Niamh at 9 months

Niamh at 3 years

Niamh at 5 years

Social Class Differences in Weight Gain from Birth to 3 Years

Richard Layte (ESRI)

Regien Biesma-Blanco (RCSI)

www.growingup.ie

ESRI

An Roinn Leanaí agus Gnóthaí Óige
Department of Children and Youth Affa

TRINITY COLLEGE DUBLIN

Introduction - 1

- Rates of child overweight and obesity are rising
- Obesity leading cause of preventable morbidity and mortality
- Gradients in child obesity risk by socio-economic status
- Some evidence for England and US of widening differentials
- Evidence from MCS in UK that gradient established by 5

Introduction - 2

- **What explains these SES gradients in obesity risk in childhood?**
  - Evidence for role of rapid growth in early infancy
    - Correlation with birth weight and gestation
    - Prenatal exposures
    - Breastfeeding and weaning
    - Child diet and lifestyle
- **Important policy implications**
- **This paper investigates the contribution of different groups of factors to social class differentials in weight gain**

Literature

- **More breastfeeding associated with less rapid growth**
  - Uncertainty around mechanism:
    - Higher levels of protein in formula
    - Passive consumption of more calories
    - Lack of development of satiety response
- **Early weaning associated with rapid growth**
- **Maternal smoking in pregnancy**
  - Possible influence on brain development, appetite and impulse control
- **Maternal pre-pregnancy weight and weight gain in pregnancy**
- **Child diet and lifestyle**

Data

- Growing Up In Ireland Infant Cohort
- Children born between December 2007 and May 2008
- Random sample from Child Benefit Register
- 11,134 (69% response rate), 9738 re-interviewed in 2010/11
- Parents interviewed when child 9 months of age and again when child aged 3
- Total sample in analysis 8719

Physical Measures

- Measured Child Weight
  - At Birth (National Perinatal Reporting System)
  - Child aged 9 months (SECA Class III Scales)
  - Child aged 3 years (SECA Class III Scales)

- Measured Child Height
  - Child aged 9 months (Leicester Height Stick)
  - Child aged 3 years (Leicester Height Stick)

- Maternal weight @ 9 months (SECA 761 Scales)
- Maternal height @9 months (Leicester Height Stick)
- Maternal pregnancy weight gain (Self-Reported)

Household Social Class

- CSO Social Class Measure
  - Parental current and past occupations coded to CSO standard occupational codes (SOC)
  - SOCs coded to CSO social classes
  - Household class by dominance (highest FT)
    - Professional Workers
    - Employers and Managers
    - Clerical and Administrative
    - Skilled Manual
    - Unskilled Manual
    - Unclassified

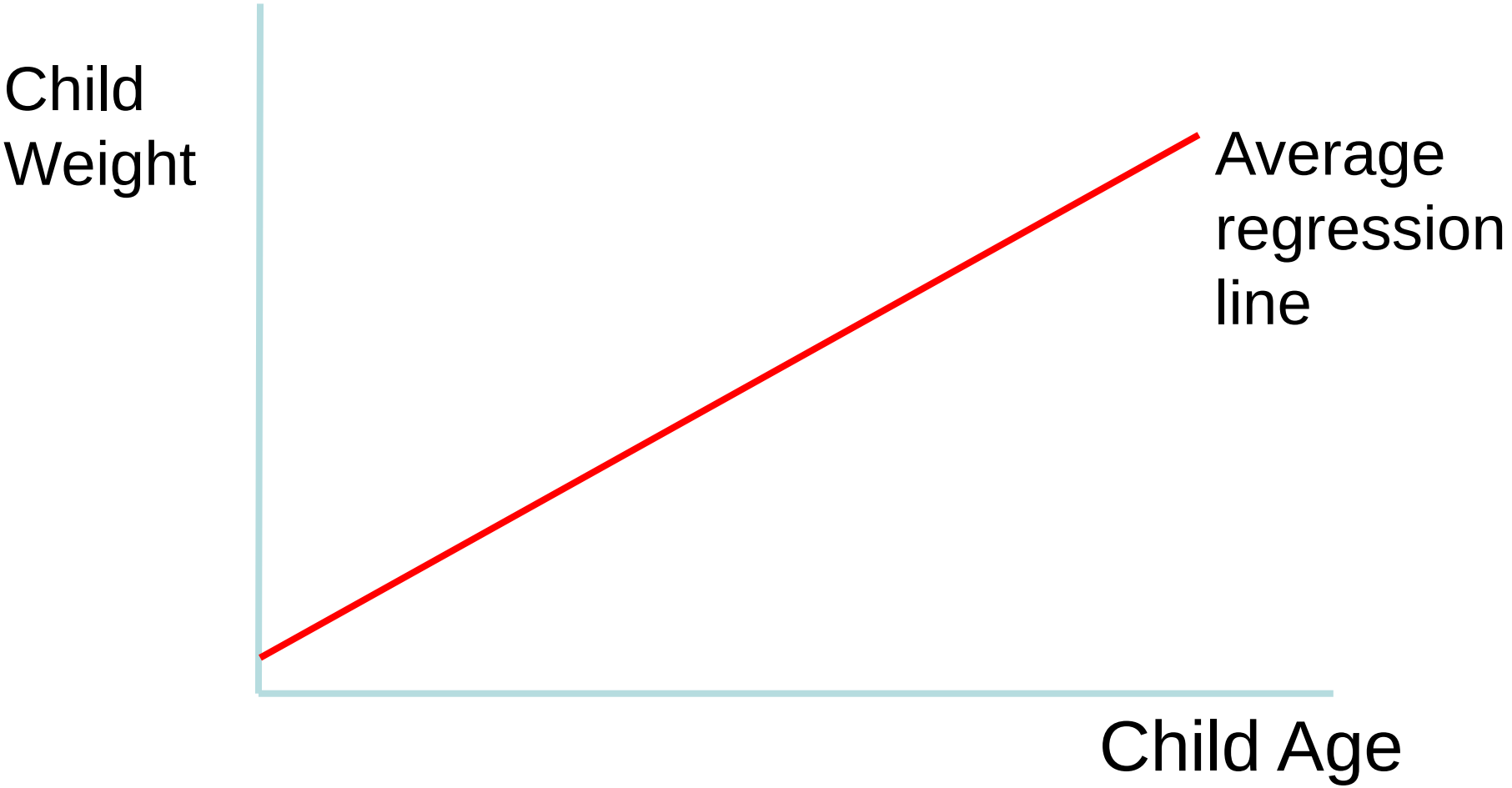
Control Variables

- **Child sex**
- **Maternal Age (5 Groups)**
- **Maternal Ethnicity (8 Groups)**
- **Child Parity**
- **Gestation (4 groups)**

