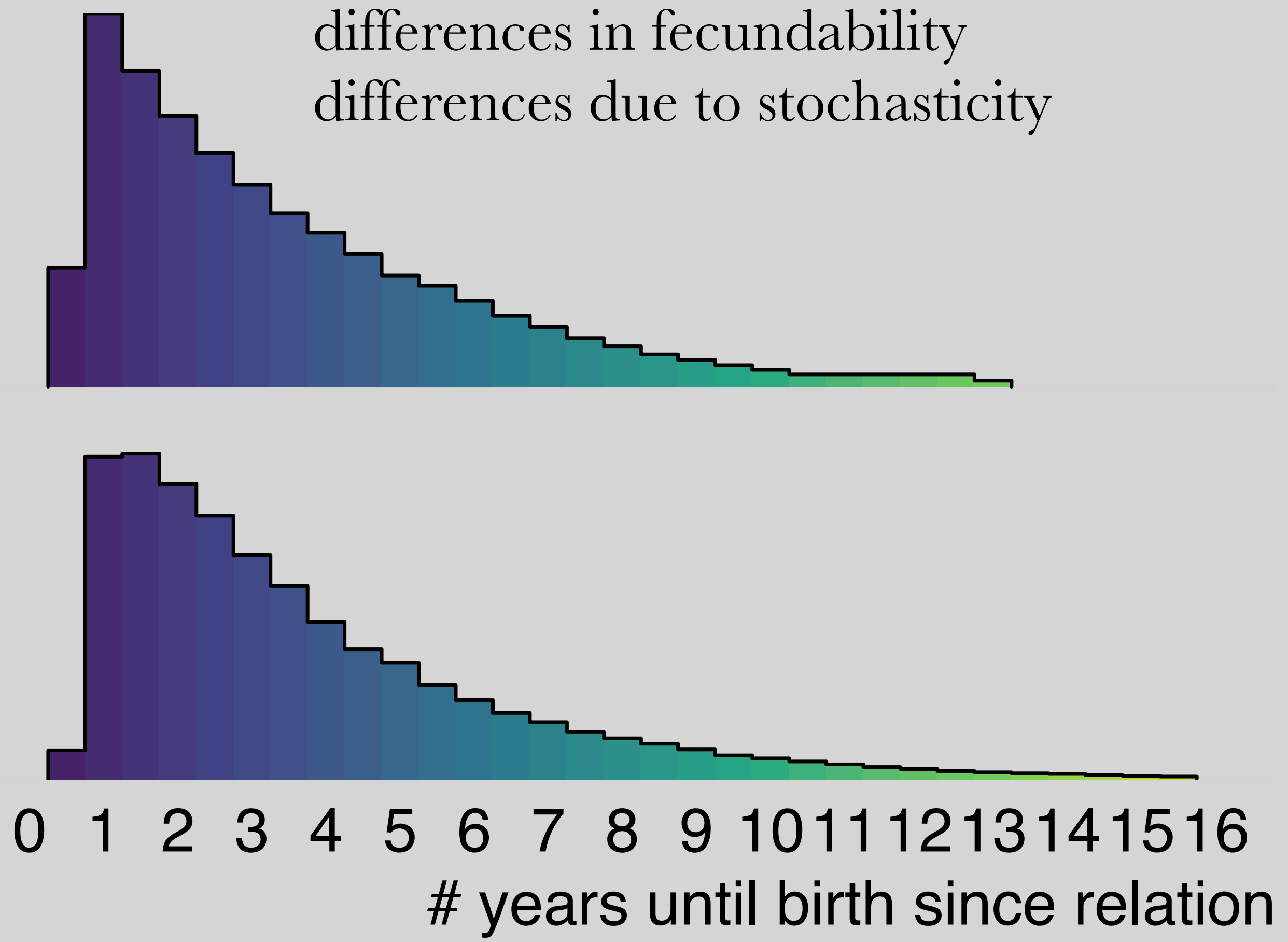
age in relation \propto



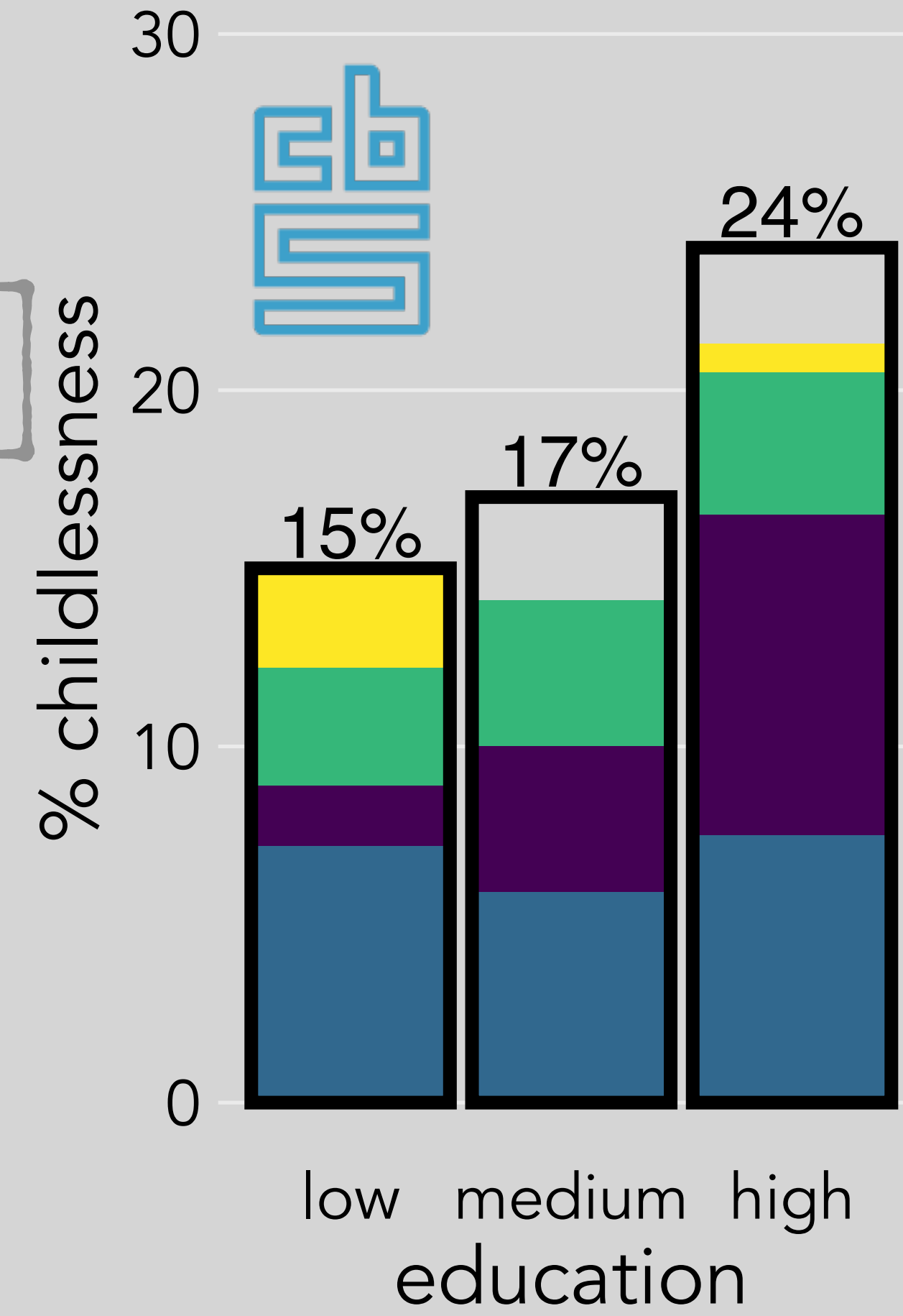
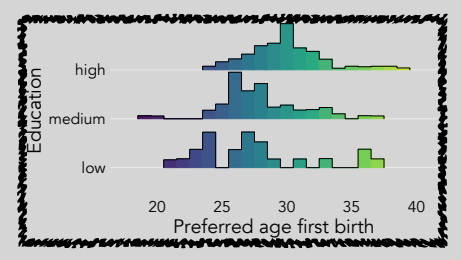
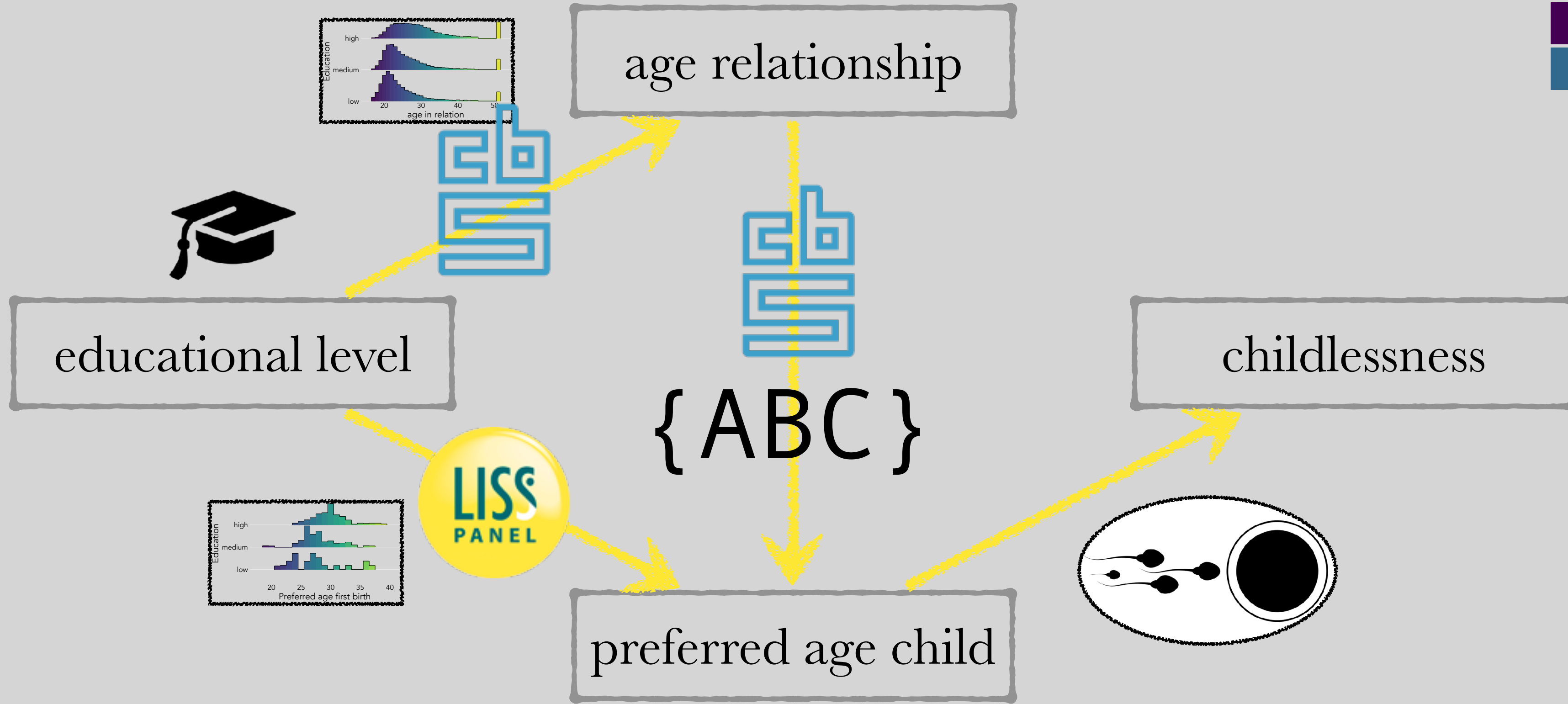
age in relation
fecundability \propto
stochasticity



Variation due to:
preferred waiting time child
differences in fecundability
differences due to stochasticity



