



Socio-structural processes underlying the production of health inequalities over the life course: Theoretical tools and empirical evidence

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Health inequalities

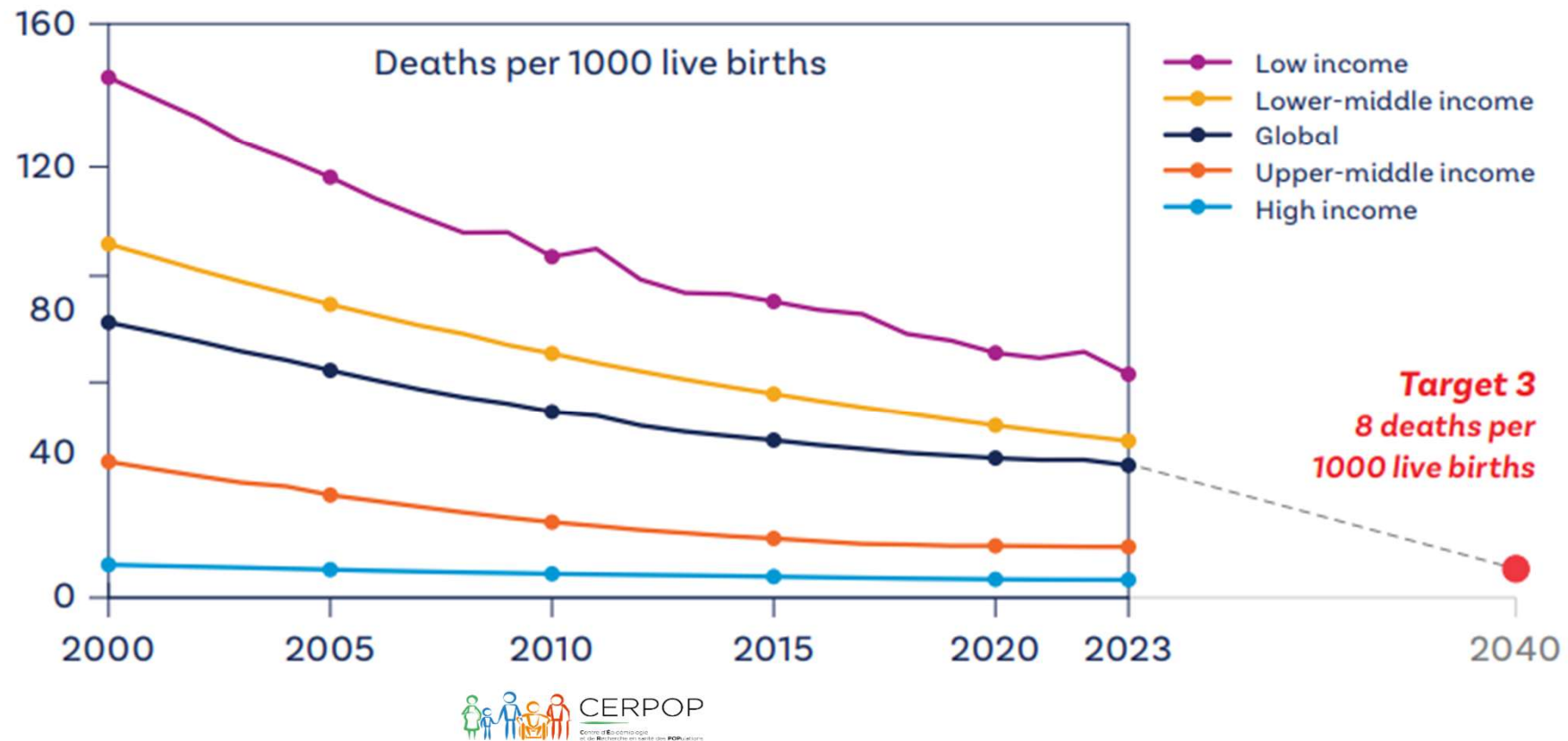
"systematic, avoidable and unfair differences in health that can be observed between populations, between social groups within the same population or as a gradient in a population classified by social position"

[McCartney, Popham, et al. 2019]



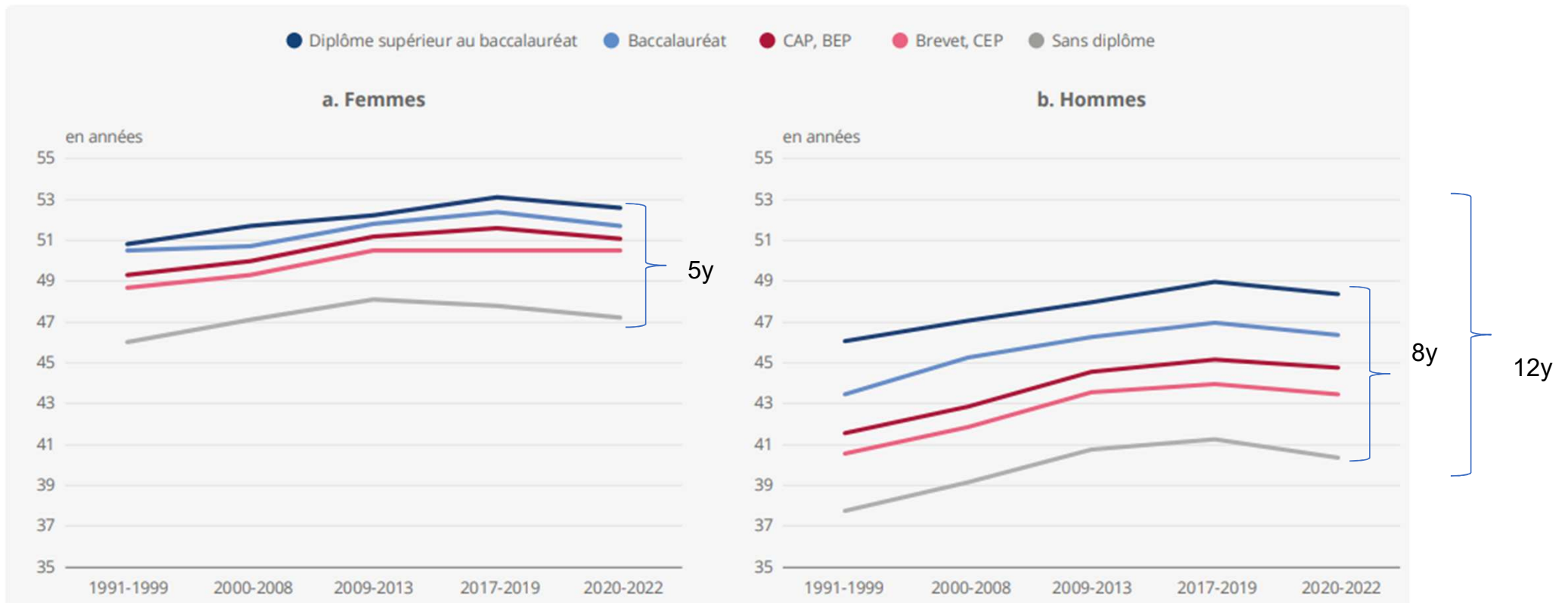
Between-country health inequalities

Under-five mortality rate (deaths per 1000 live births) globally and by World Bank income grouping (UN IGME estimates, 2000–2023)



World report on social
determinants of health
equity [WHO 2025]

Within-country inequalities: Average life expectancy at 35 in France by education & sex



Life expectancy trends are starting to drop.
Average life expectancy beyond 35y is lowest
for people with low education

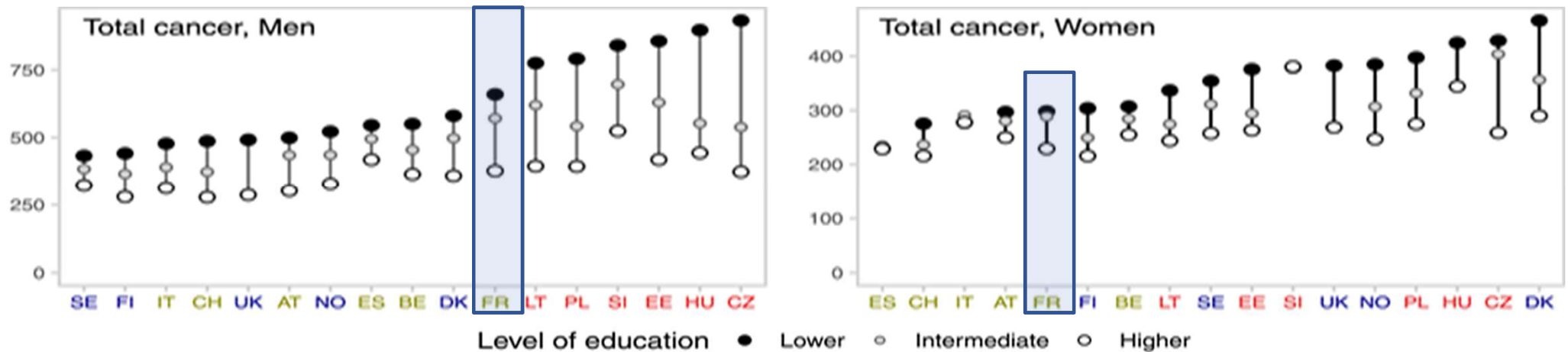


Gaps are wider among men, the most
highly educated men have the same LE as
women with the lowest education



