CLOSER Conference

Health 5: Maternity and breastfeeding

Chair: **Hazel Inskip**

- Preconceptional maternal anxiety is associated with childhood emotional problems, independent of the effect of post-natal depression
  Hazel Inskip
- Pre-pregnancy Body Mass Index and breastfeeding initiation, early cessation, and longevity: Evidence from the Millennium Cohort Study
  Tammy Campbell
- Local environmental quality positively predicts breastfeeding in the UK's Millennium Cohort Study
  Laura Brown

closer

Twitter: #CLOSERConf
WIFI: BL-GUEST-CONF
Password: BLgue5T23

Preconceptional maternal anxiety is associated with childhood emotional problems, independent of the effect of postnatal depression

Janis Baird, Megan Jarman, Sian Robinson, Wendy Lawrence, Mary Barker, Keith Godfrey, Cyrus Cooper, Hazel Inskip

MRC Lifecourse Epidemiology Unit, University of Southampton

NIHR Southampton Biomedical Research Centre, University of Southampton and University Hospital Southampton NHS Foundation Trust

CLOSER Conference November 2017

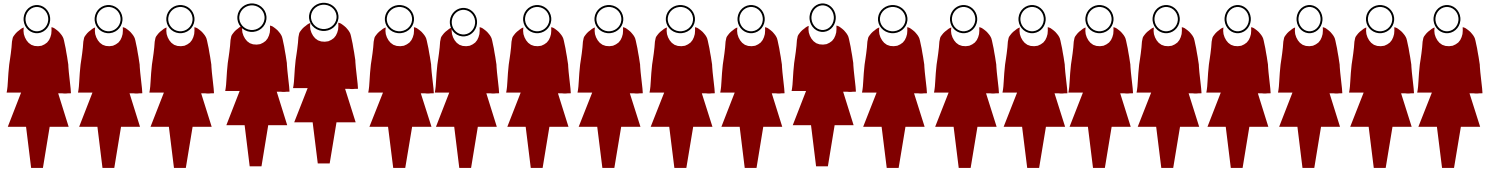
Background

- Maternal depression is associated with behavioural problems in children
- Most of the evidence relates to postnatal depression
- In the ALSPAC cohort, anxiety during pregnancy and postnatal depression had independent effects on child behaviour at 4 years
- No evidence on whether distress or anxiety before pregnancy relates to child behaviour problems

Aim

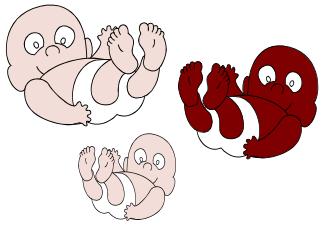
To examine the association between maternal distress/anxiety before pregnancy and child behaviour at 3 years of age

Southampton Women's Survey

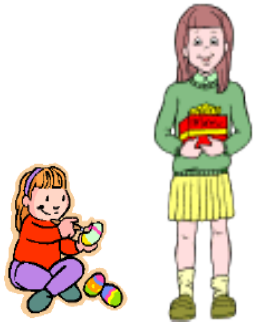


12,583 non-pregnant Southampton women aged20-34 years interviewed between 1998 and 2002

Subsequent pregnancies studied, ultrasound scans and interviews



3158 births



Children followed-up at 6, 12, 24 & 36 months. Samples seen at 4, 6-7, 8-9 and 11-13y

Adapted from Inskip et al. Int J Epidemiol. 2006

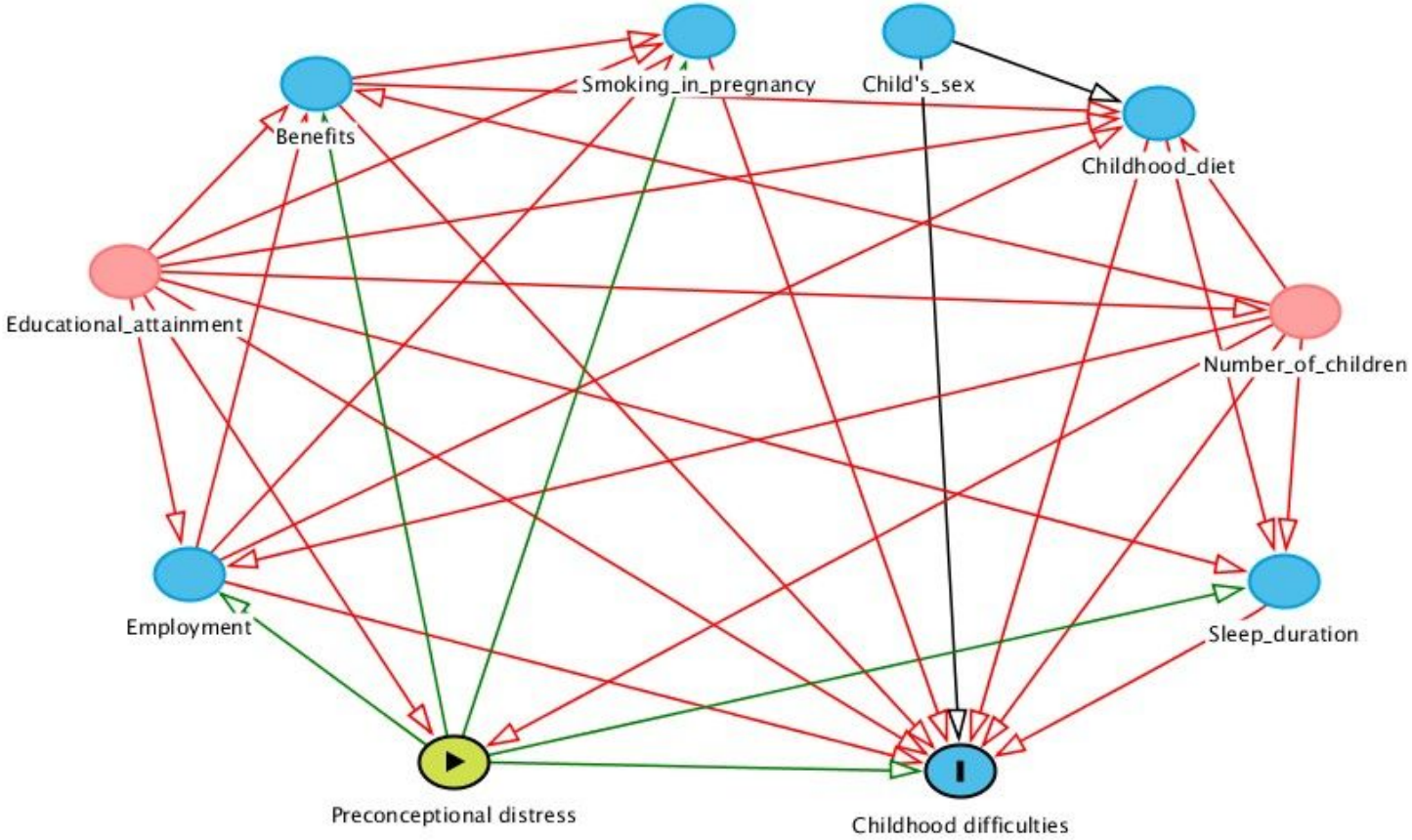
Methods

- Women enrolled during the latter half of recruitment completed the General Health Questionnaire (GHQ-12) - scores of 3 or more indicate psychological distress
- Edinburgh Postnatal Depression Scale (EPDS) completed 6 months after birth – scores of 12 or more indicate probable postnatal depression
- When children were 3 years of age, child behaviour was assessed with the Strengths and Difficulties Questionnaire (SDQ)
- Answers to the SDQ were used to define behaviour problems:
  - Hyperactivity
  - Conduct disorders
  - Emotional problems

Statistical analysis

- Binary/Poisson regression used to derive prevalence ratios for child behaviour problems
- Adjustment for effects of potential confounding factors
- Maternal confounding factors
  - Educational attainment
  - Receipt of benefits
  - Number of children
  - Employment
  - Smoking during pregnancy
- Child confounding factors
  - Gender
  - Diet
  - Sleep duration

Directed Acyclic Graph



Minimal sufficient adjustment set:

- educational attainment
- number of children

Further adjustment for postnatal depression was included to see if it mediated the associations

Further analyses examined the associations between child behaviour problems and depressive symptoms at one, or other, or both time points

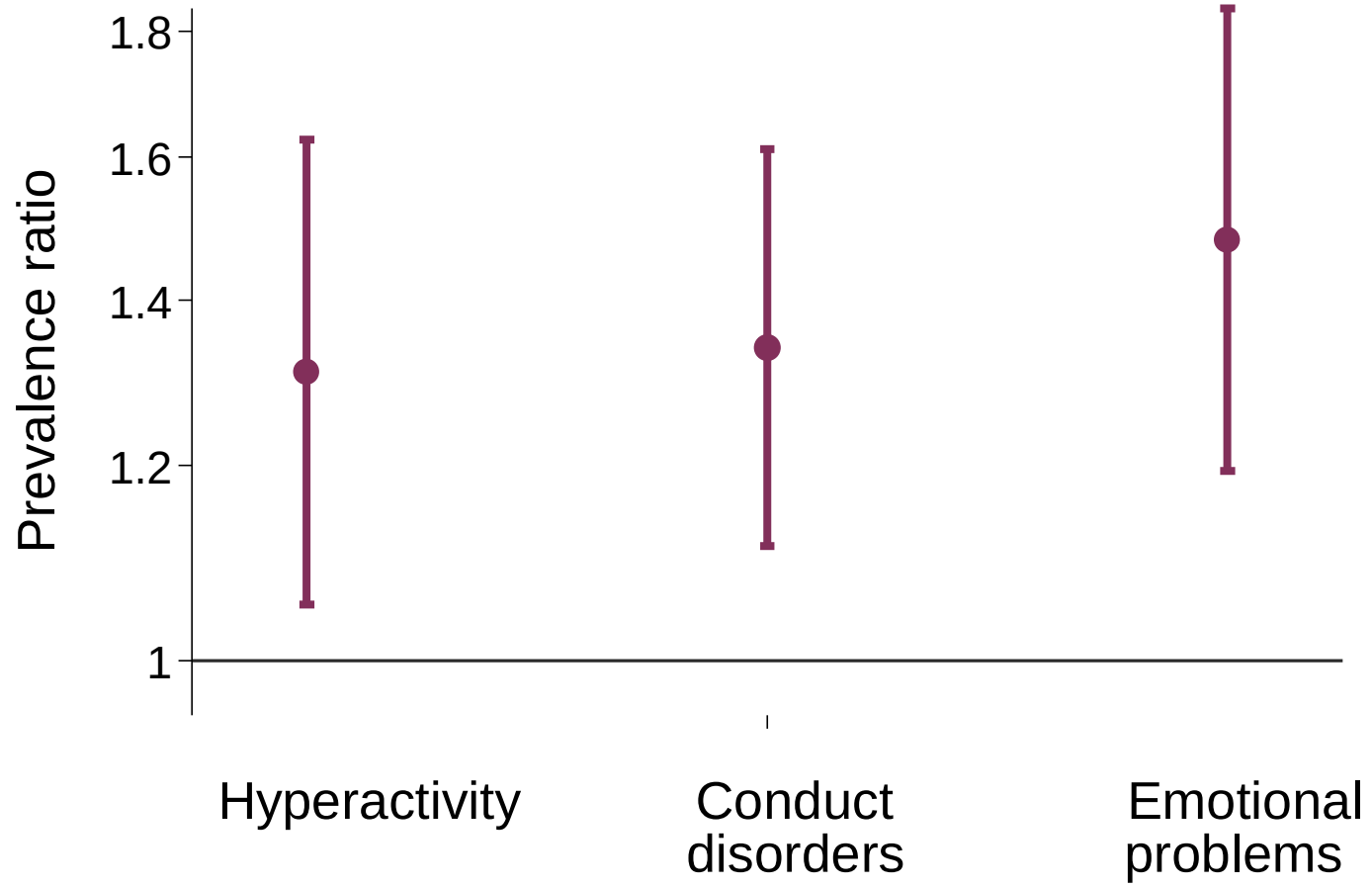
Maternal characteristics

Characteristics of mothers (n=1511)	N (%)
Educational attainment	
≤GCSE	531 (35.1)
A levels/HND	628 (41.6)
Degree or above	352 (23.3)
In receipt of benefits	489 (32.5)
In employment	433 (28.8)
Smoked in pregnancy	128 (12.4)
Preconceptional distress	615 (41.6)
Postnatal depression	417 (27.5)