- preferences + relation ABC
- preferences + relation
- relation
- preferences



{ABC}
 Approximate
 Bayesian
 Computation

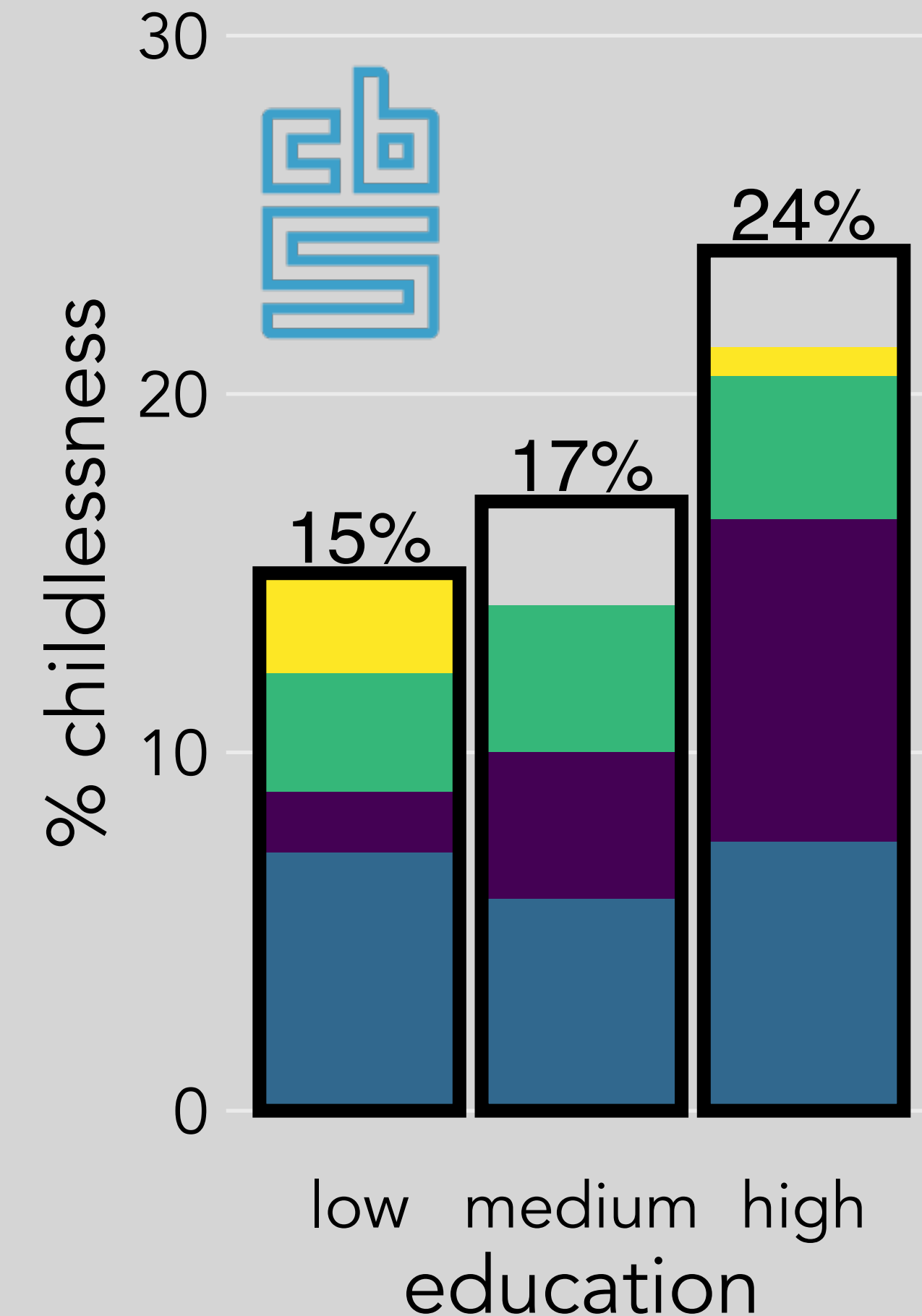
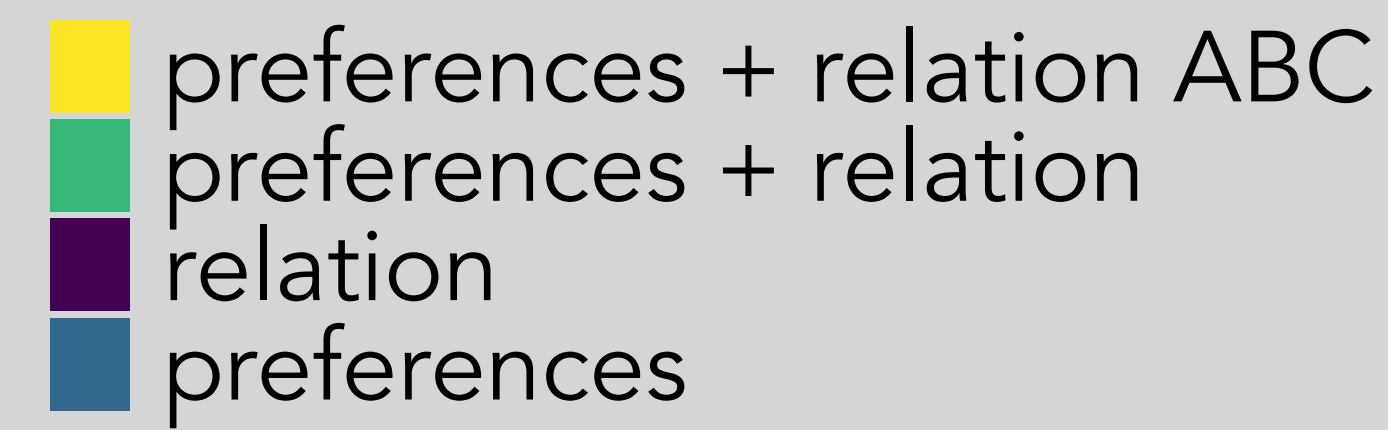
Where Did We Go Wrong?

Assumptions

1. No break-ups
2. All births are preferred
3. Preferences do not determine relationship
4. Preferences do not determine education
5. Preferences do not change
6. Education is not related to 'biology'
7. Preferences are measured well

Improvements

1. Make waiting time dependent on age and education
2. Better measures of age in relationship



If you're not
cheating, you're
not trying.