Inequalities: Education level and cancers in Europe

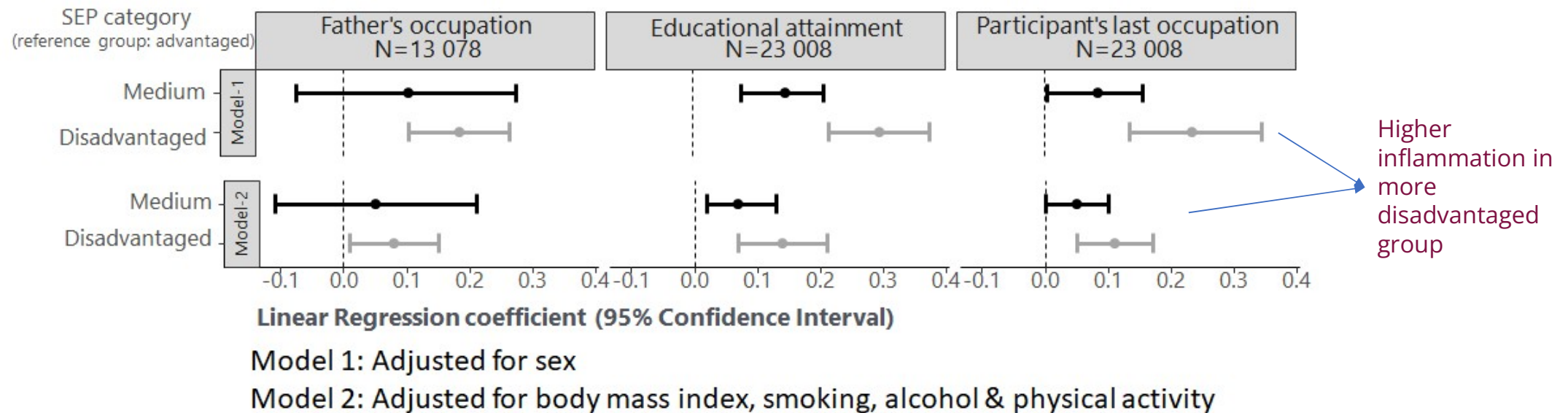
Age-standardised mortality rate Per 100 000



While inequalities are observed in most places, the extent and nature of them varies considerably
The pattern of cancer inequalities among women and men respectively is varied

[Vaccarella et al Lancet RH 2023]

Under the skin: Social position at three life stages & inflammation (CRP)

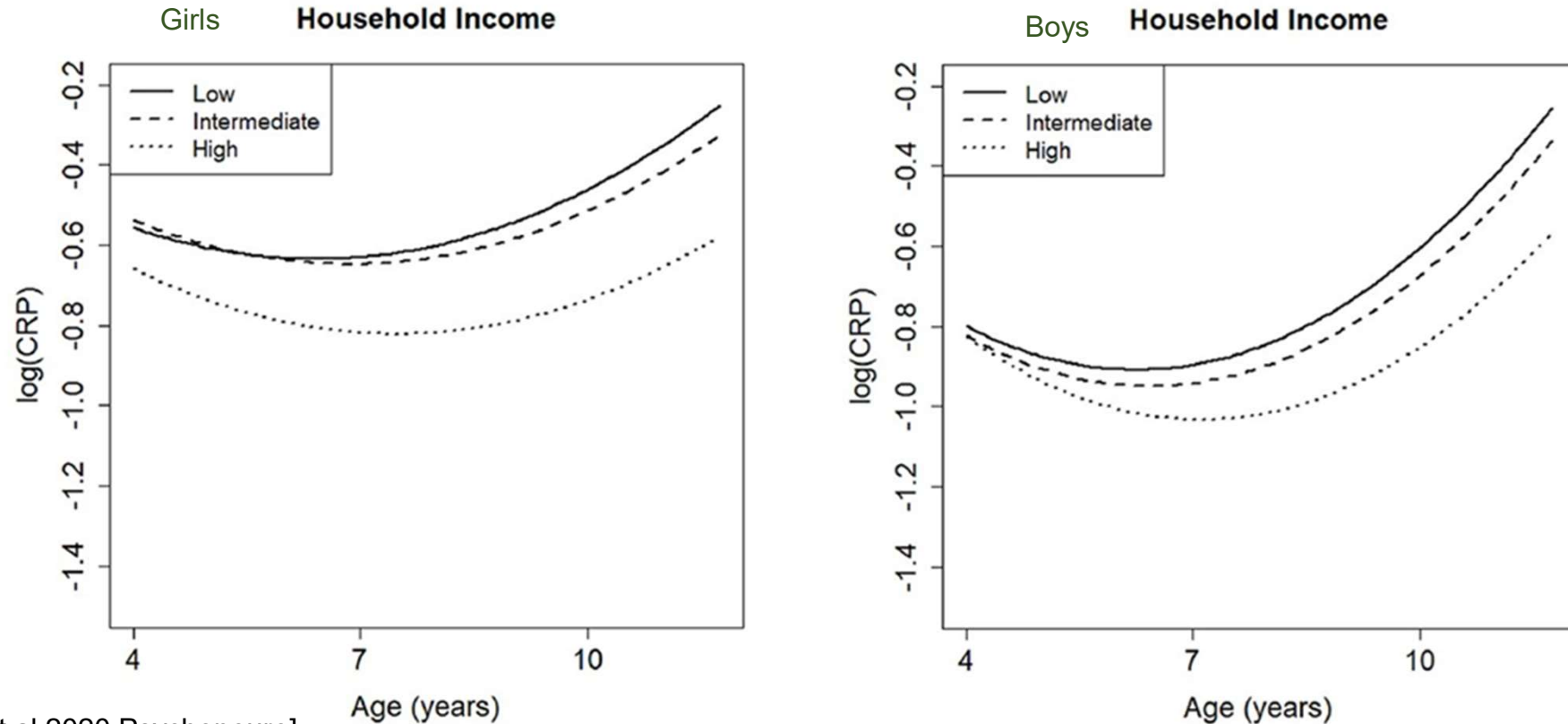


[Berger *et al* 2019 Nat Comms]

Chronic inflammation is higher adults from more disadvantaged social backgrounds, and this is not explained by 'classic risk factors'



When? Life course & timing for social pattern of inflammation (CRP)



[Soares et al 2020 Psychoneuro]

Higher levels of inflammation among the more disadvantaged children emerges earliest in the life course for boys, with steeper increases across childhood. Girls have higher levels of inflammation earlier on.



Embodiment

“at the most general level, embodiment .../... refers to how we, like any living organism, literally incorporate, biologically, the world in which we live, including our societal and ecological circumstances”

[Krieger 2005 JECH]



Embodiment

One of the most fundamental processes that underlies the production of health inequalities over the life course

- Is overlooked among scientists and health professionals
- Is often misunderstood
- Helps explain persistent systemic health inequities
- Is an adaptive process driven by socio-structural determinants from early life

[Bartley & Kelly-Irving 2024]



Ubiquitous intersectional systems

Intersectionality:

How social positions such as gender, social class, race/ethnicity sexual orientation (etc)

"intersect at the micro level of individual experience to reflect interlocking systems of privilege and oppression (i.e., racism, sexism, heterosexism, classism) at the macro social structural level" [Bowleg 2012]