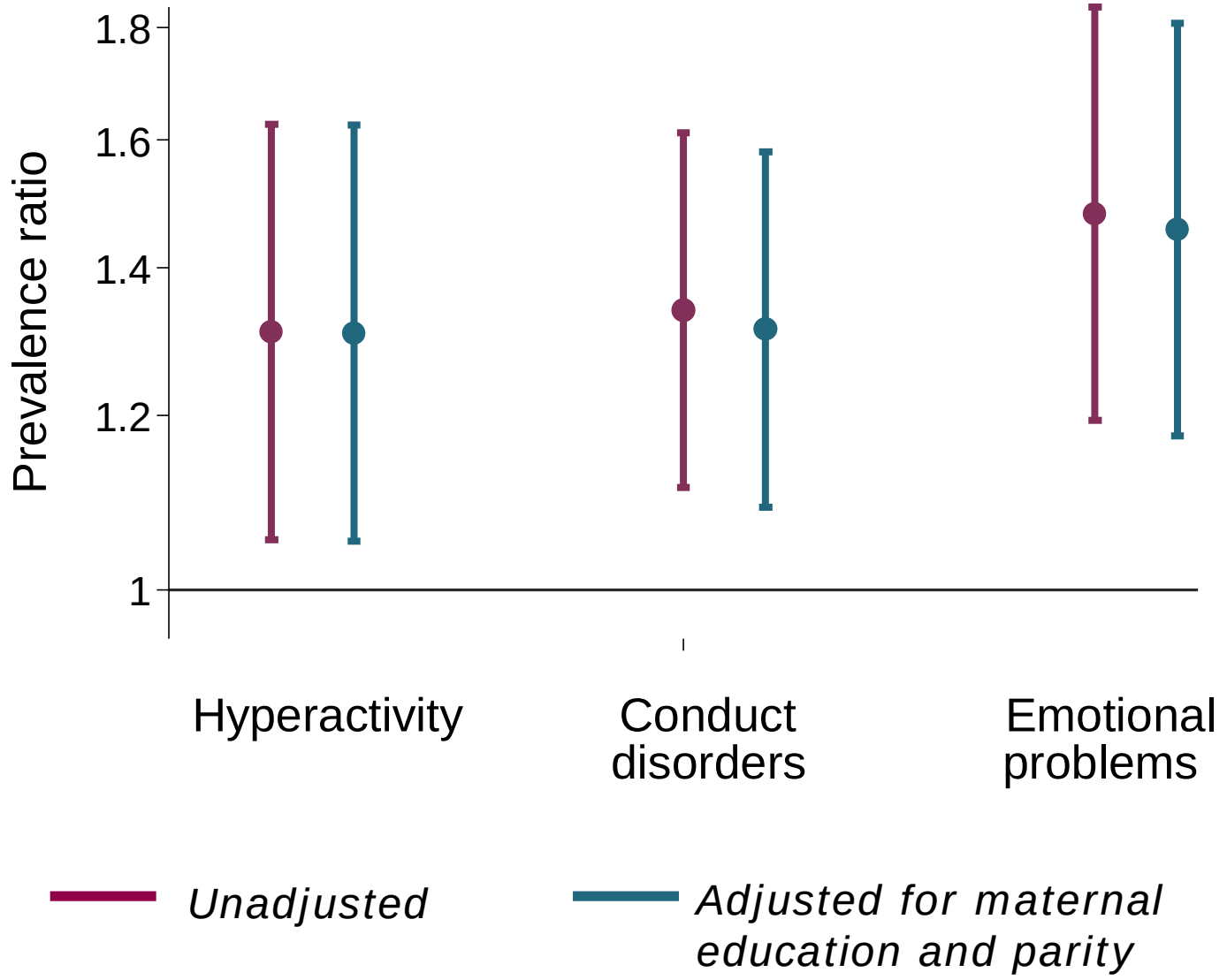
Characteristics of children

	Boys	Girls	P-value
	n=782	n=729	
Age (years)	3.0 (3.0-3.1)	3.0 (3.0-3.1)	0.7
Sleep duration (hours (IQR))	11.5 (11.0-12.0)	11.5 (11.0-12.0)	0.1
Hyperactivity (n (%))	172 (22.0)	116 (15.9)	0.003
Conduct disorders (n (%))	198 (25.3)	168 (23.1)	0.3
Emotional problems (n (%))	143 (18.3)	138 (18.9)	0.7

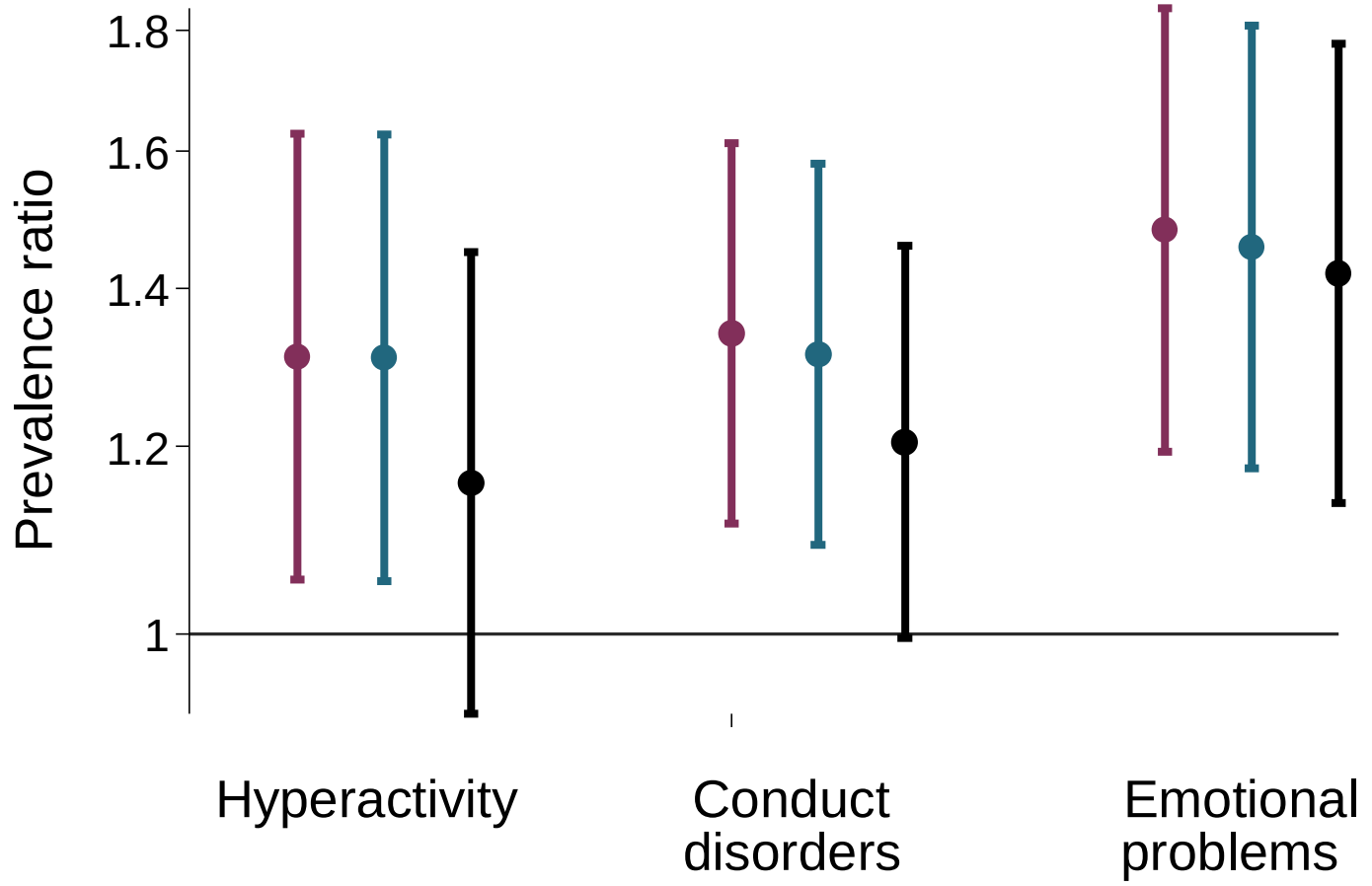
Association of maternal preconceptional distress with child behaviour at 3 years of age (unadjusted)



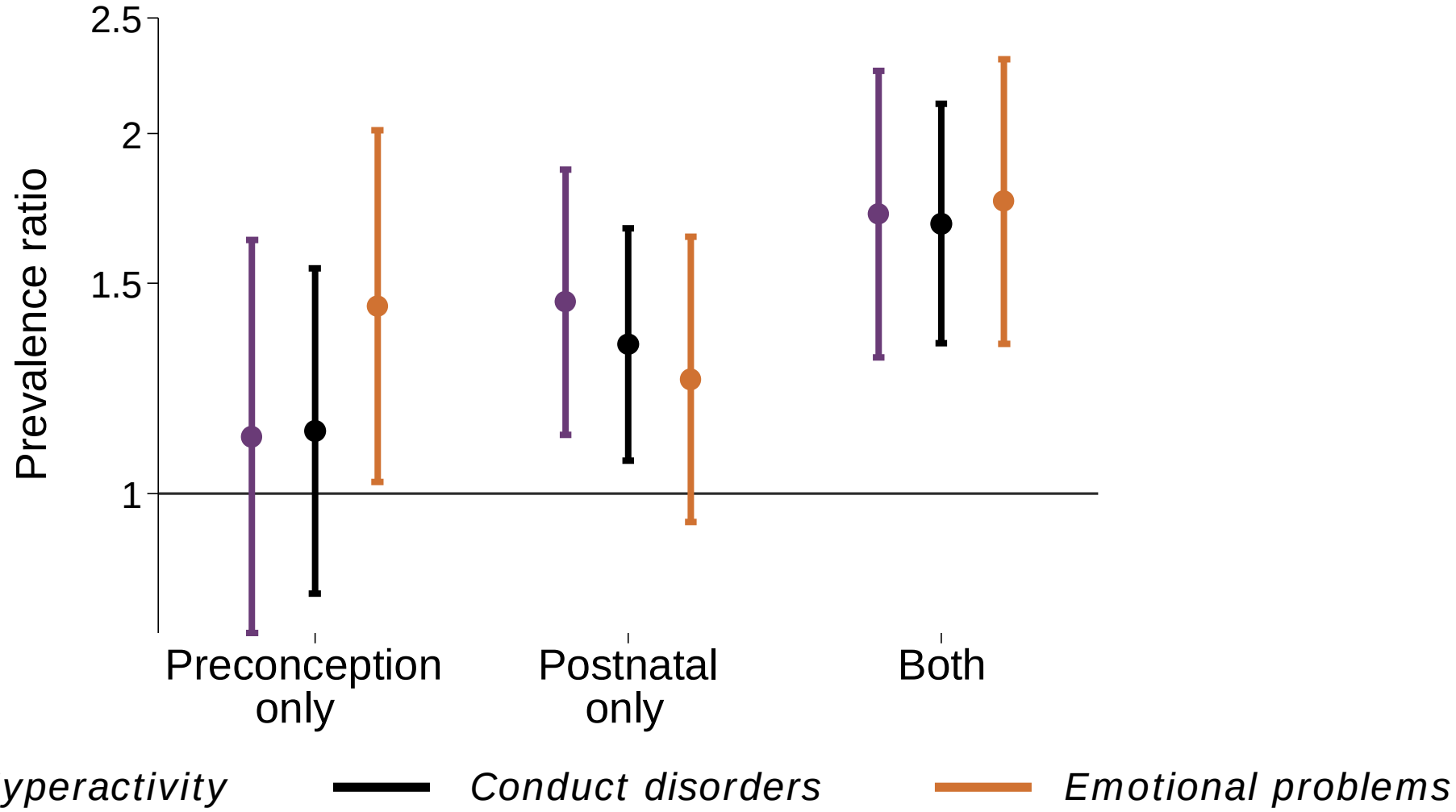
Association of maternal preconceptional distress with child behaviour at 3 years of age



