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")
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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
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Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1
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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)

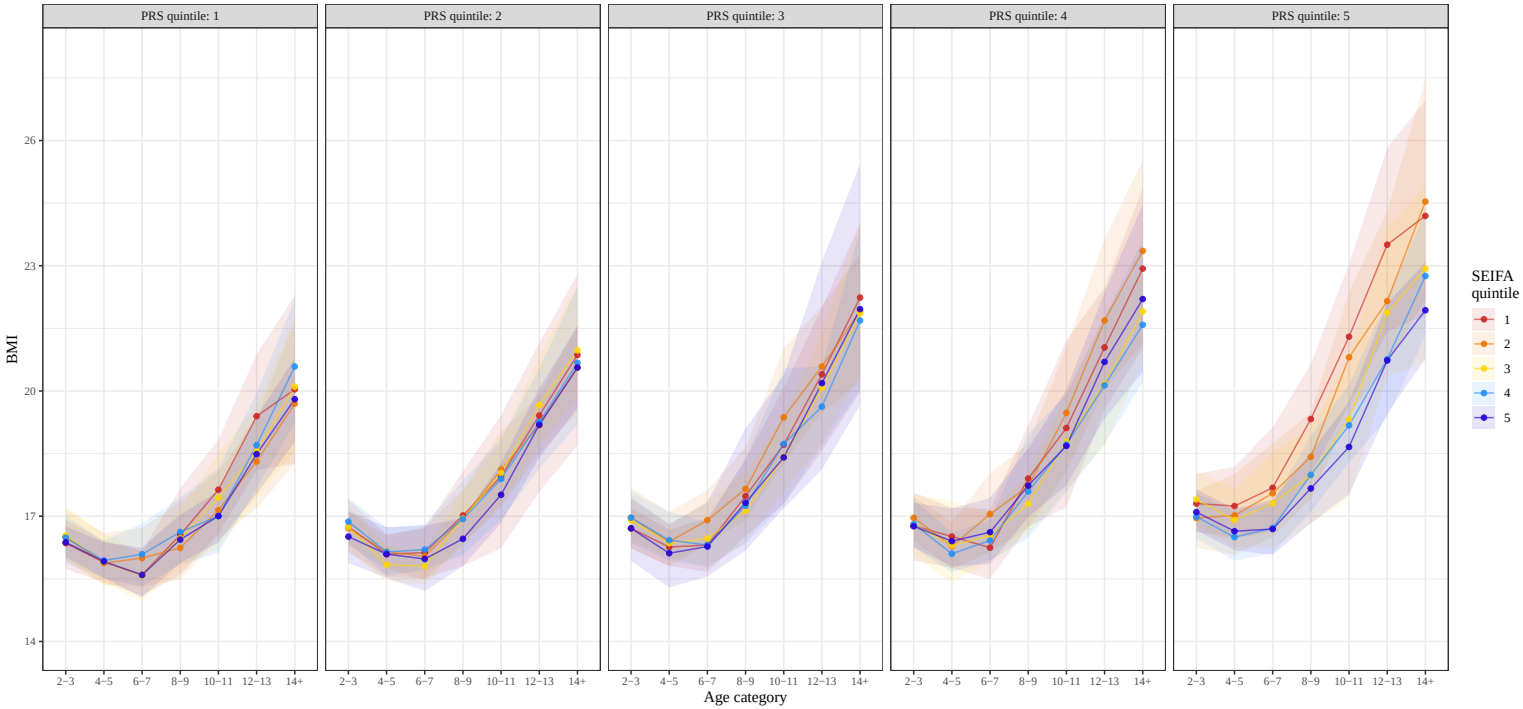

Figure 1: Estimated BMI (95% CI) across childhood by neighbourhood disadvantage (SEIFA) quintile (1=most, 5=least disadvantage), stratified by PRS quintile (1=lowest, 5=highest risk)

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)

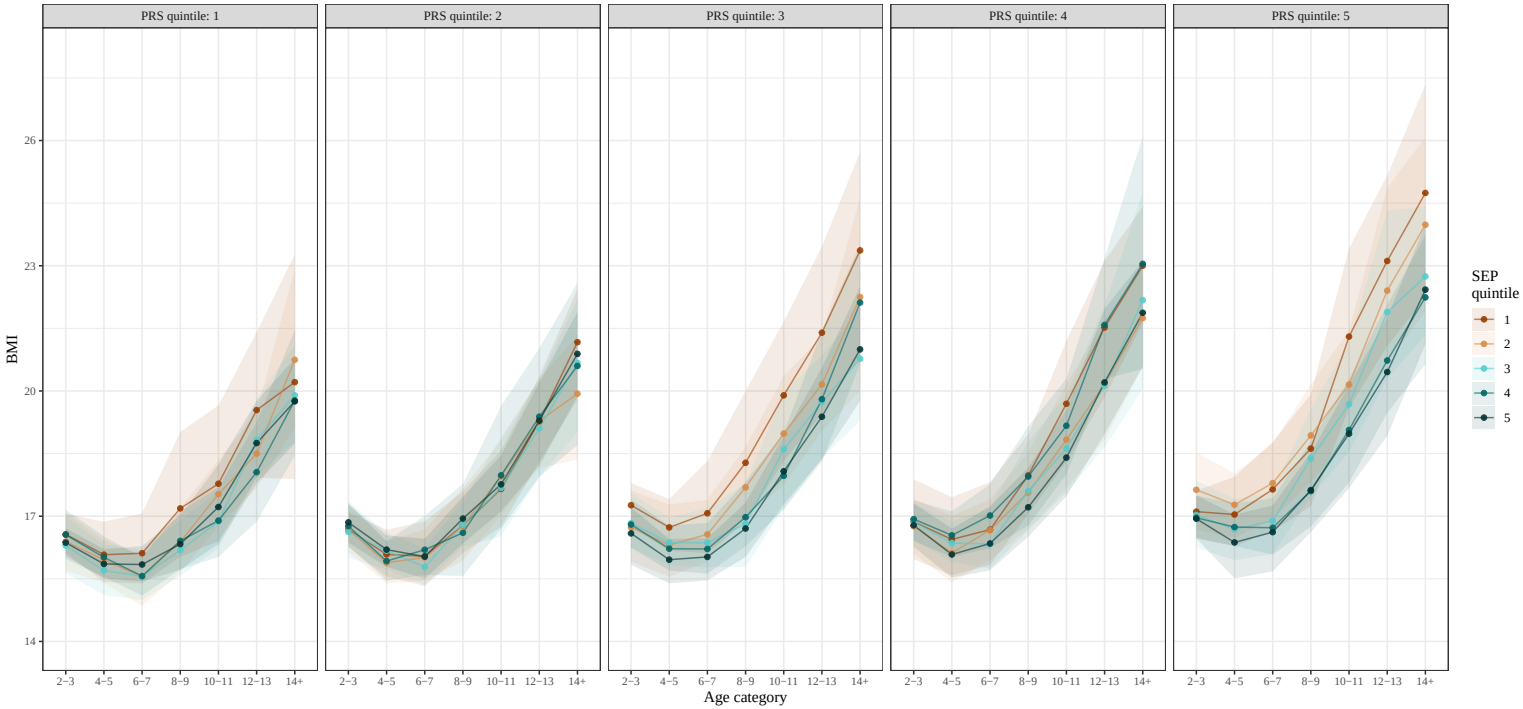

Figure 2: Estimated BMI (95% CI) across childhood by family disadvantage (SEP) quintile (1=most, 5=least disadvantage), stratified by PRS quintile (1=lowest, 5=highest risk)

1.3 Marginal SEIFA and SEP Figures

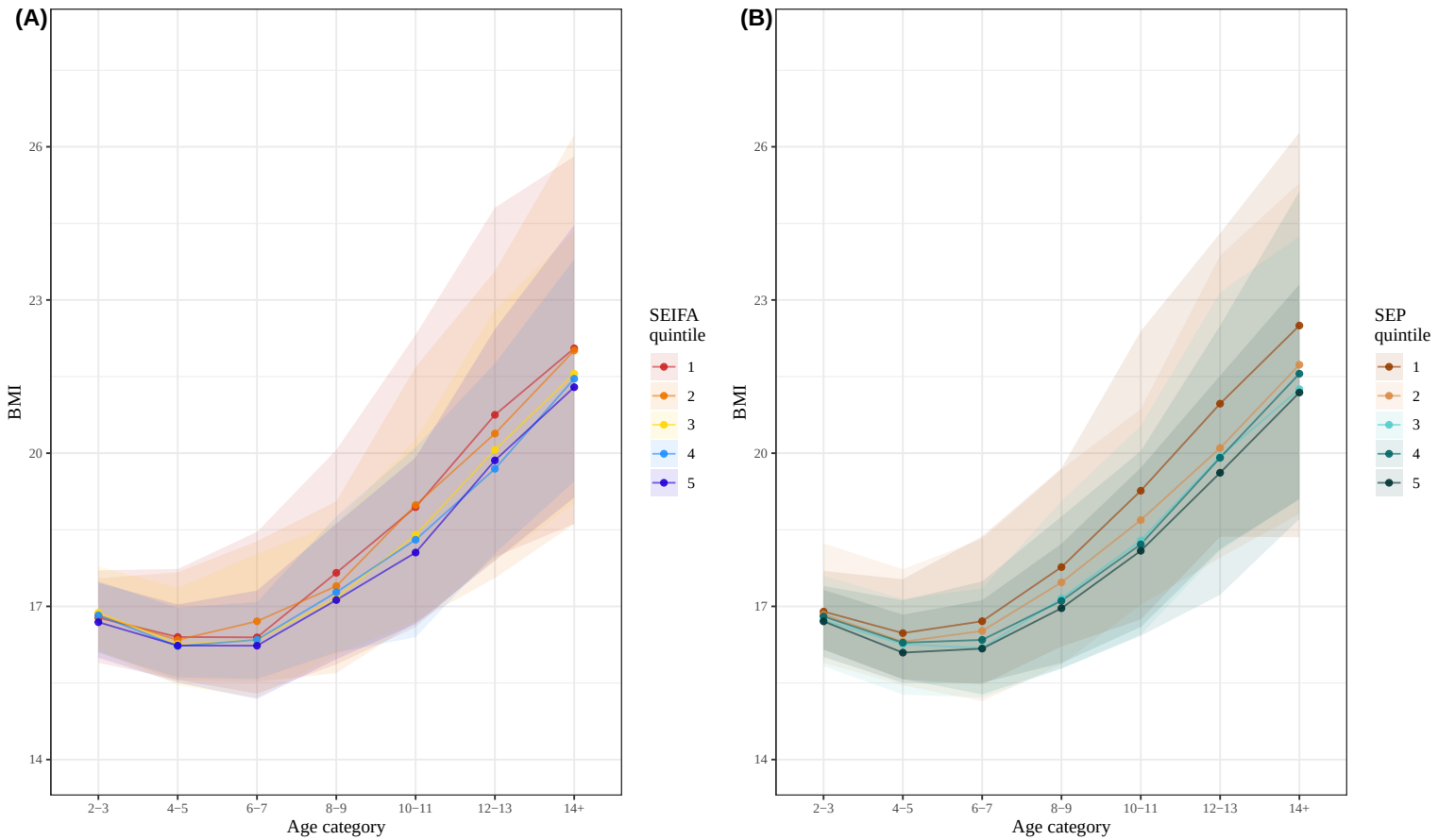

Figure 3: Association of SEIFA neighbourhood disadvantage (Panel A) and SEP family disadvantage (Panel B) with BMI across childhood. In all cases quintile 1 represents the most disadvantage.