Eddie Guerrero

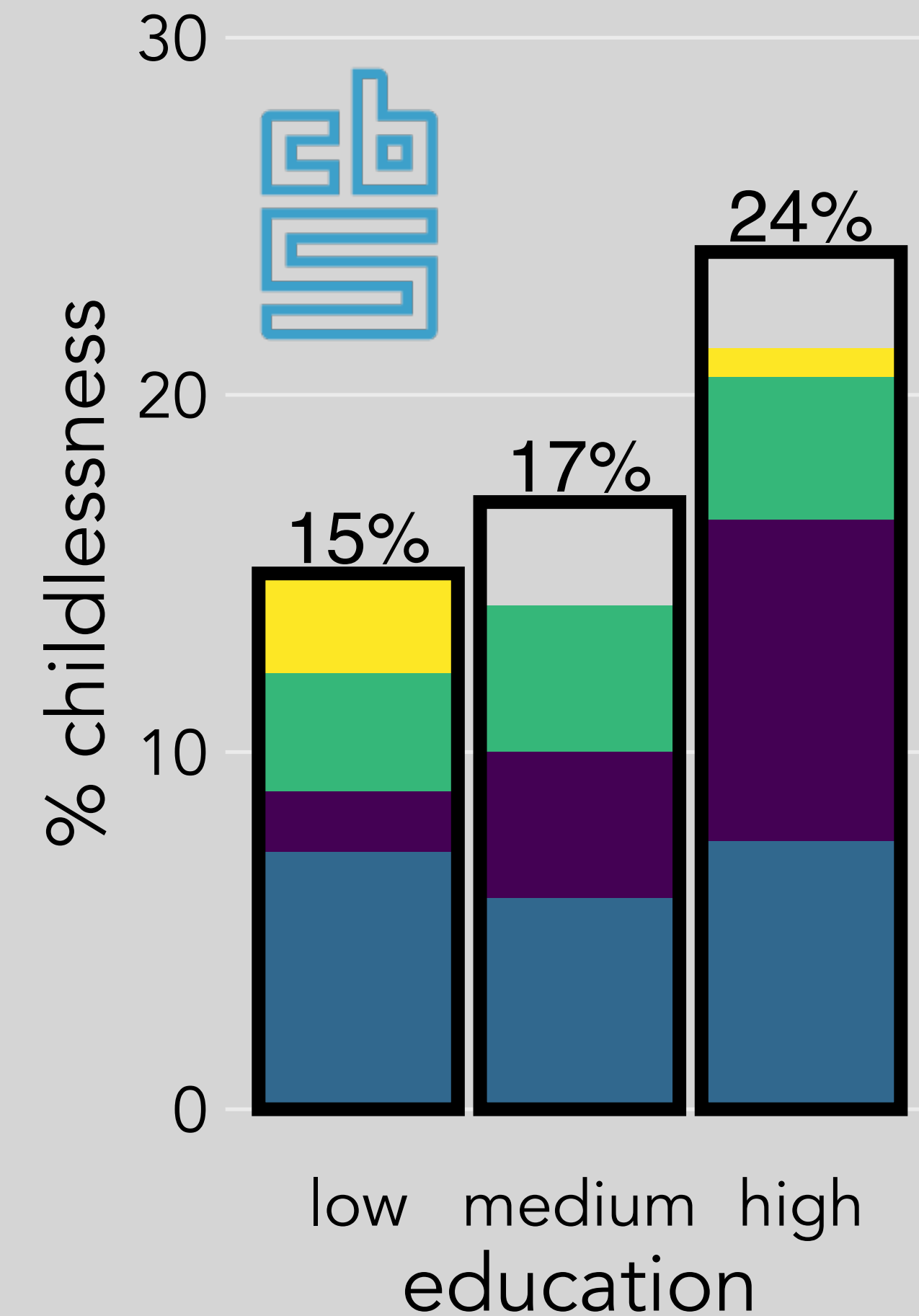
BrainyQuote®

BrainyQuote®

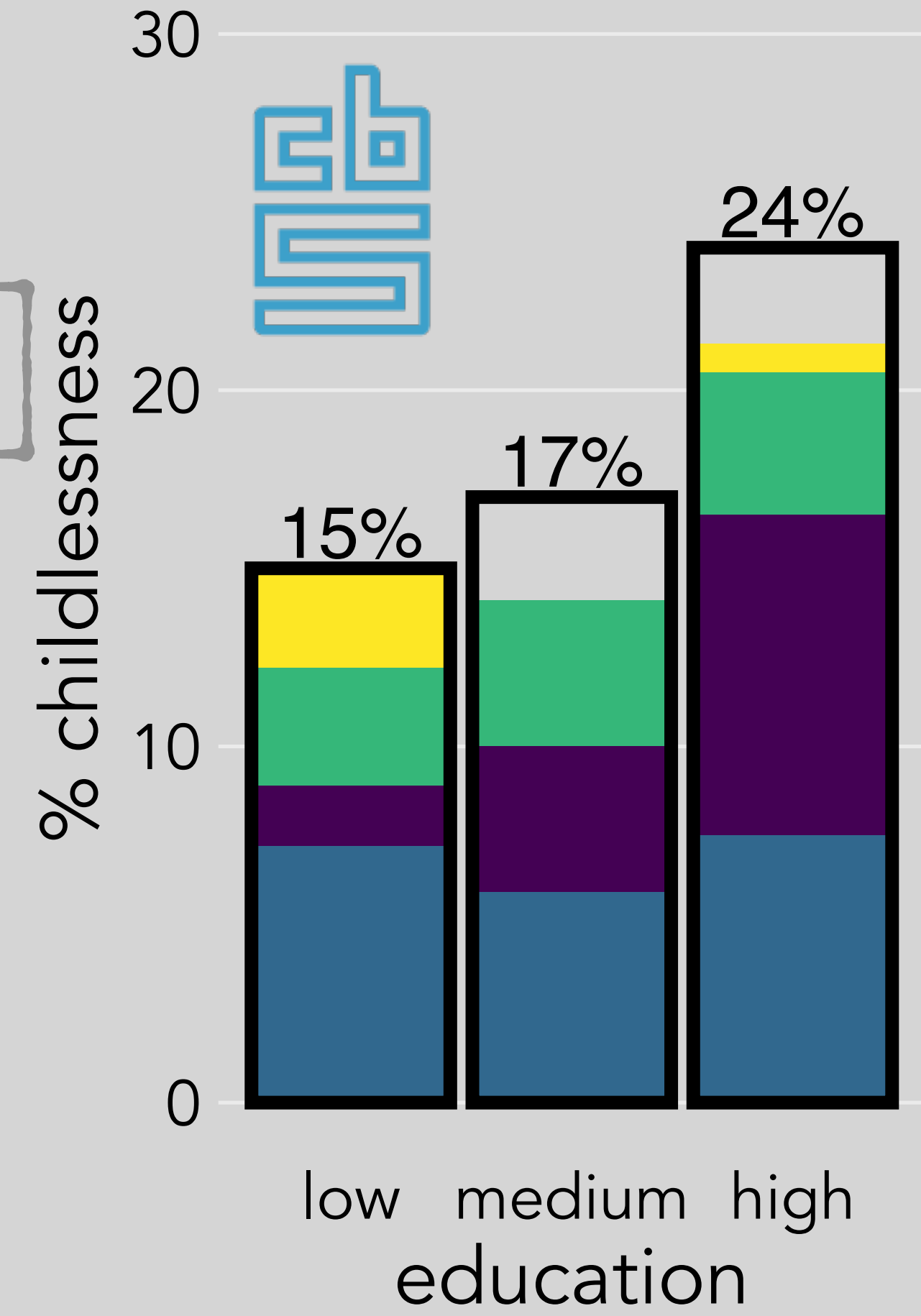
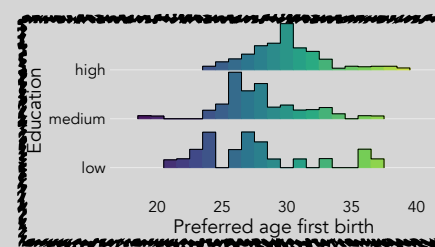
