Supplementary material

Socioeconomic disadvantage amplifies polygenic risk of overweight: A longitudinal population cohort study spanning childhood and mid-adulthood

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1 Child data: BMI models

1.1 SEIFA predictor

1.1.1 Model details

```
print_mod_text("res/mod_chi_bmi_sei.txt")
```

```
linear mixed model (estimated using REML and nlminb optimizer) to predict bmi with sex, age_cat, sei
and prs (formula: bmi ~ sex + (age_cat + sei + prs)^2). The model included waveC as random effects
(formula: ~1 + waveC | hicid).

The model's total explanatory power is substantial (conditional R2 = 0.87) and the part related to
the fixed effects alone (marginal R2) is
of 0.40


Conditional model:
 Groups   Name        Std.Dev. Corr
 hicid    (Intercept) 2.16830
          waveC       0.57046  0.845
 Residual             1.15332


The model's intercept, corresponding to sex = 0, age_cat = 2-3, sei = 1 and prs = 1, is at 16.64
(95% CI [16.34, 16.94], p < .001).

Parameter                | Coefficient |         95% CI |      z |      Fit
-------------------------------------------------------------------------
(Intercept)              |       16.64 | [16.34, 16.94] | 108.62 |
sex                      |       -0.38 | [-0.53, -0.24] |  -5.30 |
age cat [4-5]            |       -0.58 | [-0.84, -0.32] |  -4.35 |
age cat [6-7]            |       -0.91 | [-1.19, -0.62] |  -6.21 |
age cat [8-9]            |       -0.05 | [-0.38,  0.28] |  -0.27 |
```

age cat [10-11]	0.82	[0.45, 1.19]	4.32
age cat [12-13]	2.42	[1.99, 2.85]	11.05
age cat [14+]	3.62	[3.13, 4.11]	14.51
sei [2]	-0.12	[-0.45, 0.22]	-0.68
sei [3]	-2.73e-03	[-0.34, 0.34]	-0.02
sei [4]	0.03	[-0.32, 0.38]	0.16
sei [5]	-8.23e-03	[-0.37, 0.36]	-0.04
prs [2]	0.32	[-0.06, 0.70]	1.64
prs [3]	0.28	[-0.09, 0.65]	1.49
prs [4]	0.45	[0.07, 0.84]	2.32
prs [5]	0.95	[0.58, 1.32]	5.02
age cat [4-5] × sei [2]	0.03	[-0.24, 0.31]	0.22
age cat [6-7] × sei [2]	0.29	[0.01, 0.57]	2.04
age cat [8-9] × sei [2]	-0.06	[-0.37, 0.24]	-0.41
age cat [10-11] × sei [2]	0.05	[-0.26, 0.37]	0.33
age cat [12-13] × sei [2]	-0.31	[-0.66, 0.03]	-1.77
age cat [14+] × sei [2]	-0.13	[-0.51, 0.24]	-0.70
age cat [4-5] × sei [3]	-0.08	[-0.35, 0.20]	-0.55
age cat [6-7] × sei [3]	0.08	[-0.20, 0.36]	0.59
age cat [8-9] × sei [3]	-0.05	[-0.35, 0.26]	-0.30
age cat [10-11] × sei [3]	-0.15	[-0.47, 0.18]	-0.89
age cat [12-13] × sei [3]	-0.35	[-0.70, 0.01]	-1.91
age cat [14+] × sei [3]	-0.15	[-0.54, 0.24]	-0.77
age cat [4-5] × sei [4]	-0.06	[-0.34, 0.21]	-0.45
age cat [6-7] × sei [4]	0.19	[-0.09, 0.48]	1.35
age cat [8-9] × sei [4]	-0.13	[-0.44, 0.17]	-0.85
age cat [10-11] × sei [4]	-0.26	[-0.59, 0.06]	-1.59
age cat [12-13] × sei [4]	-0.44	[-0.81, -0.08]	-2.39
age cat [14+] × sei [4]	-0.10	[-0.50, 0.30]	-0.50
age cat [4-5] × sei [5]	0.07	[-0.20, 0.35]	0.54
age cat [6-7] × sei [5]	0.15	[-0.13, 0.44]	1.07
age cat [8-9] × sei [5]	-0.06	[-0.37, 0.26]	-0.36
age cat [10-11] × sei [5]	-0.26	[-0.59, 0.08]	-1.50
age cat [12-13] × sei [5]	-0.47	[-0.84, -0.09]	-2.42

age cat [14+] × sei [5]	-0.12	[-0.54, 0.30]	-0.57
age cat [4-5] × prs [2]	-0.07	[-0.34, 0.20]	-0.52
age cat [6-7] × prs [2]	-0.04	[-0.35, 0.28]	-0.23
age cat [8-9] × prs [2]	0.14	[-0.23, 0.51]	0.75
age cat [10-11] × prs [2]	0.35	[-0.08, 0.79]	1.60
age cat [12-13] × prs [2]	0.42	[-0.09, 0.93]	1.61
age cat [14+] × prs [2]	0.39	[-0.19, 0.98]	1.31
age cat [4-5] × prs [3]	0.04	[-0.23, 0.32]	0.31
age cat [6-7] × prs [3]	0.34	[0.02, 0.65]	2.11
age cat [8-9] × prs [3]	0.50	[0.13, 0.87]	2.66
age cat [10-11] × prs [3]	1.04	[0.60, 1.47]	4.68
age cat [12-13] × prs [3]	1.23	[0.72, 1.74]	4.71
age cat [14+] × prs [3]	1.53	[0.94, 2.11]	5.08
age cat [4-5] × prs [4]	0.01	[-0.26, 0.29]	0.08
age cat [6-7] × prs [4]	0.40	[0.09, 0.72]	2.50
age cat [8-9] × prs [4]	0.75	[0.38, 1.12]	3.95
age cat [10-11] × prs [4]	1.23	[0.79, 1.67]	5.54
age cat [12-13] × prs [4]	1.50	[0.99, 2.01]	5.77
age cat [14+] × prs [4]	1.80	[1.21, 2.38]	5.99
age cat [4-5] × prs [5]	0.23	[-0.04, 0.51]	1.66
age cat [6-7] × prs [5]	0.68	[0.36, 0.99]	4.21
age cat [8-9] × prs [5]	1.12	[0.75, 1.49]	5.88
age cat [10-11] × prs [5]	1.83	[1.39, 2.26]	8.22
age cat [12-13] × prs [5]	2.32	[1.81, 2.83]	8.89
age cat [14+] × prs [5]	2.49	[1.90, 3.08]	8.26
sei [2] × prs [2]	0.07	[-0.31, 0.44]	0.34
sei [3] × prs [2]	-0.13	[-0.53, 0.27]	-0.65
sei [4] × prs [2]	0.04	[-0.38, 0.46]	0.17
sei [5] × prs [2]	-0.22	[-0.67, 0.23]	-0.95
sei [2] × prs [3]	0.18	[-0.19, 0.56]	0.97
sei [3] × prs [3]	0.13	[-0.26, 0.53]	0.67
sei [4] × prs [3]	0.21	[-0.21, 0.63]	0.99
sei [5] × prs [3]	0.15	[-0.32, 0.61]	0.62
sei [2] × prs [4]	-0.03	[-0.41, 0.35]	-0.16

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sei [3] × prs [4]         |       -0.15 | [-0.55,  0.26] |  -0.72 |
sei [4] × prs [4]         |       -0.17 | [-0.59,  0.25] |  -0.77 |
sei [5] × prs [4]         |        0.08 | [-0.37,  0.54] |   0.36 |
sei [2] × prs [5]         |       -0.07 | [-0.45,  0.31] |  -0.35 |
sei [3] × prs [5]         |       -0.37 | [-0.76,  0.03] |  -1.83 |
sei [4] × prs [5]         |       -0.47 | [-0.88, -0.05] |  -2.21 |
sei [5] × prs [5]         |       -0.24 | [-0.69,  0.21] |  -1.05 |
AICc                      |             |                |        | 39804.88
R2 (conditional)          |             |                |        |     0.87
R2 (marginal)             |             |                |        |     0.40
Sigma                     |             |                |        |     1.15


Analysis of Deviance Table (Type III Wald chisquare tests)