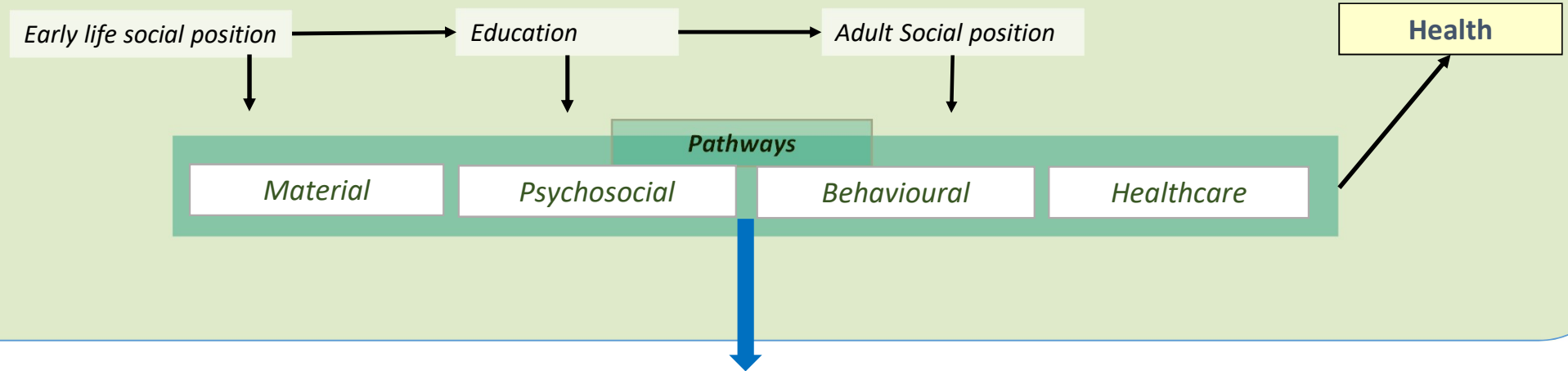


Carbado, Crenshaw et al 2013



Embodiment

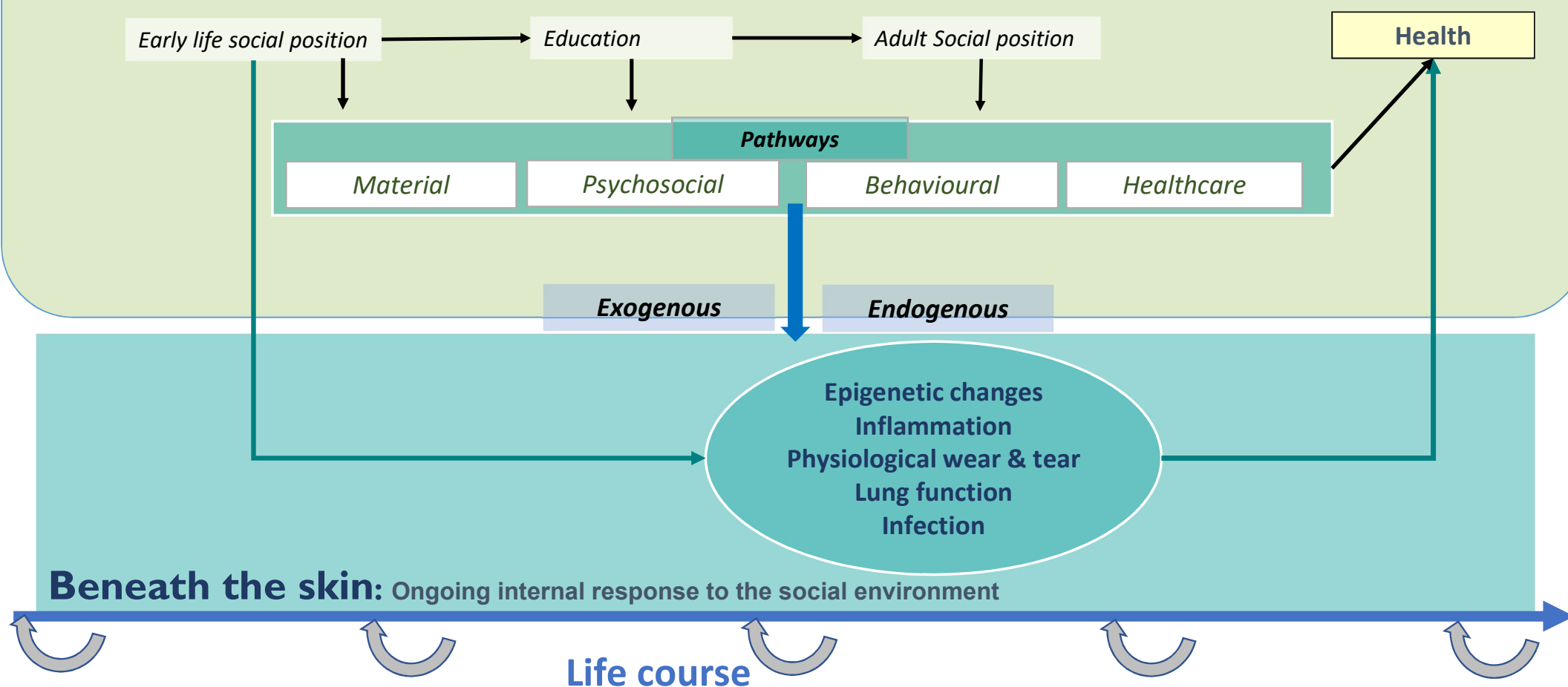
Ubiquitous intersectional systems: Gender, class, race/ethnicity, caste



Life course

Embodiment

Ubiquitous intersectional systems: Gender, class, race/ethnicity, caste





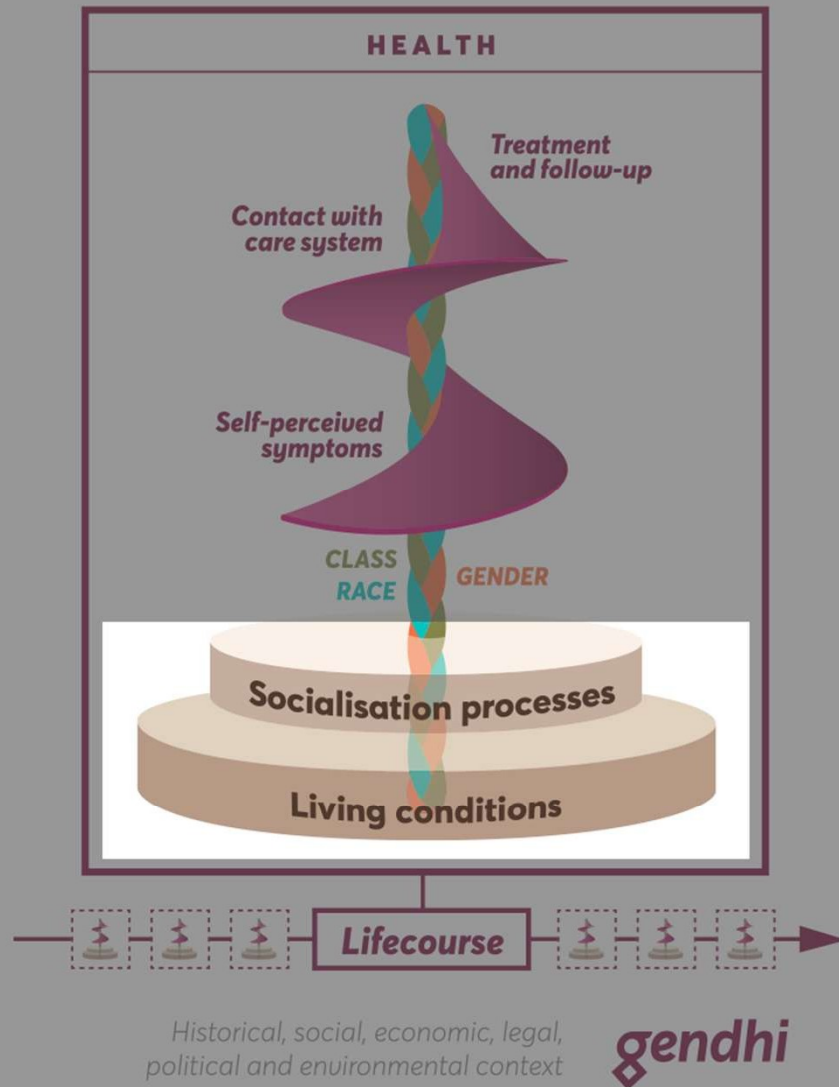
Gendhi research questions

How are health inequalities produced at the intersection of structural social systems (gender, social class and race/ethnicity) over the life course?

⌘ How are bodies constructed over the life course?

⌘ Are there social biases in health care?

The social production of health inequalities



Embodied health

- Embodied childhoods: developmental indicators by Inès Malroux with Lidia Panico
- Intersectional embodiment: blood pressure by Léna Silberzan with Nathalie Bajos

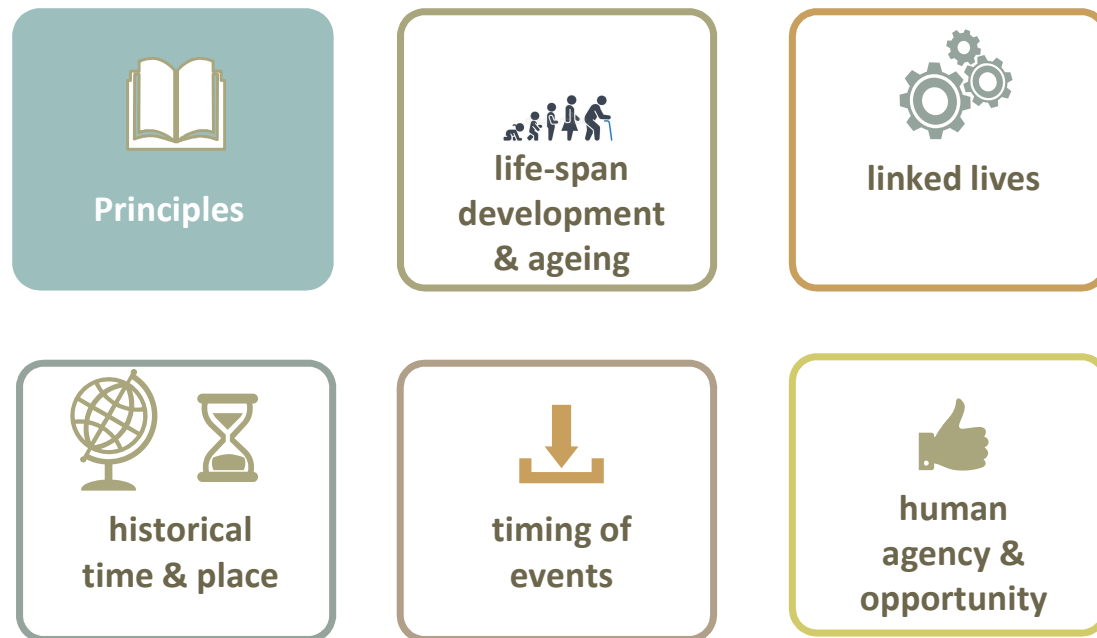
Data sources:

Elfe, HBSC, Constances, Epicov, EHIS, SHARE

Consider the lifecourse framework!