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)

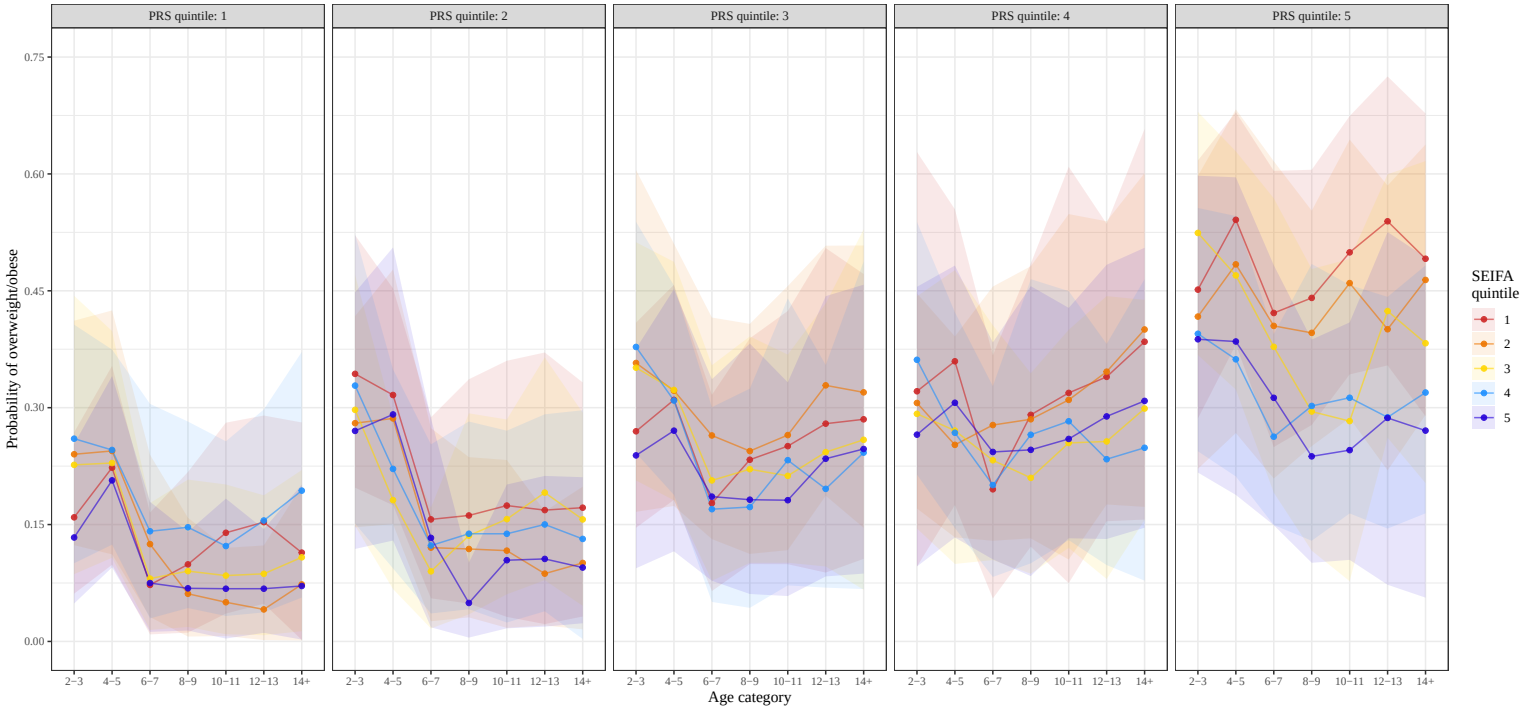

Figure 4: Estimated probability of overweight/obese (95% CI) across childhood by neighbourhood disadvantage (SEIFA) quintile (1=most, 5=least disadvantage), stratified by PRS quintile (1=lowest, 5=highest risk)

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)

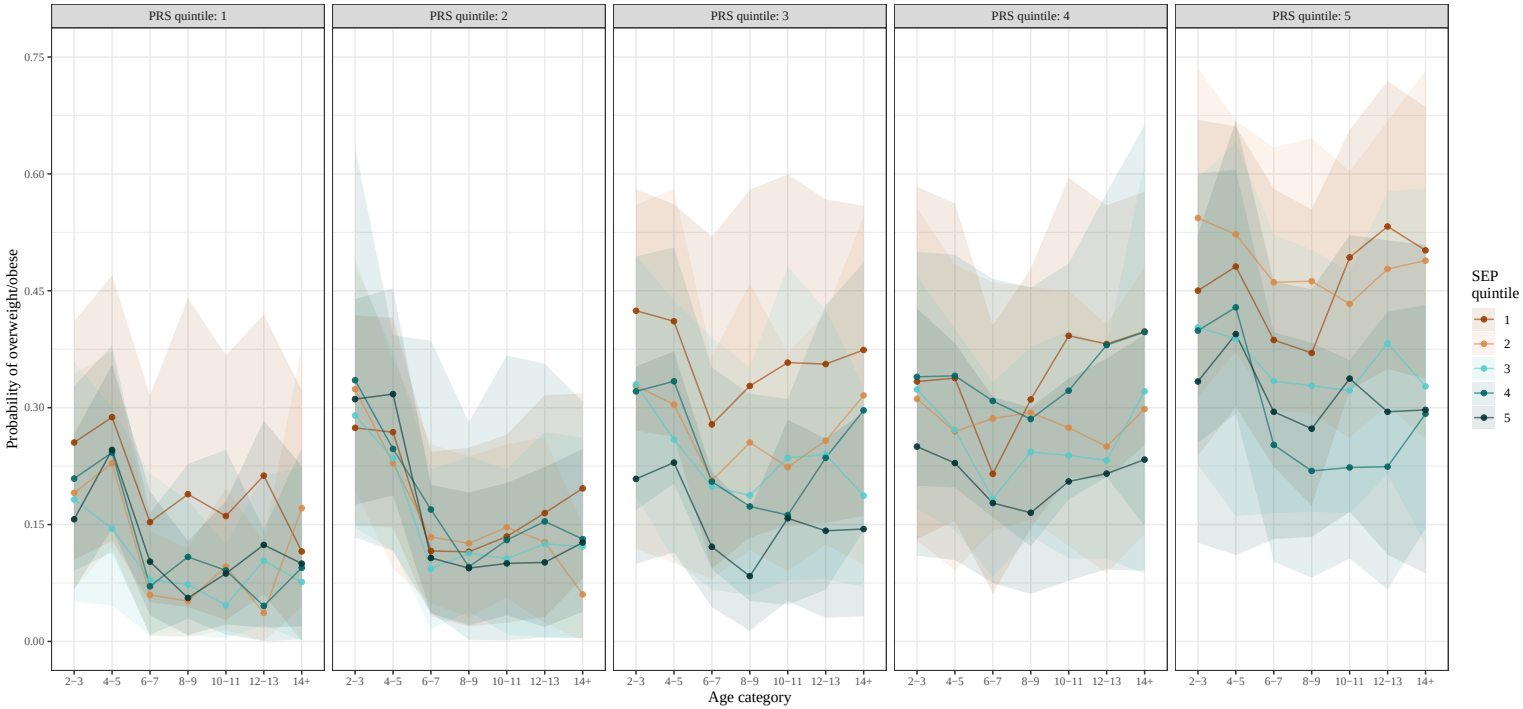

Figure 5: Estimated probability of overweight/obese (95% CI) across childhood by family disadvantage (SEP) quintile (1=most, 5=least disadvantage), stratified by PRS quintile (1=lowest, 5=highest risk)