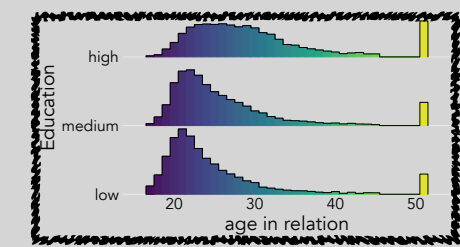
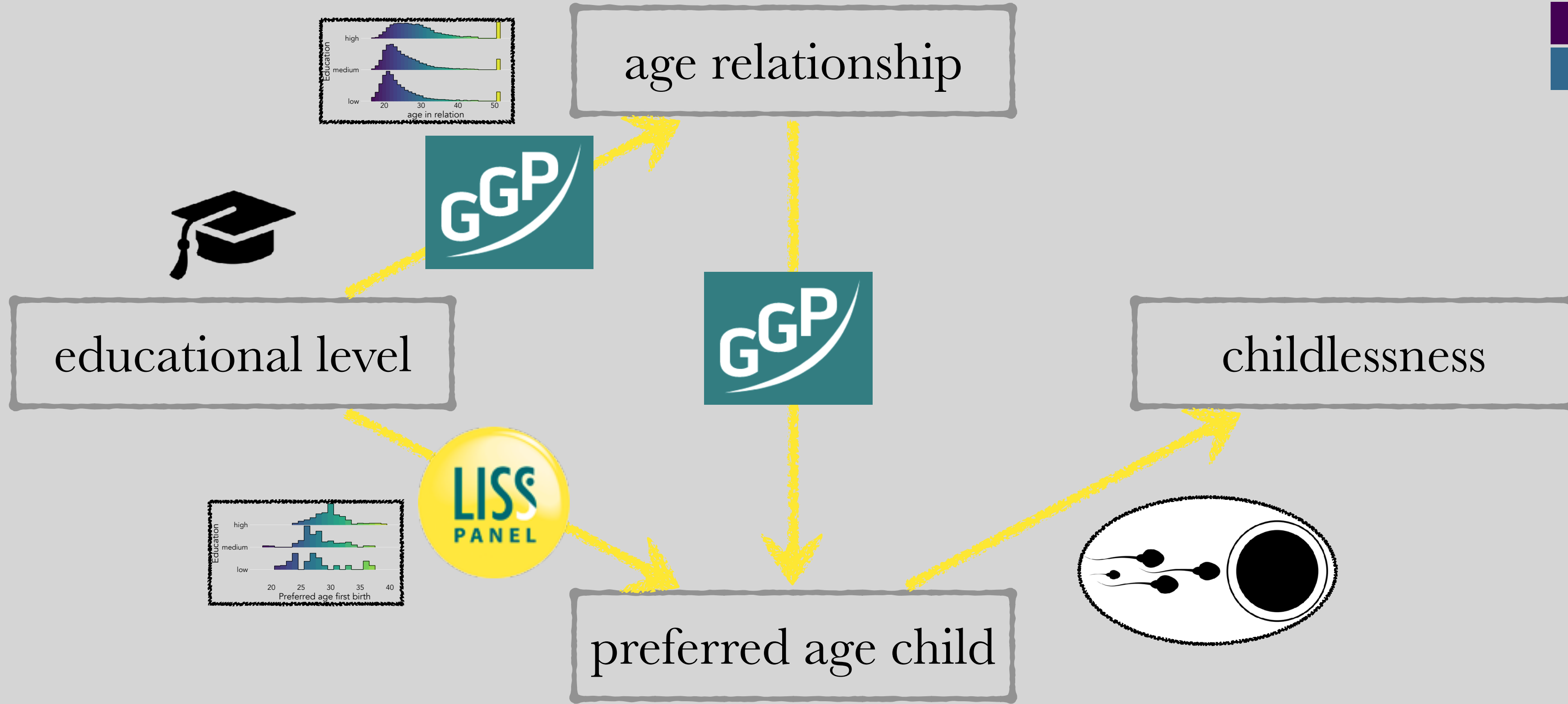
people not in (formal) relationship **who ended up having children,**
were randomly assigned an age of relationship