How intersectionality is woven through the lifecourse principles



Children of the Great Depression by Elder, 1975

Elder & Shanahan The Life Course and Human Development 2007



Embodied child development: Elfe cohort 3.5y

To describe child development indicators at the intersection of gender and social class

- Child Development Inventory (CDI), questionnaire that measures child development via an overall scale and subscales covering eight skill areas
- Data collected when children were aged 3.5 years



Embodied child development: Elfe cohort 3.5y

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Expressed language: Clear & understandable

- sentences of 4+ words, 10+ words, has a vocab of 20+ words
- asks questions, gives reasons after using 'because'
- structured sentences, detailed accounts

« Self-help »: bodily autonomy

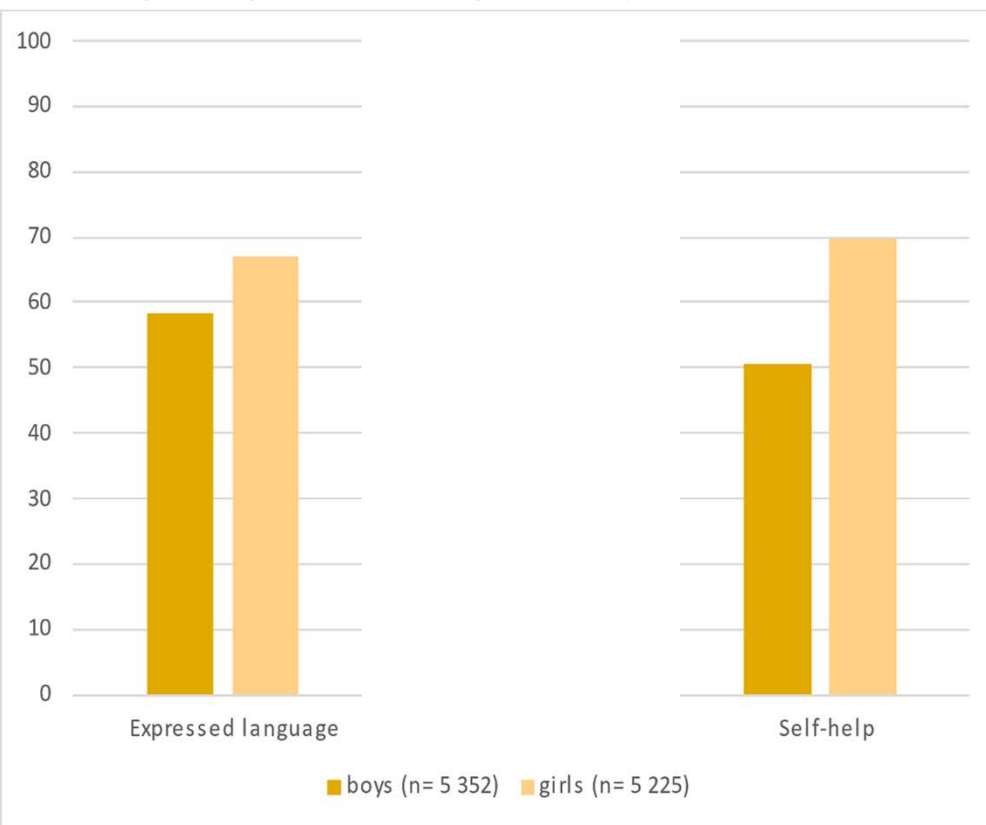
- washes/ dries hands
- uses toilet alone and controls sphincter
- uses fork to eat
- dresses alone & can do-up at least 1 button





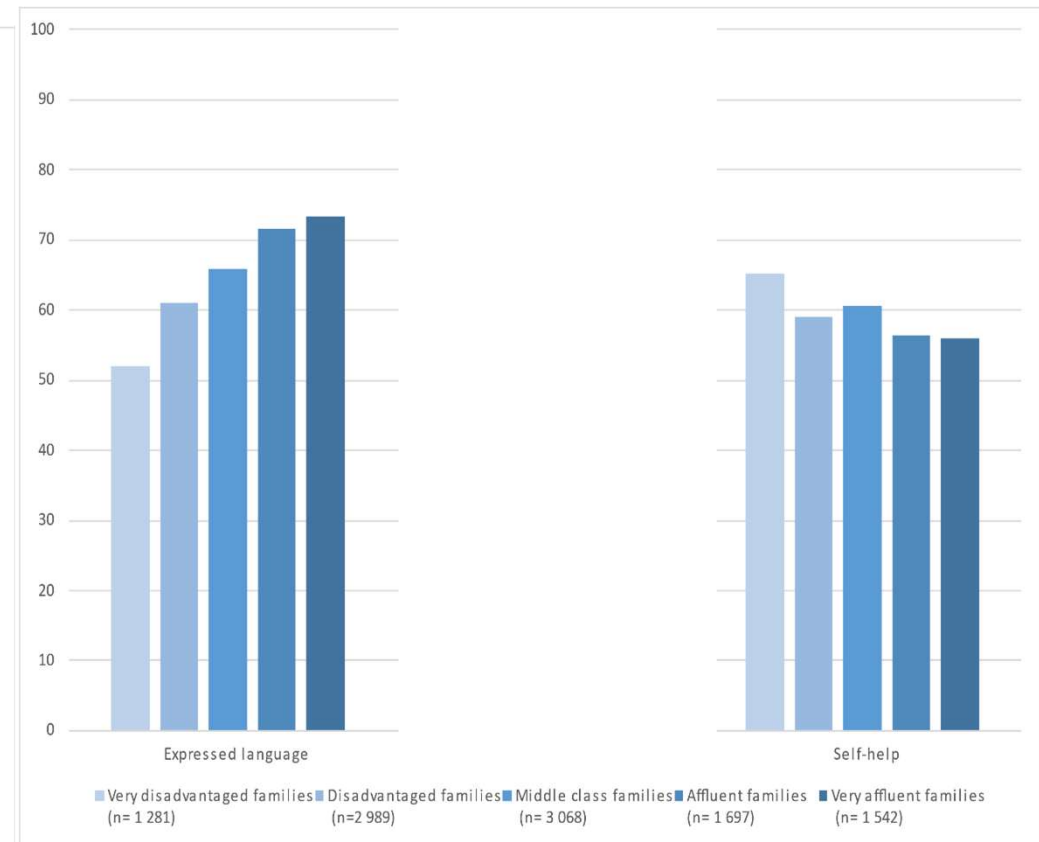
Embodied child development: Elfe cohort age 3.5y

Percentage of higher than average scores by sex



Girls are more likely to have higher scores in indicators of child development at 3.5y