2.3 Marginal SEIFA and SEP Figures

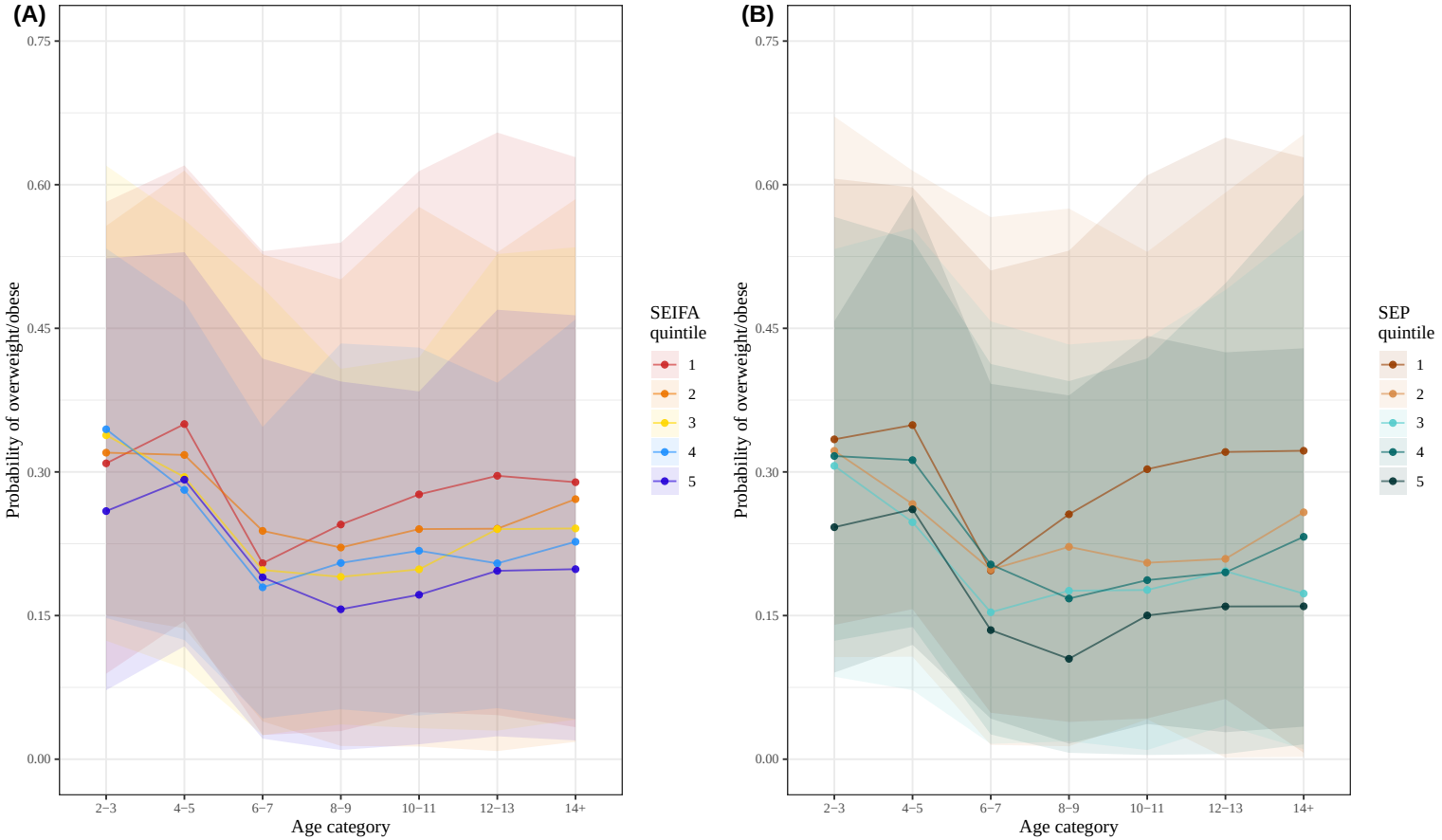

Figure 6: Association of SEIFA neighbourhood disadvantage (Panel A) and SEP family disadvantage (Panel B) with probability of overweight/obese across childhood. In all cases quintile 1 represents the most disadvantage.

3 Adult data: BMI models

3.1 SEIFA predictor

3.1.1 Model details

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

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

The model's total explanatory power is substantial (conditional R2 = 0.85) and the part related to
the fixed effects alone (marginal R2) is
of 0.09


Conditional model:
 Groups   Name        Std.Dev. Corr
 hicid    (Intercept) 2.79920
          waveC       0.46366  0.651
 personid (Intercept) 3.87316
 Residual             2.13793


The model's intercept, corresponding to waveC = 0, sex = 0, age_cat = <30, sei = 1 and prs = 1, is
at 26.29 (95% CI [25.41, 27.17], p < .001).

Parameter                | Coefficient |         95% CI |     z |      Fit
-------------------------------------------------------------------------
(Intercept)              |       26.29 | [25.41, 27.17] | 58.64 |
waveC                    |        0.40 | [ 0.35,  0.45] | 15.66 |
sex                      |       -1.54 | [-1.89, -1.18] | -8.39 |
age cat [30-35]          |        0.12 | [-0.51,  0.76] |  0.38 |
```

age cat [35-40]	-0.02	[-0.70, 0.66]	-0.06
age cat [40-45]	-0.04	[-0.79, 0.71]	-0.11
age cat [45-50]	-0.47	[-1.31, 0.37]	-1.09
age cat [50+]	-0.66	[-1.72, 0.41]	-1.21
sei [2]	-0.18	[-0.86, 0.49]	-0.54
sei [3]	-0.06	[-0.79, 0.67]	-0.17
sei [4]	0.31	[-0.50, 1.13]	0.76
sei [5]	-0.35	[-1.31, 0.60]	-0.72
prs [2]	1.05	[0.03, 2.07]	2.02
prs [3]	1.20	[0.17, 2.22]	2.29
prs [4]	3.32	[2.30, 4.34]	6.40
prs [5]	3.50	[2.51, 4.50]	6.90
age cat [30-35] × sei [2]	0.22	[-0.37, 0.82]	0.73
age cat [35-40] × sei [2]	0.22	[-0.38, 0.82]	0.71
age cat [40-45] × sei [2]	0.13	[-0.48, 0.75]	0.42
age cat [45-50] × sei [2]	0.37	[-0.31, 1.05]	1.06
age cat [50+] × sei [2]	0.78	[-0.11, 1.66]	1.73
age cat [30-35] × sei [3]	-0.04	[-0.69, 0.61]	-0.13
age cat [35-40] × sei [3]	9.38e-03	[-0.65, 0.66]	0.03
age cat [40-45] × sei [3]	-0.11	[-0.78, 0.57]	-0.31
age cat [45-50] × sei [3]	-0.07	[-0.81, 0.66]	-0.20
age cat [50+] × sei [3]	-0.32	[-1.24, 0.60]	-0.68
age cat [30-35] × sei [4]	-0.38	[-1.10, 0.34]	-1.03
age cat [35-40] × sei [4]	-0.19	[-0.92, 0.53]	-0.52
age cat [40-45] × sei [4]	-0.26	[-1.00, 0.49]	-0.68
age cat [45-50] × sei [4]	-0.15	[-0.96, 0.65]	-0.38
age cat [50+] × sei [4]	-0.28	[-1.26, 0.69]	-0.57
age cat [30-35] × sei [5]	0.54	[-0.27, 1.34]	1.30
age cat [35-40] × sei [5]	0.37	[-0.44, 1.19]	0.90
age cat [40-45] × sei [5]	0.28	[-0.56, 1.12]	0.66
age cat [45-50] × sei [5]	0.19	[-0.70, 1.08]	0.42
age cat [50+] × sei [5]	0.40	[-0.66, 1.46]	0.73
age cat [30-35] × prs [2]	-0.10	[-0.85, 0.66]	-0.25
age cat [35-40] × prs [2]	-0.24	[-1.03, 0.55]	-0.60

age cat [40-45] × prs [2]	-0.21	[-1.03, 0.62]	-0.49
age cat [45-50] × prs [2]	-0.09	[-0.97, 0.79]	-0.21
age cat [50+] × prs [2]	-0.24	[-1.28, 0.81]	-0.44
age cat [30-35] × prs [3]	0.19	[-0.55, 0.94]	0.52
age cat [35-40] × prs [3]	0.51	[-0.27, 1.29]	1.28
age cat [40-45] × prs [3]	0.46	[-0.36, 1.28]	1.10
age cat [45-50] × prs [3]	1.02	[0.15, 1.90]	2.29
age cat [50+] × prs [3]	0.96	[-0.08, 2.00]	1.82
age cat [30-35] × prs [4]	0.20	[-0.55, 0.95]	0.53
age cat [35-40] × prs [4]	0.22	[-0.56, 1.01]	0.56
age cat [40-45] × prs [4]	0.34	[-0.48, 1.16]	0.82
age cat [45-50] × prs [4]	0.38	[-0.50, 1.27]	0.85
age cat [50+] × prs [4]	0.20	[-0.85, 1.26]	0.38
age cat [30-35] × prs [5]	0.09	[-0.63, 0.82]	0.25
age cat [35-40] × prs [5]	0.16	[-0.60, 0.93]	0.42
age cat [40-45] × prs [5]	0.12	[-0.69, 0.93]	0.29
age cat [45-50] × prs [5]	0.66	[-0.21, 1.52]	1.49
age cat [50+] × prs [5]	0.49	[-0.56, 1.53]	0.91
sei [2] × prs [2]	0.07	[-0.52, 0.66]	0.24
sei [3] × prs [2]	0.06	[-0.56, 0.69]	0.19
sei [4] × prs [2]	-0.27	[-0.96, 0.42]	-0.75
sei [5] × prs [2]	-0.40	[-1.19, 0.39]	-1.00
sei [2] × prs [3]	0.08	[-0.50, 0.66]	0.26
sei [3] × prs [3]	0.08	[-0.54, 0.70]	0.26
sei [4] × prs [3]	-0.09	[-0.76, 0.58]	-0.27
sei [5] × prs [3]	-0.17	[-0.95, 0.61]	-0.43
sei [2] × prs [4]	-0.33	[-0.92, 0.25]	-1.12
sei [3] × prs [4]	-0.44	[-1.08, 0.20]	-1.34
sei [4] × prs [4]	-0.70	[-1.39, -0.01]	-2.00
sei [5] × prs [4]	-0.56	[-1.33, 0.21]	-1.43
sei [2] × prs [5]	-0.29	[-0.86, 0.27]	-1.01
sei [3] × prs [5]	-0.03	[-0.65, 0.59]	-0.09
sei [4] × prs [5]	-0.61	[-1.27, 0.05]	-1.80
sei [5] × prs [5]	-0.73	[-1.52, 0.06]	-1.82

```
AICc                    |            |               |       | 74119.15
R2 (conditional)        |            |               |       |     0.85
R2 (marginal)           |            |               |       |     0.09
Sigma                   |            |               |       |     2.14


Analysis of Deviance Table (Type III Wald chisquare tests)