excluded the **“unknown”** education group

preferences + relation ABC
preferences + relation
relation
preferences



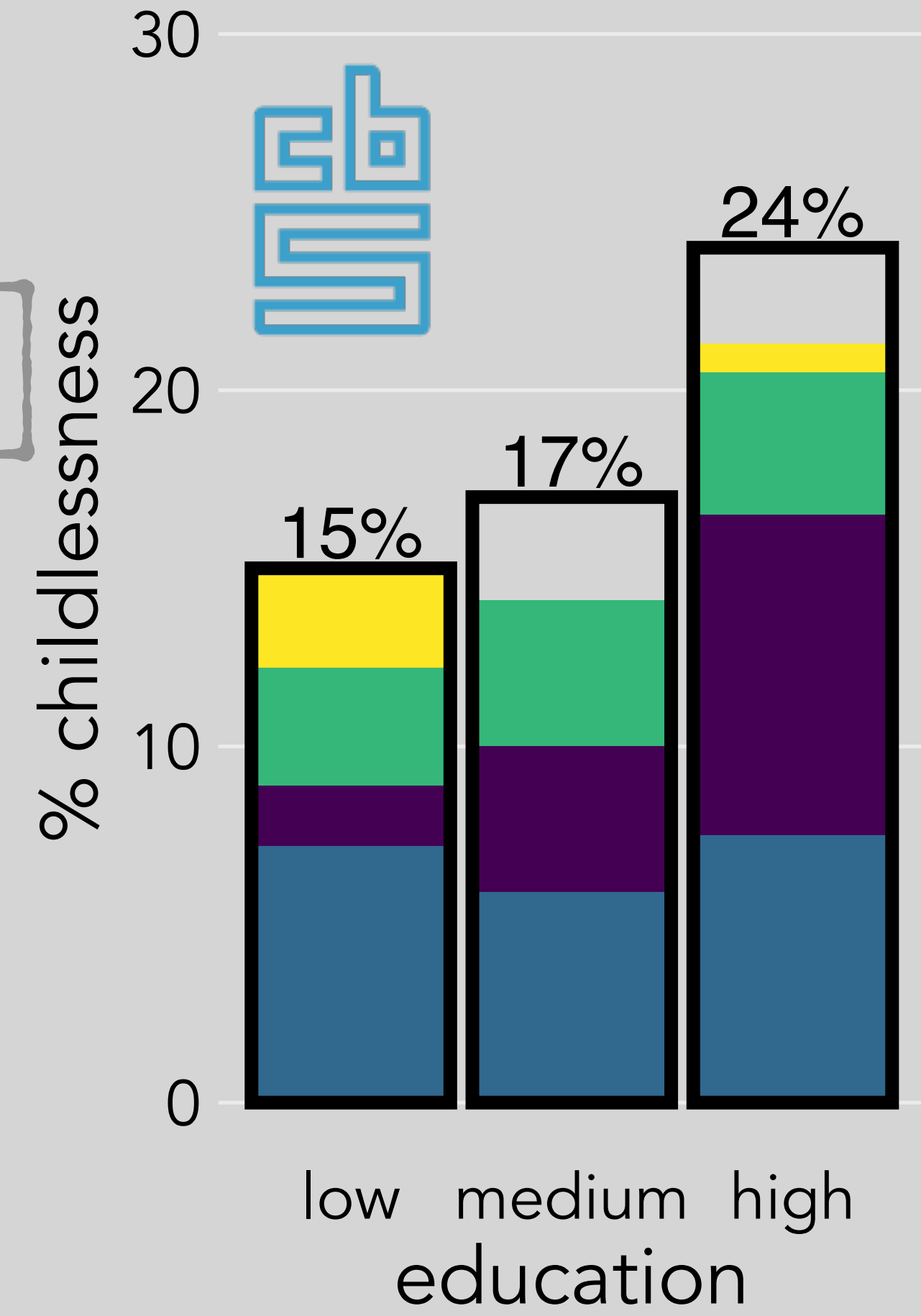
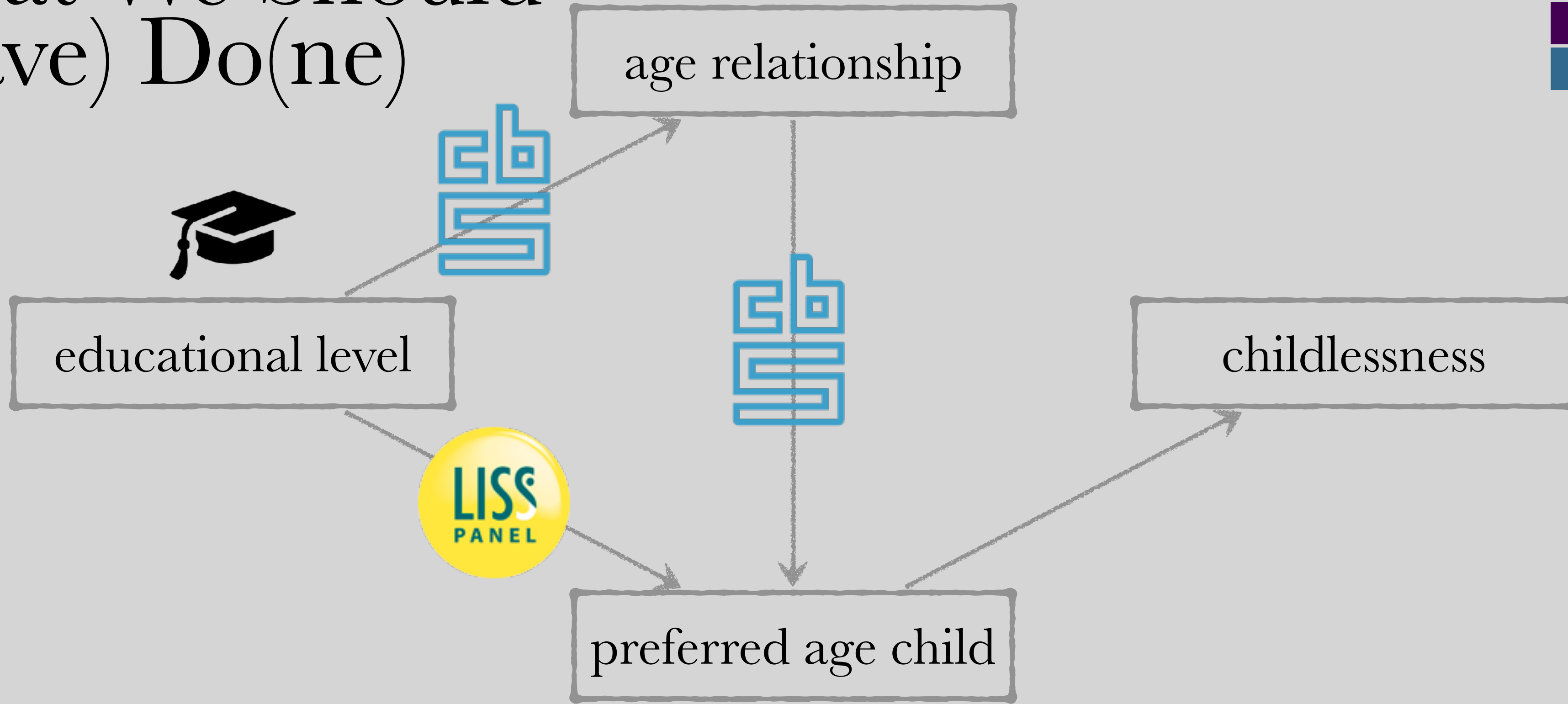
- preferences + relation ABC
- preferences + relation
- relation
- preferences