Response: bmi
                 Chisq Df Pr(>Chisq)
(Intercept) 11798.7571  1  < 2.2e-16 ***
sex            28.0737  1  1.168e-07 ***
age_cat       743.1869  6  < 2.2e-16 ***
sei             0.8784  4    0.92764
prs            27.5335  4  1.550e-05 ***
age_cat:sei    36.9306 24    0.04446 *
age_cat:prs   139.0748 24  < 2.2e-16 ***
sei:prs        21.1785 16    0.17175
---
Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1
```

1.1.2 Table and figure by PRS

Table 1: Estimated BMI (95% CI) across childhood by neighbourhood disadvantage (SEIFA) quintile (1=most, 5=least disadvantage), stratified by PRS quintile (1=lowest, 5=highest risk)

sei	prs	2-3	4-5	6-7	8-9	10-11	12-13	14+
1	1	16.4 (15.7, 16.9)	15.9 (15.4, 16.4)	15.6 (15.1, 16.2)	16.6 (15.6, 17.7)	17.6 (16.6, 18.8)	19.4 (18.1, 20.9)	20.0 (18.3, 22.3)
1	2	16.7 (16.2, 17.4)	16.1 (15.5, 16.6)	16.1 (15.5, 16.7)	17.0 (15.8, 18.1)	18.0 (16.2, 19.4)	19.4 (17.6, 21.2)	20.9 (18.7, 22.8)
1	3	16.7 (16.2, 17.2)	16.3 (15.8, 16.7)	16.3 (15.7, 16.9)	17.5 (16.5, 18.4)	18.7 (17.3, 20.1)	20.4 (18.6, 22.0)	22.2 (20.0, 24.0)
1	4	16.8 (15.9, 17.6)	16.5 (15.8, 17.2)	16.2 (15.5, 17.2)	17.9 (16.8, 19.2)	19.1 (17.2, 21.2)	21.0 (19.6, 22.5)	22.9 (21.0, 24.9)
1	5	17.3 (16.6, 18.0)	17.2 (16.5, 18.2)	17.7 (16.6, 19.1)	19.3 (18.0, 20.7)	21.3 (19.7, 23.0)	23.5 (21.4, 25.8)	24.2 (21.8, 27.0)
2	1	16.5 (15.9, 17.2)	15.9 (15.4, 16.6)	16.0 (15.3, 16.7)	16.2 (15.5, 17.3)	17.1 (16.5, 18.1)	18.3 (17.2, 19.4)	19.7 (18.3, 21.6)
2	2	16.7 (16.3, 17.1)	16.1 (15.7, 16.5)	16.0 (15.5, 16.7)	16.9 (16.3, 17.6)	18.1 (17.2, 19.0)	19.2 (18.5, 19.9)	20.6 (19.5, 21.6)
2	3	17.0 (16.2, 17.7)	16.4 (15.8, 17.1)	16.9 (16.3, 17.6)	17.7 (16.9, 18.6)	19.4 (18.3, 21.0)	20.6 (19.5, 22.0)	21.9 (20.2, 23.3)
2	4	17.0 (16.4, 17.5)	16.3 (15.7, 16.9)	17.1 (16.1, 18.0)	17.7 (16.7, 18.7)	19.5 (18.1, 21.1)	21.7 (20.0, 23.6)	23.4 (21.2, 25.5)
2	5	17.0 (16.3, 17.6)	17.0 (16.1, 18.0)	17.5 (16.5, 18.7)	18.4 (17.4, 19.5)	20.8 (19.4, 22.4)	22.2 (20.6, 24.3)	24.5 (22.2, 27.5)
3	1	16.5 (16.0, 17.2)	15.9 (15.4, 16.6)	15.6 (15.0, 16.1)	16.5 (15.8, 17.2)	17.4 (16.2, 18.5)	18.6 (17.4, 19.7)	20.1 (18.6, 21.8)
3	2	16.7 (16.1, 17.3)	15.8 (15.4, 16.3)	15.8 (15.4, 16.2)	16.9 (16.3, 17.6)	18.0 (17.3, 18.8)	19.7 (18.7, 20.8)	21.0 (19.8, 22.5)
3	3	16.9 (16.4, 17.4)	16.4 (16.0, 16.8)	16.5 (15.8, 17.4)	17.1 (16.4, 18.0)	18.4 (17.6, 19.4)	20.1 (18.8, 21.4)	21.9 (20.4, 24.0)
3	4	16.8 (16.1, 17.5)	16.3 (15.4, 17.4)	16.5 (15.9, 17.1)	17.3 (16.6, 18.0)	18.8 (17.6, 20.0)	20.2 (18.7, 21.8)	21.9 (20.7, 23.1)

sei	prs	2-3	4-5	6-7	8-9	10-11	12-13	14+
3	5	17.4 (16.8, 18.1)	16.9 (16.3, 17.6)	17.3 (16.2, 18.5)	18.0 (16.8, 19.1)	19.3 (17.4, 20.8)	21.9 (20.4, 23.9)	22.9 (20.7, 24.9)
4	1	16.5 (15.9, 17.0)	15.9 (15.5, 16.4)	16.1 (15.3, 16.8)	16.6 (15.8, 17.4)	17.0 (16.1, 18.2)	18.7 (17.7, 20.0)	20.6 (19.2, 22.2)
4	2	16.9 (16.4, 17.4)	16.1 (15.6, 16.7)	16.2 (15.7, 16.8)	16.9 (16.1, 17.9)	17.9 (16.9, 18.9)	19.2 (18.1, 20.5)	20.7 (19.2, 22.5)
4	3	17.0 (16.4, 17.6)	16.4 (15.9, 17.1)	16.3 (15.8, 16.9)	17.2 (16.3, 18.4)	18.7 (17.3, 20.5)	19.6 (18.7, 20.6)	21.7 (20.0, 23.9)
4	4	16.8 (16.3, 17.4)	16.1 (15.6, 16.6)	16.4 (15.9, 16.9)	17.6 (16.5, 19.0)	18.7 (17.6, 19.9)	20.1 (18.7, 21.8)	21.6 (20.2, 23.6)
4	5	17.0 (16.5, 17.5)	16.5 (15.9, 17.1)	16.7 (16.1, 17.3)	18.0 (17.1, 18.9)	19.2 (18.3, 20.1)	20.8 (19.4, 22.2)	22.8 (21.3, 24.3)
5	1	16.4 (16.0, 16.8)	15.9 (15.5, 16.4)	15.6 (15.0, 16.2)	16.4 (15.9, 17.0)	17.0 (16.4, 17.6)	18.5 (17.5, 19.4)	19.8 (18.8, 20.8)
5	2	16.5 (15.9, 17.1)	16.1 (15.5, 16.7)	16.0 (15.2, 16.8)	16.5 (15.8, 17.0)	17.5 (16.8, 18.3)	19.2 (18.4, 20.1)	20.6 (19.6, 21.6)
5	3	16.7 (15.9, 17.4)	16.1 (15.3, 16.8)	16.3 (15.6, 17.3)	17.3 (16.2, 19.1)	18.4 (17.2, 20.4)	20.2 (18.1, 23.1)	22.0 (19.7, 25.5)
5	4	16.8 (16.2, 17.3)	16.4 (15.8, 17.2)	16.6 (15.9, 17.4)	17.7 (17.0, 18.6)	18.7 (17.7, 20.0)	20.7 (19.3, 22.4)	22.2 (20.5, 24.5)
5	5	17.1 (16.7, 17.6)	16.6 (16.2, 17.2)	16.7 (16.1, 17.4)	17.7 (16.8, 18.5)	18.7 (17.5, 19.7)	20.7 (19.5, 22.1)	21.9 (20.8, 23.1)

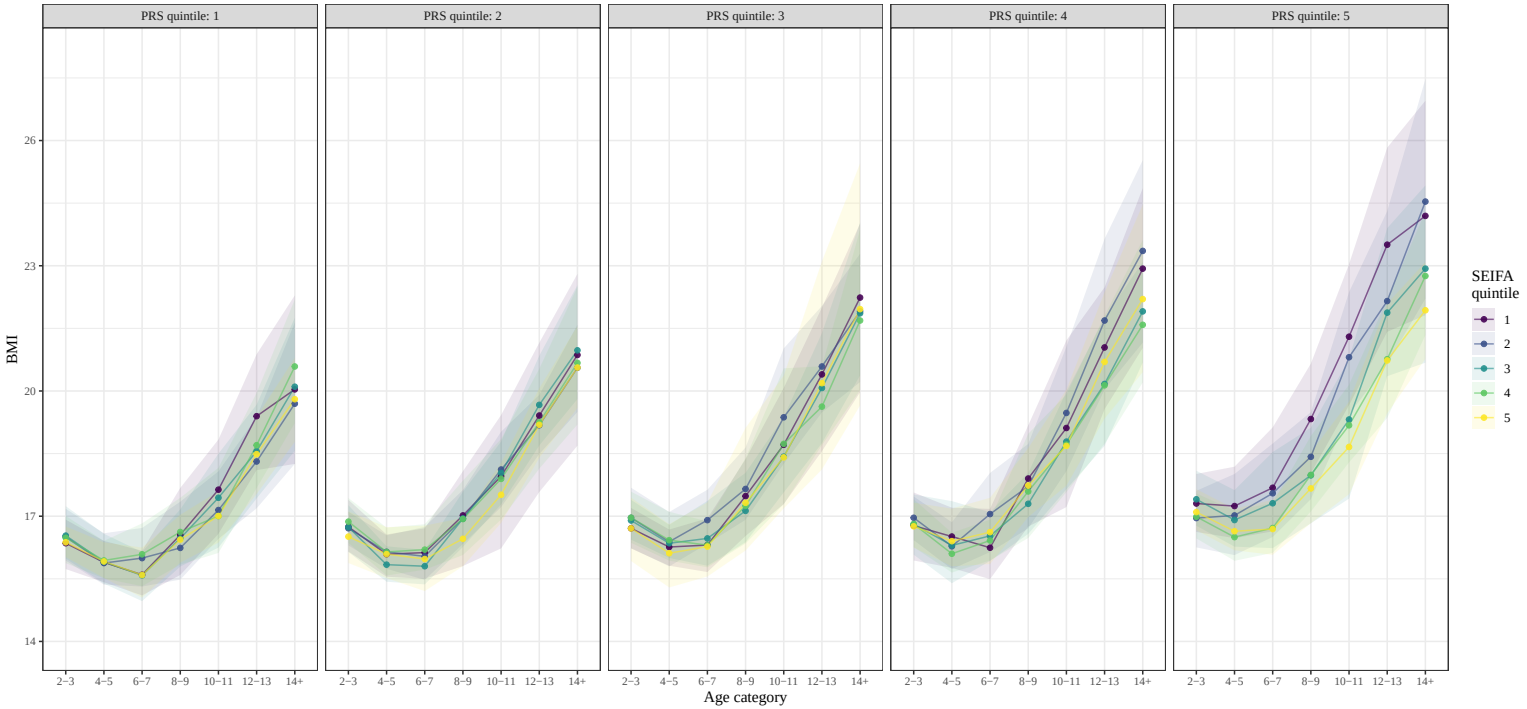

Figure 1: Estimated BMI (95% CI) across childhood by neighbourhood disadvantage (SEIFA) quintile (1=most, 5=least disadvantage), stratified by PRS quintile (1=lowest, 5=highest risk)

1.2 SEP predictor

1.2.1 Model details

```
print_mod_text("res/mod_chi_bmi_sep.txt")
```

```
linear mixed model (estimated using REML and nlminb optimizer) to predict bmi with sex, age_cat, sep
and prs (formula: bmi ~ sex + (age_cat + sep + prs)^2). The model included waveC as random effects
(formula: ~1 + waveC | hicid).

The model's total explanatory power is substantial (conditional R2 = 0.87) and the part related to
the fixed effects alone (marginal R2) is
of 0.40


Conditional model:
 Groups   Name        Std.Dev. Corr
 hicid    (Intercept) 2.16876
          waveC       0.57259  0.848
 Residual             1.14785


The model's intercept, corresponding to sex = 0, age_cat = 2-3, sep = 1 and prs = 1, is at 16.62
(95% CI [16.32, 16.92], p < .001).