Response: bmi
                Chisq Df Pr(>Chisq)
(Intercept) 3439.2266  1  < 2.2e-16 ***
waveC        245.1950  1  < 2.2e-16 ***
sex           70.4312  1  < 2.2e-16 ***
age_cat        5.5204  5     0.3557
sei            2.5208  4     0.6409
prs           72.0817  4  8.248e-15 ***
age_cat:sei   17.1916 20     0.6405
age_cat:prs   23.6838 20     0.2565
sei:prs       13.4923 16     0.6365
---
Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1
```

3.1.2 Table and figure by PRS

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

sei	prs	<30	30-35	35-40	40-45	45-50	50+
1	1	24.4 (22.4, 27.3)	25.3 (23.6, 27.2)	25.5 (24.2, 26.8)	26.1 (24.6, 27.8)	25.7 (23.6, 28.4)	25.8 (22.2, 28.5)
1	2	27.4 (23.2, 32.9)	26.5 (24.2, 30.5)	25.8 (23.9, 28.0)	26.1 (23.9, 28.6)	26.4 (24.6, 28.7)	26.7 (23.1, 30.2)
1	3	26.9 (23.6, 30.8)	28.3 (26.3, 31.5)	28.0 (26.3, 29.8)	29.1 (27.0, 31.8)	27.8 (25.8, 30.3)	28.0 (25.2, 31.3)
1	4	27.1 (23.2, 32.3)	29.4 (26.7, 32.3)	28.7 (26.7, 31.3)	29.5 (27.6, 31.5)	29.1 (26.5, 32.4)	32.6 (25.6, 39.9)

sei	prs	<30	30-35	35-40	40-45	45-50	50+
1	5	28.0 (26.3, 30.5)	29.3 (27.2, 31.6)	30.2 (28.5, 32.0)	30.4 (28.1, 32.1)	31.0 (28.0, 33.9)	30.7 (26.5, 37.1)
2	1	24.3 (20.6, 34.3)	24.7 (23.2, 26.6)	25.1 (24.0, 26.2)	25.7 (24.4, 26.9)	25.7 (23.7, 27.4)	28.5 (25.5, 31.9)
2	2	26.2 (23.6, 29.2)	26.6 (24.3, 28.5)	26.4 (24.7, 28.6)	26.5 (25.3, 27.9)	26.7 (25.0, 28.6)	28.4 (24.9, 33.2)
2	3	27.4 (24.9, 31.4)	26.6 (24.3, 29.5)	26.6 (25.2, 28.0)	26.8 (25.2, 28.5)	26.7 (25.0, 28.9)	27.8 (24.4, 33.2)
2	4	27.5 (24.7, 30.3)	29.9 (27.7, 32.5)	29.2 (27.7, 30.7)	29.0 (27.3, 31.2)	29.5 (27.3, 31.9)	30.1 (25.7, 36.1)
2	5	27.7 (26.1, 30.1)	27.9 (25.9, 30.0)	29.2 (26.5, 33.3)	30.3 (27.8, 33.3)	30.3 (26.7, 33.5)	30.9 (26.5, 35.8)
3	1	25.3 (21.2, 29.0)	25.0 (23.2, 27.0)	24.9 (23.2, 26.6)	25.8 (24.0, 27.6)	25.6 (23.3, 28.4)	25.9 (22.1, 30.4)
3	2	24.7 (22.7, 32.0)	26.1 (24.0, 28.7)	26.2 (23.9, 28.3)	26.2 (24.7, 28.4)	26.1 (23.9, 28.8)	25.3 (23.1, 27.6)
3	3	24.7 (22.4, 27.2)	25.9 (23.3, 30.0)	26.9 (24.7, 29.5)	26.8 (25.2, 28.4)	26.7 (24.7, 28.8)	27.4 (24.5, 30.4)
3	4	28.8 (25.0, 33.0)	28.3 (26.6, 30.1)	28.3 (26.7, 30.1)	29.3 (27.4, 31.0)	28.6 (27.0, 31.2)	27.9 (23.6, 31.8)
3	5	27.3 (25.7, 29.7)	28.4 (26.0, 30.9)	28.7 (27.2, 30.2)	28.4 (26.4, 30.2)	29.6 (27.4, 31.6)	29.5 (24.8, 34.4)
4	1	25.0 (21.3, 30.2)	24.3 (22.5, 26.6)	24.1 (22.9, 25.6)	24.7 (23.1, 26.3)	25.1 (23.3, 27.3)	25.7 (23.6, 28.2)
4	2	26.1 (21.1, 31.0)	26.0 (23.7, 28.7)	26.3 (24.5, 28.3)	26.0 (23.5, 28.5)	25.7 (23.4, 28.3)	25.5 (22.6, 29.6)
4	3	25.8 (22.9, 29.2)	26.3 (24.4, 28.7)	26.8 (25.1, 28.6)	26.6 (24.9, 28.5)	27.0 (25.3, 28.6)	27.2 (24.1, 29.5)
4	4	27.6 (25.1, 31.5)	27.4 (25.0, 30.3)	27.6 (26.2, 29.3)	28.3 (26.7, 30.0)	27.6 (24.7, 30.1)	27.6 (24.1, 29.9)
4	5	26.2 (22.6, 32.7)	28.0 (25.8, 30.5)	27.3 (25.6, 28.7)	27.0 (24.9, 28.9)	28.0 (25.7, 30.2)	27.9 (25.4, 31.2)
5	1	28.5 (22.2, 33.9)	24.9 (22.9, 27.7)	24.5 (23.3, 26.0)	24.7 (23.4, 25.9)	24.1 (22.4, 25.7)	24.6 (21.6, 27.8)
5	2	24.8 (21.3, 27.9)	25.8 (22.9, 28.9)	25.3 (23.1, 27.6)	25.8 (23.5, 28.1)	25.8 (23.6, 27.7)	25.9 (23.5, 27.9)
5	3	25.3 (20.2, 30.6)	26.3 (24.3, 28.3)	26.3 (24.3, 28.8)	26.6 (24.9, 28.5)	26.9 (24.9, 29.4)	25.7 (22.8, 28.8)
5	4	27.8 (21.8, 35.3)	26.5 (24.8, 28.7)	26.4 (24.5, 28.3)	26.9 (25.2, 28.6)	26.8 (24.5, 28.6)	27.1 (24.7, 30.2)
5	5	28.8 (24.5, 35.6)	27.1 (24.7, 29.5)	27.5 (25.3, 29.9)	27.8 (25.8, 30.0)	27.5 (25.1, 30.2)	28.5 (24.5, 33.2)

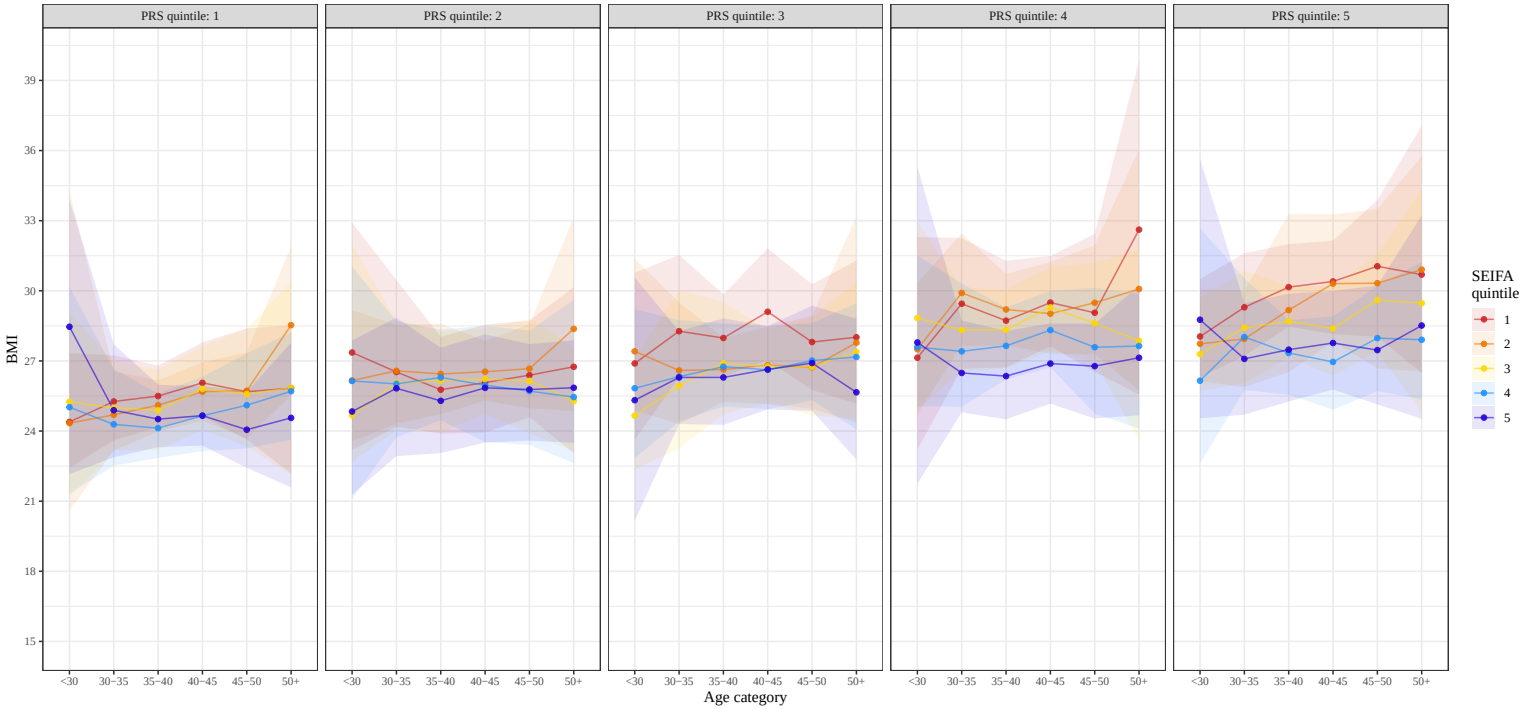

Figure 7: Estimated BMI (95% CI) across adulthood by neighbourhood disadvantage (SEIFA) quintile (1=most, 5=least disadvantage), stratified by PRS quintile (1=lowest, 5=highest risk)

3.2 SEP predictor

3.2.1 Model details

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

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

The model's total explanatory power is substantial (conditional R2 = 0.85) and the part related to
the fixed effects alone (marginal R2) is
of 0.09


Conditional model:
 Groups   Name        Std.Dev. Corr
 hicid    (Intercept) 2.76206
          waveC       0.46267  0.650
 personid (Intercept) 3.87633
 Residual             2.14040


The model's intercept, corresponding to waveC = 0, sex = 0, age_cat = <30, sep = 1 and prs = 1, is
at 26.26 (95% CI [25.40, 27.11], p < .001).

Parameter                | Coefficient |         95% CI |         z |      Fit
-------------------------------------------------------------------------------
(Intercept)              |       26.26 | [25.40, 27.11] |     60.06 |
waveC                    |        0.40 | [ 0.35,  0.45] |     15.52 |
sex                      |       -1.54 | [-1.90, -1.18] |     -8.40 |
age cat [30-35]          |        0.10 | [-0.52,  0.71] |      0.31 |
```