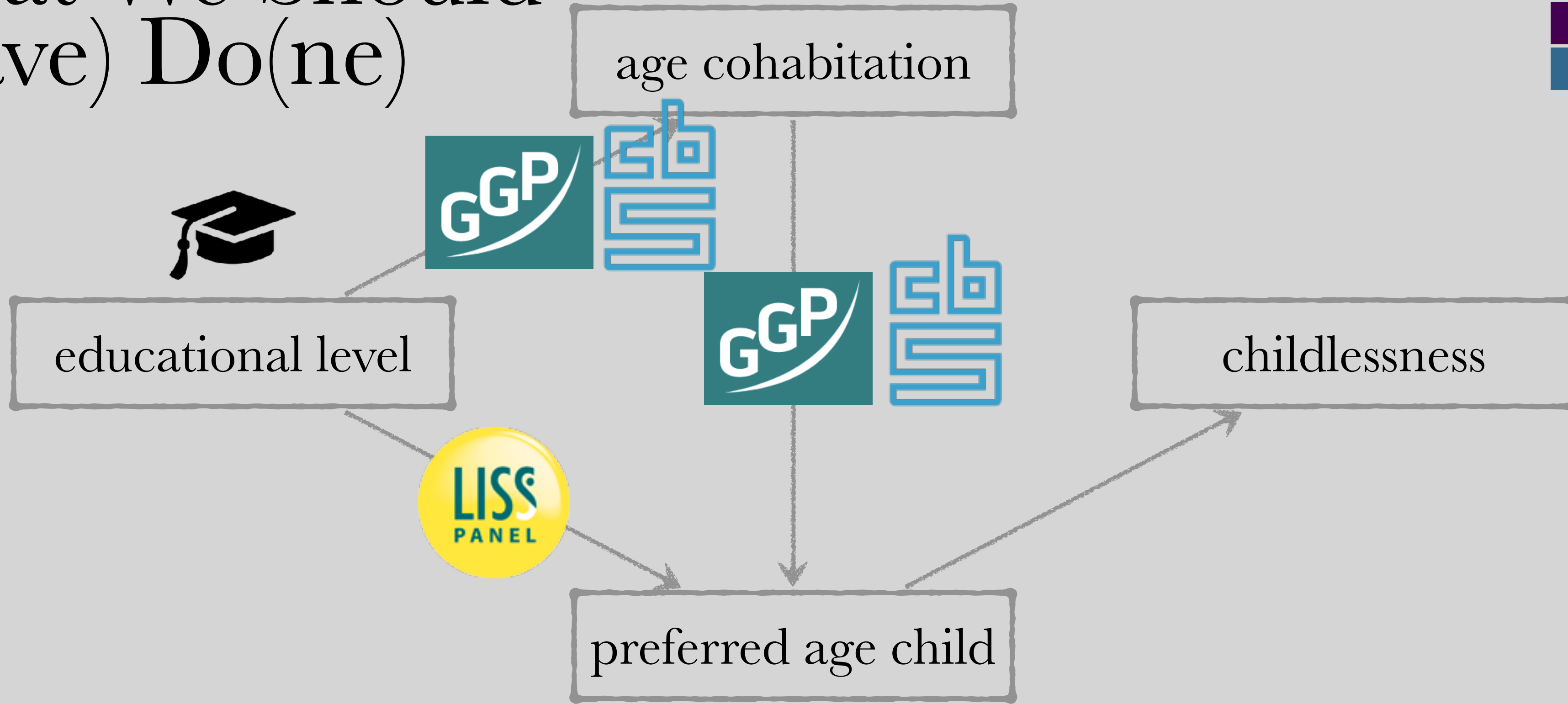
16 june 2022
 Dag van Sociologie

What We Should (Have) Do(ne)

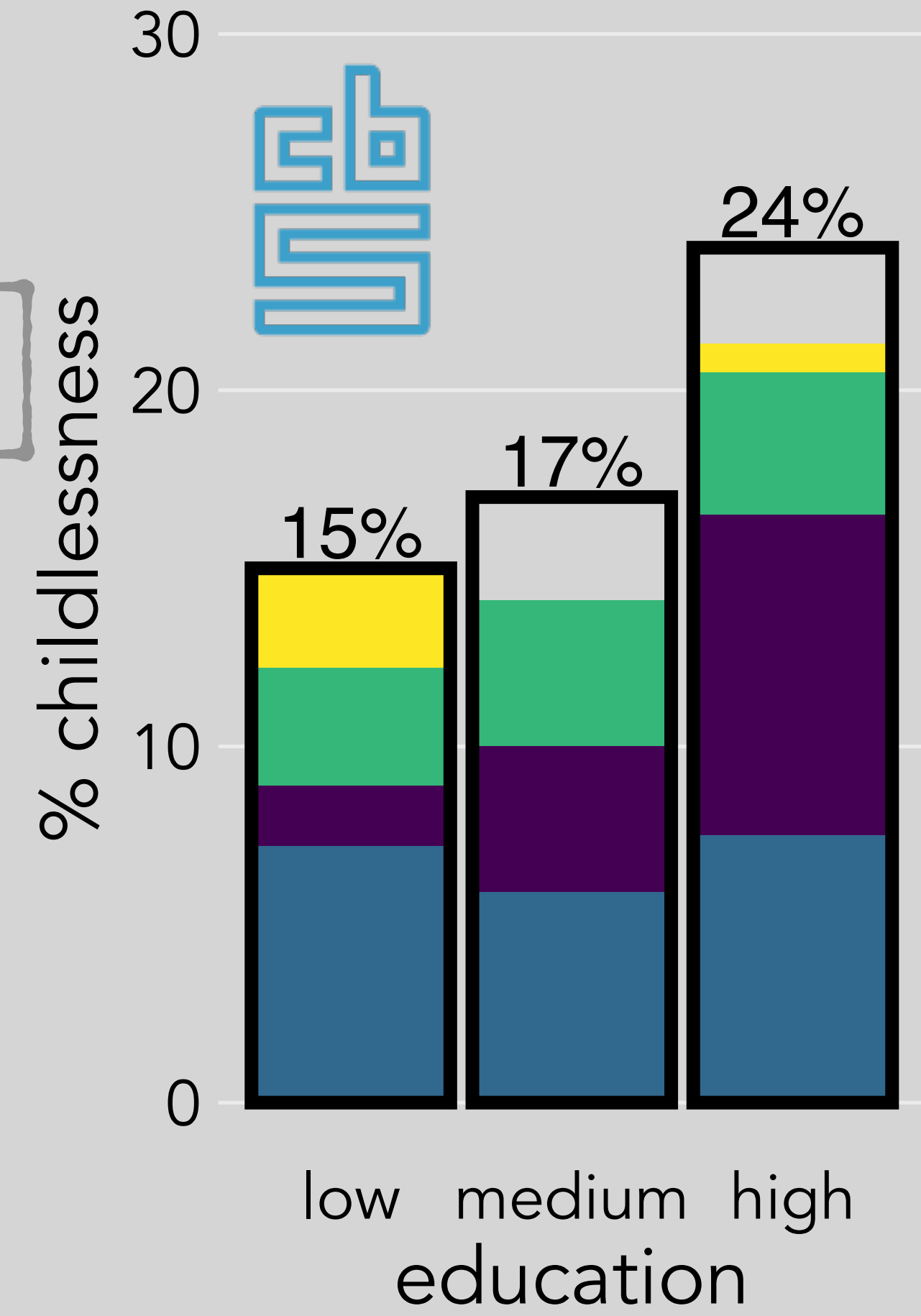
- preferences + relation ABC
- preferences + relation
- relation
- preferences



What We Should (Have) Do(ne)



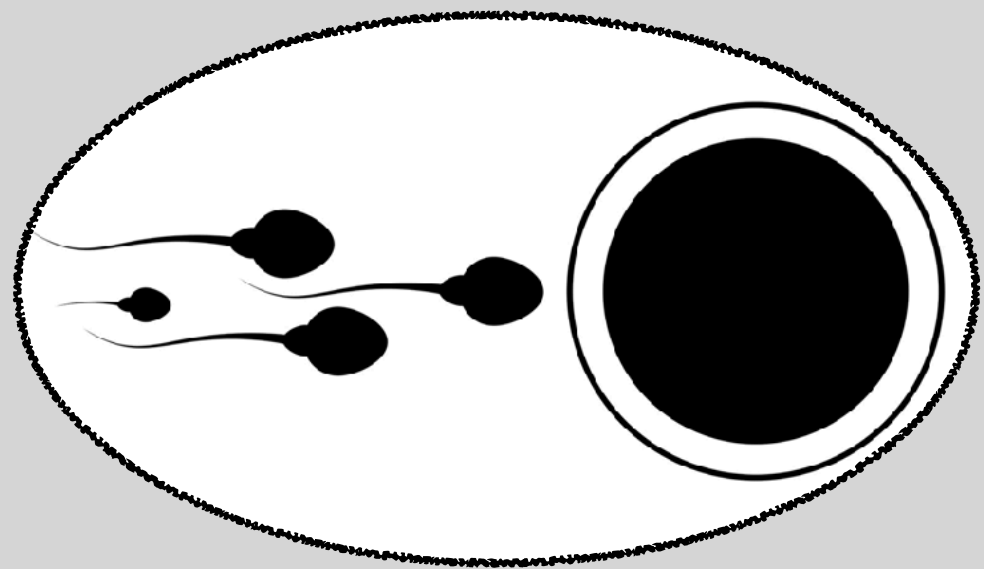
- preferences + relation ABC
- preferences + relation
- relation
- preferences