Association of maternal preconceptional distress with child behaviour at 3 years of age



Association of distress, preconception, postnatally or both, with child behaviour at 3 years of age*



*Adjusted for maternal education and number of children

Summary of findings

- Around 40% of mothers had preconceptional distress and a quarter had probable postnatal depression
- Around a fifth of children had hyperactivity or emotional problems and a quarter had conduct disorders
- Maternal preconceptional distress was associated with an increased risk of child behavioural difficulties, particularly emotional problems at 3 years of age
- The influence of preconceptional maternal distress on child behaviour was still apparent once we adjusted for postnatal depression

Strengths and limitations

- **Strengths**
  - SWS is a population-based study
  - Adjustment for important confounding factors
  - GHQ-12 is a sensitive instrument for detecting depression and anxiety disorders
  - EPDS measure of postnatal depression
- **Limitations**
  - GHQ-12 data only collected during second phase of SWS
  - Measure of child behaviour based on parental report
  - No measure of depression or anxiety during pregnancy

Comparison with previous studies

- Link between postnatal depression and behavioural and emotional problems in childhood is well established
- ALSPAC findings - anxiety during pregnancy predicted behavioural and emotional problems independent of postnatal depression
- ALSPAC focused on pregnancy not preconception
- To the best of our knowledge, these analyses in SWS are first to demonstrate that preconceptional maternal distress is linked to child behaviour

Implications

Three time points at which maternal psychological problems can affect child behaviour

Support for women with psychological distress from before conception might facilitate the prevention of childhood emotional problems

Acknowledgements

The SWS Study Group:

- Nurses/midwives
- Teachers
- Research assistants
- Administrative staff
- Computing staff
- Psychologists
- Dieticians/nutritionists
- Ultrasonographers
- Clerical staff
- Statisticians
- Doctors
- Lab staff
- Radiographers

Funders:

MRC, NIHR, ARUK,
University of Southampton,
Dunhill Medical Trust,
BHF, FSA, Hope,
Wellcome Trust

Young women and children in participating in the SWS

Pre-pregnancy Body Mass Index and breastfeeding initiation, early cessation, and longevity: Evidence from the first wave of the UK Millennium Cohort Study

Dr Tammy Campbell* and Dr Nichola Shackleton^

*London School of Economics

^University of Auckland

Research context

- Evidence that breastfeeding is associated with positive child outcomes (e.g. cognitive development; weight) and maternal experiences (e.g. depression; weight)
- Heavily recommended and promoted to mothers in the UK
- But very few breastfeed to or beyond the six months encouraged by the World Health Organisation and the NHS

Why not?

- **Background factors** associated with breastfeeding initiation and continuation among UK mothers include: ethnicity, maternal education, maternal age, siblings, drinking and smoking behaviours

- **Pregnancy and birth factors** include: gestational diabetes, gestational age, labour complications, delivery method, birthweight

International evidence that pre-pregnancy Body Mass Index (BMI) is another predictor of breastfeeding (both overweight and underweight negatively associated). So:

- Does this hold in the UK context?
- Can relationships between pre-pregnancy BMI and BF be explained by confounders?
- Does maternal ethnicity moderate any associations, in the UK context?
- Can we find evidence for any mediating pathways from pre-pregnancy BMI to breastfeeding?

Data and sample

- Millennium Cohort Study: nationally representative sample of 18,552 UK babies born 2000-2002
- 17,113 biological mothers have information on pre-pregnancy BMI and length of breastfeeding

Questions asked at first interview, circa 9 months: weight and height

- “How tall are you (without shoes)?”
- “Thinking back to just before you became pregnant with [baby], what was your weight then (without clothes)?”

Reported pre-pregnancy weight (in kilos) / height (in metres) squared = pre-pregnancy BMI

- ‘Underweight’ (<18.5) – 6%
- ‘Healthy weight’ (18.5-24.99) – 66%
- ‘Overweight’ (25-29.99) –20%
- ‘Obese’ (30+) – 9%

Questions asked at first interview, circa 9 months: breastfeeding

- “Did you ever try to breastfeed [baby]?”
- “How old was [baby] when [s]he last had breast milk?”

Three outcome variables, to represent different stages of the breastfeeding journey / points for potential intervention and help:

- Initiation (breastfeeding at all) – 70%
- Early cessation (stopping within the first month) – 32% of those who initiated
- Longevity (continuing to 5+ months) 34% of those who initiated

Binary logistic regressions (presenting EMMs)

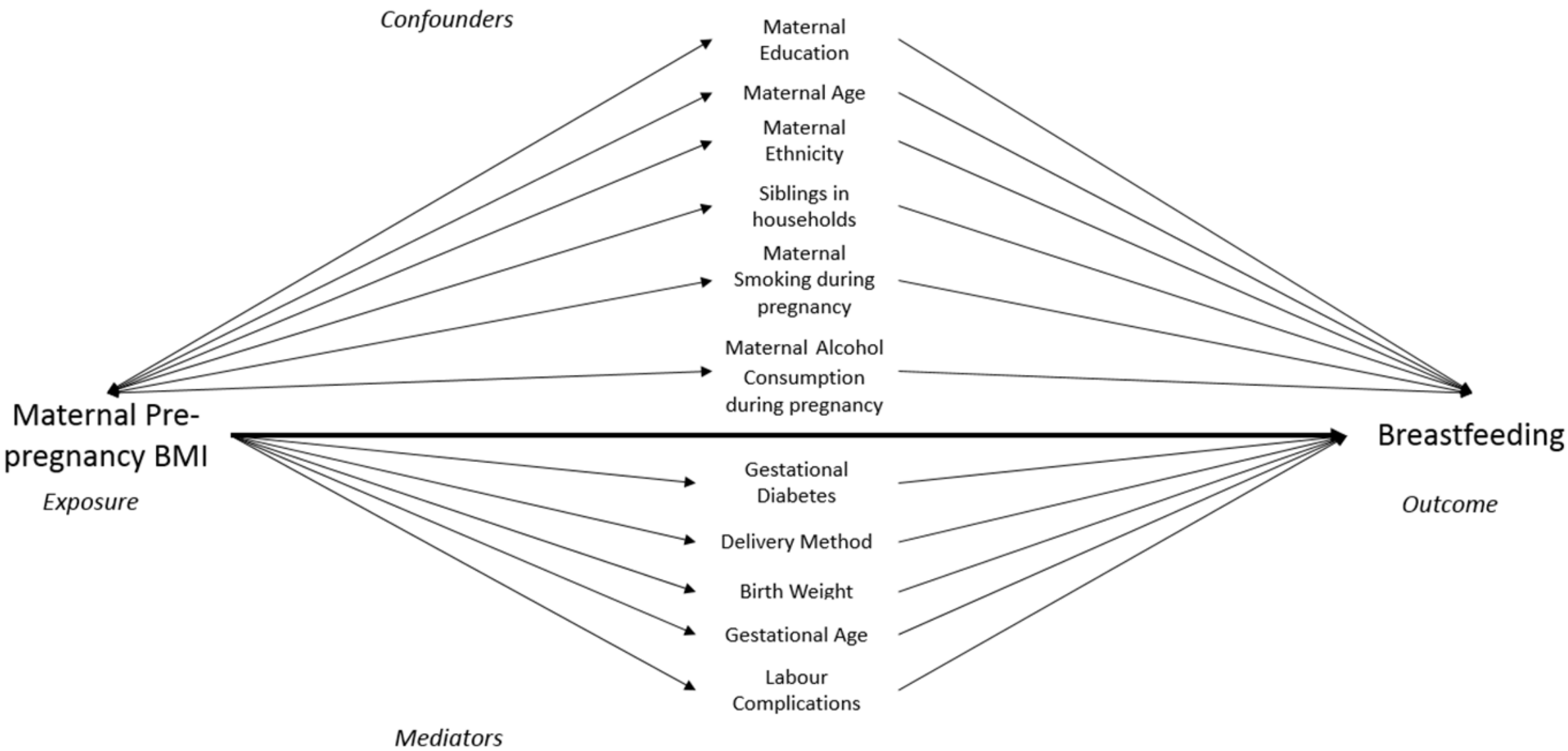
Discrete outcomes: BF initiation / BF early cessation / BF longevity

Predictor: Pre-pregnancy BMI group

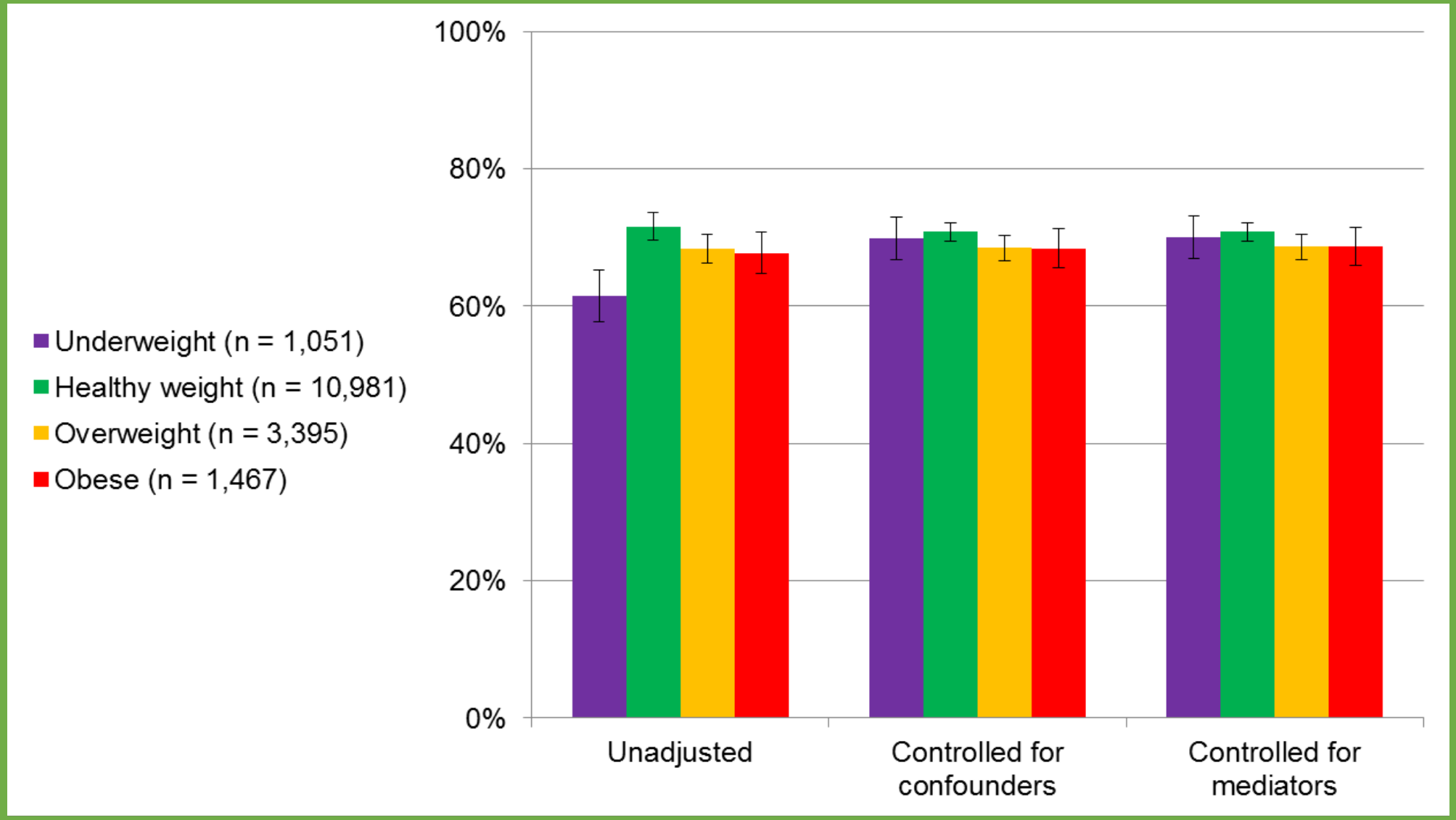
Confounders: ethnicity, maternal education, maternal age, siblings, drinking, smoking

Mediators: gestational diabetes, gestational age, labour complications, delivery method, birthweight