age cat [35-40]	0.15	[-0.52, 0.82]	0.44
age cat [40-45]	0.21	[-0.53, 0.95]	0.56
age cat [45-50]	0.11	[-0.72, 0.94]	0.26
age cat [50+]	-0.18	[-1.21, 0.86]	-0.34
sep [2]	0.30	[-0.35, 0.94]	0.90
sep [3]	0.03	[-0.72, 0.79]	0.09
sep [4]	-0.13	[-1.02, 0.76]	-0.29
sep [5]	-0.02	[-1.25, 1.20]	-0.04
prs [2]	1.08	[0.07, 2.08]	2.09
prs [3]	1.09	[0.09, 2.09]	2.13
prs [4]	3.02	[2.01, 4.03]	5.87
prs [5]	3.21	[2.22, 4.21]	6.34
age cat [30-35] × sep [2]	0.01	[-0.57, 0.59]	0.04
age cat [35-40] × sep [2]	-0.30	[-0.88, 0.28]	-1.02
age cat [40-45] × sep [2]	-0.30	[-0.90, 0.29]	-1.01
age cat [45-50] × sep [2]	-0.71	[-1.35, -0.06]	-2.15
age cat [50+] × sep [2]	-0.65	[-1.44, 0.15]	-1.59
age cat [30-35] × sep [3]	0.14	[-0.52, 0.79]	0.41
age cat [35-40] × sep [3]	-2.18e-03	[-0.67, 0.66]	-6.41e-03
age cat [40-45] × sep [3]	-0.23	[-0.92, 0.45]	-0.66
age cat [45-50] × sep [3]	-0.52	[-1.25, 0.22]	-1.38
age cat [50+] × sep [3]	-0.29	[-1.18, 0.60]	-0.63
age cat [30-35] × sep [4]	0.15	[-0.58, 0.89]	0.40
age cat [35-40] × sep [4]	-0.17	[-0.93, 0.59]	-0.44
age cat [40-45] × sep [4]	-0.40	[-1.18, 0.39]	-0.99
age cat [45-50] × sep [4]	-0.63	[-1.47, 0.20]	-1.49
age cat [50+] × sep [4]	-0.35	[-1.34, 0.64]	-0.69
age cat [30-35] × sep [5]	-0.12	[-1.20, 0.96]	-0.22
age cat [35-40] × sep [5]	-0.22	[-1.32, 0.87]	-0.40
age cat [40-45] × sep [5]	-0.42	[-1.55, 0.70]	-0.74
age cat [45-50] × sep [5]	-0.81	[-1.97, 0.35]	-1.37
age cat [50+] × sep [5]	-0.77	[-2.05, 0.51]	-1.17
age cat [30-35] × prs [2]	-0.02	[-0.78, 0.73]	-0.06
age cat [35-40] × prs [2]	-0.17	[-0.96, 0.62]	-0.42

age cat [40-45] × prs [2]	-0.13	[-0.96, 0.69]	-0.32
age cat [45-50] × prs [2]	-0.04	[-0.92, 0.84]	-0.10
age cat [50+] × prs [2]	-0.21	[-1.26, 0.83]	-0.40
age cat [30-35] × prs [3]	0.20	[-0.54, 0.95]	0.53
age cat [35-40] × prs [3]	0.53	[-0.25, 1.32]	1.33
age cat [40-45] × prs [3]	0.46	[-0.36, 1.29]	1.10
age cat [45-50] × prs [3]	1.01	[0.13, 1.89]	2.26
age cat [50+] × prs [3]	0.99	[-0.05, 2.03]	1.86
age cat [30-35] × prs [4]	0.27	[-0.48, 1.02]	0.71
age cat [35-40] × prs [4]	0.30	[-0.49, 1.09]	0.75
age cat [40-45] × prs [4]	0.41	[-0.41, 1.24]	0.98
age cat [45-50] × prs [4]	0.47	[-0.41, 1.35]	1.04
age cat [50+] × prs [4]	0.33	[-0.72, 1.39]	0.61
age cat [30-35] × prs [5]	0.16	[-0.56, 0.89]	0.44
age cat [35-40] × prs [5]	0.24	[-0.53, 1.01]	0.61
age cat [40-45] × prs [5]	0.19	[-0.63, 1.00]	0.45
age cat [45-50] × prs [5]	0.67	[-0.20, 1.54]	1.50
age cat [50+] × prs [5]	0.52	[-0.53, 1.57]	0.98
sep [2] × prs [2]	-0.33	[-0.86, 0.20]	-1.21
sep [3] × prs [2]	-0.30	[-0.95, 0.34]	-0.92
sep [4] × prs [2]	-0.18	[-0.90, 0.55]	-0.48
sep [5] × prs [2]	-0.22	[-1.06, 0.63]	-0.50
sep [2] × prs [3]	0.10	[-0.45, 0.65]	0.37
sep [3] × prs [3]	0.10	[-0.56, 0.76]	0.30
sep [4] × prs [3]	0.05	[-0.69, 0.80]	0.14
sep [5] × prs [3]	0.03	[-0.81, 0.88]	0.08
sep [2] × prs [4]	-0.25	[-0.81, 0.31]	-0.87
sep [3] × prs [4]	-0.44	[-1.09, 0.21]	-1.32
sep [4] × prs [4]	-0.22	[-0.97, 0.52]	-0.59
sep [5] × prs [4]	-0.06	[-0.91, 0.79]	-0.14
sep [2] × prs [5]	0.02	[-0.52, 0.56]	0.07
sep [3] × prs [5]	-0.25	[-0.90, 0.40]	-0.75
sep [4] × prs [5]	-0.20	[-0.94, 0.53]	-0.54
sep [5] × prs [5]	-0.27	[-1.13, 0.59]	-0.62

```
AICc                    |            |               |          | 73981.67
R2 (conditional)        |            |               |          |     0.85
R2 (marginal)           |            |               |          |     0.09
Sigma                   |            |               |          |     2.14


Analysis of Deviance Table (Type III Wald chisquare tests)

Response: bmi
                Chisq Df Pr(>Chisq)
(Intercept) 3607.2505  1  < 2.2e-16 ***
waveC        240.7413  1  < 2.2e-16 ***
sex           70.5204  1  < 2.2e-16 ***
age_cat        1.5012  5     0.9129
sep            1.3256  4     0.8570
prs           59.0129  4  4.676e-12 ***
age_cat:sep   17.3163 20     0.6323
age_cat:prs   21.9885 20     0.3411
sep:prs        8.1410 16     0.9446
---
Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1
```

3.2.2 Table and figure by PRS

Table 6: Estimated BMI (95% CI) across adulthood by family disadvantage (SEP) quintile (1=most, 5=least disadvantage), stratified by PRS quintile (1=lowest, 5=highest risk)

sep	prs	<30	30-35	35-40	40-45	45-50	50+
1	1	25.5 (22.4, 31.8)	26.0 (23.8, 29.6)	26.2 (24.8, 27.7)	26.7 (24.5, 29.1)	25.5 (23.7, 27.8)	27.2 (24.4, 31.1)
1	2	27.3 (24.7, 29.9)	26.8 (24.7, 29.7)	27.0 (24.5, 30.0)	27.5 (25.5, 29.9)	26.4 (24.3, 28.2)	26.5 (24.5, 28.7)
1	3	27.5 (24.3, 31.6)	28.2 (25.9, 31.3)	28.5 (26.5, 30.7)	28.5 (26.4, 31.5)	28.7 (26.3, 31.6)	26.9 (20.5, 32.6)
1	4	28.5 (24.5, 33.2)	30.0 (26.5, 34.2)	30.4 (27.9, 33.7)	30.9 (28.4, 33.9)	30.4 (27.6, 33.9)	32.6 (26.2, 40.3)