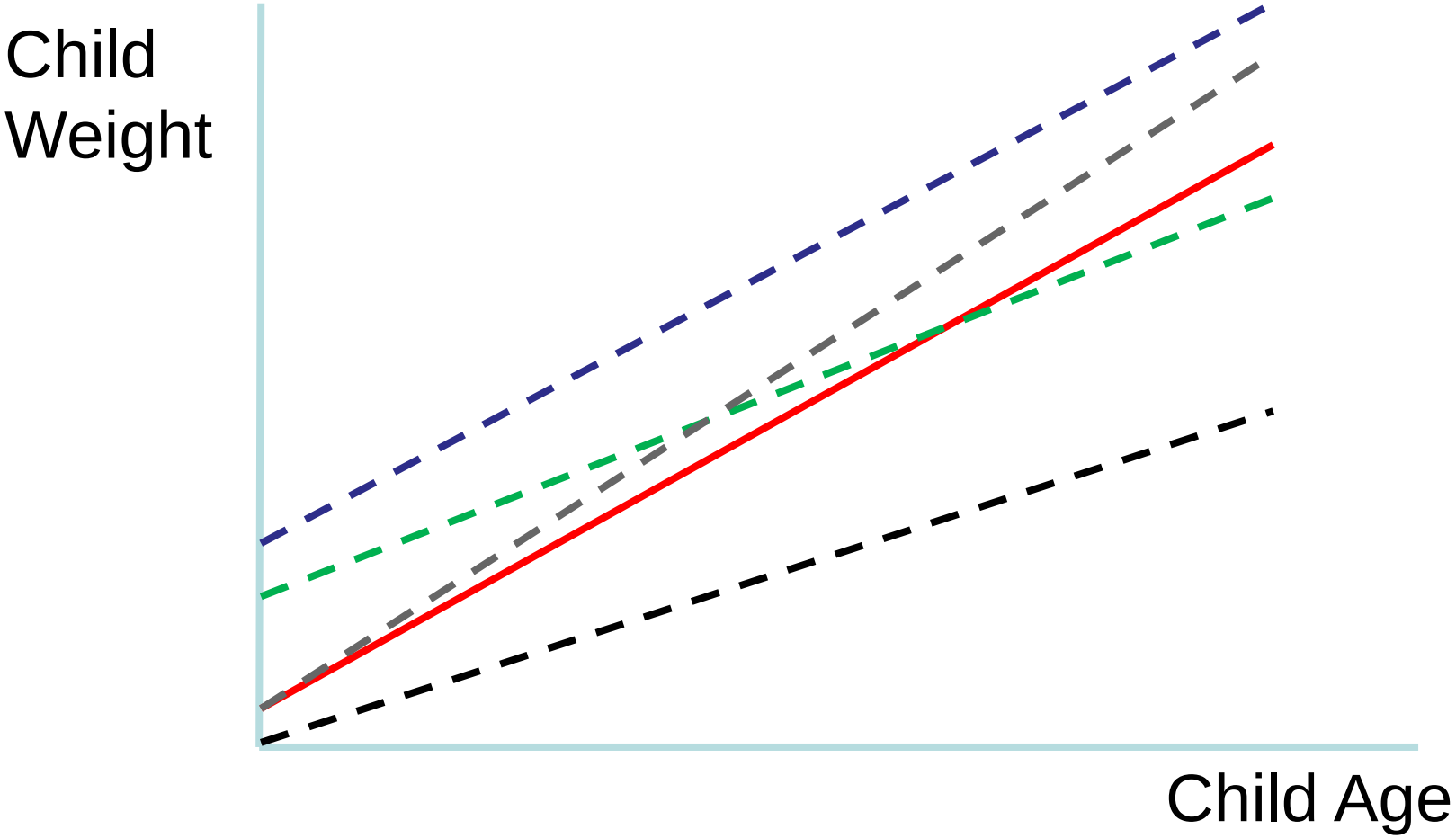
Independent Variables

- Duration of breastfeeding (any in days)
- Child age at weaning to regular solids (days)
- Daily cigarettes Third Trimester (number)
- Daily Hours of TV (4 Groups)
- Child dietary quality (20 item weighted)
- Maternal BMI @ 9 months (3 groups)
- Maternal weight gain in pregnancy (kgs)