Parameter                | Coefficient |         95% CI |      z |      Fit
-------------------------------------------------------------------------
(Intercept)              |       16.62 | [16.32, 16.92] | 107.39 |
sex                      |       -0.38 | [-0.52, -0.24] |  -5.26 |
age cat [4-5]            |       -0.60 | [-0.86, -0.33] |  -4.43 |
age cat [6-7]            |       -0.83 | [-1.11, -0.54] |  -5.65 |
age cat [8-9]            |       -0.10 | [-0.42,  0.23] |  -0.58 |
```

age cat [10-11]	0.79	[0.42, 1.17]	4.15
age cat [12-13]	2.36	[1.93, 2.79]	10.76
age cat [14+]	3.34	[2.85, 3.83]	13.38
sep [2]	-0.05	[-0.36, 0.26]	-0.32
sep [3]	-0.07	[-0.41, 0.27]	-0.42
sep [4]	0.08	[-0.27, 0.43]	0.44
sep [5]	0.01	[-0.35, 0.38]	0.07
prs [2]	0.19	[-0.18, 0.56]	1.02
prs [3]	0.66	[0.29, 1.04]	3.45
prs [4]	0.33	[-0.05, 0.70]	1.72
prs [5]	0.73	[0.35, 1.10]	3.80
age cat [4-5] × sep [2]	-0.03	[-0.31, 0.25]	-0.22
age cat [6-7] × sep [2]	0.05	[-0.24, 0.33]	0.32
age cat [8-9] × sep [2]	0.13	[-0.16, 0.43]	0.89
age cat [10-11] × sep [2]	0.09	[-0.21, 0.40]	0.59
age cat [12-13] × sep [2]	-0.21	[-0.53, 0.12]	-1.25
age cat [14+] × sep [2]	0.33	[-0.01, 0.68]	1.89
age cat [4-5] × sep [3]	0.12	[-0.16, 0.39]	0.83
age cat [6-7] × sep [3]	0.02	[-0.26, 0.31]	0.15
age cat [8-9] × sep [3]	-0.04	[-0.34, 0.26]	-0.26
age cat [10-11] × sep [3]	-0.14	[-0.45, 0.18]	-0.85
age cat [12-13] × sep [3]	-0.17	[-0.51, 0.17]	-0.99
age cat [14+] × sep [3]	0.20	[-0.17, 0.57]	1.07
age cat [4-5] × sep [4]	0.08	[-0.19, 0.35]	0.58
age cat [6-7] × sep [4]	0.15	[-0.13, 0.43]	1.04
age cat [8-9] × sep [4]	-0.03	[-0.33, 0.27]	-0.20
age cat [10-11] × sep [4]	-0.14	[-0.46, 0.18]	-0.87
age cat [12-13] × sep [4]	-0.32	[-0.67, 0.03]	-1.81
age cat [14+] × sep [4]	0.39	[0.00, 0.77]	1.98
age cat [4-5] × sep [5]	0.01	[-0.26, 0.28]	0.09
age cat [6-7] × sep [5]	0.08	[-0.20, 0.37]	0.56
age cat [8-9] × sep [5]	-0.08	[-0.38, 0.23]	-0.49
age cat [10-11] × sep [5]	-0.22	[-0.56, 0.11]	-1.33
age cat [12-13] × sep [5]	-0.50	[-0.87, -0.14]	-2.70

age cat [14+] × sep [5]	-0.03	[-0.43, 0.37]	-0.15
age cat [4-5] × prs [2]	-0.07	[-0.35, 0.20]	-0.53
age cat [6-7] × prs [2]	-0.01	[-0.33, 0.30]	-0.07
age cat [8-9] × prs [2]	0.12	[-0.25, 0.49]	0.64
age cat [10-11] × prs [2]	0.30	[-0.13, 0.74]	1.36
age cat [12-13] × prs [2]	0.43	[-0.08, 0.94]	1.64
age cat [14+] × prs [2]	0.45	[-0.14, 1.04]	1.48
age cat [4-5] × prs [3]	0.02	[-0.25, 0.29]	0.13
age cat [6-7] × prs [3]	0.33	[0.02, 0.65]	2.09
age cat [8-9] × prs [3]	0.49	[0.12, 0.86]	2.59
age cat [10-11] × prs [3]	1.04	[0.60, 1.47]	4.67
age cat [12-13] × prs [3]	1.21	[0.70, 1.72]	4.65
age cat [14+] × prs [3]	1.52	[0.93, 2.11]	5.04
age cat [4-5] × prs [4]	-4.16e-03	[-0.28, 0.27]	-0.03
age cat [6-7] × prs [4]	0.42	[0.11, 0.74]	2.64
age cat [8-9] × prs [4]	0.75	[0.38, 1.12]	3.94
age cat [10-11] × prs [4]	1.22	[0.79, 1.66]	5.51
age cat [12-13] × prs [4]	1.49	[0.98, 2.00]	5.71
age cat [14+] × prs [4]	1.80	[1.21, 2.39]	5.99
age cat [4-5] × prs [5]	0.20	[-0.07, 0.47]	1.43
age cat [6-7] × prs [5]	0.67	[0.35, 0.98]	4.14
age cat [8-9] × prs [5]	1.10	[0.73, 1.48]	5.79
age cat [10-11] × prs [5]	1.81	[1.37, 2.24]	8.11
age cat [12-13] × prs [5]	2.27	[1.75, 2.78]	8.66
age cat [14+] × prs [5]	2.46	[1.87, 3.06]	8.16
sep [2] × prs [2]	0.10	[-0.22, 0.41]	0.60
sep [3] × prs [2]	0.18	[-0.20, 0.57]	0.95
sep [4] × prs [2]	-0.11	[-0.53, 0.31]	-0.52
sep [5] × prs [2]	0.16	[-0.29, 0.62]	0.70
sep [2] × prs [3]	-0.25	[-0.59, 0.08]	-1.47
sep [3] × prs [3]	-0.25	[-0.65, 0.14]	-1.25
sep [4] × prs [3]	-0.37	[-0.79, 0.05]	-1.75
sep [5] × prs [3]	-0.36	[-0.82, 0.11]	-1.51
sep [2] × prs [4]	0.16	[-0.17, 0.48]	0.96

```
sep [3] × prs [4]         |        0.13 | [-0.25,  0.51] |   0.66 |
sep [4] × prs [4]         |        0.02 | [-0.40,  0.43] |   0.07 |
sep [5] × prs [4]         |        0.04 | [-0.42,  0.50] |   0.17 |
sep [2] × prs [5]         |        0.16 | [-0.17,  0.49] |   0.96 |
sep [3] × prs [5]         |        0.03 | [-0.36,  0.42] |   0.17 |
sep [4] × prs [5]         |       -0.13 | [-0.54,  0.29] |  -0.59 |
sep [5] × prs [5]         |       -0.10 | [-0.57,  0.37] |  -0.42 |
AICc                      |             |                |        | 39636.84
R2 (conditional)          |             |                |        |     0.87
R2 (marginal)             |             |                |        |     0.40
Sigma                     |             |                |        |     1.15


Analysis of Deviance Table (Type III Wald chisquare tests)