sep	prs	<30	30-35	35-40	40-45	45-50	50+
1	5	27.7 (26.2, 29.8)	29.7 (27.9, 31.9)	30.7 (29.0, 33.0)	31.3 (29.0, 33.8)	32.2 (29.1, 35.1)	30.9 (25.5, 36.4)
2	1	24.8 (21.8, 27.8)	25.8 (24.3, 27.5)	25.6 (24.3, 26.9)	26.4 (24.4, 28.3)	25.8 (23.4, 27.8)	24.9 (20.8, 28.4)
2	2	26.5 (22.3, 32.8)	27.2 (24.6, 30.4)	26.2 (24.8, 27.9)	26.6 (24.7, 28.9)	26.7 (24.2, 29.3)	25.5 (22.5, 29.5)
2	3	25.9 (23.7, 28.8)	27.3 (25.4, 29.7)	27.4 (25.2, 29.9)	27.9 (26.1, 29.8)	26.7 (24.9, 28.4)	26.3 (22.9, 30.8)
2	4	27.5 (25.4, 30.8)	29.3 (26.6, 31.8)	29.4 (27.5, 32.2)	29.8 (28.0, 31.9)	28.9 (26.9, 31.2)	30.1 (27.8, 33.9)
2	5	28.0 (26.2, 31.4)	28.7 (26.8, 30.8)	29.2 (27.7, 30.6)	29.6 (27.2, 31.8)	29.9 (27.8, 31.8)	29.6 (25.7, 33.7)
3	1	24.9 (22.4, 28.2)	24.3 (23.1, 25.4)	24.6 (23.4, 25.6)	25.0 (23.4, 26.7)	25.4 (23.2, 27.7)	26.1 (23.7, 28.9)
3	2	23.5 (21.1, 26.6)	26.3 (24.2, 28.6)	26.4 (24.4, 28.4)	26.4 (24.4, 28.4)	26.1 (23.6, 28.8)	26.4 (23.9, 29.3)
3	3	26.2 (22.0, 30.5)	26.5 (24.0, 30.5)	27.1 (25.0, 29.4)	27.1 (25.3, 29.4)	27.1 (24.8, 29.6)	27.8 (25.4, 30.3)
3	4	27.8 (24.5, 32.3)	28.8 (26.4, 32.0)	27.6 (26.3, 29.0)	28.1 (26.7, 29.6)	27.8 (25.3, 29.9)	30.2 (25.6, 33.8)
3	5	28.1 (23.8, 32.4)	29.1 (26.8, 32.1)	28.9 (26.7, 31.7)	28.8 (27.0, 30.8)	28.3 (25.5, 30.7)	29.0 (26.1, 31.8)
4	1	23.5 (20.1, 29.0)	23.9 (22.2, 26.3)	24.6 (23.1, 26.4)	25.2 (23.6, 26.8)	24.7 (23.1, 26.2)	25.1 (22.1, 28.3)
4	2	24.4 (21.8, 27.9)	25.7 (23.2, 28.8)	25.6 (23.3, 28.2)	26.1 (23.9, 28.5)	25.9 (23.6, 28.0)	26.8 (23.2, 29.9)
4	3	24.6 (22.3, 26.5)	25.9 (23.9, 27.6)	26.7 (25.1, 28.0)	27.1 (25.6, 28.7)	26.6 (24.8, 28.5)	26.8 (24.5, 29.1)
4	4	26.7 (21.6, 35.5)	26.8 (24.9, 30.1)	27.2 (25.0, 29.7)	28.0 (26.7, 29.2)	28.1 (25.9, 29.8)	28.0 (25.3, 30.3)
4	5	26.8 (25.2, 28.8)	27.4 (25.4, 29.9)	27.5 (25.2, 30.5)	27.1 (25.1, 29.4)	27.4 (25.7, 29.7)	25.6 (21.5, 33.1)
5	1	22.3 (18.1, 26.7)	24.2 (21.8, 26.7)	23.6 (22.3, 24.8)	24.2 (22.9, 25.1)	24.6 (22.9, 26.5)	26.1 (23.2, 30.2)
5	2	26.4 (21.4, 32.9)	25.1 (21.9, 28.8)	25.0 (22.7, 27.6)	24.9 (22.8, 27.1)	25.2 (23.1, 27.4)	25.2 (23.4, 27.5)
5	3	NA	24.4 (22.8, 26.1)	25.1 (23.7, 26.6)	25.5 (24.3, 26.9)	26.6 (25.3, 27.9)	26.2 (23.3, 29.0)
5	4	25.4 (22.4, 27.4)	26.1 (24.0, 28.2)	26.2 (24.4, 28.2)	26.8 (24.9, 28.9)	26.4 (24.9, 27.8)	26.2 (23.4, 30.1)
5	5	24.6 (20.8, 28.0)	25.4 (23.6, 27.0)	26.5 (24.4, 28.4)	27.1 (25.0, 29.1)	27.0 (24.7, 29.5)	27.2 (24.5, 31.2)

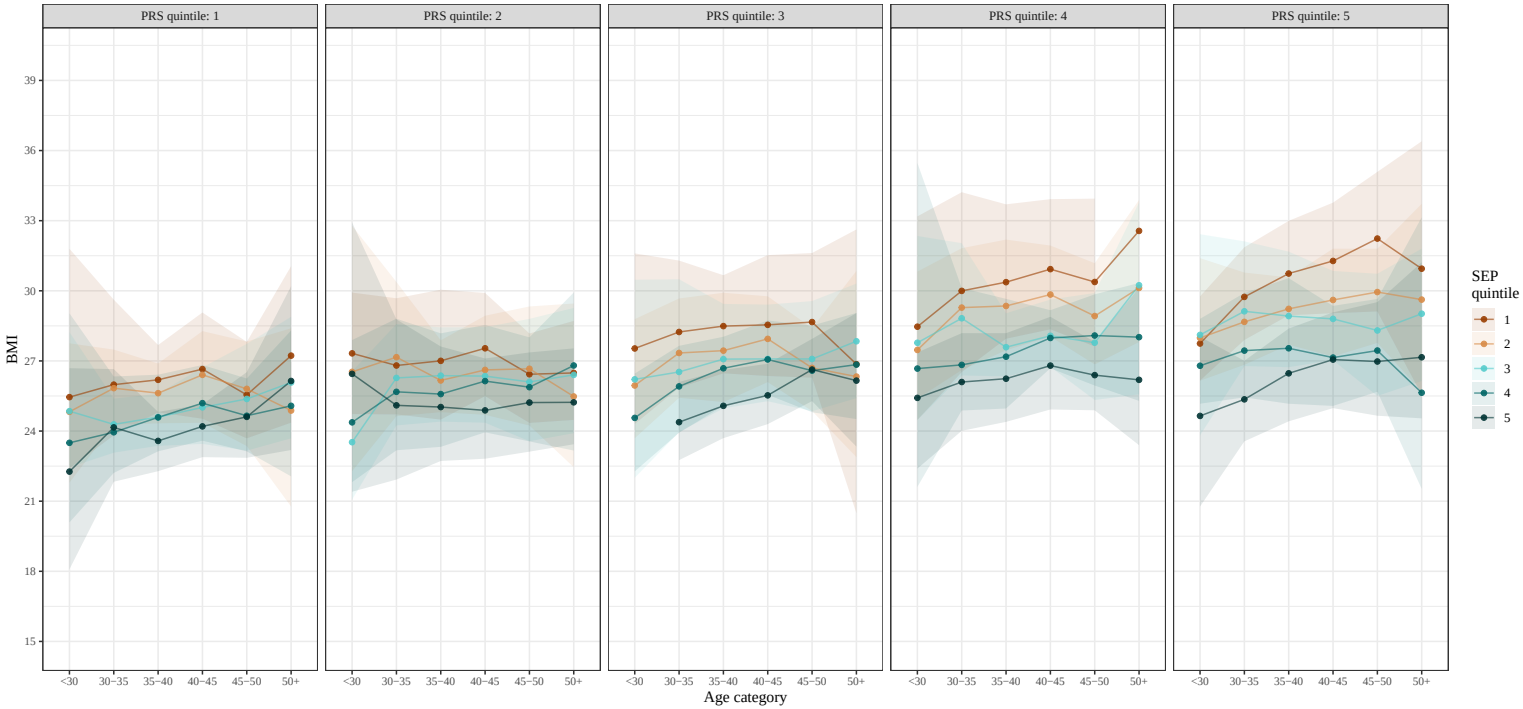

Figure 8: Estimated BMI (95% CI) across adulthood by family disadvantage (SEP) quintile (1=most, 5=least disadvantage), stratified by PRS quintile (1=lowest, 5=highest risk)

3.3 Marginal SEIFA and SEP Figures

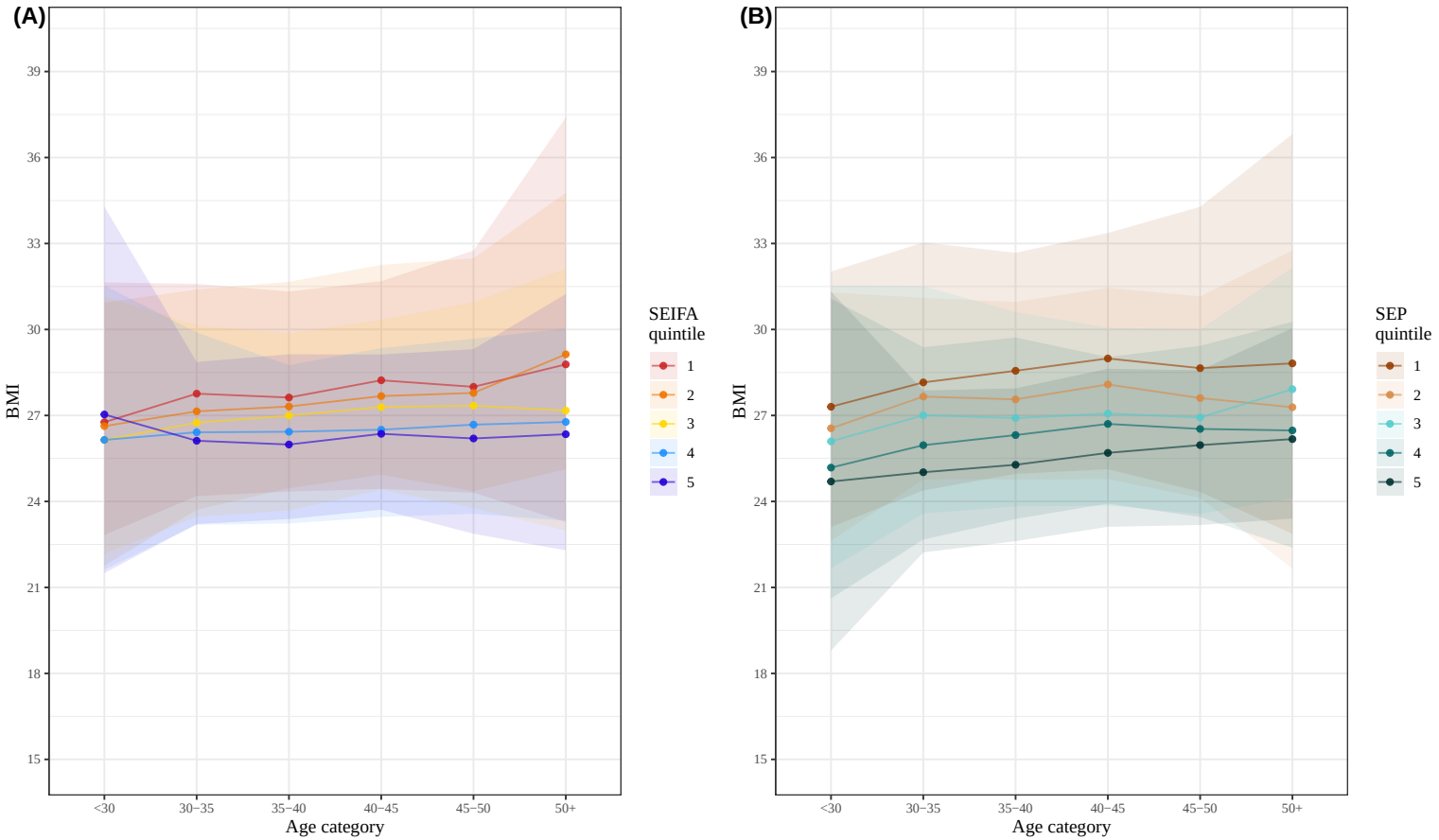

Figure 9: Association of SEIFA neighbourhood disadvantage (Panel A) and SEP family disadvantage (Panel B) with BMI across adulthood. In all cases quintile 1 represents the most disadvantage.