Percentage of higher than average scores by social class



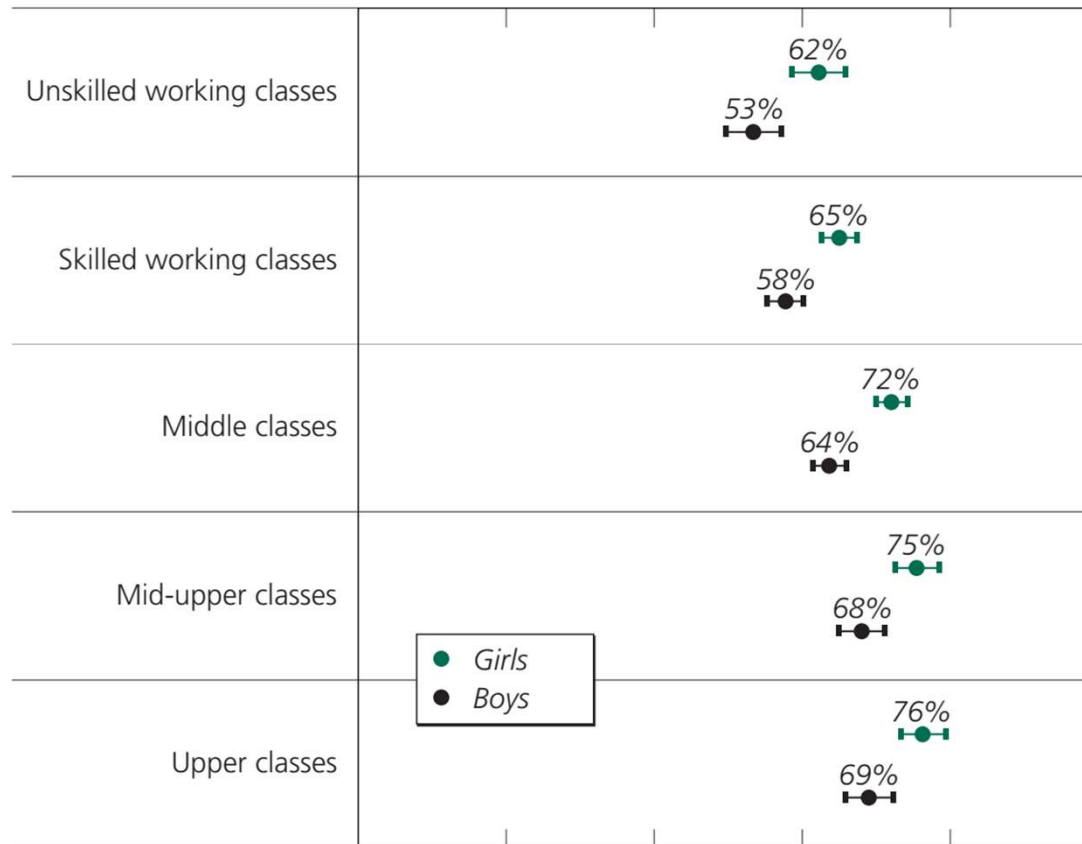
Social class pattern in indicators of child development at 3.5y

[Courtesy I Malroux]

Expressed language in girls & boys by social class: Elfe cohort 3.5y



Figure 2. Predicted probabilities of interaction between class and gender on the probability of obtaining an above-average score for expressive language (%)



- A social gradient in expressed language at 3.5y
- The most disadvantaged children are least likely to have above average rates of expressed language
- The gap between girls and boys is relatively consistent across social class groups

Model adjusted for parental migration status, maternal age, birth weight, childcare arrangements, birth rank

[Malroux et al, Population, 2025]

Hot off the press!

'Self-help' Bodily autonomy in girls & boys by social class : Elfe cohort 3.5y

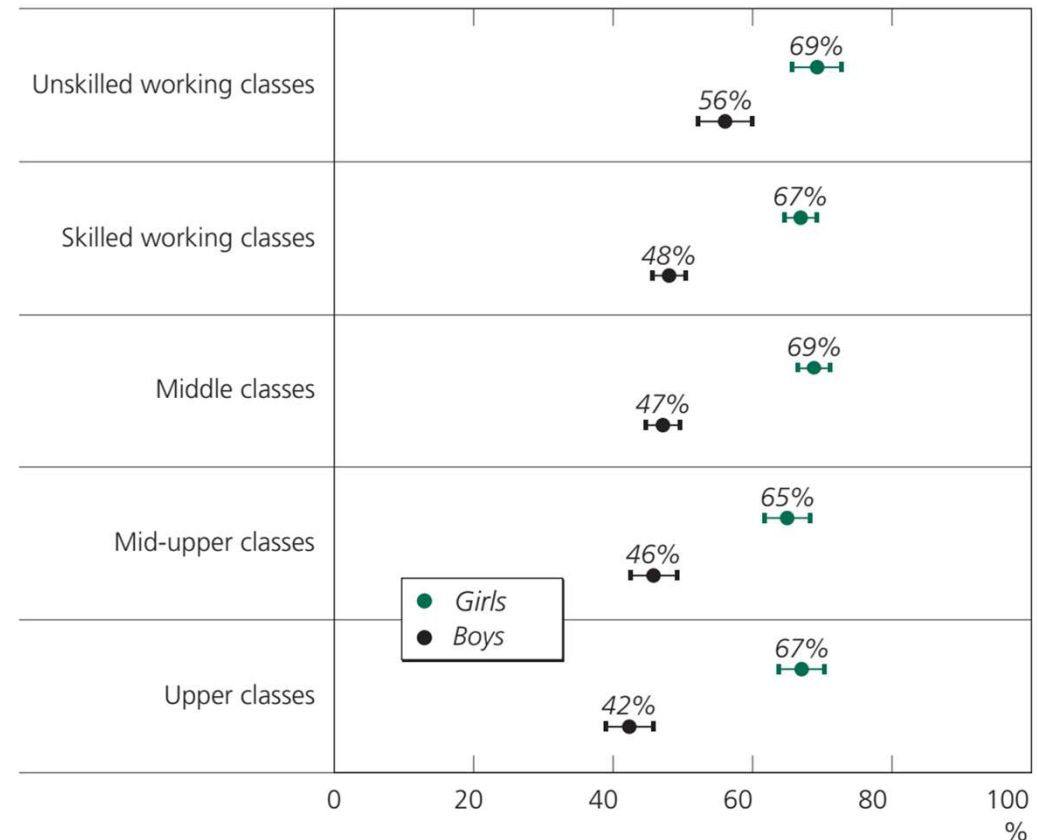


- Girls are more likely to score above average in 'self help' at age 3.5y than boys
- No social class difference in girls
- Boys in most advantaged families are least likely to perform well
- Most disadvantaged boys resemble girls the most

Model adjusted for parental migration status, maternal age, birth weight, childcare arrangements, birth rank

[Malroux et al, Population, 2025]

Figure 4. Predicted probabilities of interaction between class and gender on the probability of obtaining an above-average score for self-help skills (%)

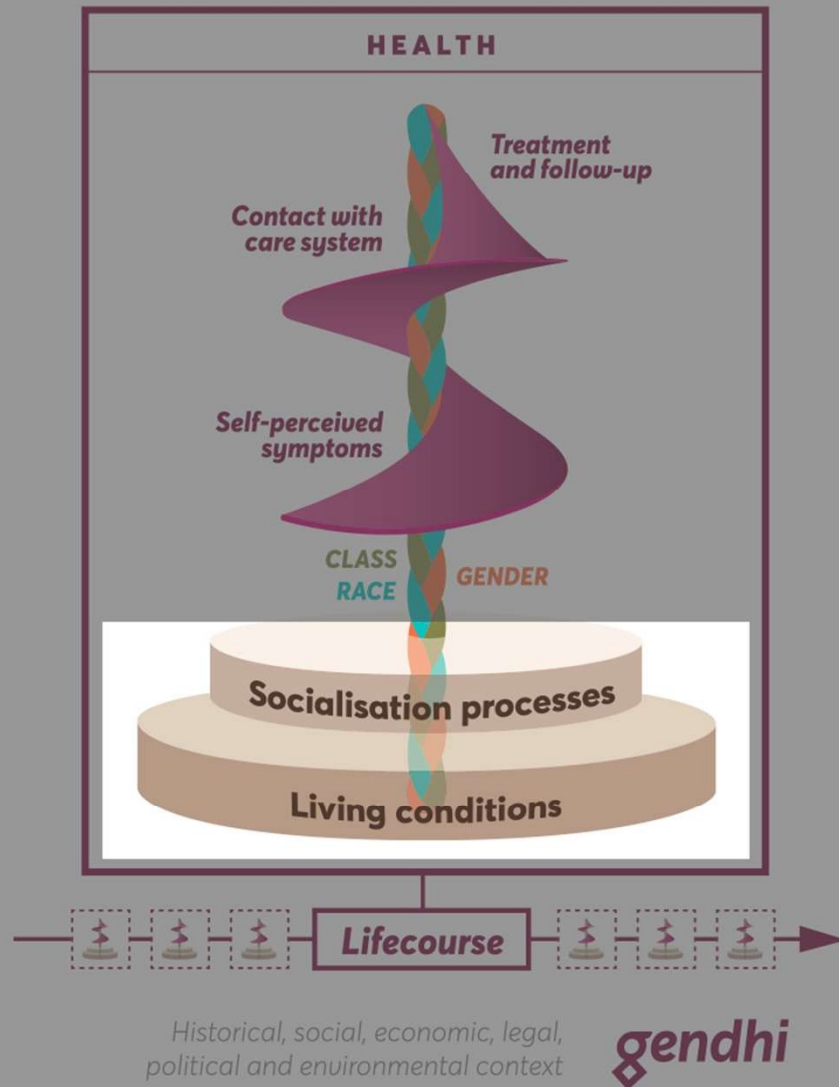


Embodied child development: Elfe cohort age 3.5y



- Embodiment considered using normative markers of development, language expression & bodily autonomy
- Do the findings for bodily autonomy challenge accepted stereotypes that girls are essentially biologically more developed than boys?