Child Weight Gain



Child Weight Gain

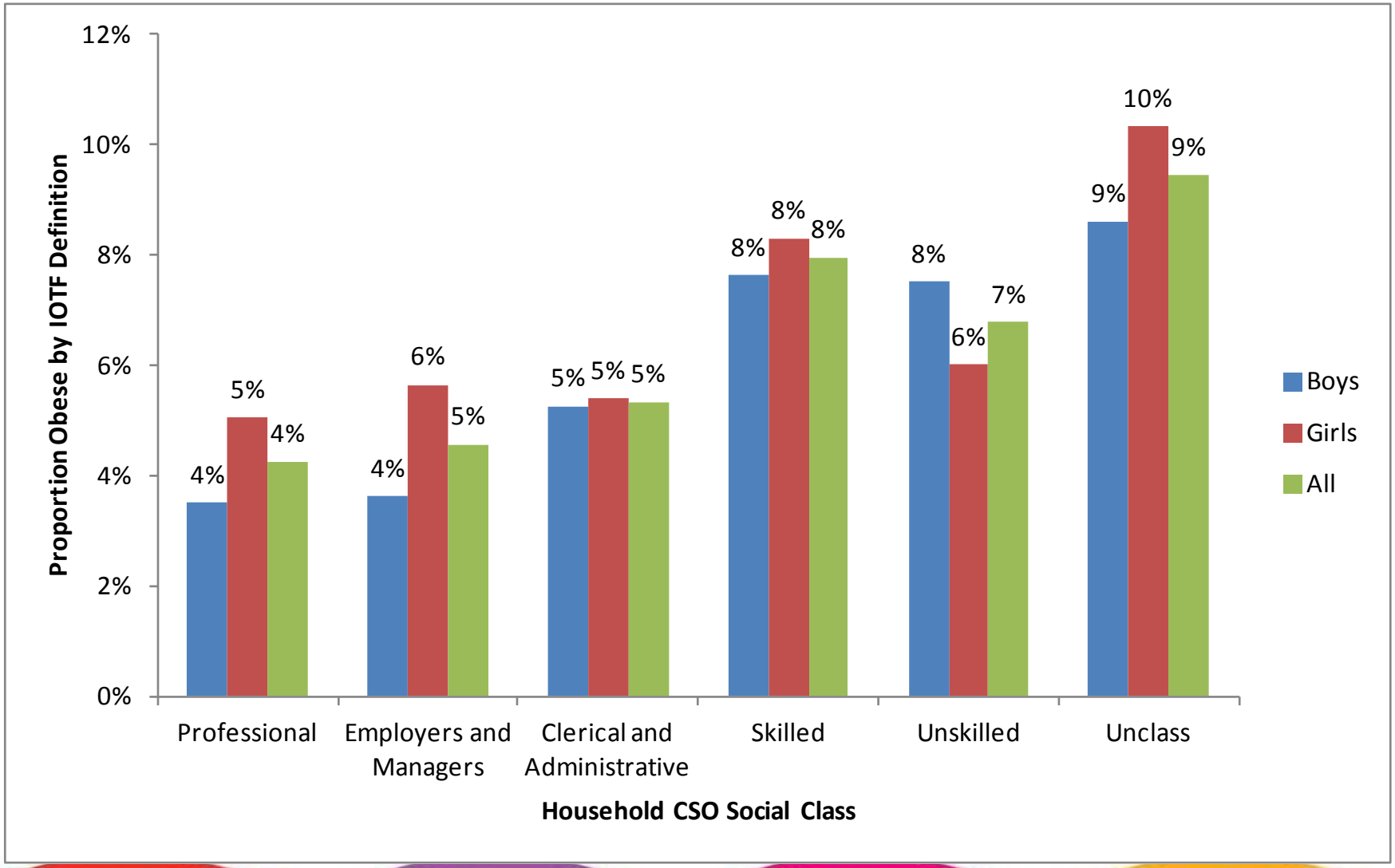


Latent Growth Model

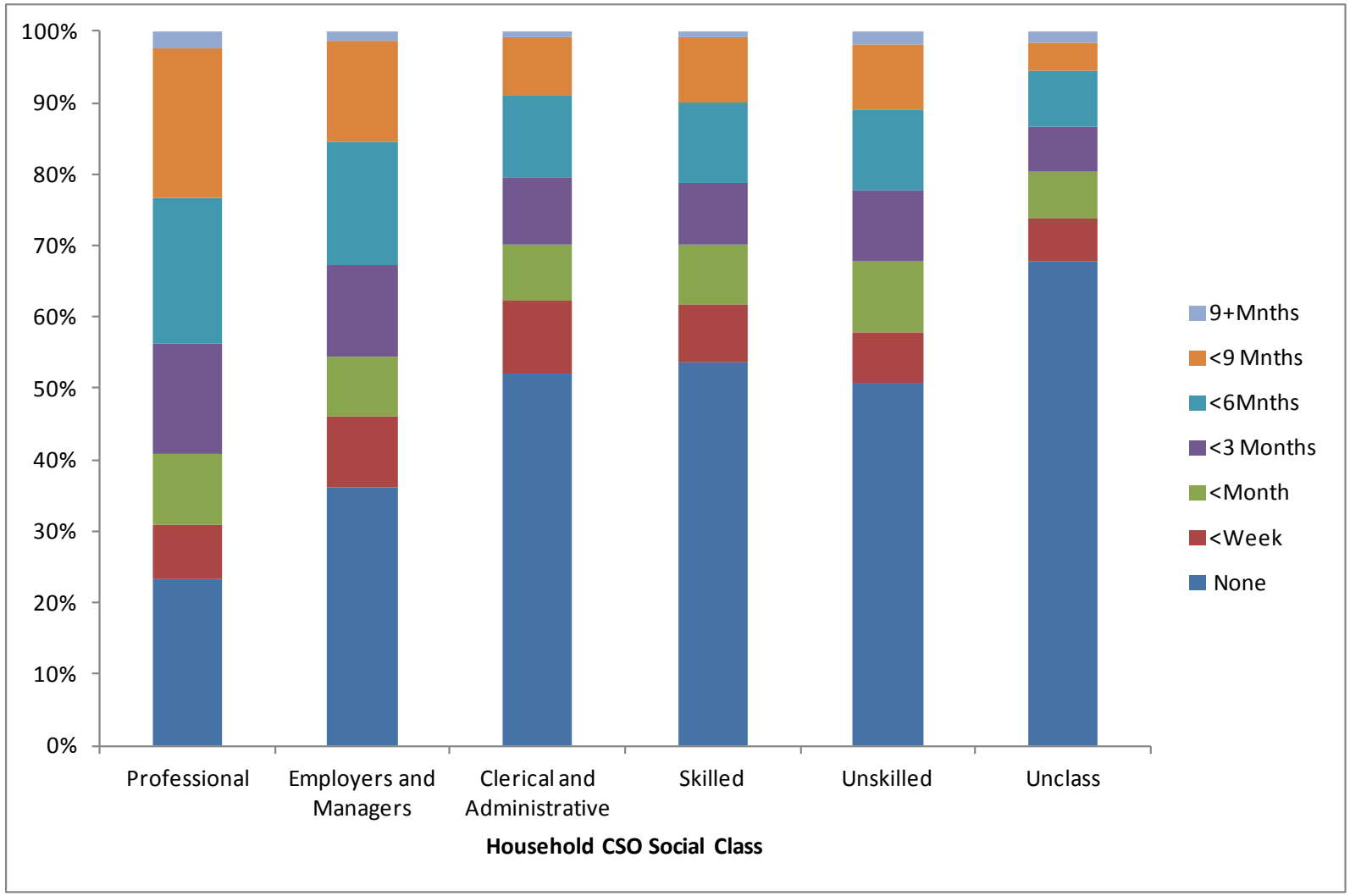
$$Weight_{ij}=\gamma_{00}$$
$$+\gamma_{01}(SOCIAL\ CLASS_j)$$
$$+\gamma_{02}(\chi_j)$$
$$+\gamma_{10}(TIME_{ij})$$
$$+\gamma_{23}(SOCIAL\ CLASS_j*TIME_{ij})$$
$$+\gamma_{34}(\chi_j*TIME_{ij})$$
$$+u_{0j}+u_{1j}(TIME_{ij})+r_{ij}$$

Each Model Conditions on Child Length at 9 Months and 3 Years

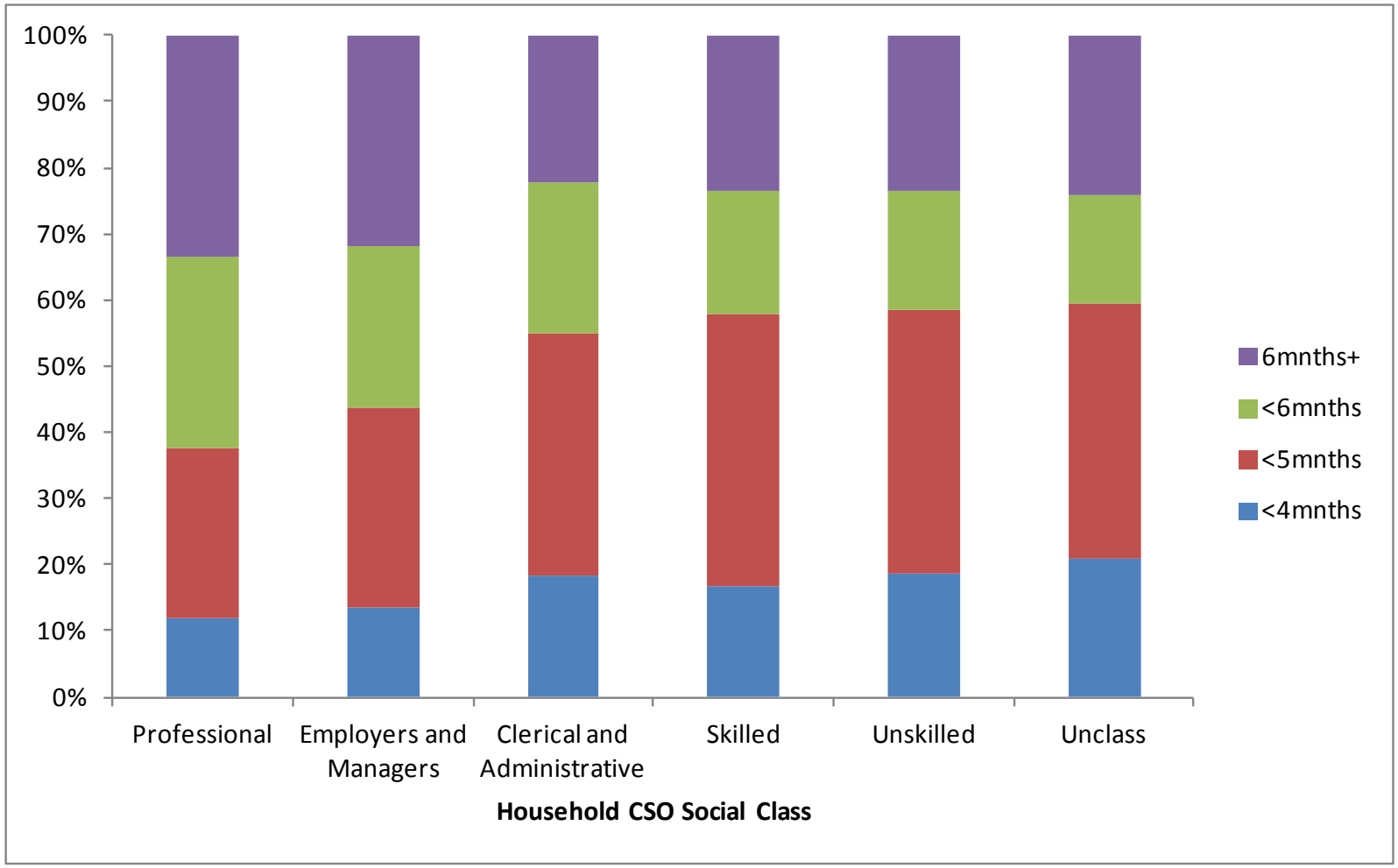
IOTF Obesity Prevalence – Infant Cohort Wave 2 (Age 3)