Response: bmi
                 Chisq Df Pr(>Chisq)
(Intercept) 11532.7516  1  < 2.2e-16 ***
sex            27.7015  1  1.416e-07 ***
age_cat       675.2613  6  < 2.2e-16 ***
sep             1.0532  4  0.9016273
prs            21.2589  4  0.0002813 ***
age_cat:sep    48.4294 24  0.0022325 **
age_cat:prs   135.4543 24  < 2.2e-16 ***
sep:prs        15.6682 16  0.4763470
---
Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1
```

1.2.2 Table and figure by PRS

Table 2: Estimated BMI (95% CI) across childhood by family disadvantage (SEP) quintile (1=most, 5=least disadvantage), stratified by PRS quintile (1=lowest, 5=highest risk)

sep	prs	2-3	4-5	6-7	8-9	10-11	12-13	14+
1	1	16.6 (16.1, 17.1)	16.1 (15.4, 16.9)	16.1 (15.4, 17.1)	17.2 (16.0, 19.0)	17.8 (16.4, 19.7)	19.5 (17.9, 21.4)	20.2 (17.9, 23.3)
1	2	16.7 (16.3, 17.1)	16.1 (15.6, 16.7)	16.0 (15.3, 16.9)	16.8 (16.1, 17.6)	17.7 (16.7, 18.6)	19.3 (18.3, 20.3)	21.2 (19.8, 22.4)
1	3	17.3 (16.7, 17.8)	16.7 (16.2, 17.4)	17.1 (16.1, 18.3)	18.3 (16.9, 20.0)	19.9 (18.3, 21.7)	21.4 (19.4, 23.5)	23.4 (20.8, 25.7)
1	4	16.9 (16.0, 17.9)	16.4 (15.6, 17.5)	16.7 (15.8, 17.8)	18.0 (17.1, 19.0)	19.7 (18.3, 21.2)	21.5 (19.9, 23.1)	23.0 (21.6, 24.4)
1	5	17.1 (16.5, 17.6)	17.0 (16.3, 17.9)	17.6 (16.6, 18.8)	18.6 (17.2, 19.9)	21.3 (19.6, 23.4)	23.1 (21.1, 25.2)	24.7 (22.2, 27.3)
2	1	16.4 (15.7, 17.1)	16.0 (15.4, 16.4)	15.6 (14.9, 16.1)	16.4 (15.7, 17.2)	17.5 (16.8, 18.3)	18.5 (17.7, 19.5)	20.7 (19.1, 22.9)
2	2	16.7 (16.1, 17.3)	15.9 (15.4, 16.4)	16.0 (15.5, 16.7)	16.8 (15.9, 17.7)	18.0 (17.0, 18.8)	19.3 (18.2, 20.3)	19.9 (18.4, 21.3)
2	3	16.7 (15.9, 17.6)	16.3 (15.5, 17.3)	16.6 (15.9, 17.4)	17.7 (17.0, 18.7)	19.0 (17.7, 20.4)	20.2 (19.1, 21.3)	22.2 (20.0, 24.6)
2	4	16.8 (16.1, 17.4)	16.1 (15.4, 17.0)	16.7 (16.0, 17.4)	17.6 (16.7, 18.5)	18.8 (17.7, 20.2)	20.2 (18.8, 21.7)	21.7 (20.6, 23.0)
2	5	17.6 (16.7, 18.5)	17.3 (16.5, 18.0)	17.8 (16.9, 18.7)	18.9 (17.8, 20.2)	20.2 (18.9, 21.4)	22.4 (20.7, 24.9)	24.0 (21.9, 26.1)
3	1	16.3 (15.6, 17.0)	15.7 (15.1, 16.3)	15.6 (15.0, 16.2)	16.2 (15.6, 16.9)	16.9 (16.2, 17.6)	18.8 (18.0, 19.8)	19.9 (18.8, 21.1)
3	2	16.6 (16.0, 17.3)	16.2 (15.7, 16.6)	15.8 (15.3, 16.2)	16.8 (16.3, 17.3)	17.7 (16.5, 18.9)	19.1 (17.9, 20.3)	20.7 (19.0, 22.2)
3	3	16.8 (16.2, 17.6)	16.4 (15.8, 17.0)	16.4 (15.8, 17.2)	16.8 (15.8, 17.8)	18.6 (17.2, 20.0)	19.7 (18.4, 20.8)	20.8 (19.3, 22.0)
3	4	16.9 (16.4, 17.3)	16.4 (15.9, 16.9)	16.3 (15.7, 17.2)	17.6 (16.7, 18.8)	18.6 (17.6, 19.9)	20.1 (18.6, 22.1)	22.2 (20.1, 24.8)

sep	prs	2-3	4-5	6-7	8-9	10-11	12-13	14+
3	5	17.0 (16.2, 17.8)	16.7 (15.9, 17.4)	16.9 (16.1, 17.6)	18.4 (17.5, 19.6)	19.7 (18.5, 21.2)	21.9 (20.3, 24.3)	22.7 (21.3, 24.4)
4	1	16.6 (16.0, 17.2)	16.0 (15.5, 16.5)	15.6 (15.1, 16.0)	16.4 (15.7, 17.1)	16.9 (16.0, 17.7)	18.1 (16.9, 19.2)	19.8 (18.5, 21.5)
4	2	16.8 (16.3, 17.3)	15.9 (15.5, 16.4)	16.2 (15.6, 17.0)	16.6 (15.6, 17.8)	18.0 (16.7, 19.6)	19.4 (17.9, 21.0)	20.6 (18.7, 22.6)
4	3	16.8 (16.2, 17.4)	16.2 (15.7, 16.8)	16.2 (15.6, 16.8)	17.0 (16.3, 17.8)	18.0 (17.2, 19.0)	19.8 (18.3, 21.4)	22.1 (20.7, 23.5)
4	4	16.9 (16.4, 17.4)	16.5 (16.0, 17.1)	17.0 (16.2, 17.8)	18.0 (16.8, 19.2)	19.2 (18.0, 20.3)	21.6 (20.3, 23.2)	23.0 (20.5, 26.1)
4	5	17.0 (16.5, 17.5)	16.7 (16.3, 17.3)	16.7 (16.1, 17.4)	17.6 (16.8, 18.8)	19.1 (17.8, 20.3)	20.7 (19.5, 22.1)	22.2 (20.6, 23.7)
5	1	16.4 (16.0, 16.7)	15.9 (15.5, 16.2)	15.8 (15.4, 16.3)	16.3 (15.7, 17.0)	17.2 (16.3, 18.2)	18.8 (17.8, 19.8)	19.8 (18.7, 20.8)
5	2	16.9 (16.4, 17.3)	16.2 (15.8, 16.5)	16.0 (15.5, 16.5)	16.9 (16.3, 17.5)	17.8 (17.1, 18.5)	19.3 (18.2, 20.2)	20.9 (19.9, 21.9)
5	3	16.6 (15.8, 17.2)	16.0 (15.4, 16.5)	16.0 (15.5, 16.5)	16.7 (16.0, 17.3)	18.1 (17.3, 18.9)	19.4 (18.4, 20.6)	21.0 (19.8, 22.5)
5	4	16.8 (16.3, 17.3)	16.1 (15.5, 16.7)	16.3 (15.7, 17.2)	17.2 (16.5, 18.2)	18.4 (17.5, 19.6)	20.2 (19.0, 22.0)	21.9 (20.6, 23.1)
5	5	16.9 (16.5, 17.5)	16.4 (15.5, 17.0)	16.6 (15.7, 17.3)	17.6 (16.6, 18.5)	19.0 (17.7, 20.1)	20.5 (18.9, 21.8)	22.4 (21.1, 24.0)

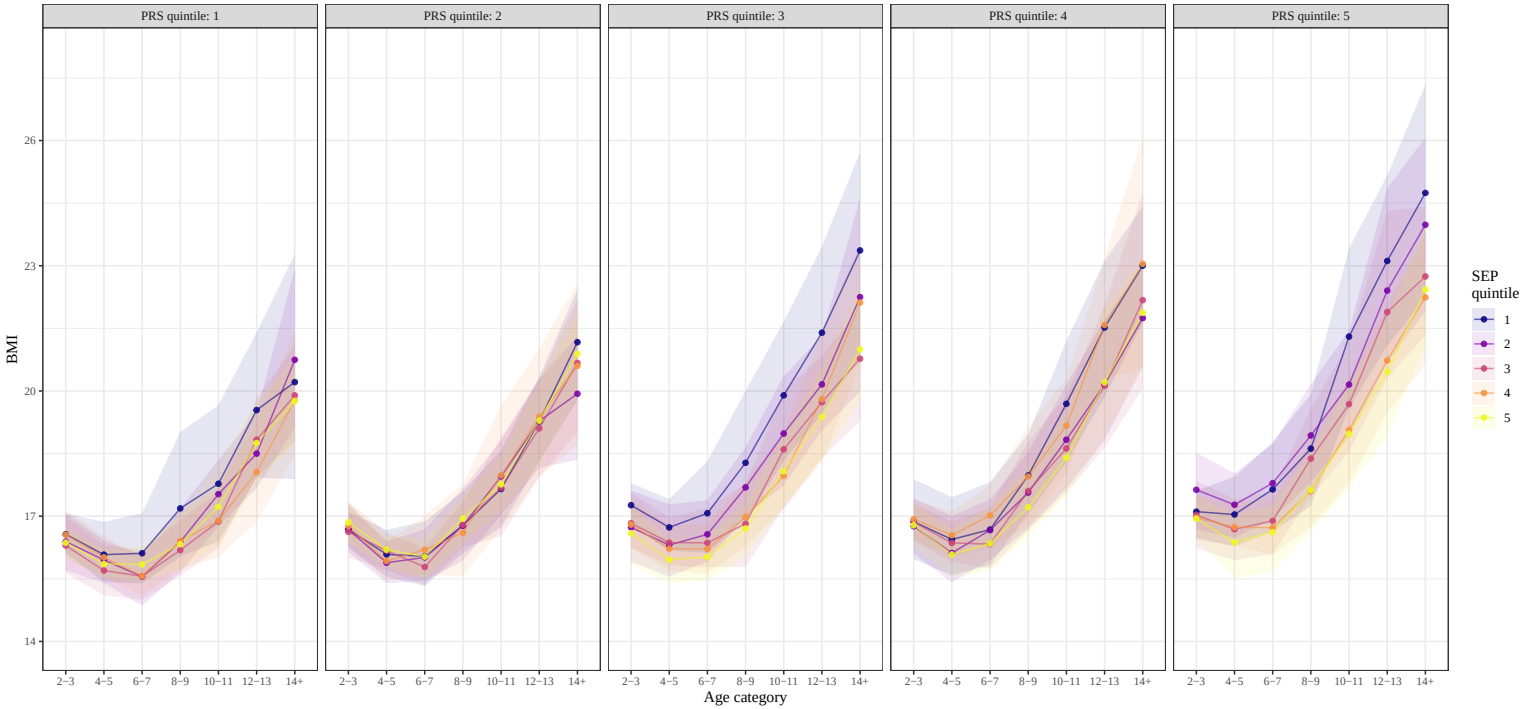

Figure 2: Estimated BMI (95% CI) across childhood by family disadvantage (SEP) quintile (1=most, 5=least disadvantage), stratified by PRS quintile (1=lowest, 5=highest risk)

1.3 Marginal SEIFA and SEP Figures

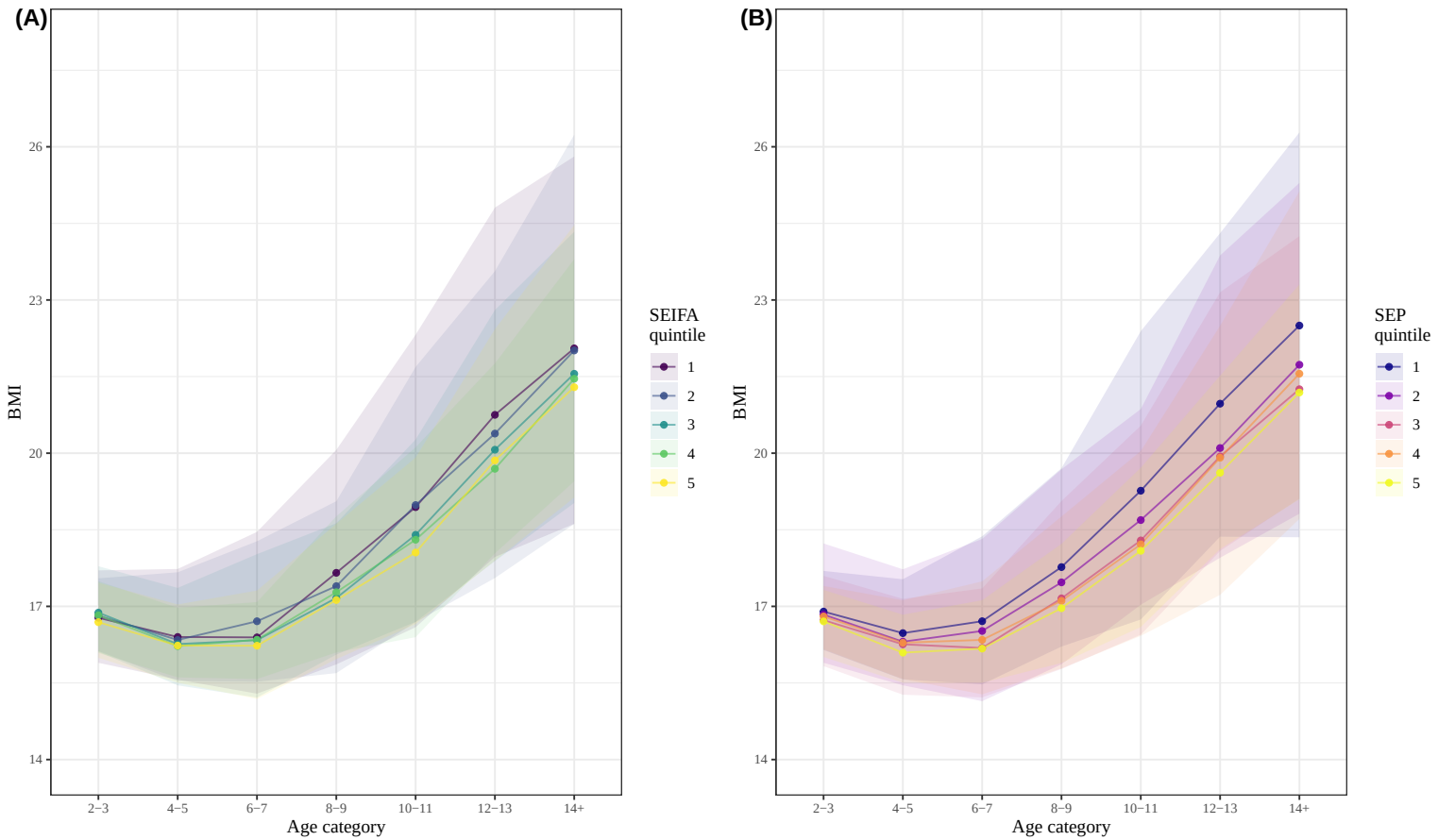

Figure 3: Association of SEIFA neighbourhood disadvantage (Panel A) and SEP family disadvantage (Panel B) with BMI across childhood. In all cases quintile 1 represents the most disadvantage.

2 Child data: Probability of overweight/obese models

2.1 SEIFA predictor

2.1.1 Model details

```
print_mod_text("res/mod_chi_ovo_sei.txt")
```

```
logistic mixed model (estimated using REML and nlminb optimizer) to predict ovo with sex, age_cat,
sei and prs (formula: ovo ~ sex + (age_cat + sei + prs)^2). The model included waveC as random
effects (formula: ~1 + waveC | hicid).

The model's total explanatory power is substantial (conditional R2 = 0.83) and the part related to
the fixed effects alone (marginal R2) is
of 0.08


Conditional model:
 Groups Name        Std.Dev. Corr
 hicid  (Intercept) 3.77080
        waveC       0.97556  0.758


The model's intercept, corresponding to sex = 0, age_cat = 2-3, sei = 1 and prs = 1, is at -1.86
(95% CI [-2.65, -1.06], p < .001).