The social production of health inequalities



Embodied health

- Embodied childhoods: developmental indicators
- Intersectional embodiment: blood pressure

Data sources:

Elfe, HBSC, **Constances**, Epicov, EHIS, SHARE

Consider the lifecourse framework!

Applying a quantitative intersectional approach to blood pressure: Constances cohort



To map predicted Systolic Blood Pressure (SBP) means across intersectional groups in order to identify those at higher risk

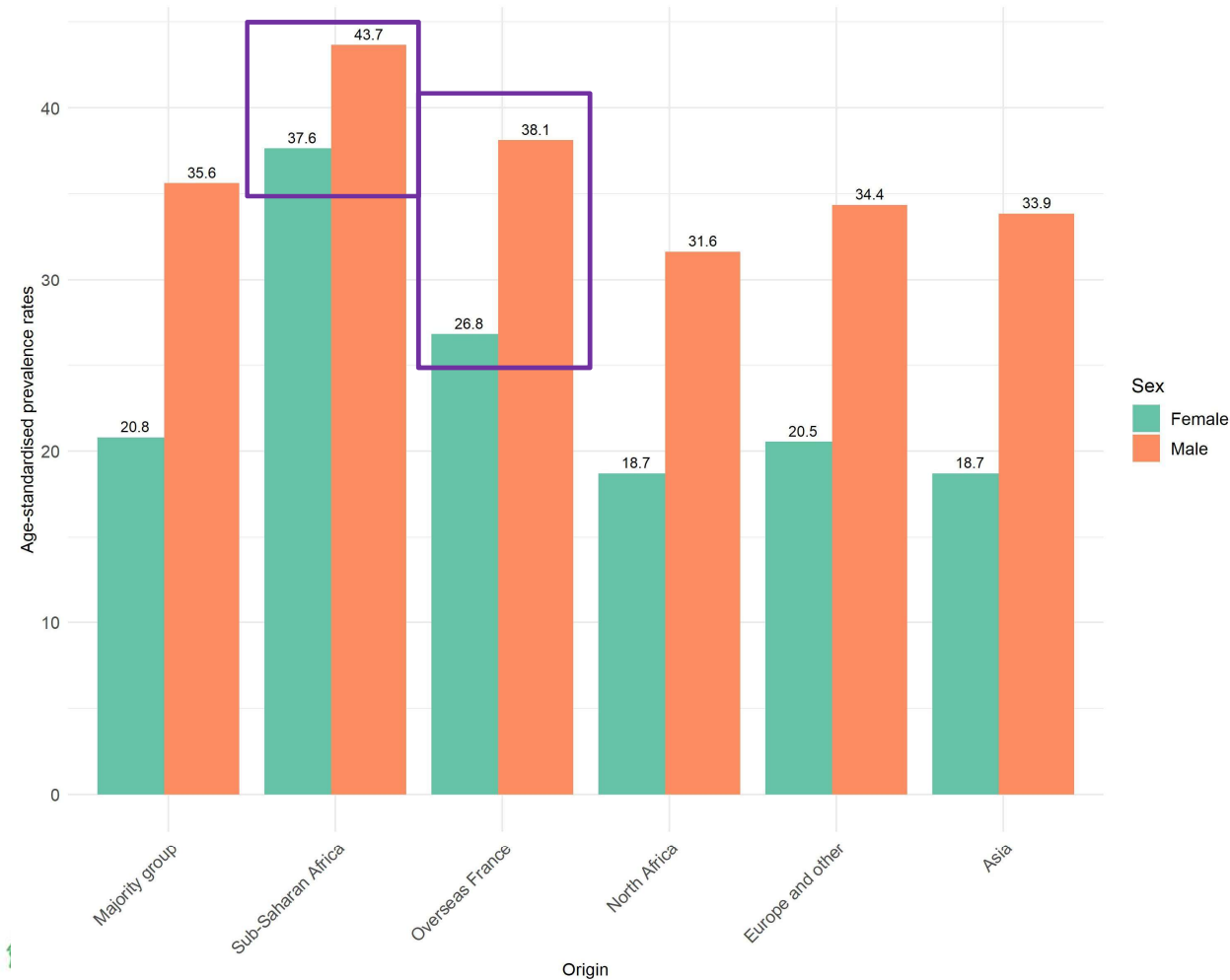
- Intersectionality theory to study blood pressure
- CONSTANCES cohort (2012-2021) in the French general population
- N=150 739 individuals aged 25 to 69
- Nested within 126 intersectional strata defined by combining sex, age, race/ethnicity, and education

[Silberzan et al, under review, 2025]



Age-adjusted hypertension prevalence by sex & race/ethnicity : Constances cohort

- Men have a higher rate of hypertension in all groups
- Hypertension rate is higher among SSA and Overseas territories for men and women
- The gap in hypertension rates between men and women is smaller for SS-African and Overseas France categories

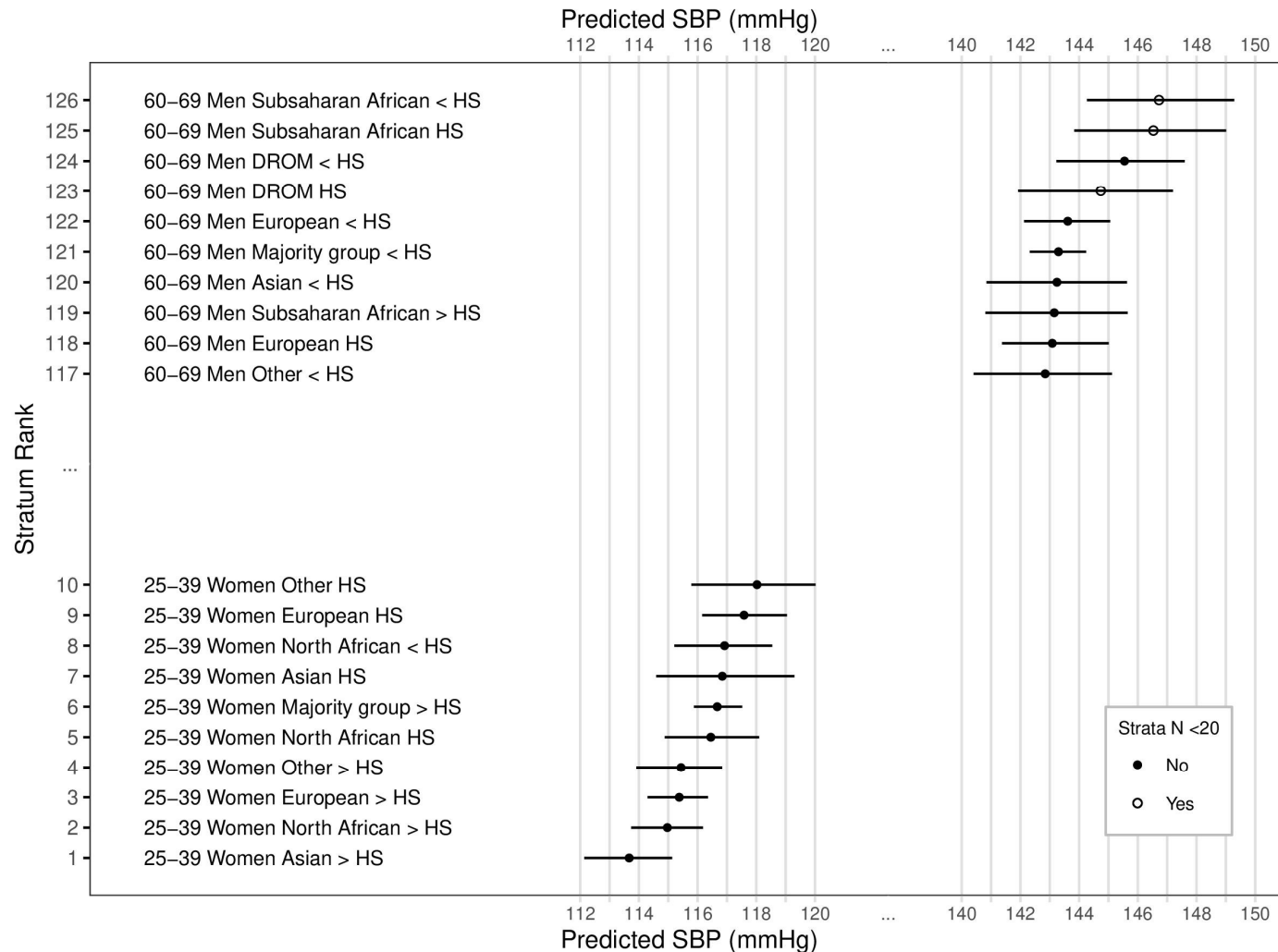


Systolic blood pressure (SBP) predicted probabilities by sex, age, education & race/ethnicity: Constances cohort



- Describing intersectional strata at the higher & lower ends of the distribution
- High SBP characterised as older men belonging to SSA & overseas France group
- Role of educational attainment?