Interaction: BMI x ethnicity


Confounders
Maternal Education
Maternal Age
Maternal Ethnicity
Siblings in households
Maternal Smoking during pregnancy
Maternal Alcohol Consumption during pregnancy
Maternal Pre-pregnancy BMI
Exposure
Breastfeeding
Outcome
Gestational Diabetes
Delivery Method
Birth Weight
Gestational Age
Labour Complications
Mediators

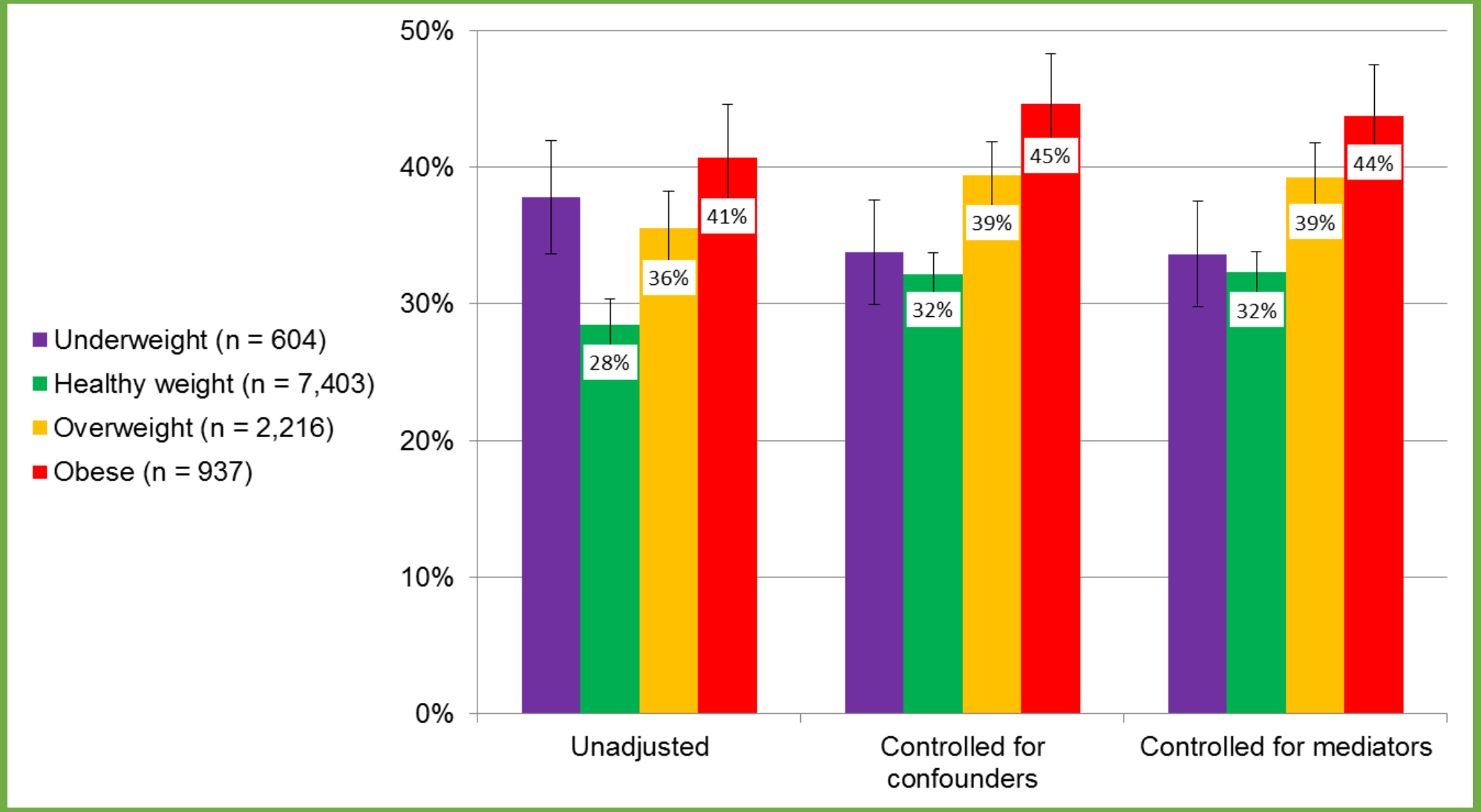
Results: initiation



70% of all mothers initiate

Little difference by BMI, on adding controls

Results: early cessation (among those who initiated)

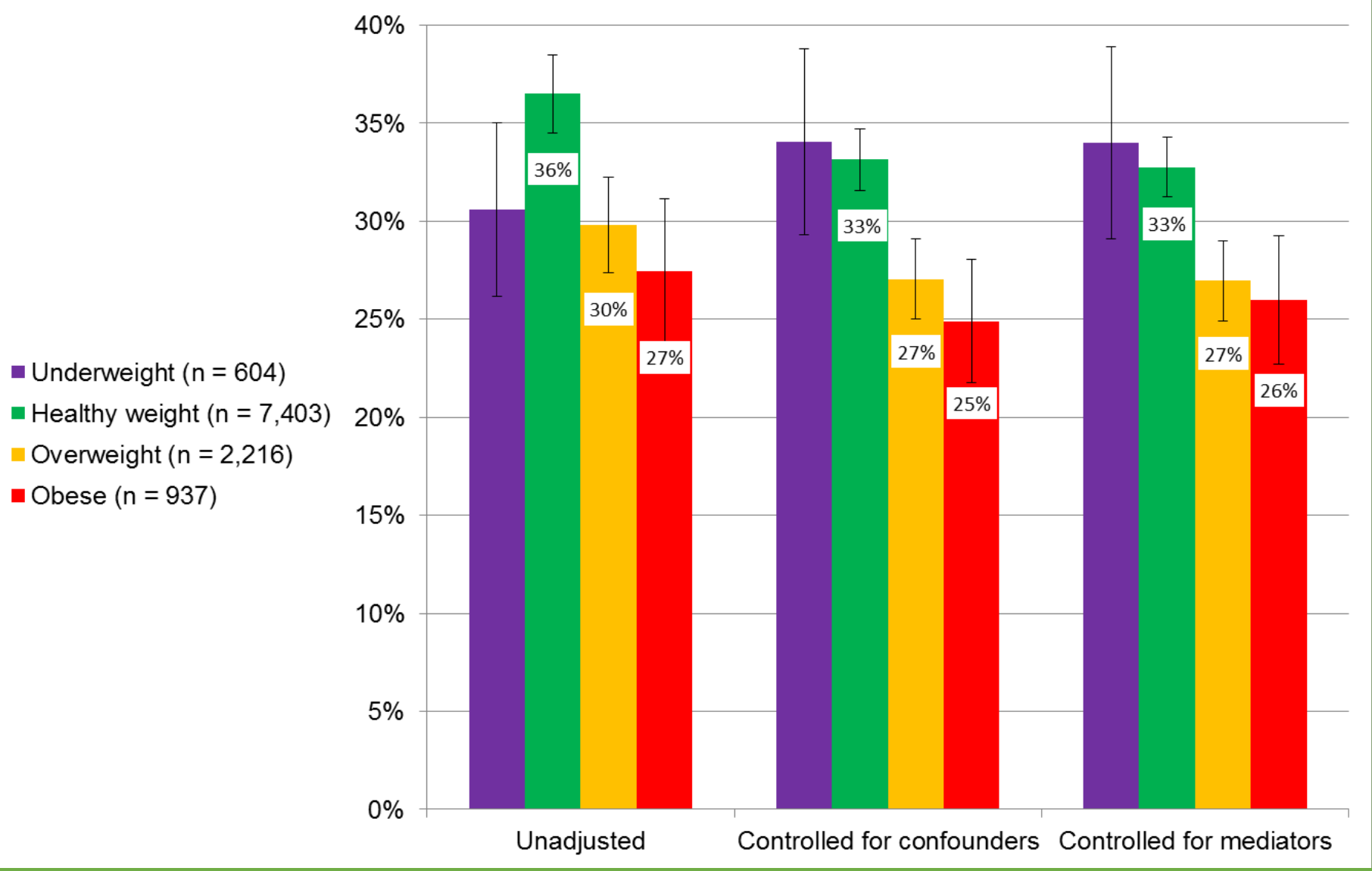


32% of all mothers cease within first month

Overweight and obese mothers more likely to cease early

Not explained by potential mediators

Results: longevity (among those who initiated)

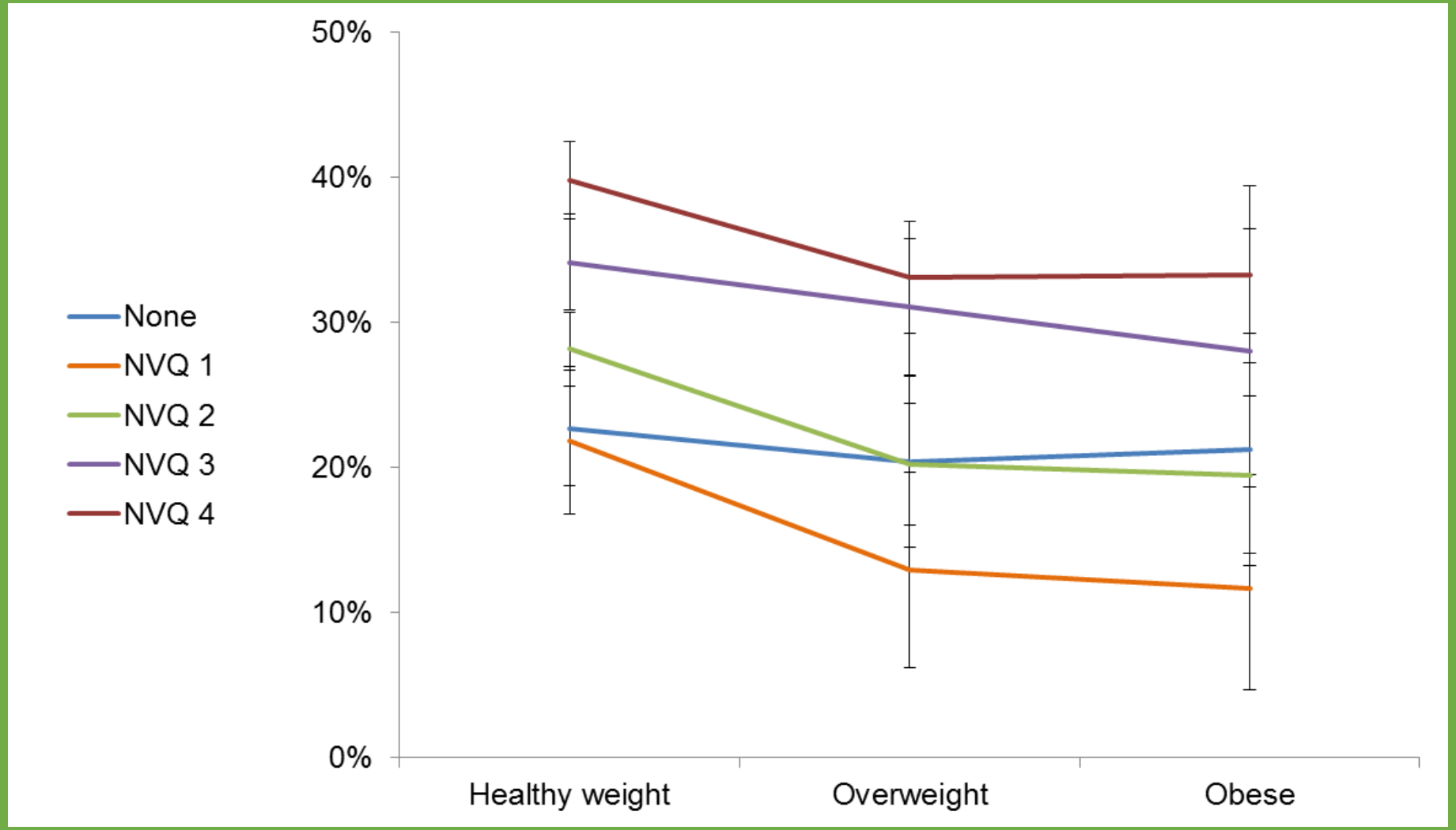


34% of all mothers who initiated continue to 5+ months

Overweight and obese mothers least likely to continue

Not explained by potential mediators

Results: No evidence for moderation by ethnicity...
...and results hold across other characteristics, e.g. education



Education level explains patterns for ‘underweight’ mothers

But patterns for early cessation and longevity hold for ‘overweight’ and ‘obese’ mothers, across education levels

Chart = selected estimates from longevity model

Main findings

- In this UK sample, little evidence that ‘underweight’ is independently related to breastfeeding. And little patterning by BMI in initiation.
- But among those who initiate, ‘overweight’ / ‘obese’ mothers more likely to cease early and less likely to continue to 5+ months (not explained by observed confounders)
- Available potential mediators (pregnancy and birth factors) do not explain relationships
- No evidence that maternal ethnicity moderates associations
- The magnitude of associations is smaller than those with other factors, e.g. education level – but patterns by ‘overweight’ and ‘obesity’ hold across factors such as this

Implications

- Pre-pregnancy BMI may be one useful factor to consider when targeting and tailoring support to mothers, and may help with informing / interpreting their feeding decisions and experiences

- This should take into account existing and new research on possible reasons for BMI-BF associations (physiological; psychological; societal; environmental)

- Breastfeeding may be a mediating factor in observed relationships between maternal BMI and children’s development

Thanks for listening

Questions, comments...?