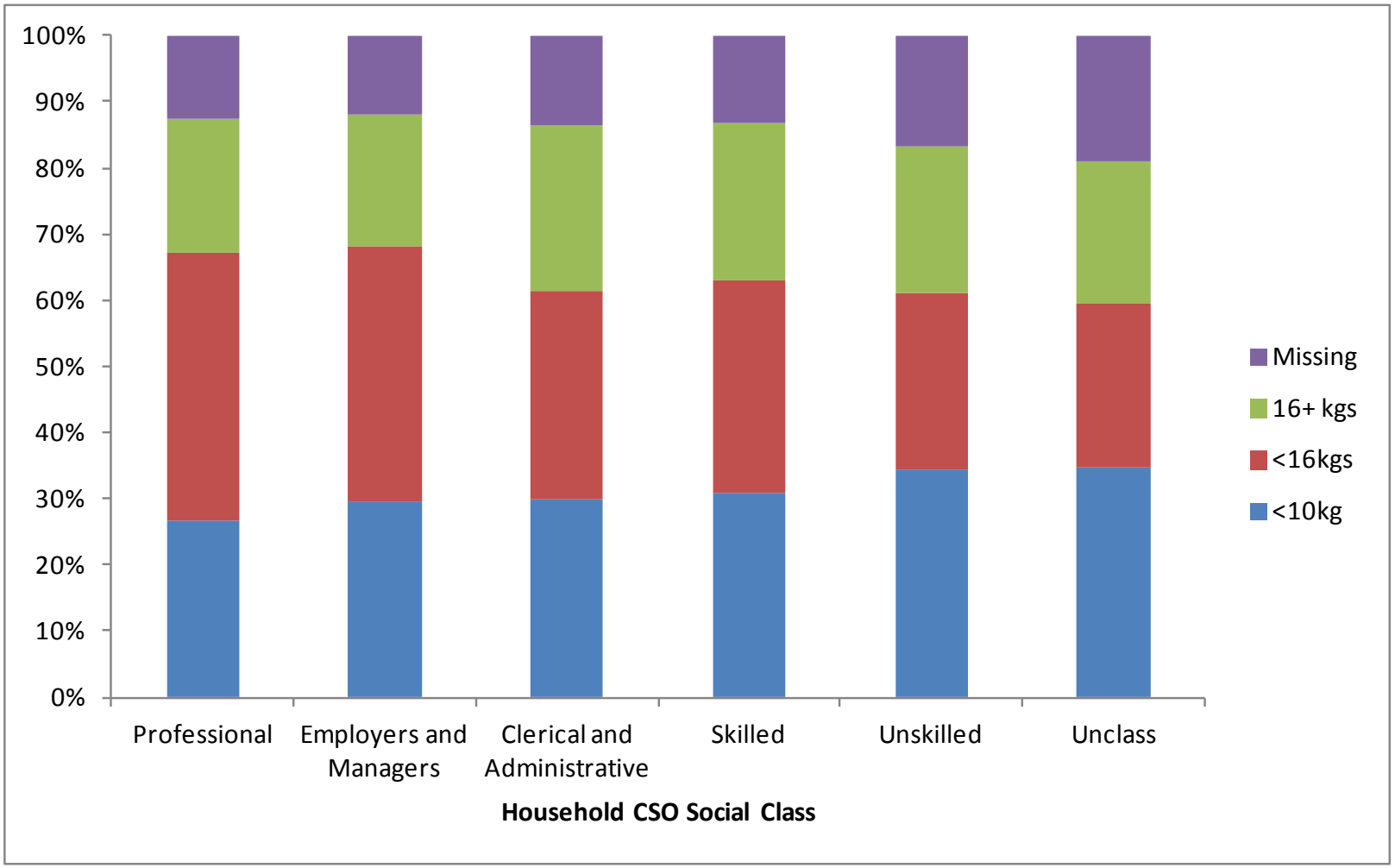
Breastfeeding by Social Class



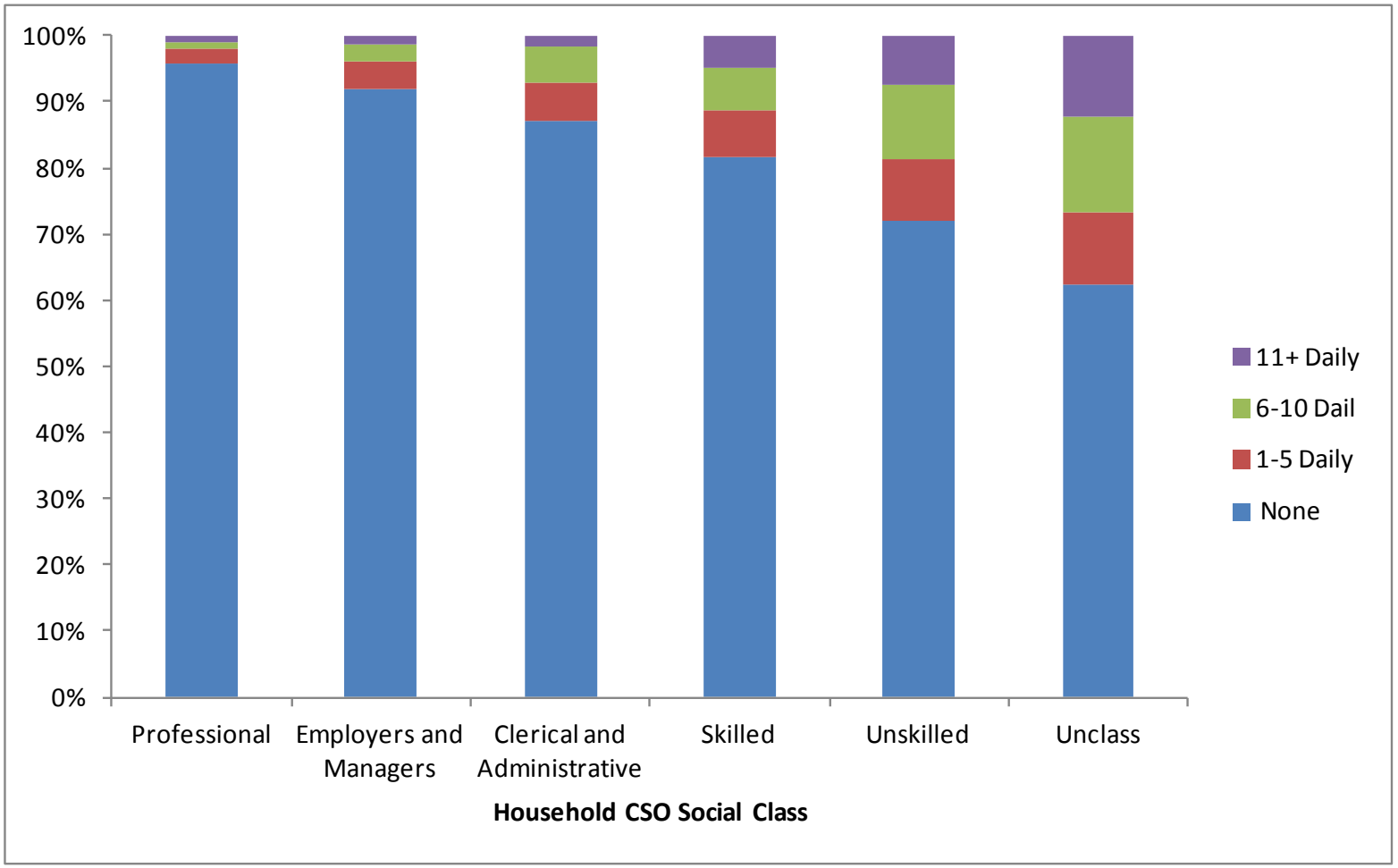
Age at Weaning by Social Class