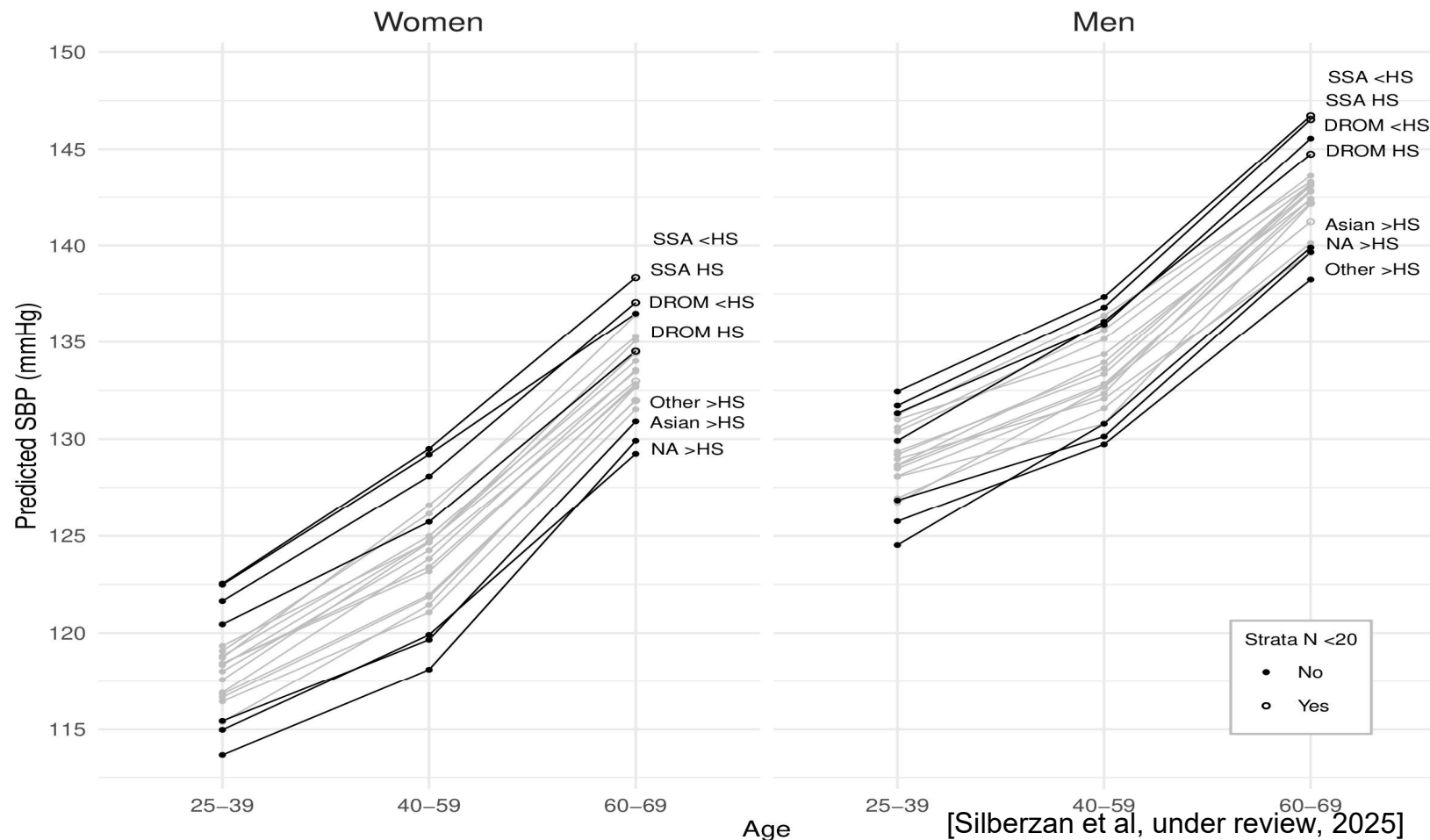
Ten lowest and ten highest predicted SBP
DROM : French overseas *territories*, < HS : less than high school diploma, HS: high school diploma, >HS: high school diploma



Systolic blood pressure (SBP) predicted probabilities by sex, age, education & race/ethnicity: Constances cohort

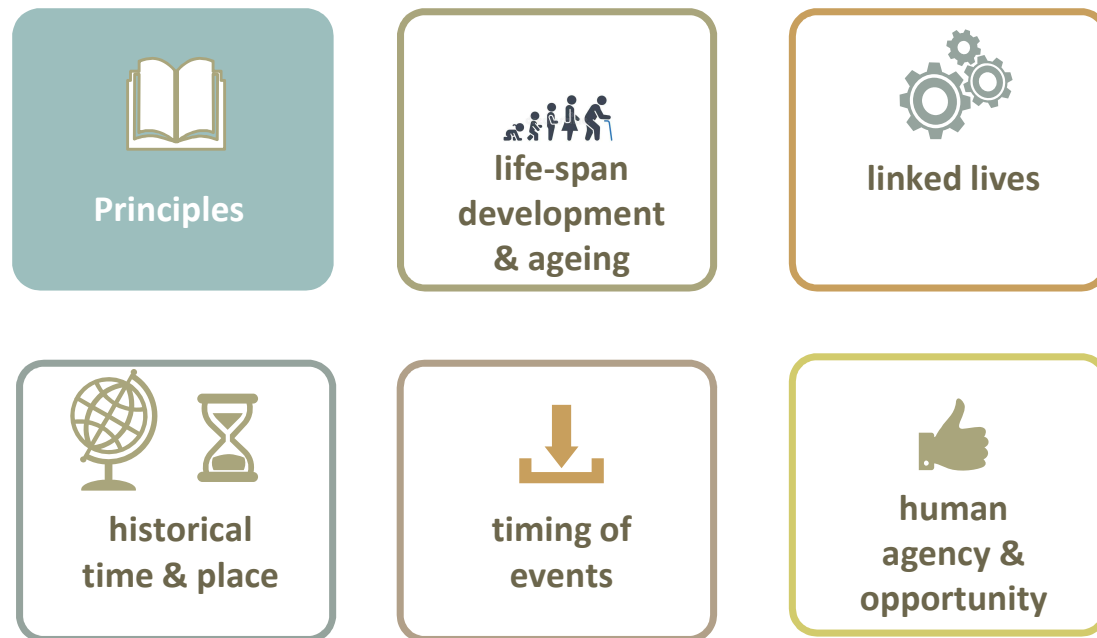


- In both men & women, SSA & overseas group have higher SBP even in the youngest age group
- Steeper increase in men between 40-59 to 60-69y groups & for women in lowest SBP groups
- This work underlines racialised inequalities in blood pressure in France





How intersectionality is woven through the lifecourse principles



Children of the Great Depression by Elder, 1975

Elder & Shanahan The Life Course and Human Development 2007

Principles governing the shapes and patterns of life courses



“how individuals’ life courses are embedded and shaped by the historical times and places they experience”



historical
time & place



Embodied intersectional childhoods:

- What are the lived experiences of children up to the age of 3.5y at the intersection of gender, social class and race/ethnicity in France today?



Socially patterned blood pressure distribution:

- Who are the people within the strata on the extremes of the SBP distribution, what lives have they lived in France and beyond?
- What are the impacts of social policies & political determinants in France on these people?
- How does structural racism & discrimination affect people’s bodies (Geronimus et al 2006)

Principles governing the shapes and patterns of life courses



“human development and ageing as being dynamic, continuous and lifelong processes”

“the antecedents and consequences of life transitions & events are variable according to the moment they occur in a person’s life”



life-span
development
& ageing



timing of
events



Embodied intersectional childhoods:

- To what extent do the developmental markers reflect embodied realities?
- What are the consequences of these observed differences in children’s present lives, as well as over their lifecourses, notably their educational careers?



Socially patterned blood pressure distribution:

- Blood pressure patterns track across the lifecourse from birth: physiological responses to the social environment start early
- At what age/ life stage does hypertension emerge?