Tammy Campbell <t.campbell1@lse.ac.uk>
Nichola Shackleton <n.shackleton@auckland.ac.nz>

Local environmental quality positively predicts breastfeeding in the UK's Millennium Cohort Study

Laura J Brown

@lolabear88

PhD Supervisor: Rebecca Sear

EVOLUTION, MEDICINE, & PUBLIC HEALTH

Improving health worldwide

www.lshtm.ac.uk

LONDON SCHOOL of HYGIENE &TROPICAL MEDICINE

Outline

- Introduction
- Environmental influences on health outcomes and behaviours
- Aims of our study
- The MCS data and measures used
- Key findings
- Conclusions and implications

LONDON SCHOOL of HYGIENE &TROPICAL MEDICINE

“We must now find a way to build a supportive, enabling environment for all women who want to breastfeed”

UNICEF’s call to governments across the UK to take urgent action to remove the barriers to breastfeeding in the UK

Environmental influences on health outcomes and behaviours

Life history theory

- Age- and stage-specific patterns of key life events depend on **extrinsic environmental factors** and **resource availability**

- Trade-offs in energetic resource allocation

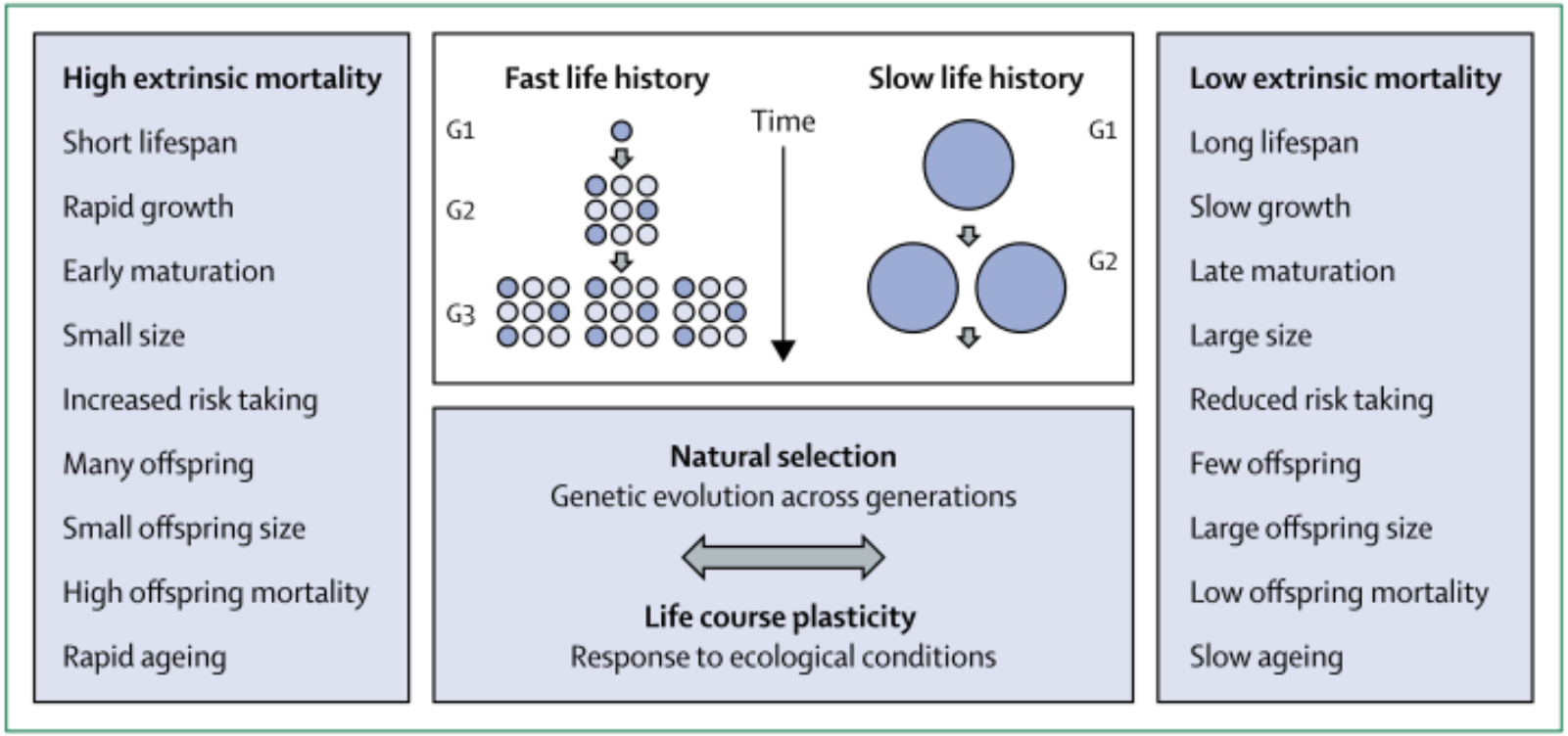


Figure 1: **Life history contrasts across a fast–slow continuum**
Fast life histories are favoured in environments with high mortality risk, whereas slow life histories can evolve when mortality risk reduces. These strategies might evolve under natural selection, but physiology can also respond to cues during the life course through plasticity. The size of the circles is proportional to adult body size, and filled circles indicate individuals that survive to reproduce. G1=first generation. G2=second generation. G3=third generation.

Wells, J. C. K., Nesse, R. M., Sear, R., Johnstone, R. A., & Stearns, S. C. (2017). **Evolutionary public health: introducing the concept.** The Lancet, 390(10093), 500–509.

Environmental quality links with...

- Chronic diseases
- The aging process
- Mental health outcomes
- Health behaviours
- Social well-being

Harsher environments →

- Earlier first births
- Preterm deliveries
- SGA & LBW babies

Environmental quality vs socioeconomic status

Environmental quality

- Local conditions
- External resources
- Physical and sociocultural
- Subjective / objective
- Various scales

SES

- Individual condition
- Somatic and cognitive resources
- Income / job status / education

LONDON SCHOOL of HYGIENE &TROPICAL MEDICINE

Our study

Aim: To investigate whether localised measures of environmental quality are associated with breastfeeding initiation and duration, and to tease apart the influence of local environmental experience and individual SES on women's investments in breastfeeding in the UK

Two hypotheses:

1. Local environmental quality is positively correlated with the probability of breastfeeding initiation and lengthened breastfeeding duration;
2. Higher individual SES buffers against negative effects of lower local environmental quality on breastfeeding.

LONDON SCHOOL of HYGIENE &TROPICAL MEDICINE

Data

UK Millennium Cohort Study

19,000 children born between 2000 and 2002

Restricted to:

- Biological mothers, still living with their babies
- If multiple birth, only included first cohort member
- Mothers who completed waves 1 (9mo) and 2 (3yrs)

Max. usable sample = **14,576** mothers

CHILD OF THE NEW CENTURY

Measures

Breastfeeding

- **Initiation** – “Did you ever try to breastfeed ^Jack?”

- **Duration** – “How old was ^Jack when ^he last had breast milk?”

Local environmental quality


























CLEAN IT UP




NO
CLEAN IT UP


CLEAN IT UP


CLEAN IT UP


















CLEAN IT UP


















Objective
environmental
quality




Socioeconomic status

- **Income:** OECD equivalised Hh income quintiles

- **Job status:** NS-SEC 3 categories. If mothers were partnered, highest of mother's and partner's job status used.

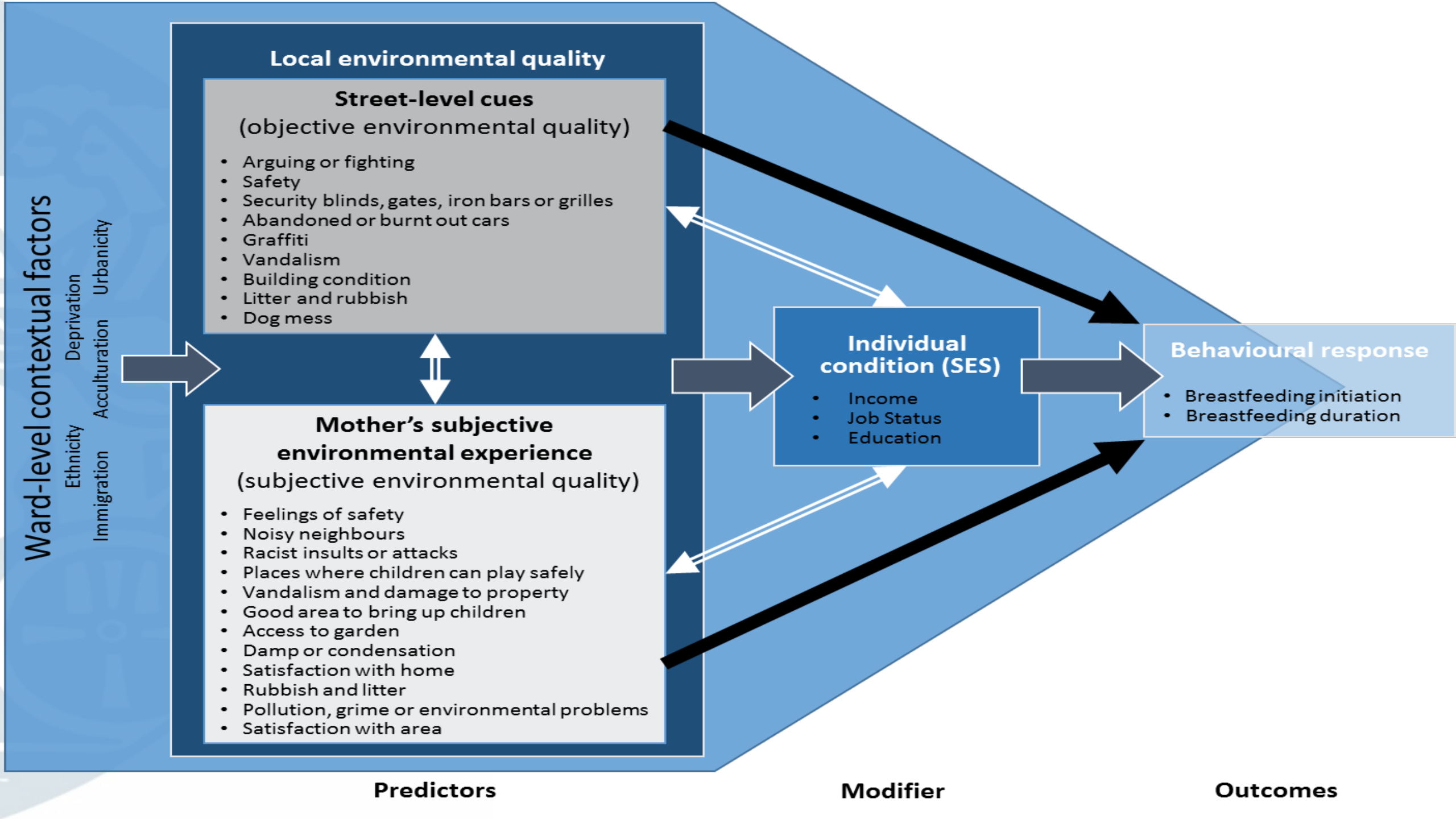
- **Education:** Highest qualification level. If mothers were partnered, highest of mother's and partner's qualifications used.