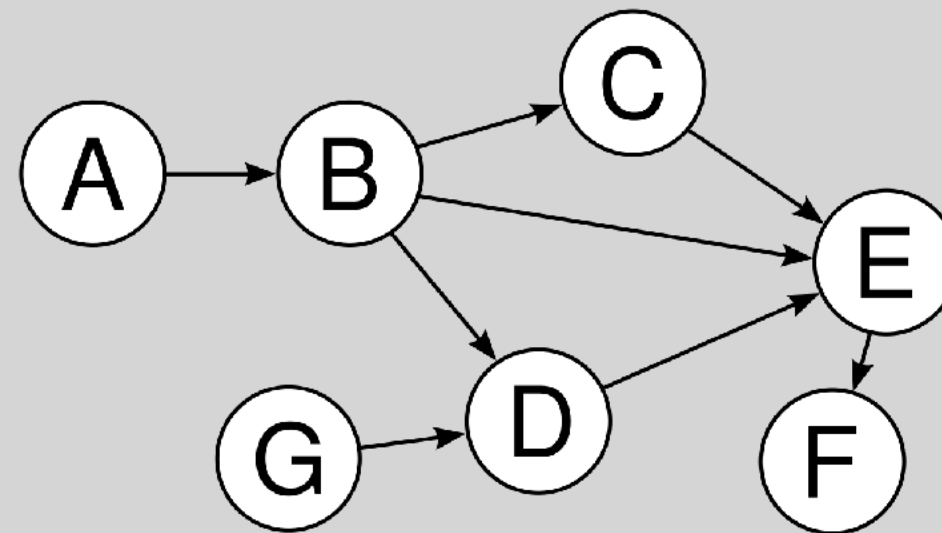
Take-Home Messages

microsimulation
can advance
sociological research

microsimulation can:



include
biological
information




test (causal)
mechanisms

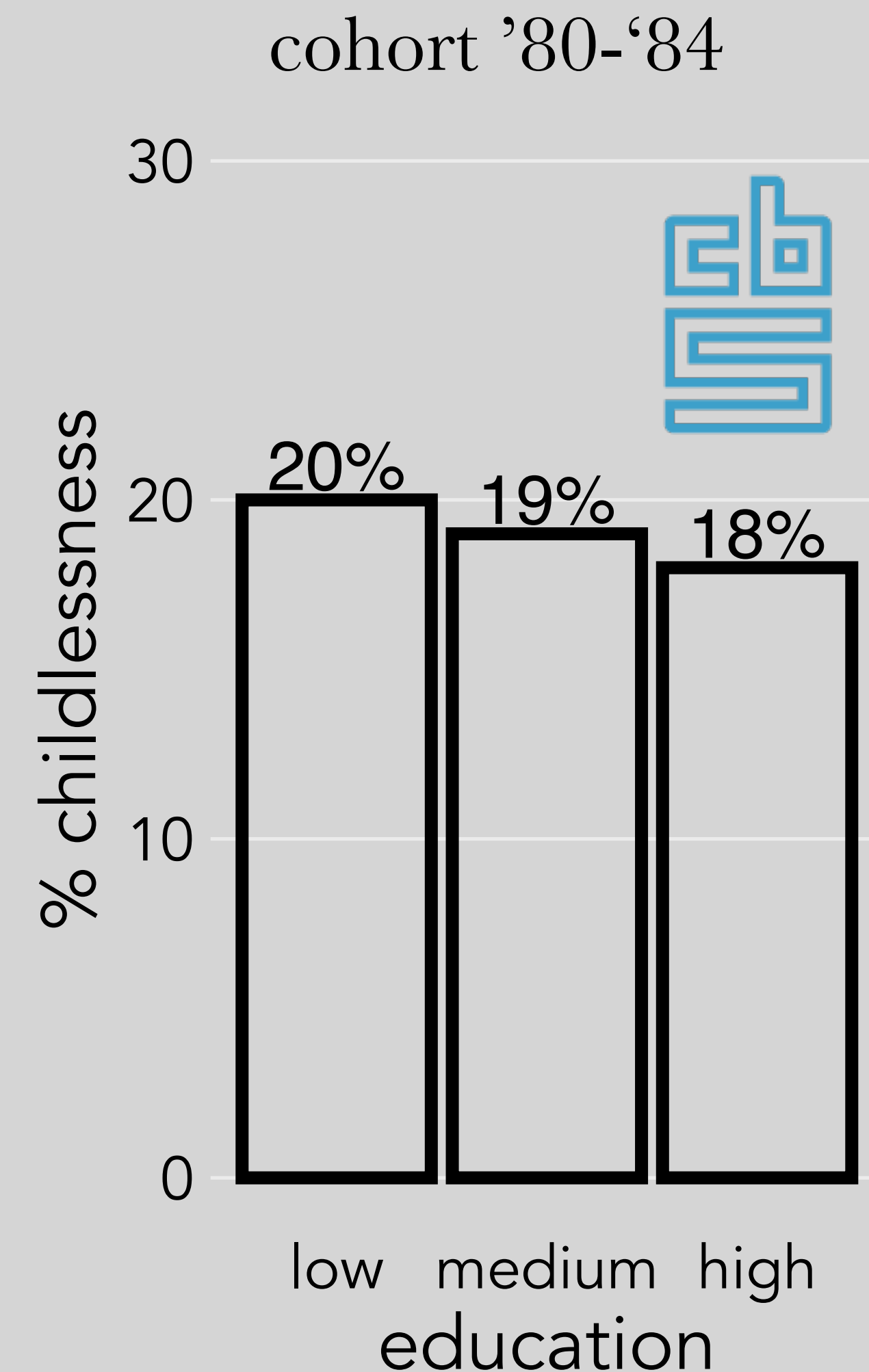
{ ABC }

estimate unknown
parameters



Education, Gender, and Cohort Fertility in the Nordic Countries

Marika Jalovaara¹  · Gerda Neyer² · Gunnar Andersson² · Johan Dahlberg² · Lars Dommermuth³ · Peter Fallesen^{2,4} · Trude Lappegård⁵



“ In Denmark, Norway and Sweden, childlessness is now highest among the least educated women



Variation due to Stochasticity (sd = 13 months)

Unpredictable Variation!