Principles governing the shapes and patterns of life courses



“the way our lives are lived in an interdependent way and socio-historical influences are expressed through a network of shared relationships”



linked lives

“how individuals construct their own lives through the choices and actions they take regarding opportunities”



human
agency &
opportunity



Embodied intersectional childhoods:

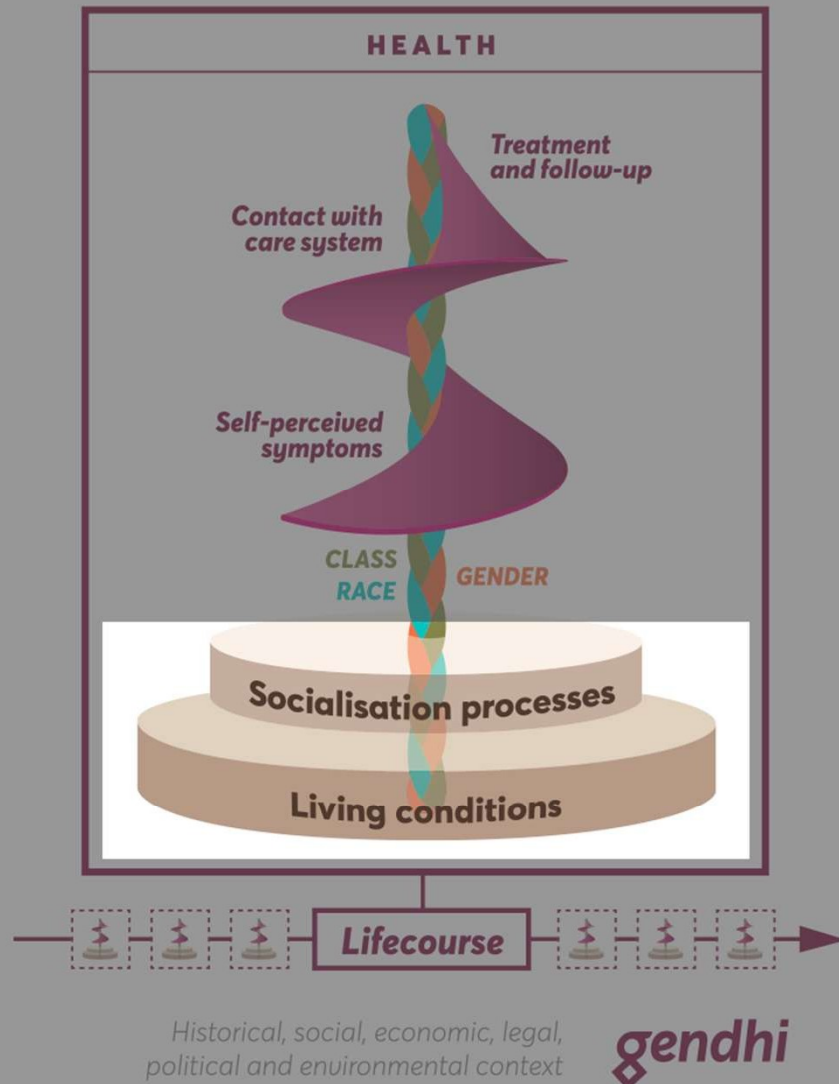
- Across the intersection of social class and gender, who do these children share their lives with? Do they live in multigenerational households? Do they have caring responsibilities?
- To what extent is bodily autonomy an indication of agency, and does this vary by gender & social class? Does the bodily autonomy of disadvantaged boys come at a « cost »?



Socially patterned blood pressure distribution:

- Considering intersectionality, what are people's working and household roles? What is their family structure?
- To what extent CAN people pay attention to their own health?

The social production of health inequalities



Embodied health

Other Gendhi epidemiological research

- Body image in adolescents: **Ophélie Merville**
- Intersectional perspectives on perceived physical and mental wellbeing in parents: **Fé·e Santos**
- Symptomatology: **Richard Dudouet, Eugenia Alcade**
- Early life disadvantage and biological health in older age by gender: **Léna Bonin**
- Social determinants of colorectal cancer incidence and tumour characteristics: **Nadine Hamieh & Amalia Martinez**



Discussion: Ubiquitous intersectional systems & causality

“there is surprisingly little robust evidence that the correlation between socioeconomic inequalities and health inequalities is causal”
(Mackenbach, 2020)



Discussion: Ubiquitous intersectional systems & causality

“there is surprisingly little robust evidence that the correlation between socioeconomic inequalities and health inequalities is causal”
(Mackenbach, 2020)



Why are social determinants so easily dismissed as not being true causes of health inequalities when there is so much evidence that they are?



Discussion: Ubiquitous intersectional systems

Like a landscape immersed in thick fog, the social environment is omnipresent, it touches everything:

- the way you're raised as a child
- where you live and go to school or work
- the type of food you eat
- the people you form relationships with
- the type of job you have
- your activities and hobbies
- your retirement
- when & how you die





Discussion: Ubiquitous intersectional systems

Intersectional ubiquitous systems affect health indirectly and directly through a tissue of causal structures, having small but potentially widespread effects on population-level health, disease and mortality





Discussion: Ubiquitous intersectional systems

“Small changes in ubiquitous causes may result in a more substantial change in the health of populations than larger changes in rarer causes”

[Keyes & Galea 2016, pg72]



Ubiquitous systems require an ontological shift in causality



Events as causes: « classic » definition of quantitative causality

Vs

Substantial entities as causes



Dicussion: Ubiquitous systems require an ontological shift in considering causality



Events as causes: « classic » definition of quantitative causality:

In most statistical causal inference methods the focus is on the relation between two events, often expressed as counterfactual dependence: « if things were different... »

Vs

Substantial entities as causes:

The very existence of the ubiquitous relational system causes the unequal distributions observed. This position is not considered in quantitative research, though statistics describe the causal entity





Concluding remarks

Embodiment is one of the most **fundamental processes** that **underlies the production of health inequalities** over the life course

Intersectional ubiquitous systems affect *who* in society experiences adversity, discrimination, and their life long embodied consequences

Adressing these structural determinants in quantitative research requires a shift in our definition of « causality »



Thank you!

www.gendhi.eu

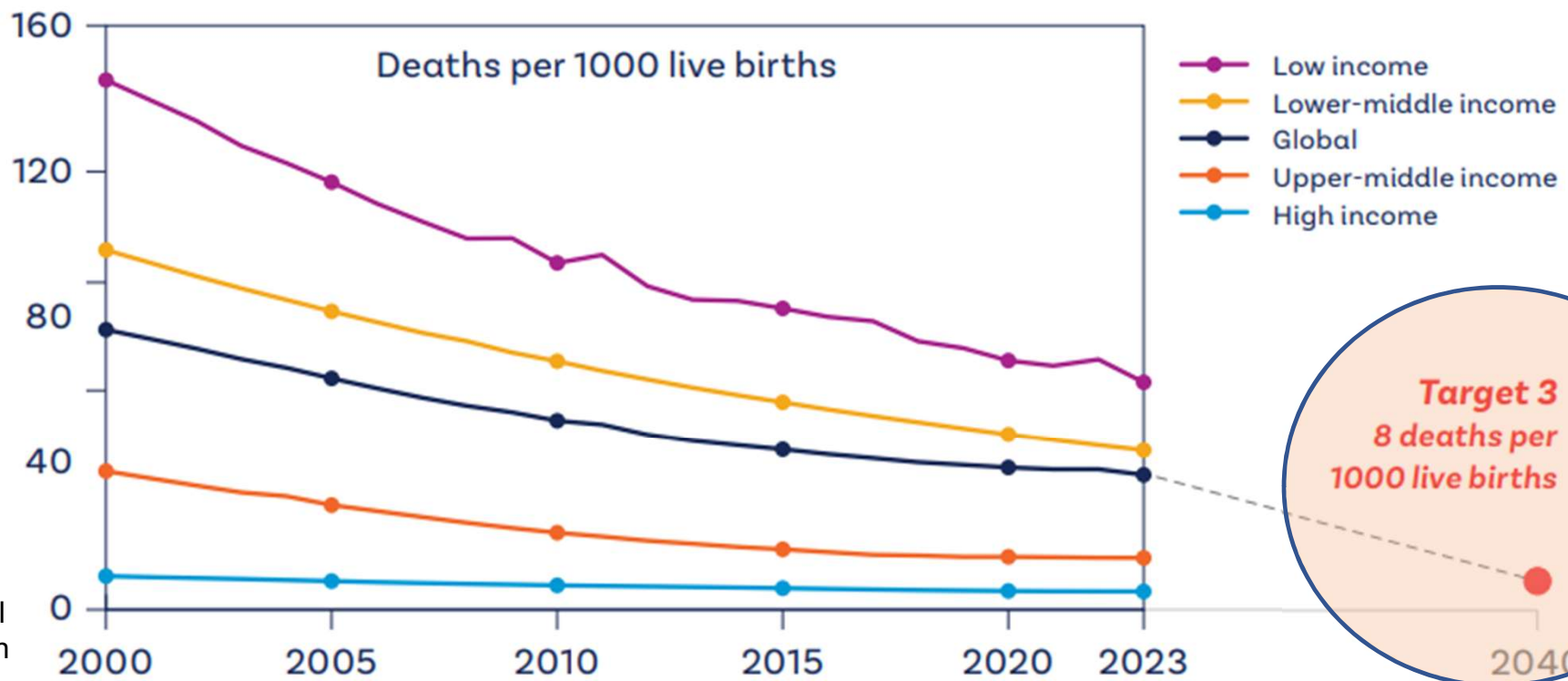


This project has received funding from the European Research Council (ERC) under the European Union's Horizon 2020 research and innovation programme (grant agreement N° 856478)



Political determinants are a threat to improvements

Under-five mortality rate (deaths per 1000 live births) globally and by World Bank income grouping (UN IGME estimates, 2000-2023)



World report on social determinants of health equity [WHO 2025]