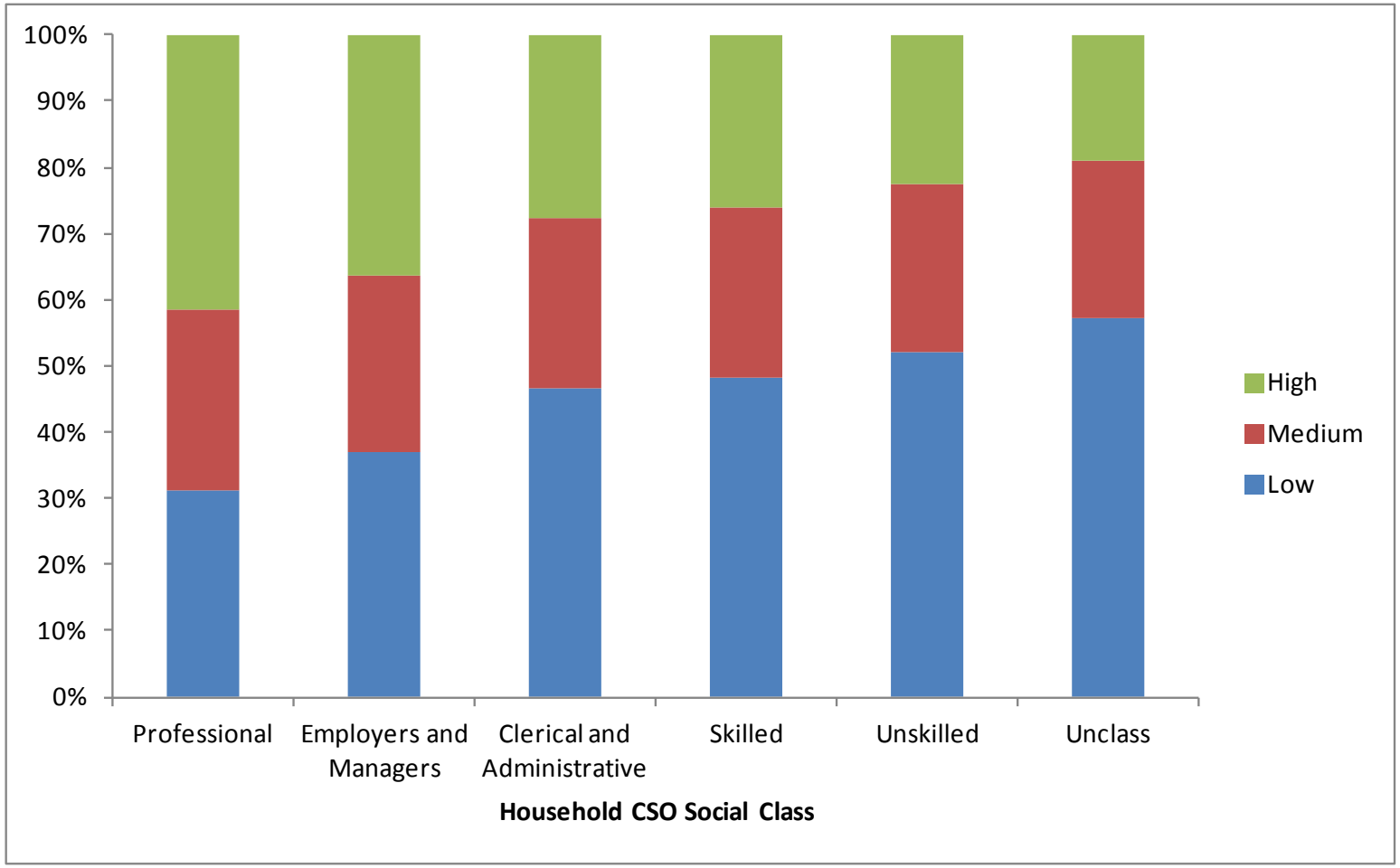
Maternal Weight Gain in Pregnancy



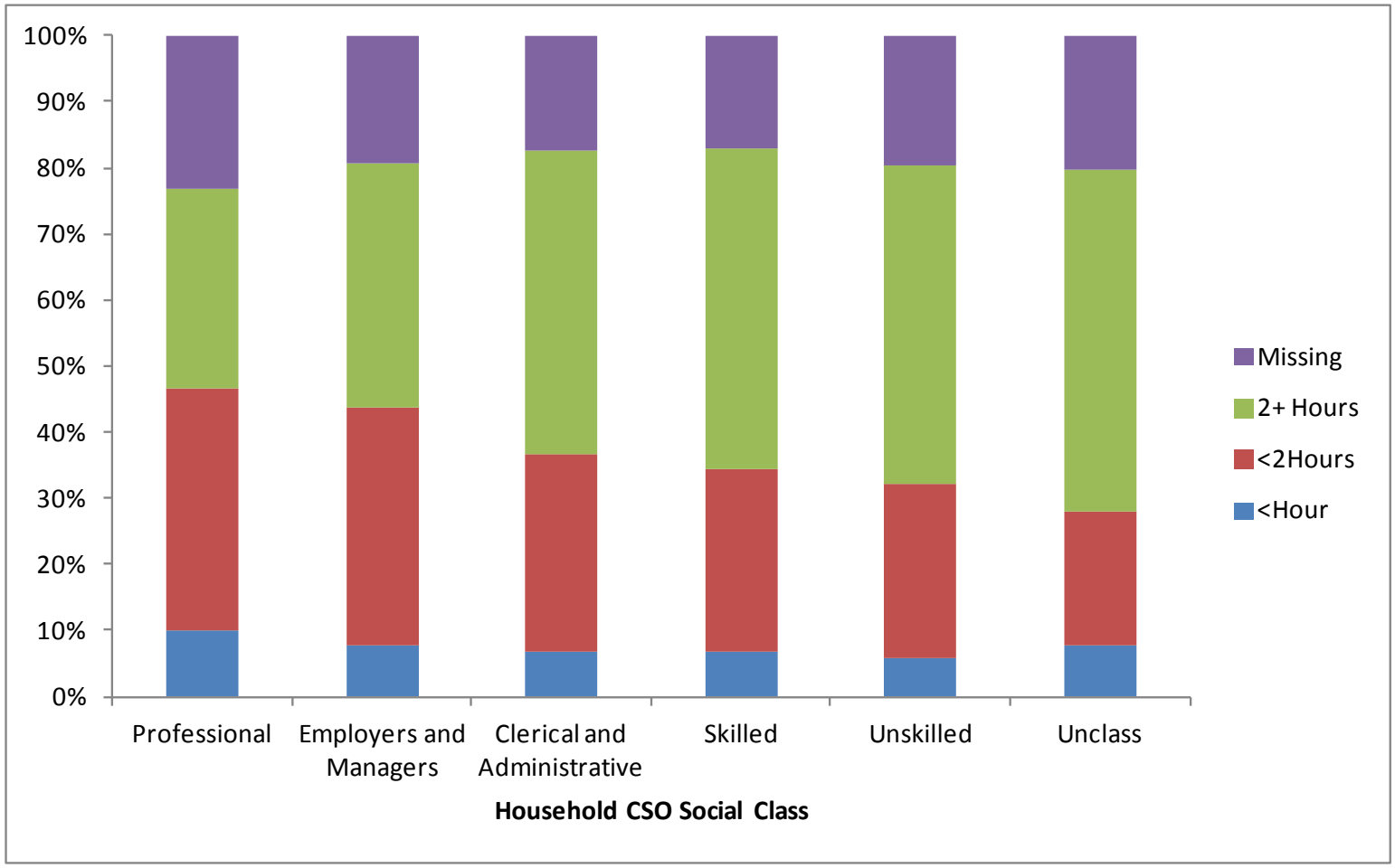