- **Combination:** Income + Job status + Education

Covariates

- ***Exposure to current environment:***
  - time at current address, moved house between waves
  - (Model 1, 2 and 3)
- ***Infant and maternal characteristics:***
  - birthweight, parents/carers in Hh, maternal age, parity, ethnicity, immigration status and level of acculturation
  - (Model 1, 2 and 3)
- ***Ward-level factors:***
  - BME %, Immigrant %, Non-English speaker %, urbanicity %, deprivation (IMD)
  - (Model 3 only)

LONDON SCHOOL of HYGIENE &TROPICAL MEDICINE


Ward-level contextual factors
Ethnicity
Deprivation
Immigration
Acculturation
Urbanicity
Local environmental quality
Street-level cues
(objective environmental quality)
Arguing or fighting
Safety
Security blinds, gates, iron bars or grilles
Abandoned or burnt out cars
Graffiti
Vandalism
Building condition
Litter and rubbish
Dog mess
Mother's subjective environmental experience
(subjective environmental quality)
Feelings of safety
Noisy neighbours
Racist insults or attacks
Places where children can play safely
Vandalism and damage to property
Good area to bring up children
Access to garden
Damp or condensation
Satisfaction with home
Rubbish and litter
Pollution, grime or environmental problems
Satisfaction with area
Individual condition (SES)
Income
Job Status
Education
Behavioural response
Breastfeeding initiation
Breastfeeding duration
Predictors
Modifier
Outcomes

We wanted to know…

1) Does local environmental quality predict breastfeeding?

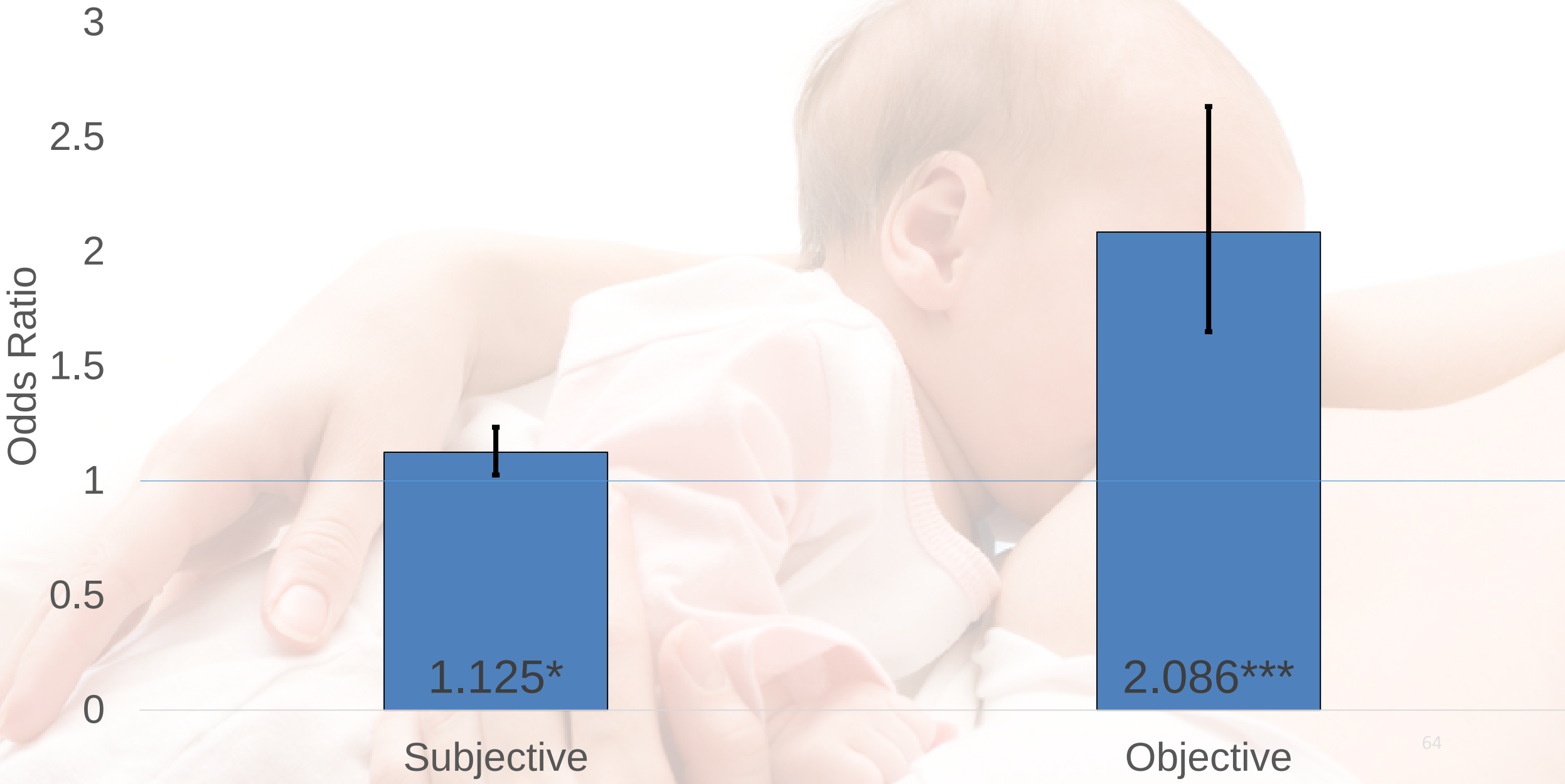
2) Does high SES buffer against harsh environmental conditions?

Key findings

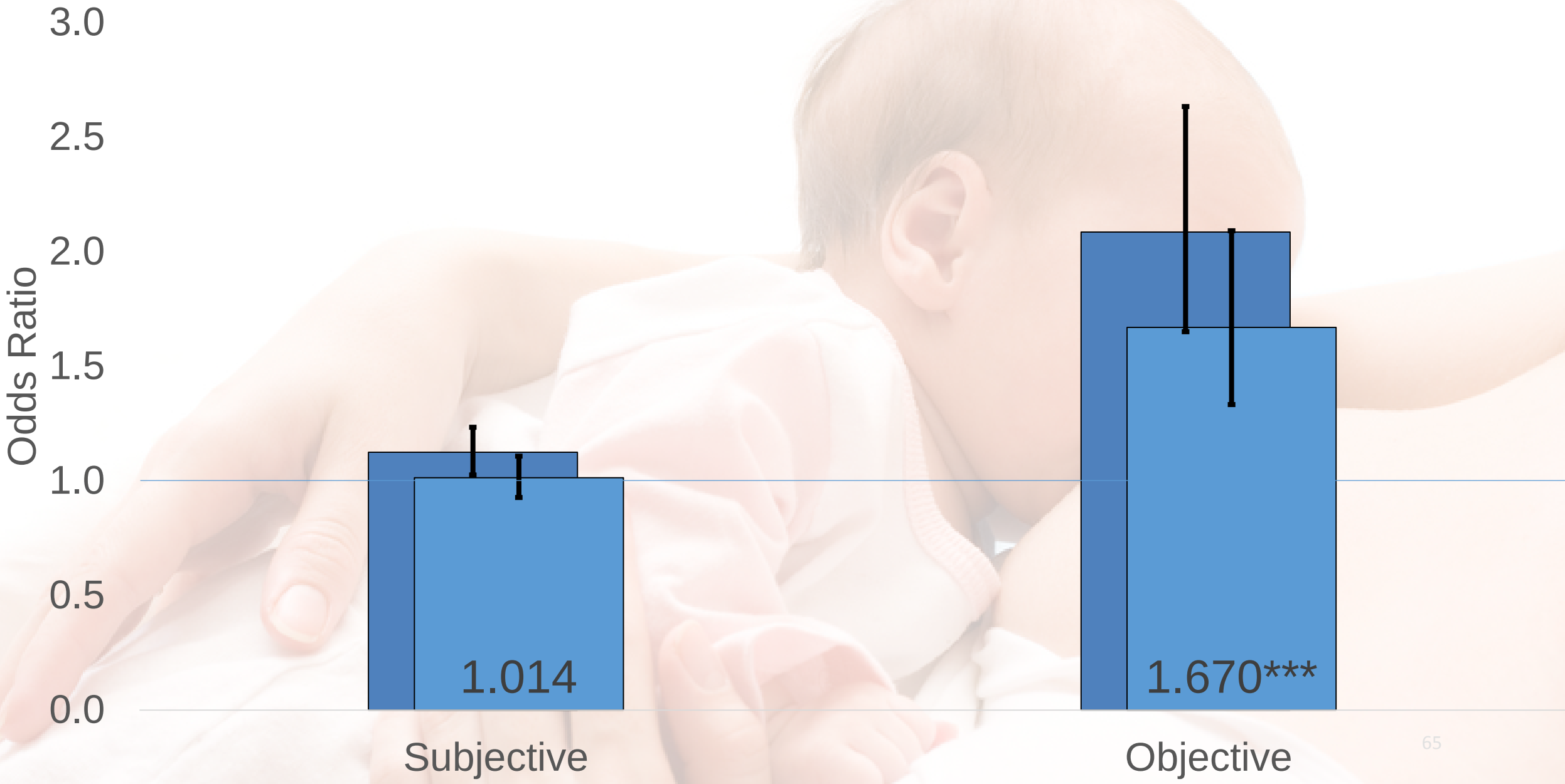
1) Does environmental quality – as captured by our two measures – predict breastfeeding?