Parameter                | Coefficient |         95% CI |     z |     Fit
-------------------------------------------------------------------------
(Intercept)              |       -1.86 | [-2.65, -1.06] | -4.58 |
sex                      |       -0.15 | [-0.46,  0.17] | -0.91 |
age cat [4-5]            |        0.50 | [-0.15,  1.15] |  1.51 |
age cat [6-7]            |       -1.77 | [-2.61, -0.92] | -4.08 |
age cat [8-9]            |       -1.88 | [-2.86, -0.89] | -3.73 |
age cat [10-11]          |       -2.05 | [-3.16, -0.94] | -3.62 |
```

age cat [12-13]	-2.12	[-3.41, -0.82]	-3.21
age cat [14+]	-2.26	[-3.77, -0.74]	-2.92
sei [2]	0.10	[-0.86, 1.05]	0.20
sei [3]	0.14	[-0.82, 1.10]	0.29
sei [4]	0.58	[-0.39, 1.54]	1.17
sei [5]	-0.40	[-1.44, 0.63]	-0.77
prs [2]	1.07	[0.08, 2.06]	2.12
prs [3]	0.48	[-0.49, 1.44]	0.96
prs [4]	1.03	[0.04, 2.02]	2.04
prs [5]	1.70	[0.76, 2.65]	3.53
age cat [4-5] × sei [2]	-0.22	[-0.88, 0.44]	-0.65
age cat [6-7] × sei [2]	0.34	[-0.42, 1.10]	0.87
age cat [8-9] × sei [2]	-0.13	[-0.96, 0.71]	-0.30
age cat [10-11] × sei [2]	-0.53	[-1.43, 0.38]	-1.14
age cat [12-13] × sei [2]	-0.98	[-2.01, 0.05]	-1.86
age cat [14+] × sei [2]	-0.15	[-1.32, 1.02]	-0.26
age cat [4-5] × sei [3]	-0.55	[-1.21, 0.12]	-1.62
age cat [6-7] × sei [3]	-0.10	[-0.87, 0.67]	-0.25
age cat [8-9] × sei [3]	-0.19	[-1.03, 0.64]	-0.45
age cat [10-11] × sei [3]	-0.63	[-1.53, 0.28]	-1.36
age cat [12-13] × sei [3]	-0.73	[-1.78, 0.32]	-1.37
age cat [14+] × sei [3]	-0.70	[-1.88, 0.49]	-1.15
age cat [4-5] × sei [4]	-0.64	[-1.29, 0.01]	-1.93
age cat [6-7] × sei [4]	0.02	[-0.73, 0.78]	0.06
age cat [8-9] × sei [4]	-0.24	[-1.08, 0.60]	-0.56
age cat [10-11] × sei [4]	-0.45	[-1.38, 0.47]	-0.96
age cat [12-13] × sei [4]	-0.68	[-1.76, 0.40]	-1.24
age cat [14+] × sei [4]	-0.37	[-1.59, 0.85]	-0.60
age cat [4-5] × sei [5]	0.06	[-0.60, 0.73]	0.18
age cat [6-7] × sei [5]	0.55	[-0.23, 1.34]	1.38
age cat [8-9] × sei [5]	-0.29	[-1.18, 0.60]	-0.63
age cat [10-11] × sei [5]	-0.26	[-1.23, 0.71]	-0.52
age cat [12-13] × sei [5]	-0.94	[-2.08, 0.21]	-1.61
age cat [14+] × sei [5]	-0.47	[-1.79, 0.85]	-0.69

age cat [4-5] × prs [2]	-0.57	[-1.24, 0.10]	-1.68
age cat [6-7] × prs [2]	-0.31	[-1.20, 0.58]	-0.68
age cat [8-9] × prs [2]	-0.20	[-1.26, 0.85]	-0.38
age cat [10-11] × prs [2]	0.10	[-1.11, 1.32]	0.17
age cat [12-13] × prs [2]	0.23	[-1.20, 1.66]	0.32
age cat [14+] × prs [2]	-0.46	[-2.11, 1.20]	-0.54
age cat [4-5] × prs [3]	-0.28	[-0.94, 0.39]	-0.82
age cat [6-7] × prs [3]	0.51	[-0.36, 1.38]	1.15
age cat [8-9] × prs [3]	0.69	[-0.33, 1.72]	1.33
age cat [10-11] × prs [3]	1.14	[-0.04, 2.32]	1.89
age cat [12-13] × prs [3]	1.82	[0.44, 3.21]	2.58
age cat [14+] × prs [3]	1.30	[-0.29, 2.89]	1.60
age cat [4-5] × prs [4]	-0.49	[-1.17, 0.19]	-1.40
age cat [6-7] × prs [4]	0.73	[-0.13, 1.60]	1.66
age cat [8-9] × prs [4]	1.21	[0.20, 2.22]	2.34
age cat [10-11] × prs [4]	1.65	[0.48, 2.82]	2.77
age cat [12-13] × prs [4]	1.93	[0.55, 3.31]	2.74
age cat [14+] × prs [4]	2.24	[0.67, 3.81]	2.80
age cat [4-5] × prs [5]	-0.16	[-0.82, 0.50]	-0.47
age cat [6-7] × prs [5]	0.94	[0.09, 1.79]	2.16
age cat [8-9] × prs [5]	1.00	[0.00, 2.01]	1.95
age cat [10-11] × prs [5]	1.64	[0.48, 2.81]	2.76
age cat [12-13] × prs [5]	2.16	[0.78, 3.54]	3.07
age cat [14+] × prs [5]	1.96	[0.38, 3.54]	2.44
sei [2] × prs [2]	-0.34	[-1.46, 0.78]	-0.60
sei [3] × prs [2]	-0.46	[-1.62, 0.69]	-0.78
sei [4] × prs [2]	-0.63	[-1.84, 0.57]	-1.03
sei [5] × prs [2]	-0.21	[-1.49, 1.07]	-0.32
sei [2] × prs [3]	0.48	[-0.60, 1.57]	0.88
sei [3] × prs [3]	0.58	[-0.54, 1.70]	1.01
sei [4] × prs [3]	-0.03	[-1.19, 1.12]	-0.06
sei [5] × prs [3]	0.57	[-0.75, 1.88]	0.84
sei [2] × prs [4]	-0.48	[-1.58, 0.62]	-0.85
sei [3] × prs [4]	-0.24	[-1.38, 0.90]	-0.41

```
sei [4] × prs [4]         |       -0.69 | [-1.86,  0.48] | -1.16 |
sei [5] × prs [4]         |        0.20 | [-1.07,  1.48] |  0.31 |
sei [2] × prs [5]         |        0.07 | [-1.01,  1.15] |  0.13 |
sei [3] × prs [5]         |       -0.19 | [-1.29,  0.91] | -0.34 |
sei [4] × prs [5]         |       -0.98 | [-2.11,  0.16] | -1.69 |
sei [5] × prs [5]         |       -0.02 | [-1.26,  1.23] | -0.03 |
AICc                      |             |                |       | 8539.37
R2 (conditional)          |             |                |       |    0.83
R2 (marginal)             |             |                |       |    0.08
Sigma                     |             |                |       |    1.00
Log_loss                  |             |                |       |    0.18


Analysis of Deviance Table (Type III Wald chisquare tests)