Prenatal Smoking by Social Class



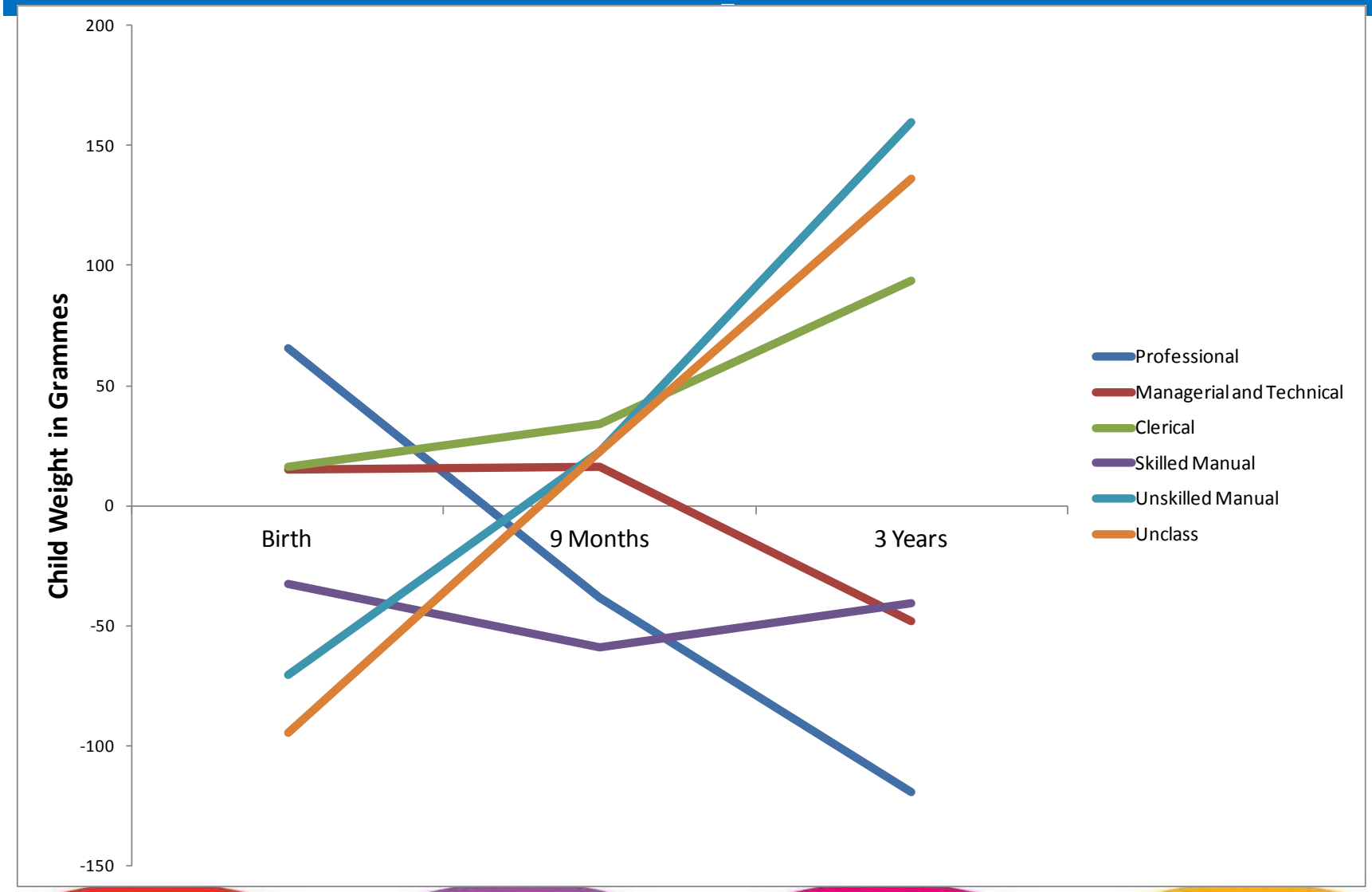
Child Dietary Quality at 3 Years by Social Class