Breastfeeding initiation

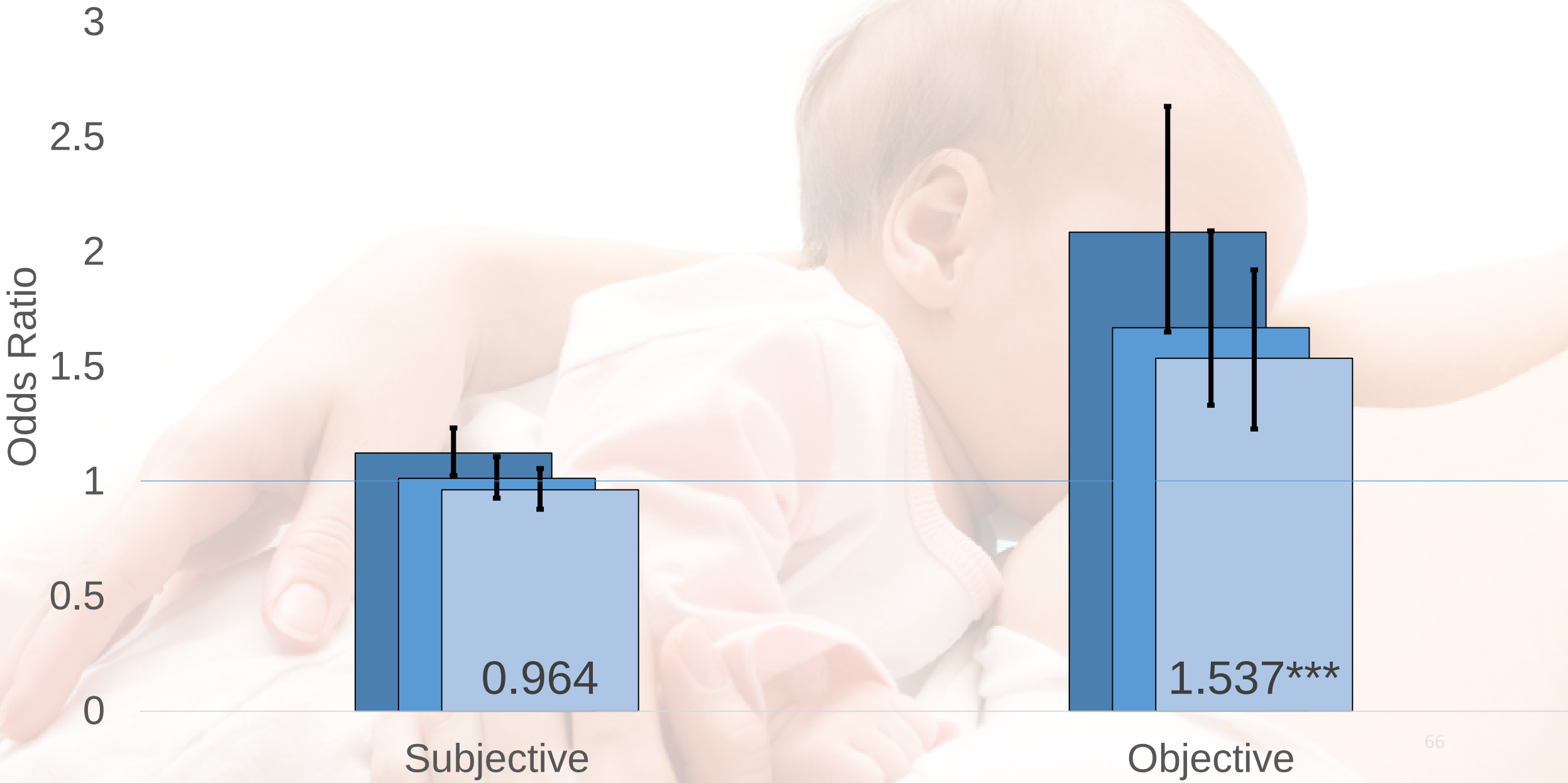
Breastfeeding initiation



Breastfeeding initiation

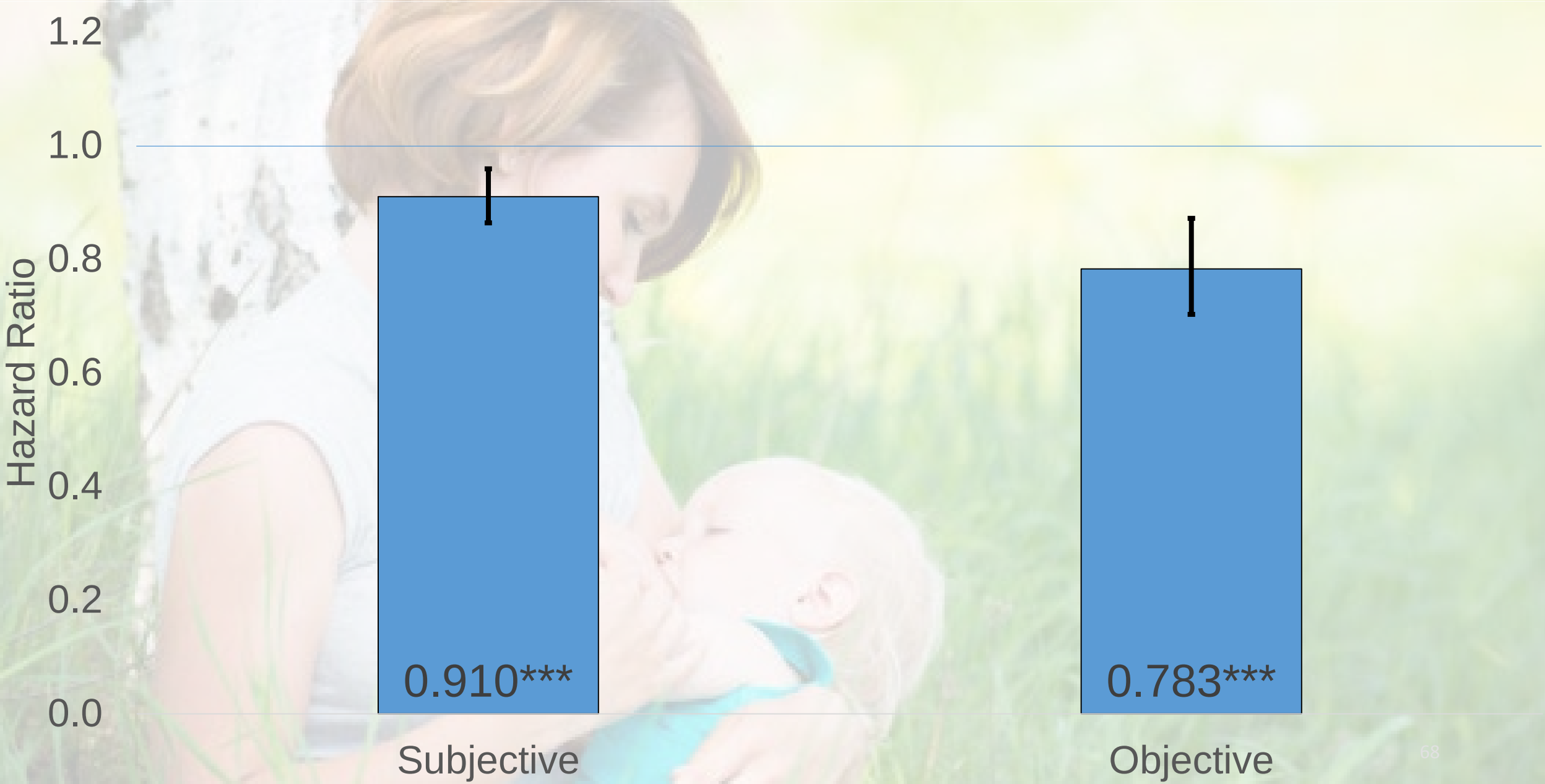


Breastfeeding initiation

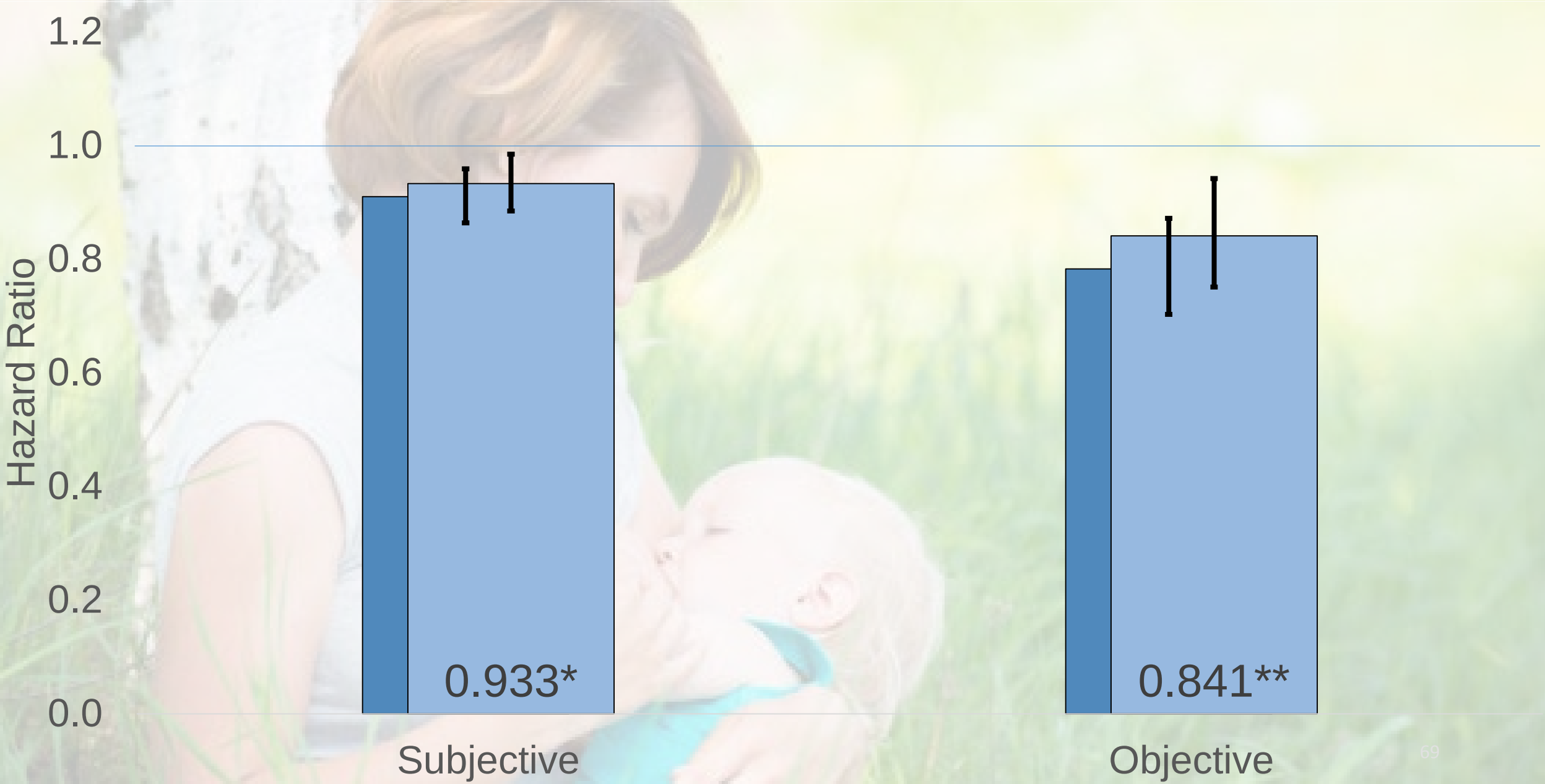


Breastfeeding duration

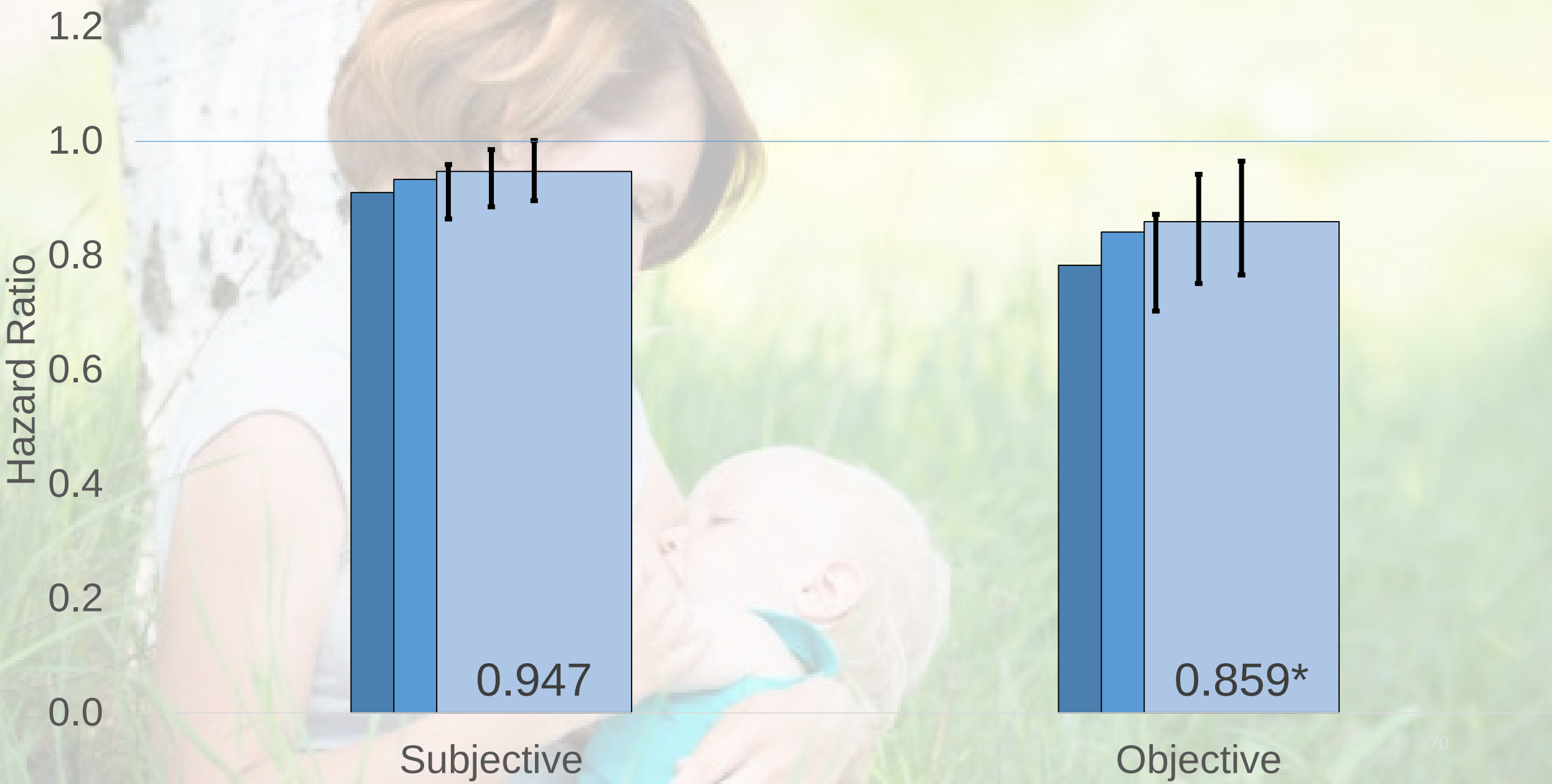
Breastfeeding termination



Breastfeeding termination

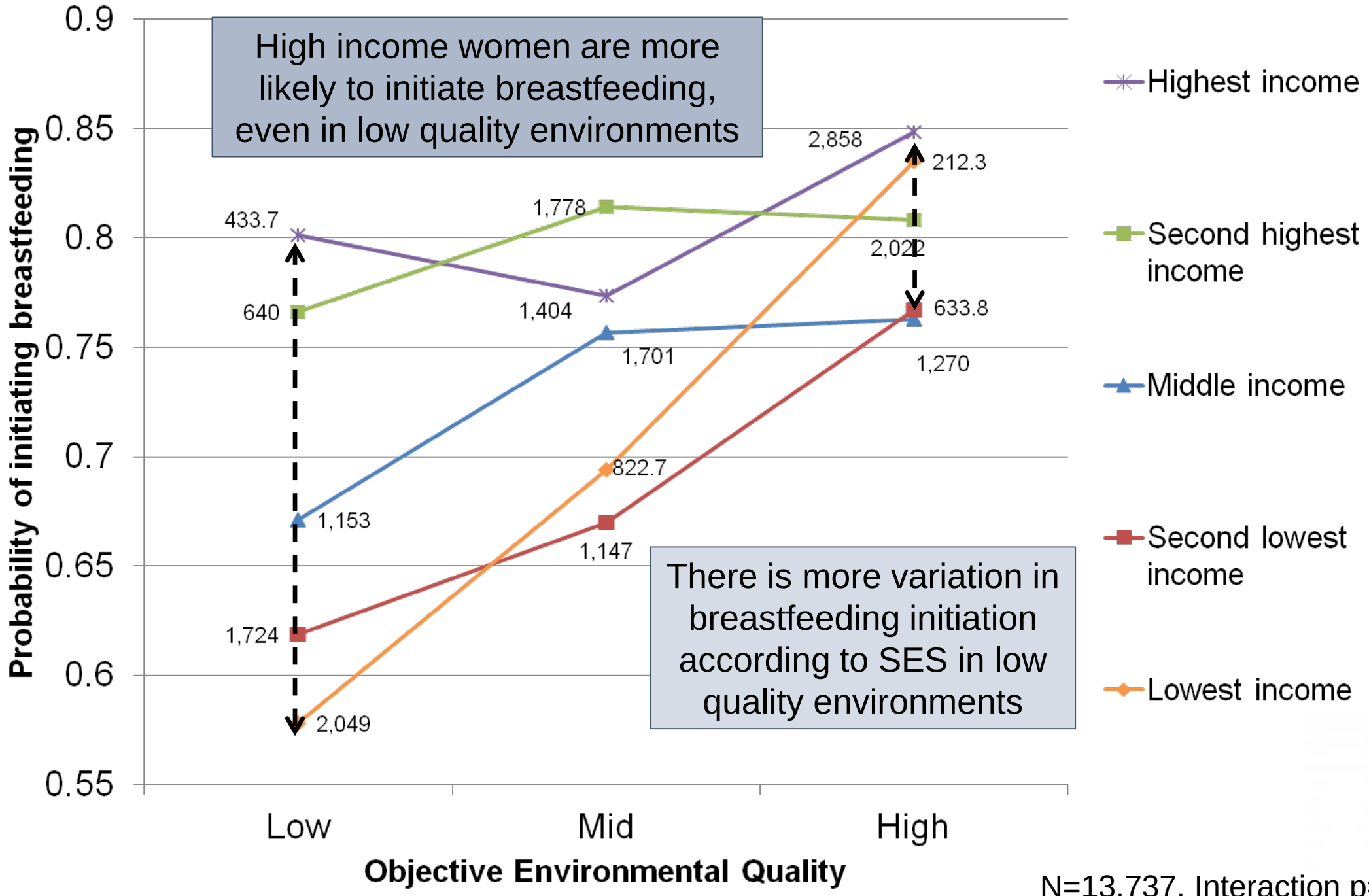


Breastfeeding termination



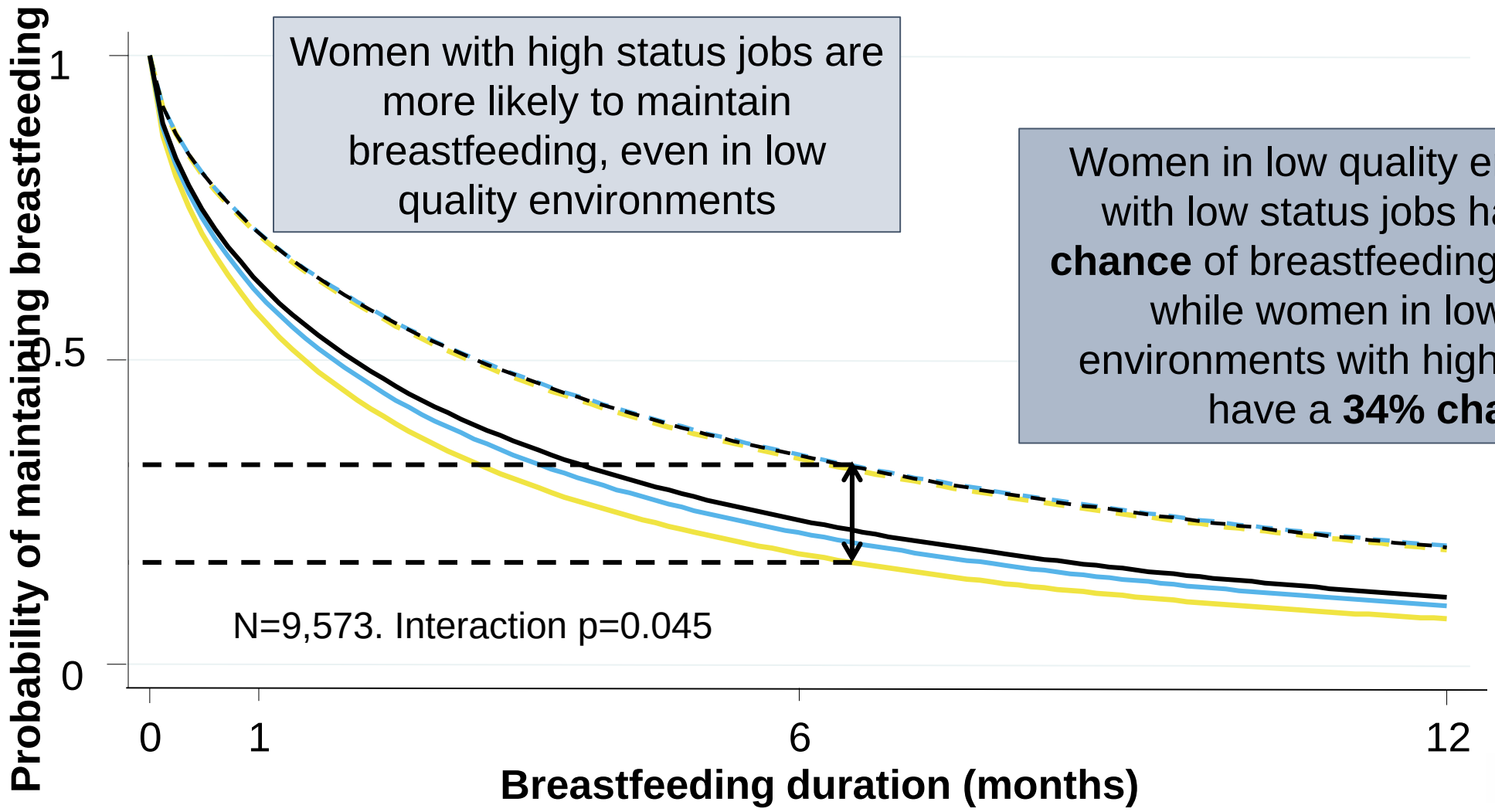
2) Does SES buffer against harsh environmental conditions?

Breastfeeding initiation



N=13,737. Interaction p=0.014

Breastfeeding duration


Probability of maintaining breastfeeding
1
0.5
0
0
1
6
12
Breastfeeding duration (months)
Women with high status jobs are more likely to maintain breastfeeding, even in low quality environments
Women in low quality environments with low status jobs have a 18% chance of breastfeeding to 6 months, while women in low quality environments with high status jobs have a 34% chance
N=9,573. Interaction p=0.045
Low OEQ, low job status (n=2,872)
Low OEQ, high job status (n=1,446)
Mid OEQ, low job status (n=1,812)
Mid OEQ, high job status (n=3,374)
High OEQ, low job status (n=727.4)
High OEQ, high job status (n=5,025)

Conclusions & implications

Conclusions

1) Higher objective, but not subjective, environmental quality predicts higher likelihood of breastfeeding initiation and longer durations once individual SES and wider-level environmental factors are accounted for