Response: ovo
              Chisq Df Pr(>Chisq)
(Intercept) 20.9833  1  4.633e-06 ***
sex          0.8216  1   0.364698
age_cat     45.3877  6  3.919e-08 ***
sei          4.3934  4   0.355379
prs         14.8504  4   0.005022 **
age_cat:sei 20.6700 24   0.658107
age_cat:prs 40.8387 24   0.017349 *
sei:prs     12.7719 16   0.689354
---
Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1
```

2.1.2 Table and figure by PRS

Table 3: Estimated probability of overweight/obese (95% CI) across childhood by neighbourhood disadvantage (SEIFA) quintile (1=most, 5=least disadvantage), stratified by PRS quintile (1=lowest, 5=highest risk)

sei	prs	2-3	4-5	6-7	8-9	10-11	12-13	14+
1	1	0.16 (0.06, 0.27)	0.22 (0.10, 0.35)	0.07 (0.01, 0.17)	0.10 (0.01, 0.22)	0.14 (0.04, 0.28)	0.15 (0.05, 0.29)	0.11 (0.00, 0.28)
1	2	0.34 (0.20, 0.52)	0.32 (0.17, 0.45)	0.16 (0.06, 0.29)	0.16 (0.05, 0.34)	0.17 (0.03, 0.36)	0.17 (0.02, 0.37)	0.17 (0.03, 0.33)
1	3	0.27 (0.15, 0.41)	0.31 (0.18, 0.46)	0.18 (0.06, 0.32)	0.23 (0.10, 0.39)	0.25 (0.10, 0.42)	0.28 (0.09, 0.50)	0.29 (0.11, 0.47)
1	4	0.32 (0.10, 0.63)	0.36 (0.18, 0.55)	0.20 (0.06, 0.37)	0.29 (0.12, 0.48)	0.32 (0.07, 0.61)	0.34 (0.15, 0.54)	0.38 (0.16, 0.66)
1	5	0.45 (0.29, 0.62)	0.54 (0.38, 0.68)	0.42 (0.25, 0.60)	0.44 (0.28, 0.61)	0.50 (0.34, 0.67)	0.54 (0.35, 0.73)	0.49 (0.29, 0.68)
2	1	0.24 (0.12, 0.41)	0.24 (0.11, 0.42)	0.12 (0.03, 0.24)	0.06 (0.01, 0.16)	0.05 (0.01, 0.12)	0.04 (0.00, 0.12)	0.07 (0.00, 0.20)
2	2	0.28 (0.15, 0.42)	0.29 (0.15, 0.48)	0.12 (0.03, 0.27)	0.12 (0.03, 0.24)	0.12 (0.02, 0.23)	0.09 (0.02, 0.17)	0.10 (0.02, 0.20)
2	3	0.36 (0.17, 0.60)	0.32 (0.17, 0.51)	0.26 (0.13, 0.42)	0.24 (0.11, 0.41)	0.26 (0.12, 0.46)	0.33 (0.19, 0.51)	0.32 (0.15, 0.51)
2	4	0.31 (0.17, 0.45)	0.25 (0.13, 0.39)	0.28 (0.13, 0.46)	0.29 (0.13, 0.48)	0.31 (0.11, 0.55)	0.35 (0.18, 0.54)	0.40 (0.17, 0.60)
2	5	0.42 (0.22, 0.60)	0.48 (0.27, 0.68)	0.40 (0.21, 0.62)	0.40 (0.25, 0.55)	0.46 (0.29, 0.64)	0.40 (0.22, 0.59)	0.46 (0.29, 0.64)
3	1	0.23 (0.09, 0.44)	0.23 (0.11, 0.40)	0.08 (0.01, 0.18)	0.09 (0.02, 0.21)	0.08 (0.01, 0.20)	0.09 (0.01, 0.19)	0.11 (0.01, 0.22)
3	2	0.30 (0.15, 0.47)	0.18 (0.07, 0.29)	0.09 (0.02, 0.17)	0.14 (0.03, 0.29)	0.16 (0.06, 0.28)	0.19 (0.08, 0.36)	0.16 (0.05, 0.29)
3	3	0.35 (0.21, 0.51)	0.32 (0.18, 0.49)	0.21 (0.08, 0.35)	0.22 (0.10, 0.39)	0.21 (0.10, 0.37)	0.24 (0.10, 0.43)	0.26 (0.07, 0.53)
3	4	0.29 (0.14, 0.44)	0.27 (0.10, 0.48)	0.23 (0.10, 0.41)	0.21 (0.09, 0.34)	0.25 (0.12, 0.40)	0.26 (0.08, 0.44)	0.30 (0.16, 0.44)

sei	prs	2-3	4-5	6-7	8-9	10-11	12-13	14+
3	5	0.52 (0.37, 0.68)	0.47 (0.32, 0.63)	0.38 (0.19, 0.57)	0.30 (0.12, 0.48)	0.28 (0.08, 0.49)	0.42 (0.26, 0.60)	0.38 (0.20, 0.62)
4	1	0.26 (0.10, 0.41)	0.25 (0.12, 0.37)	0.14 (0.03, 0.30)	0.15 (0.04, 0.28)	0.12 (0.03, 0.26)	0.16 (0.04, 0.30)	0.19 (0.06, 0.37)
4	2	0.33 (0.15, 0.52)	0.22 (0.09, 0.35)	0.12 (0.04, 0.25)	0.14 (0.04, 0.28)	0.14 (0.02, 0.27)	0.15 (0.04, 0.29)	0.13 (0.00, 0.30)
4	3	0.38 (0.24, 0.54)	0.31 (0.19, 0.46)	0.17 (0.05, 0.30)	0.17 (0.04, 0.32)	0.23 (0.07, 0.44)	0.20 (0.07, 0.35)	0.24 (0.07, 0.49)
4	4	0.36 (0.21, 0.54)	0.27 (0.15, 0.42)	0.20 (0.08, 0.33)	0.27 (0.10, 0.46)	0.28 (0.13, 0.45)	0.23 (0.10, 0.38)	0.25 (0.08, 0.47)
4	5	0.39 (0.24, 0.56)	0.36 (0.21, 0.55)	0.26 (0.15, 0.39)	0.30 (0.13, 0.48)	0.31 (0.16, 0.46)	0.29 (0.14, 0.44)	0.32 (0.16, 0.48)
5	1	0.13 (0.05, 0.25)	0.21 (0.09, 0.34)	0.07 (0.01, 0.18)	0.07 (0.01, 0.14)	0.07 (0.00, 0.18)	0.07 (0.01, 0.14)	0.07 (0.00, 0.20)
5	2	0.27 (0.12, 0.45)	0.29 (0.13, 0.51)	0.13 (0.02, 0.29)	0.05 (0.00, 0.10)	0.10 (0.02, 0.20)	0.11 (0.02, 0.21)	0.09 (0.02, 0.21)
5	3	0.24 (0.09, 0.38)	0.27 (0.12, 0.45)	0.19 (0.08, 0.34)	0.18 (0.06, 0.38)	0.18 (0.06, 0.33)	0.23 (0.08, 0.44)	0.25 (0.09, 0.46)
5	4	0.27 (0.10, 0.46)	0.31 (0.13, 0.48)	0.24 (0.11, 0.38)	0.25 (0.08, 0.46)	0.26 (0.13, 0.43)	0.29 (0.13, 0.48)	0.31 (0.15, 0.51)
5	5	0.39 (0.22, 0.60)	0.38 (0.19, 0.60)	0.31 (0.15, 0.48)	0.24 (0.10, 0.39)	0.25 (0.10, 0.41)	0.29 (0.07, 0.53)	0.27 (0.06, 0.49)

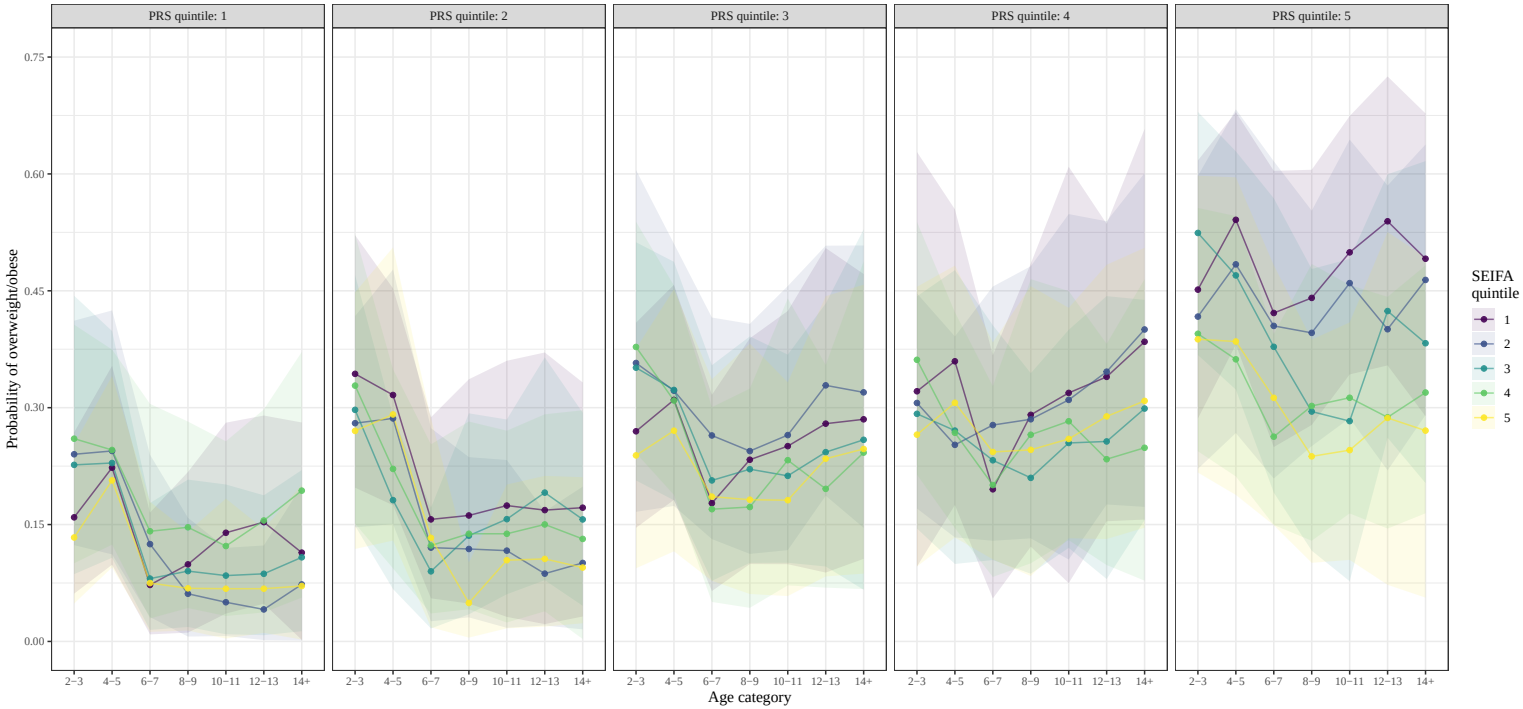

Figure 4: Estimated probability of overweight/obese (95% CI) across childhood by neighbourhood disadvantage (SEIFA) quintile (1=most, 5=least disadvantage), stratified by PRS quintile (1=lowest, 5=highest risk)

2.2 SEP predictor

2.2.1 Model details

```
print_mod_text("res/mod_chi_ovo_sep.txt")
```

```
logistic mixed model (estimated using REML and nlminb optimizer) to predict ovo with sex, age_cat,
sep and prs (formula: ovo ~ sex + (age_cat + sep + prs)^2). The model included waveC as random
effects (formula: ~1 + waveC | hicid).

The model's total explanatory power is substantial (conditional R2 = 0.82) and the part related to
the fixed effects alone (marginal R2) is
of 0.08


Conditional model:
 Groups Name        Std.Dev. Corr
 hicid  (Intercept) 3.74017
        waveC       0.97417  0.762


The model's intercept, corresponding to sex = 0, age_cat = 2-3, sep = 1 and prs = 1, is at -1.51
(95% CI [-2.29, -0.72], p < .001).