TV Time at 3 Years by Social Class



Unadjusted Social Class Child Weights



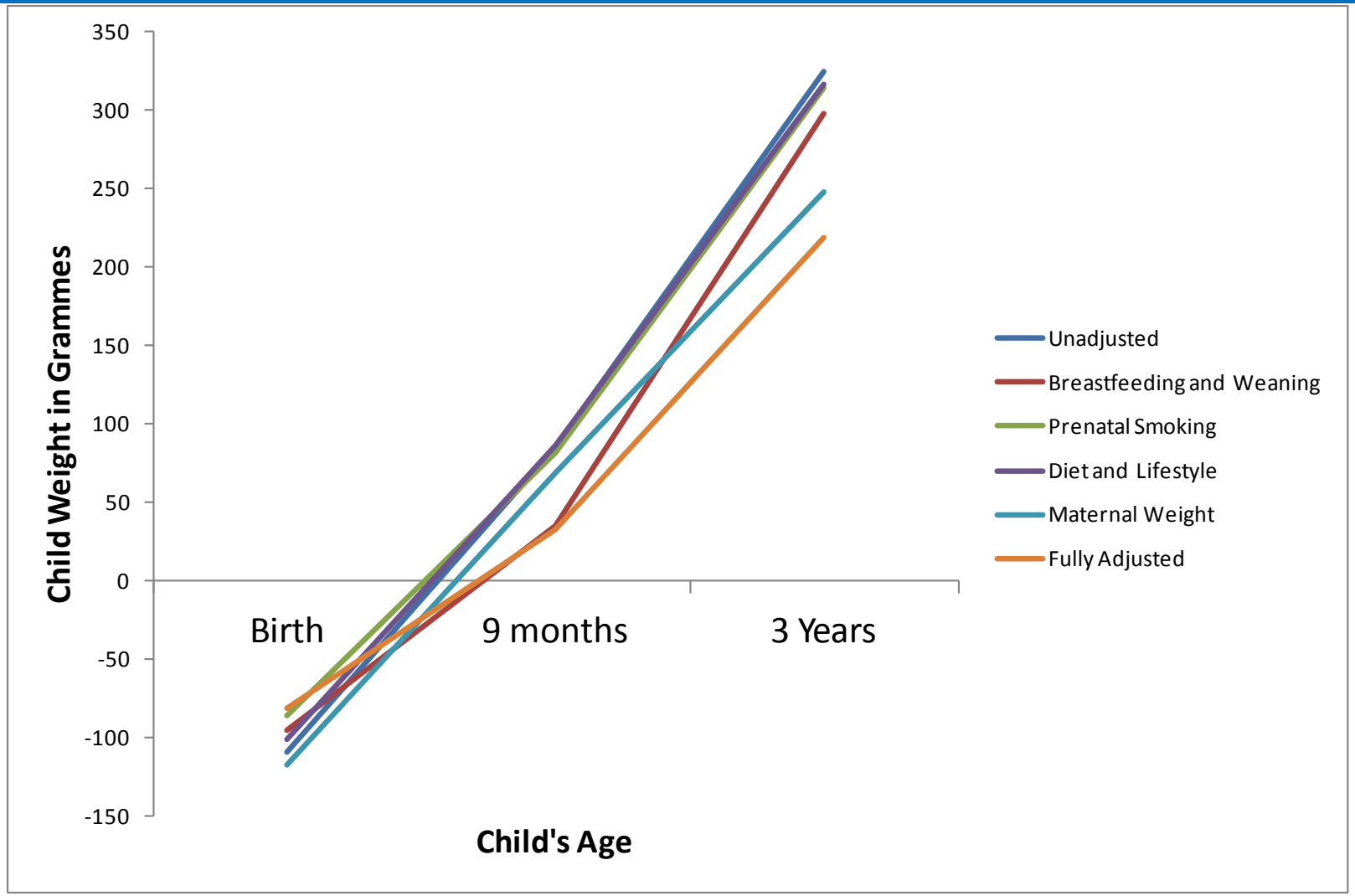
Model Fits

	Deviance	Parameters	ΔDeviance	Δ Degrees of Freedom	ΔLL/DF
Independence Model	442572.3	20			
Random Intercept	442275.0	21	297.3284	1	297.3284
+ Class Intercept	442267.1	26	305.1884	6	50.86473
+ Class Interactions	442186.9	36	385.3884	16	24.08677
+ Random Slopes	432391.3	38	10181.05	18	565.6138
+ Early Nutrition	432230.8	44	10341.49	24	430.8953
+ Prenatal Smoking	432297.8	41	10274.49	21	489.2614
+ Child Lifestyle	432340.5	50	10231.81	30	341.0603
+ Maternal BMI and Gain	431975.3	56	10597.01	36	294.3613
All	431692.0	77	10880.29	57	190.8823