2) Higher individual SES is protective, with women from high-income households having relatively high breastfeeding initiation rates and those with high status jobs being more likely to maintain breastfeeding, even in poor environmental conditions

LONDON SCHOOL of HYGIENE &TROPICAL MEDICINE

Implications for further research and policy

- Barriers behind breastfeeding-specific barriers

Who is most vulnerable?

- Double jeopardy of low environmental quality and low SES

How do we help?

- Environmental vs individual-level interventions

Limitations

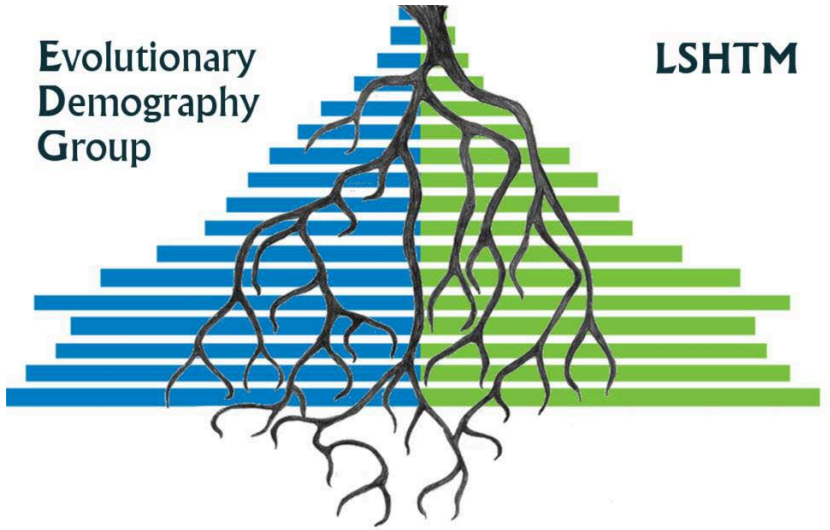
- Correlation not causation. Mechanisms?
- Other environmental quality measures, individual aspects

Thank you!

- University of London. Institute of Education. Centre for Longitudinal Studies. (2012). *Millennium Cohort Study: First Survey, 2001-2003*. [data collection]. *11th Edition.* UK Data Service. SN: 4683, http://dx.doi.org/10.5255/UKDA-SN-4683-3
- University of London. Institute of Education. Centre for Longitudinal Studies. (2012). *Millennium Cohort Study: Second Survey, 2003-2005*. [data collection]. *8th Edition.* UK Data Service. SN: 5350, http://dx.doi.org/10.5255/UKDA-SN-5350-3

UK Data Service

E·S·R·C ECONOMIC & SOCIAL RESEARCH COUNCIL



@lolabear88

laura.brown@lshtm.ac.uk

LONDON SCHOOL of HYGIENE &TROPICAL MEDICINE