Parameter                | Coefficient |         95% CI |     z |     Fit
-------------------------------------------------------------------------
(Intercept)              |       -1.51 | [-2.29, -0.72] | -3.76 |
sex                      |       -0.16 | [-0.47,  0.16] | -0.97 |
age cat [4-5]            |        0.26 | [-0.40,  0.91] |  0.77 |
age cat [6-7]            |       -1.81 | [-2.63, -0.99] | -4.32 |
age cat [8-9]            |       -2.09 | [-3.06, -1.12] | -4.23 |
age cat [10-11]          |       -2.37 | [-3.49, -1.25] | -4.15 |
```

age cat [12-13]	-2.39	[-3.67, -1.10]	-3.63
age cat [14+]	-3.10	[-4.62, -1.58]	-3.99
sep [2]	-0.27	[-1.15, 0.60]	-0.61
sep [3]	-0.36	[-1.33, 0.62]	-0.72
sep [4]	-0.28	[-1.24, 0.69]	-0.56
sep [5]	-0.47	[-1.47, 0.52]	-0.94
prs [2]	0.49	[-0.46, 1.45]	1.01
prs [3]	0.89	[-0.07, 1.84]	1.82
prs [4]	0.54	[-0.42, 1.51]	1.10
prs [5]	1.25	[0.29, 2.20]	2.55
age cat [4-5] × sep [2]	-0.33	[-1.00, 0.35]	-0.95
age cat [6-7] × sep [2]	0.10	[-0.66, 0.85]	0.25
age cat [8-9] × sep [2]	0.31	[-0.49, 1.11]	0.77
age cat [10-11] × sep [2]	-0.05	[-0.91, 0.82]	-0.11
age cat [12-13] × sep [2]	-0.51	[-1.47, 0.45]	-1.04
age cat [14+] × sep [2]	0.78	[-0.30, 1.86]	1.42
age cat [4-5] × sep [3]	-0.29	[-0.96, 0.38]	-0.85
age cat [6-7] × sep [3]	0.06	[-0.72, 0.83]	0.14
age cat [8-9] × sep [3]	-0.25	[-1.08, 0.58]	-0.59
age cat [10-11] × sep [3]	-0.38	[-1.29, 0.52]	-0.83
age cat [12-13] × sep [3]	-0.29	[-1.29, 0.72]	-0.56
age cat [14+] × sep [3]	0.03	[-1.10, 1.17]	0.05
age cat [4-5] × sep [4]	0.14	[-0.52, 0.79]	0.41
age cat [6-7] × sep [4]	0.45	[-0.30, 1.21]	1.17
age cat [8-9] × sep [4]	0.06	[-0.78, 0.91]	0.14
age cat [10-11] × sep [4]	0.11	[-0.80, 1.03]	0.24
age cat [12-13] × sep [4]	-0.52	[-1.57, 0.52]	-0.99
age cat [14+] × sep [4]	1.03	[-0.14, 2.20]	1.72
age cat [4-5] × sep [5]	0.39	[-0.27, 1.04]	1.15
age cat [6-7] × sep [5]	0.53	[-0.25, 1.30]	1.33
age cat [8-9] × sep [5]	-0.03	[-0.90, 0.85]	-0.06
age cat [10-11] × sep [5]	0.16	[-0.79, 1.12]	0.33
age cat [12-13] × sep [5]	-0.60	[-1.69, 0.49]	-1.07
age cat [14+] × sep [5]	0.48	[-0.75, 1.71]	0.77

age cat [4-5] × prs [2]	-0.55	[-1.22, 0.13]	-1.59
age cat [6-7] × prs [2]	-0.28	[-1.17, 0.61]	-0.62
age cat [8-9] × prs [2]	-0.18	[-1.24, 0.88]	-0.34
age cat [10-11] × prs [2]	-0.02	[-1.24, 1.21]	-0.02
age cat [12-13] × prs [2]	0.29	[-1.14, 1.72]	0.40
age cat [14+] × prs [2]	-0.20	[-1.86, 1.46]	-0.24
age cat [4-5] × prs [3]	-0.34	[-1.01, 0.33]	-0.98
age cat [6-7] × prs [3]	0.50	[-0.37, 1.36]	1.12
age cat [8-9] × prs [3]	0.64	[-0.38, 1.67]	1.23
age cat [10-11] × prs [3]	1.09	[-0.09, 2.27]	1.81
age cat [12-13] × prs [3]	1.78	[0.39, 3.16]	2.51
age cat [14+] × prs [3]	1.31	[-0.28, 2.90]	1.61
age cat [4-5] × prs [4]	-0.46	[-1.14, 0.23]	-1.30
age cat [6-7] × prs [4]	0.75	[-0.11, 1.62]	1.70
age cat [8-9] × prs [4]	1.27	[0.26, 2.29]	2.46
age cat [10-11] × prs [4]	1.68	[0.51, 2.85]	2.81
age cat [12-13] × prs [4]	1.96	[0.58, 3.34]	2.79
age cat [14+] × prs [4]	2.34	[0.76, 3.91]	2.91
age cat [4-5] × prs [5]	-0.15	[-0.81, 0.52]	-0.43
age cat [6-7] × prs [5]	0.87	[0.02, 1.72]	2.02
age cat [8-9] × prs [5]	1.08	[0.07, 2.09]	2.09
age cat [10-11] × prs [5]	1.65	[0.49, 2.82]	2.77
age cat [12-13] × prs [5]	2.08	[0.70, 3.46]	2.96
age cat [14+] × prs [5]	2.03	[0.45, 3.61]	2.52
sep [2] × prs [2]	0.24	[-0.75, 1.23]	0.48
sep [3] × prs [2]	0.35	[-0.80, 1.49]	0.59
sep [4] × prs [2]	0.07	[-1.14, 1.28]	0.11
sep [5] × prs [2]	0.53	[-0.71, 1.77]	0.84
sep [2] × prs [3]	0.22	[-0.77, 1.21]	0.44
sep [3] × prs [3]	-0.05	[-1.19, 1.10]	-0.08
sep [4] × prs [3]	-0.02	[-1.19, 1.14]	-0.04
sep [5] × prs [3]	-0.47	[-1.72, 0.78]	-0.74
sep [2] × prs [4]	0.52	[-0.47, 1.51]	1.02
sep [3] × prs [4]	0.46	[-0.66, 1.59]	0.81

```
sep [4] × prs [4]         |        0.21 | [-0.93,  1.35] |  0.36 |
sep [5] × prs [4]         |       -0.06 | [-1.32,  1.19] | -0.10 |
sep [2] × prs [5]         |        0.60 | [-0.37,  1.56] |  1.22 |
sep [3] × prs [5]         |        0.45 | [-0.68,  1.58] |  0.78 |
sep [4] × prs [5]         |       -0.08 | [-1.23,  1.07] | -0.14 |
sep [5] × prs [5]         |        0.14 | [-1.11,  1.40] |  0.23 |
AICc                      |             |                |       | 8515.38
R2 (conditional)          |             |                |       |    0.82
R2 (marginal)             |             |                |       |    0.08
Sigma                     |             |                |       |    1.00
Log_loss                  |             |                |       |    0.18


Analysis of Deviance Table (Type III Wald chisquare tests)