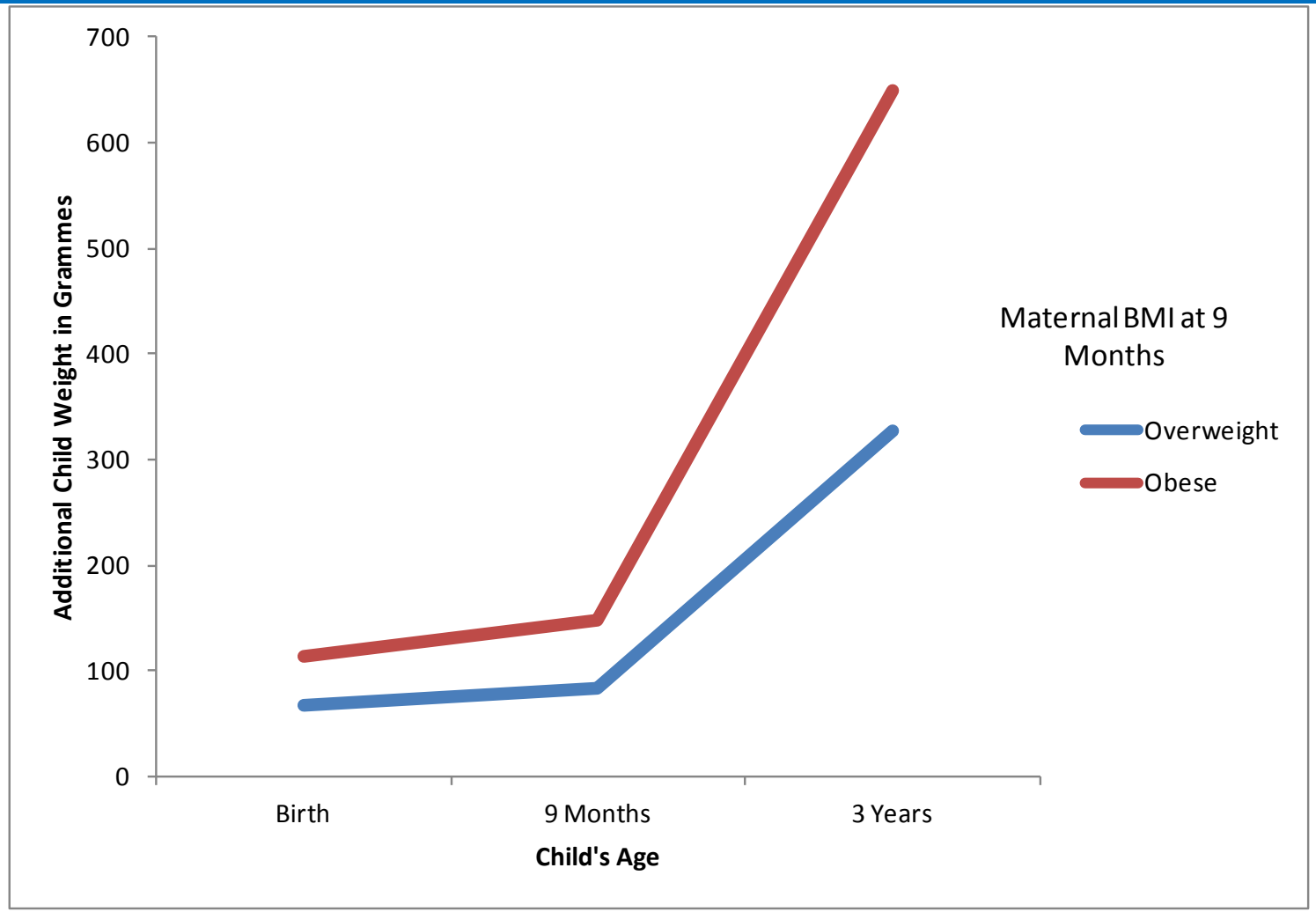
Direct Effects of SES on Mediators

	Emps	Clerical	Skilled	unskilled	Unclass	Mean
Breastfeeding and Age at Weaning	9.00%	12.20%	16.60%	8.70%	8.60%	11.00%
Maternal Prenatal Smoking	3.10%	3.60%	10.70%	6.70%	11.70%	7.20%
Child Dietary Quality and TV Viewing	5.90%	2.80%	6.10%	1.60%	0.10%	4.10%
Maternal weight Gain and BMI	27.30%	27.60%	54.90%	24.30%	25.70%	33.50%
All	36.80%	38.10%	76.30%	35.50%	39.60%	46.70%

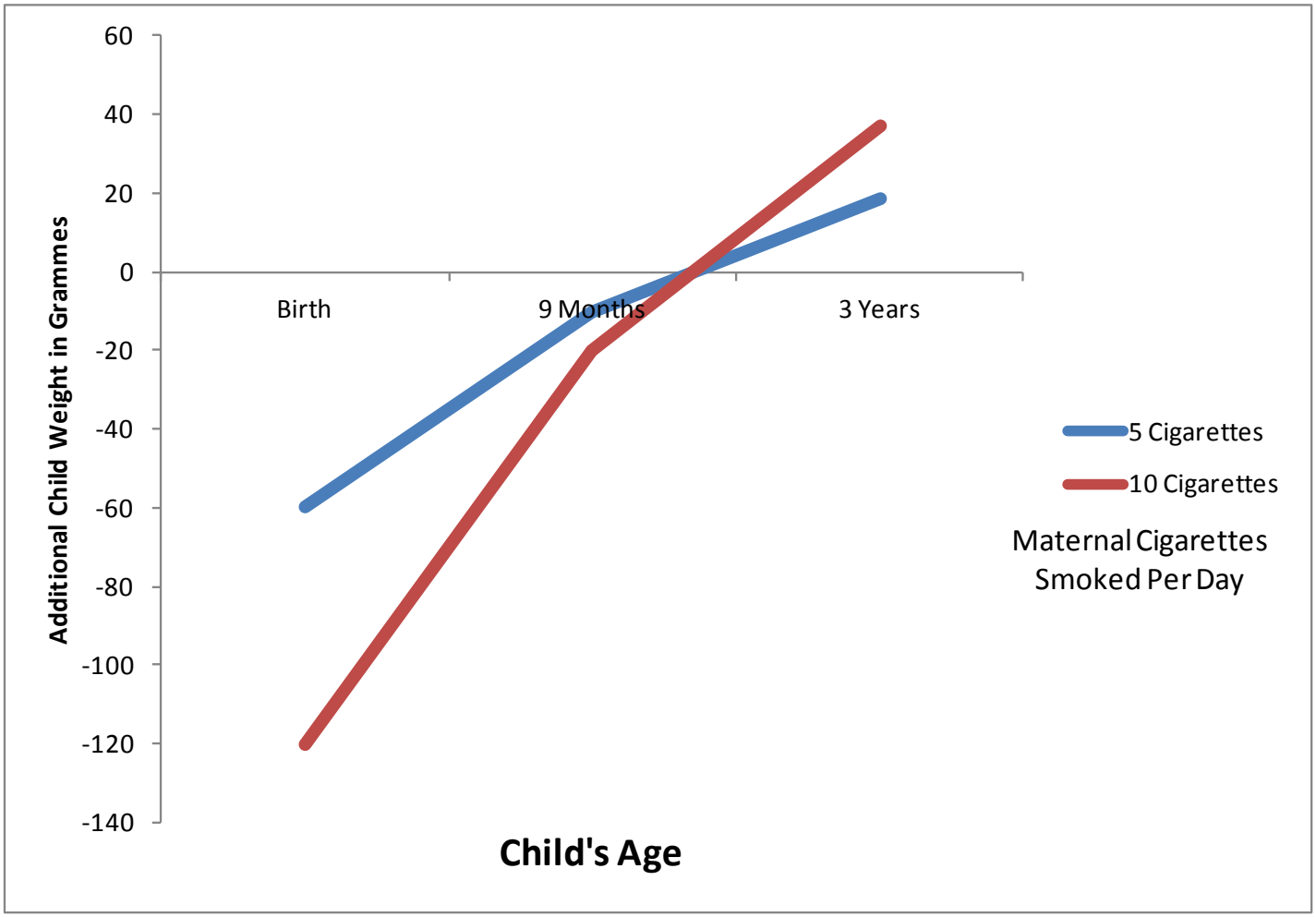
Reduction in Differential for Unskilled Manual to Professional Workers by Variable Groups



Direct and Indirect Effects of Maternal BMI?



Predicted Prenatal Smoking Effects



Discussion

- Parental social class is strongly associated with patterns of child weight gain
- Manual working class children are significantly lower weight at birth and higher weight by 3 years
- Four groups of factors account for almost 50% of the social class differential
- Maternal weight gain in pregnancy/BMI accounts for 34% of the differential
    - BMI likely to be associated with child lifestyle
- Breastfeeding and weaning 11%
- Child diet and lifestyle @ 3 just 4%
- BUT, prenatal smoking accounts for more variation overall

Policy Implications

- Ireland's low rate of breastfeeding (56%) requires more resources and action
- Parental education on the early weaning a priority
- Prenatal smoking still among 1 in 8 pregnant women
- Child inactivity and dietary quality still an issue