4 Adult data: Probability of overweight/obese models

4.1 SEIFA predictor

4.1.1 Model details

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

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

The model's total explanatory power is substantial (conditional R2 = 0.91) and the part related to
the fixed effects alone (marginal R2) is
of 0.07


Conditional model:
 Groups   Name        Std.Dev. Corr
 hicid    (Intercept) 3.2539
          waveC       0.5533   0.650
 personid (Intercept) 4.1629


The model's intercept, corresponding to waveC = 0, sex = 0, age_cat = <30, sei = 1 and prs = 1, is
at 0.94 (95% CI [-0.38, 2.26], p = 0.163).

Parameter                | Coefficient |         95% CI |        z |      Fit
-------------------------------------------------------------------------------
(Intercept)              |        0.94 | [-0.38,  2.26] |     1.39 |
waveC                    |        0.41 | [ 0.33,  0.50] |     9.66 |
sex                      |       -2.28 | [-2.73, -1.83] |    -9.93 |
age cat [30-35]          |       -0.11 | [-1.14,  0.92] |    -0.21 |
age cat [35-40]          |       -0.08 | [-1.21,  1.04] |    -0.15 |
```

age cat [40-45]	-0.36	[-1.59, 0.87]	-0.57
age cat [45-50]	-0.30	[-1.68, 1.08]	-0.42
age cat [50+]	0.04	[-1.74, 1.83]	0.05
sei [2]	0.19	[-0.91, 1.29]	0.35
sei [3]	0.44	[-0.80, 1.68]	0.69
sei [4]	0.74	[-0.54, 2.02]	1.13
sei [5]	0.14	[-1.44, 1.72]	0.18
prs [2]	0.94	[-0.60, 2.49]	1.20
prs [3]	0.70	[-0.89, 2.28]	0.86
prs [4]	2.28	[0.72, 3.84]	2.86
prs [5]	3.32	[1.78, 4.87]	4.22
age cat [30-35] × sei [2]	0.28	[-0.74, 1.30]	0.54
age cat [35-40] × sei [2]	0.23	[-0.79, 1.26]	0.45
age cat [40-45] × sei [2]	0.07	[-1.00, 1.14]	0.12
age cat [45-50] × sei [2]	0.04	[-1.13, 1.20]	0.06
age cat [50+] × sei [2]	-0.32	[-1.98, 1.34]	-0.37
age cat [30-35] × sei [3]	-0.09	[-1.21, 1.03]	-0.16
age cat [35-40] × sei [3]	-0.04	[-1.17, 1.09]	-0.07
age cat [40-45] × sei [3]	-0.18	[-1.35, 1.00]	-0.30
age cat [45-50] × sei [3]	-0.63	[-1.91, 0.65]	-0.97
age cat [50+] × sei [3]	-0.87	[-2.55, 0.80]	-1.02
age cat [30-35] × sei [4]	-0.79	[-1.95, 0.37]	-1.33
age cat [35-40] × sei [4]	-0.55	[-1.72, 0.62]	-0.92
age cat [40-45] × sei [4]	-0.47	[-1.67, 0.74]	-0.76
age cat [45-50] × sei [4]	-0.56	[-1.87, 0.74]	-0.85
age cat [50+] × sei [4]	-0.72	[-2.42, 0.98]	-0.83
age cat [30-35] × sei [5]	0.19	[-1.19, 1.57]	0.27
age cat [35-40] × sei [5]	0.03	[-1.36, 1.43]	0.05
age cat [40-45] × sei [5]	-0.31	[-1.75, 1.12]	-0.43
age cat [45-50] × sei [5]	-0.38	[-1.90, 1.14]	-0.49
age cat [50+] × sei [5]	-0.34	[-2.23, 1.56]	-0.35
age cat [30-35] × prs [2]	0.49	[-0.74, 1.72]	0.78
age cat [35-40] × prs [2]	-0.03	[-1.33, 1.27]	-0.04
age cat [40-45] × prs [2]	0.19	[-1.18, 1.56]	0.27

age cat [45-50] × prs [2]	-0.14	[-1.60, 1.33]	-0.18	
age cat [50+] × prs [2]	-0.35	[-2.14, 1.43]	-0.39	
age cat [30-35] × prs [3]	0.74	[-0.54, 2.02]	1.13	
age cat [35-40] × prs [3]	0.68	[-0.68, 2.03]	0.98	
age cat [40-45] × prs [3]	0.92	[-0.50, 2.34]	1.26	
age cat [45-50] × prs [3]	1.58	[0.05, 3.11]	2.03	
age cat [50+] × prs [3]	1.44	[-0.42, 3.30]	1.51	
age cat [30-35] × prs [4]	0.87	[-0.40, 2.14]	1.34	
age cat [35-40] × prs [4]	0.53	[-0.81, 1.88]	0.78	
age cat [40-45] × prs [4]	0.71	[-0.71, 2.13]	0.98	
age cat [45-50] × prs [4]	0.18	[-1.35, 1.71]	0.24	
age cat [50+] × prs [4]	0.89	[-1.06, 2.84]	0.90	
age cat [30-35] × prs [5]	-0.22	[-1.44, 1.00]	-0.35	
age cat [35-40] × prs [5]	-0.35	[-1.67, 0.96]	-0.53	
age cat [40-45] × prs [5]	0.07	[-1.33, 1.46]	0.10	
age cat [45-50] × prs [5]	-0.22	[-1.73, 1.29]	-0.28	
age cat [50+] × prs [5]	-0.70	[-2.57, 1.17]	-0.73	
sei [2] × prs [2]	-0.45	[-1.41, 0.51]	-0.91	
sei [3] × prs [2]	-0.33	[-1.35, 0.68]	-0.64	
sei [4] × prs [2]	-0.27	[-1.39, 0.86]	-0.47	
sei [5] × prs [2]	-0.19	[-1.45, 1.06]	-0.30	
sei [2] × prs [3]	-0.33	[-1.27, 0.61]	-0.68	
sei [3] × prs [3]	0.11	[-0.89, 1.11]	0.22	
sei [4] × prs [3]	3.34e-03	[-1.08, 1.09]	6.05e-03	
sei [5] × prs [3]	-0.17	[-1.46, 1.13]	-0.25	
sei [2] × prs [4]	-0.45	[-1.47, 0.56]	-0.87	
sei [3] × prs [4]	-0.54	[-1.64, 0.56]	-0.96	
sei [4] × prs [4]	-0.78	[-1.95, 0.38]	-1.32	
sei [5] × prs [4]	-1.17	[-2.45, 0.11]	-1.79	
sei [2] × prs [5]	-0.64	[-1.64, 0.37]	-1.24	
sei [3] × prs [5]	-0.77	[-1.85, 0.31]	-1.41	
sei [4] × prs [5]	-0.86	[-2.00, 0.29]	-1.47	
sei [5] × prs [5]	-0.92	[-2.25, 0.41]	-1.35	
AICc				10946.00

```
R2 (conditional)          |             |                |          |     0.91
R2 (marginal)             |             |                |          |     0.07
Sigma                     |             |                |          |     1.00
Log_loss                  |             |                |          |     0.14


Analysis of Deviance Table (Type III Wald chisquare tests)