Response: ovo
              Chisq Df Pr(>Chisq)
(Intercept) 14.1184  1  0.0001717 ***
sex          0.9505  1  0.3295911
age_cat     44.8281  6  5.063e-08 ***
sep          0.9855  4  0.9119840
prs          7.5741  4  0.1084839
age_cat:sep 24.7681 24  0.4184466
age_cat:prs 39.2668 24  0.0255990 *
sep:prs      8.5371 16  0.9312487
---
Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1
```

2.2.2 Table and figure by PRS

Table 4: Estimated probability of overweight/obese (95% CI) across childhood by family disadvantage (SEP) quintile (1=most, 5=least disadvantage), stratified by PRS quintile (1=lowest, 5=highest risk)

sep	prs	2-3	4-5	6-7	8-9	10-11	12-13	14+
1	1	0.26 (0.10, 0.41)	0.29 (0.13, 0.47)	0.15 (0.05, 0.32)	0.19 (0.04, 0.44)	0.16 (0.03, 0.37)	0.21 (0.06, 0.42)	0.12 (0.00, 0.32)
1	2	0.27 (0.15, 0.42)	0.27 (0.15, 0.42)	0.12 (0.03, 0.24)	0.12 (0.02, 0.25)	0.13 (0.02, 0.27)	0.16 (0.03, 0.32)	0.20 (0.08, 0.32)
1	3	0.42 (0.27, 0.58)	0.41 (0.26, 0.56)	0.28 (0.09, 0.52)	0.33 (0.13, 0.58)	0.36 (0.15, 0.60)	0.36 (0.15, 0.57)	0.37 (0.16, 0.56)
1	4	0.33 (0.13, 0.58)	0.34 (0.15, 0.56)	0.22 (0.06, 0.41)	0.31 (0.15, 0.48)	0.39 (0.21, 0.60)	0.38 (0.21, 0.56)	0.40 (0.25, 0.58)
1	5	0.45 (0.24, 0.67)	0.48 (0.30, 0.66)	0.39 (0.22, 0.58)	0.37 (0.17, 0.55)	0.49 (0.32, 0.66)	0.53 (0.35, 0.72)	0.50 (0.34, 0.69)
2	1	0.19 (0.07, 0.34)	0.23 (0.12, 0.37)	0.06 (0.01, 0.14)	0.05 (0.01, 0.12)	0.10 (0.01, 0.20)	0.04 (0.00, 0.13)	0.17 (0.05, 0.38)
2	2	0.32 (0.19, 0.49)	0.23 (0.09, 0.36)	0.13 (0.05, 0.25)	0.13 (0.03, 0.24)	0.15 (0.06, 0.25)	0.13 (0.02, 0.26)	0.06 (0.00, 0.15)
2	3	0.33 (0.12, 0.56)	0.30 (0.10, 0.58)	0.21 (0.08, 0.37)	0.26 (0.12, 0.46)	0.22 (0.09, 0.37)	0.26 (0.12, 0.42)	0.32 (0.10, 0.55)
2	4	0.31 (0.13, 0.56)	0.27 (0.09, 0.48)	0.29 (0.14, 0.46)	0.29 (0.16, 0.45)	0.27 (0.12, 0.45)	0.25 (0.09, 0.41)	0.30 (0.14, 0.48)
2	5	0.54 (0.31, 0.74)	0.52 (0.37, 0.67)	0.46 (0.30, 0.63)	0.46 (0.29, 0.65)	0.43 (0.26, 0.60)	0.48 (0.30, 0.67)	0.49 (0.26, 0.73)
3	1	0.18 (0.05, 0.36)	0.14 (0.05, 0.30)	0.08 (0.01, 0.22)	0.07 (0.01, 0.18)	0.05 (0.00, 0.12)	0.10 (0.02, 0.21)	0.08 (0.00, 0.22)
3	2	0.29 (0.15, 0.48)	0.23 (0.12, 0.37)	0.09 (0.02, 0.22)	0.11 (0.04, 0.24)	0.11 (0.01, 0.22)	0.13 (0.00, 0.27)	0.12 (0.00, 0.26)
3	3	0.33 (0.19, 0.49)	0.26 (0.10, 0.44)	0.20 (0.07, 0.39)	0.19 (0.06, 0.35)	0.24 (0.08, 0.48)	0.24 (0.08, 0.43)	0.19 (0.07, 0.33)
3	4	0.32 (0.17, 0.47)	0.27 (0.14, 0.40)	0.18 (0.08, 0.33)	0.24 (0.14, 0.38)	0.24 (0.11, 0.40)	0.23 (0.11, 0.38)	0.32 (0.09, 0.62)

sep	prs	2-3	4-5	6-7	8-9	10-11	12-13	14+
3	5	0.40 (0.23, 0.60)	0.39 (0.16, 0.64)	0.33 (0.16, 0.52)	0.33 (0.17, 0.50)	0.32 (0.16, 0.47)	0.38 (0.21, 0.58)	0.33 (0.12, 0.58)
4	1	0.21 (0.09, 0.33)	0.24 (0.11, 0.38)	0.07 (0.01, 0.16)	0.11 (0.03, 0.23)	0.09 (0.01, 0.25)	0.05 (0.00, 0.14)	0.09 (0.00, 0.25)
4	2	0.34 (0.13, 0.63)	0.25 (0.12, 0.39)	0.17 (0.04, 0.39)	0.10 (0.00, 0.28)	0.13 (0.00, 0.37)	0.15 (0.01, 0.36)	0.13 (0.00, 0.31)
4	3	0.32 (0.17, 0.49)	0.33 (0.20, 0.51)	0.21 (0.09, 0.35)	0.17 (0.05, 0.32)	0.16 (0.05, 0.31)	0.24 (0.07, 0.43)	0.30 (0.14, 0.49)
4	4	0.34 (0.20, 0.50)	0.34 (0.20, 0.50)	0.31 (0.16, 0.47)	0.29 (0.12, 0.45)	0.32 (0.18, 0.48)	0.38 (0.21, 0.58)	0.40 (0.15, 0.66)
4	5	0.40 (0.25, 0.60)	0.43 (0.29, 0.61)	0.25 (0.10, 0.40)	0.22 (0.08, 0.38)	0.22 (0.11, 0.36)	0.22 (0.07, 0.42)	0.29 (0.15, 0.43)
5	1	0.16 (0.07, 0.27)	0.25 (0.14, 0.36)	0.10 (0.03, 0.19)	0.06 (0.01, 0.13)	0.09 (0.02, 0.18)	0.12 (0.02, 0.28)	0.10 (0.02, 0.23)
5	2	0.31 (0.18, 0.44)	0.32 (0.19, 0.45)	0.11 (0.04, 0.20)	0.09 (0.02, 0.19)	0.10 (0.03, 0.20)	0.10 (0.02, 0.22)	0.13 (0.04, 0.25)
5	3	0.21 (0.10, 0.35)	0.23 (0.11, 0.37)	0.12 (0.04, 0.22)	0.08 (0.01, 0.17)	0.16 (0.05, 0.28)	0.14 (0.03, 0.26)	0.14 (0.03, 0.29)
5	4	0.25 (0.11, 0.43)	0.23 (0.10, 0.38)	0.18 (0.07, 0.31)	0.17 (0.06, 0.30)	0.21 (0.08, 0.34)	0.22 (0.09, 0.36)	0.23 (0.09, 0.39)
5	5	0.33 (0.13, 0.52)	0.39 (0.11, 0.67)	0.29 (0.13, 0.46)	0.27 (0.13, 0.45)	0.34 (0.17, 0.52)	0.29 (0.11, 0.51)	0.30 (0.09, 0.51)

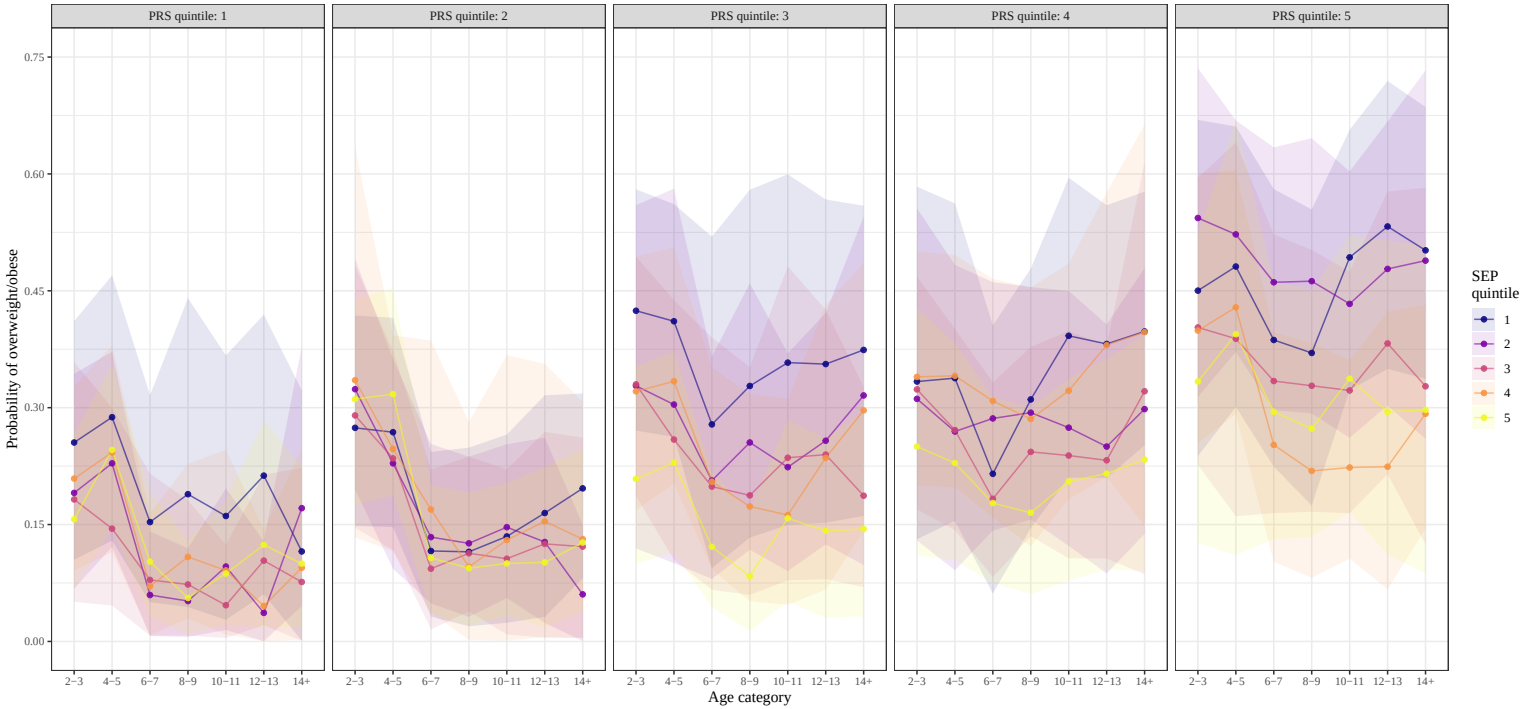

Figure 5: Estimated probability of overweight/obese (95% CI) across childhood by family disadvantage (SEP) quintile (1=most, 5=least disadvantage), stratified by PRS quintile (1=lowest, 5=highest risk)

2.3 Marginal SEIFA and SEP Figures

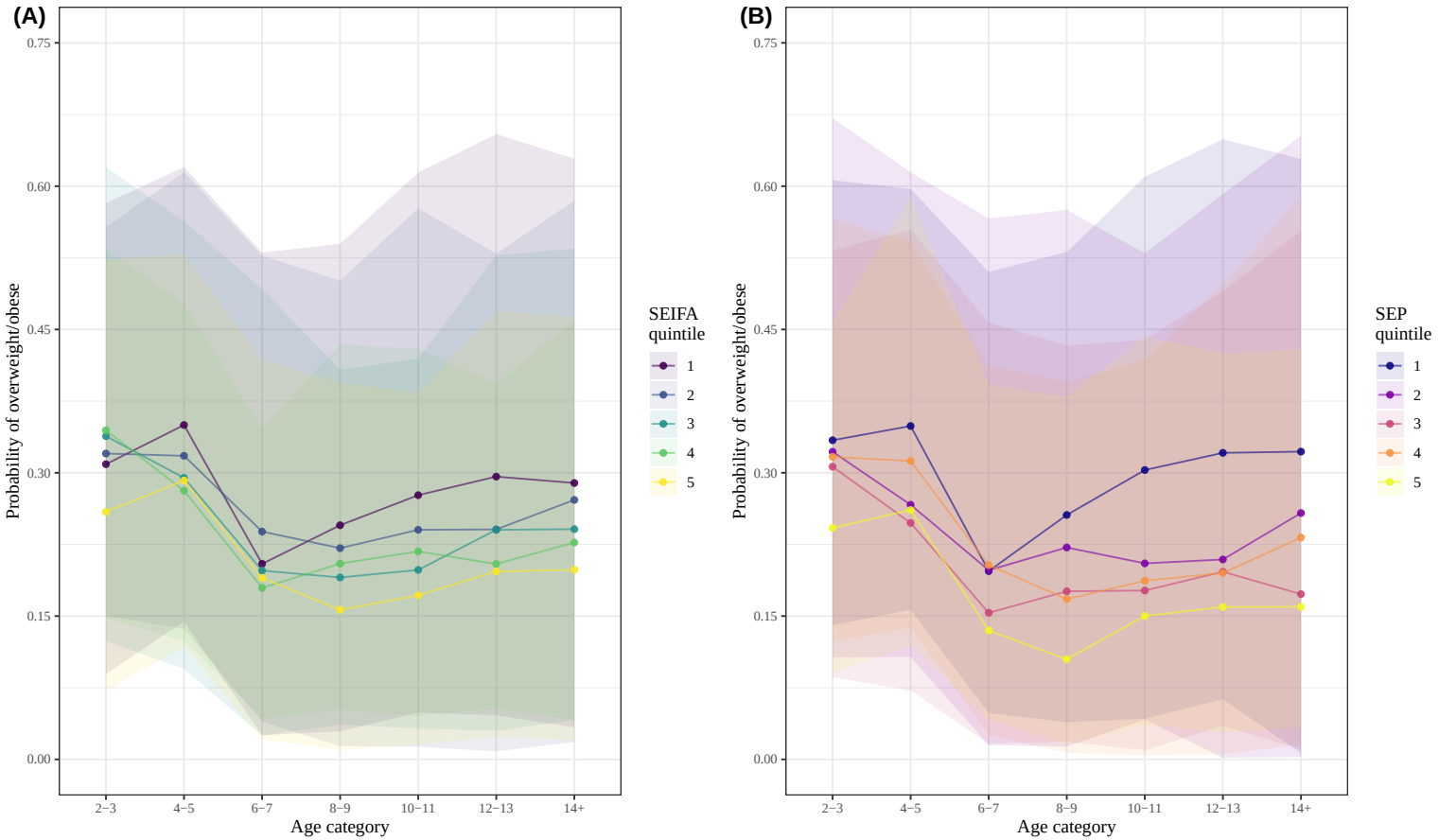

Figure 6: Association of SEIFA neighbourhood disadvantage (Panel A) and SEP family disadvantage (Panel B) with probability of overweight/obese across childhood. In all cases quintile 1 represents the most disadvantage.

3 Session info

```
format(Sys.time(), '%d-%b-%Y')
```

```
[1] "22-Feb-2023"
```

```
sessionInfo()
```

```
R version 4.2.2 (2022-10-31 ucrt)
Platform: x86_64-w64-mingw32/x64 (64-bit)
Running under: Windows 10 x64 (build 19045)

Matrix products: default

locale:
[1] LC_COLLATE=English_Australia.utf8  LC_CTYPE=English_Australia.utf8
[3] LC_MONETARY=English_Australia.utf8 LC_NUMERIC=C
[5] LC_TIME=English_Australia.utf8

attached base packages:
[1] stats     graphics  grDevices utils     datasets  methods   base

other attached packages:
[1] arrow_11.0.0.2 stringi_1.7.12 knitr_1.42     tidyr_1.3.0    ggpubr_0.6.0
[6] ggplot2_3.4.1  forcats_1.0.0  dplyr_1.1.0

loaded via a namespace (and not attached):
 [1] pillar_1.8.1      compiler_4.2.2    tools_4.2.2       bit_4.0.5
 [5] digest_0.6.31     viridisLite_0.4.1 jsonlite_1.8.4    evaluate_0.20
 [9] lifecycle_1.0.3   tibble_3.1.8      gtable_0.3.1      pkgconfig_2.0.3
[13] rlang_1.0.6       cli_3.6.0         rstudioapi_0.14   yaml_2.3.7
```

```
[17] xfun_0.37          fastmap_1.1.0     withr_2.5.0       generics_0.1.3
[21] vctrs_0.5.2        cowplot_1.1.1     bit64_4.0.5       grid_4.2.2
[25] tidyselect_1.2.0   glue_1.6.2        R6_2.5.1          rstatix_0.7.2
[29] fansi_1.0.4        rmarkdown_2.20    carData_3.0-5     farver_2.1.1
[33] tzdb_0.3.0         car_3.1-1         purrr_1.0.1       magrittr_2.0.3
[37] backports_1.4.1    scales_1.2.1      htmltools_0.5.4   assertthat_0.2.1
[41] abind_1.4-5        colorspace_2.1-0  ggsignif_0.6.4    labeling_0.4.2
[45] utf8_1.2.3         munsell_0.5.0     broom_1.0.3
```