Response: ovo
              Chisq Df Pr(>Chisq)
(Intercept)  1.9444  1  0.1631882
waveC       93.3288  1  < 2.2e-16 ***
sex         98.5484  1  < 2.2e-16 ***
age_cat      1.1500  5  0.9495836
sei          1.4836  4  0.8295363
prs         22.7287  4  0.0001434 ***
age_cat:sei  9.9731 20  0.9686572
age_cat:prs 22.7022 20  0.3036536
sei:prs      8.6296 16  0.9278803
---
Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1
```

4.1.2 Table and figure by PRS

Table 7: Estimated probability of overweight/obese (95% CI) across adulthood by neighbourhood disadvantage (SEIFA) quintile (1=most, 5=least disadvantage), stratified by PRS quintile (1=lowest, 5=highest risk)

sei	prs	<30	30-35	35-40	40-45	45-50	50+
1	1	0.36 (0.05, 0.66)	0.46 (0.29, 0.69)	0.47 (0.31, 0.68)	0.47 (0.30, 0.68)	0.52 (0.30, 0.80)	0.62 (0.16, 0.92)
1	2	0.48 (0.13, 0.89)	0.48 (0.27, 0.74)	0.45 (0.28, 0.65)	0.52 (0.32, 0.77)	0.61 (0.40, 0.83)	0.71 (0.29, 0.99)
1	3	0.50 (0.11, 0.89)	0.64 (0.44, 0.89)	0.65 (0.50, 0.85)	0.75 (0.57, 0.93)	0.70 (0.43, 0.93)	0.85 (0.50, 1.00)
1	4	0.57 (0.09, 0.95)	0.75 (0.56, 0.98)	0.70 (0.54, 0.88)	0.76 (0.61, 0.91)	0.77 (0.53, 0.97)	0.91 (0.56, 1.00)

sei	prs	<30	30-35	35-40	40-45	45-50	50+
1	5	0.85 (0.58, 1.00)	0.76 (0.61, 0.92)	0.83 (0.64, 0.98)	0.83 (0.61, 0.98)	0.79 (0.59, 0.96)	0.82 (0.52, 1.00)
2	1	0.23 (0.00, 0.64)	0.40 (0.23, 0.59)	0.46 (0.27, 0.68)	0.50 (0.34, 0.69)	0.56 (0.31, 0.81)	0.70 (0.40, 1.00)
2	2	0.54 (0.18, 0.97)	0.65 (0.33, 0.98)	0.60 (0.40, 0.83)	0.59 (0.45, 0.75)	0.55 (0.35, 0.72)	0.63 (0.28, 0.98)
2	3	0.70 (0.30, 0.99)	0.53 (0.31, 0.77)	0.57 (0.39, 0.78)	0.55 (0.39, 0.73)	0.57 (0.34, 0.77)	0.64 (0.27, 0.96)
2	4	0.68 (0.41, 0.97)	0.78 (0.55, 1.00)	0.74 (0.57, 0.90)	0.71 (0.58, 0.88)	0.68 (0.48, 0.88)	0.69 (0.41, 0.96)
2	5	0.82 (0.51, 1.00)	0.70 (0.44, 0.96)	0.72 (0.51, 0.93)	0.78 (0.56, 0.97)	0.78 (0.50, 0.98)	0.87 (0.49, 1.00)
3	1	0.54 (0.07, 0.99)	0.45 (0.21, 0.71)	0.44 (0.21, 0.71)	0.54 (0.29, 0.80)	0.50 (0.23, 0.79)	0.54 (0.11, 0.87)
3	2	0.37 (0.01, 0.99)	0.57 (0.32, 0.88)	0.61 (0.32, 0.93)	0.53 (0.39, 0.76)	0.50 (0.28, 0.77)	0.46 (0.22, 0.74)
3	3	0.46 (0.04, 0.98)	0.55 (0.29, 0.89)	0.63 (0.38, 0.88)	0.65 (0.44, 0.87)	0.61 (0.39, 0.83)	0.61 (0.30, 0.90)
3	4	0.79 (0.40, 0.99)	0.76 (0.58, 0.94)	0.73 (0.53, 0.92)	0.78 (0.52, 0.97)	0.74 (0.47, 0.97)	0.70 (0.32, 0.99)
3	5	0.76 (0.48, 0.98)	0.72 (0.41, 0.96)	0.75 (0.52, 0.96)	0.73 (0.50, 0.93)	0.79 (0.56, 0.98)	0.68 (0.26, 0.99)
4	1	0.45 (0.01, 0.94)	0.35 (0.14, 0.69)	0.35 (0.19, 0.56)	0.39 (0.21, 0.63)	0.39 (0.19, 0.64)	0.49 (0.14, 0.92)
4	2	0.64 (0.01, 0.99)	0.57 (0.25, 0.97)	0.61 (0.34, 0.91)	0.55 (0.24, 0.89)	0.51 (0.24, 0.78)	0.47 (0.17, 0.82)
4	3	0.56 (0.15, 1.00)	0.55 (0.28, 0.89)	0.59 (0.42, 0.79)	0.62 (0.43, 0.84)	0.67 (0.50, 0.88)	0.79 (0.41, 1.00)
4	4	0.76 (0.27, 1.00)	0.66 (0.45, 0.91)	0.74 (0.51, 0.95)	0.73 (0.50, 0.94)	0.62 (0.30, 0.91)	0.78 (0.45, 0.97)
4	5	0.68 (0.17, 1.00)	0.63 (0.43, 0.88)	0.67 (0.43, 0.91)	0.67 (0.41, 0.91)	0.70 (0.46, 0.93)	0.70 (0.43, 0.91)
5	1	0.73 (0.02, 0.99)	0.44 (0.21, 0.77)	0.39 (0.24, 0.58)	0.34 (0.20, 0.52)	0.35 (0.16, 0.59)	0.40 (0.07, 0.78)
5	2	0.59 (0.04, 0.99)	0.56 (0.14, 0.95)	0.52 (0.19, 0.90)	0.53 (0.21, 0.88)	0.55 (0.23, 0.86)	0.57 (0.23, 0.86)
5	3	0.38 (0.00, 0.87)	0.60 (0.39, 0.82)	0.57 (0.34, 0.82)	0.60 (0.41, 0.80)	0.66 (0.42, 0.92)	0.58 (0.19, 1.00)
5	4	0.63 (0.01, 0.99)	0.55 (0.32, 0.84)	0.58 (0.31, 0.90)	0.61 (0.35, 0.88)	0.63 (0.33, 0.90)	0.72 (0.39, 0.98)
5	5	0.77 (0.36, 0.99)	0.68 (0.40, 0.97)	0.65 (0.40, 0.93)	0.65 (0.47, 0.86)	0.56 (0.35, 0.84)	0.48 (0.19, 0.81)

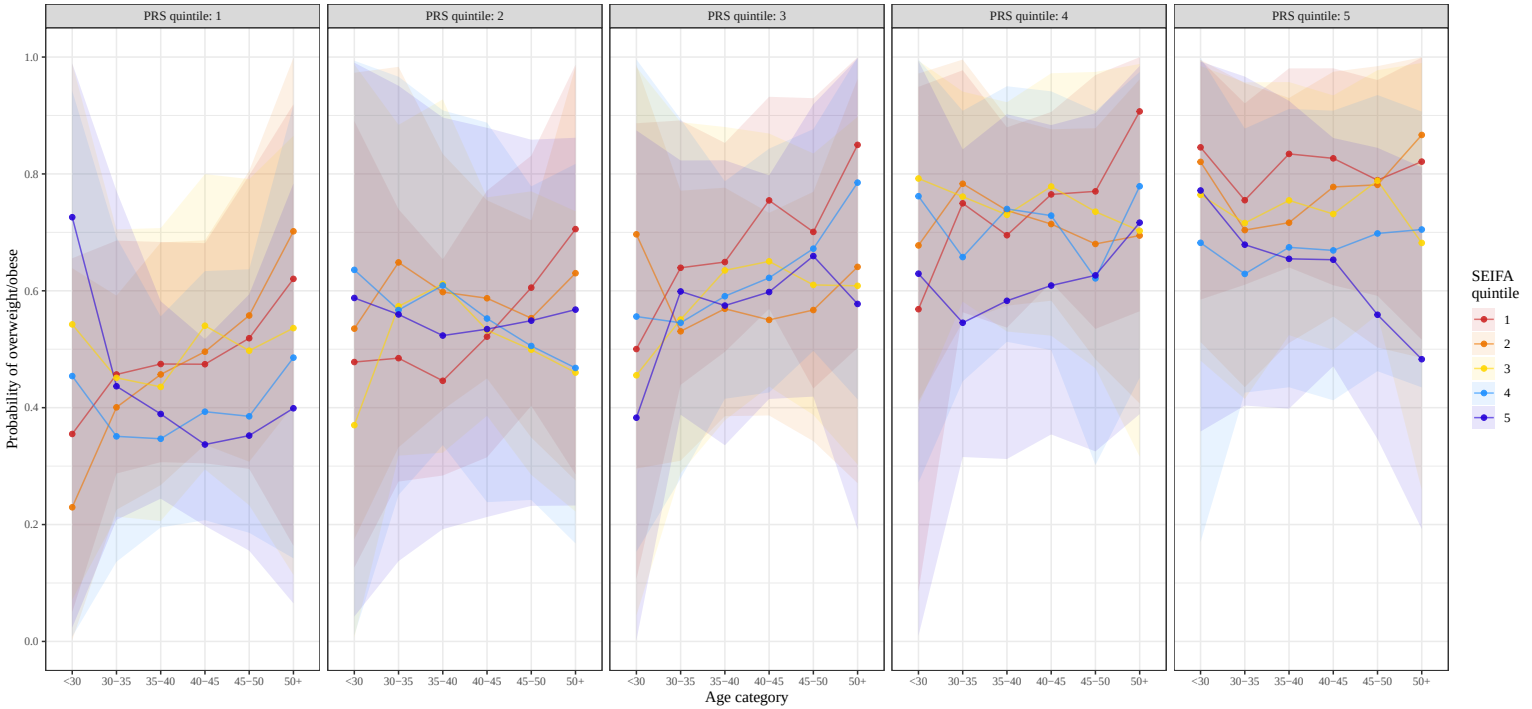

Figure 10: Estimated probability of overweight/obese (95% CI) across adulthood by neighbourhood disadvantage (SEIFA) quintile (1=most, 5=least disadvantage), stratified by PRS quintile (1=lowest, 5=highest risk)

4.2 SEP predictor

4.2.1 Model details

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

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

The model's total explanatory power is substantial (conditional R2 = 0.90) and the part related to
the fixed effects alone (marginal R2) is
of 0.08


Conditional model:
 Groups   Name        Std.Dev. Corr
 hicid    (Intercept) 3.1786
          waveC       0.5447   0.652
 personid (Intercept) 4.1260


The model's intercept, corresponding to waveC = 0, sex = 0, age_cat = <30, sep = 1 and prs = 1, is
at 1.24 (95% CI [-9.51e-03, 2.50], p = 0.052).

Parameter                | Coefficient |         95% CI |      z |      Fit
-------------------------------------------------------------------------
(Intercept)              |        1.24 | [-0.01,  2.50] |   1.95 |
waveC                    |        0.41 | [ 0.33,  0.49] |   9.62 |
sex                      |       -2.30 | [-2.74, -1.85] | -10.07 |
age cat [30-35]          |       -0.09 | [-1.08,  0.89] |  -0.19 |
age cat [35-40]          |       -0.03 | [-1.11,  1.04] |  -0.06 |
```

age cat [40-45]	-0.14	[-1.34, 1.06]	-0.23
age cat [45-50]	-0.61	[-1.95, 0.74]	-0.88
age cat [50+]	-0.92	[-2.64, 0.80]	-1.05
sep [2]	0.17	[-0.91, 1.26]	0.31
sep [3]	0.40	[-0.81, 1.61]	0.65
sep [4]	0.30	[-1.11, 1.70]	0.41
sep [5]	-0.79	[-2.92, 1.34]	-0.73
prs [2]	0.50	[-0.99, 1.99]	0.66
prs [3]	0.20	[-1.35, 1.75]	0.26
prs [4]	1.72	[0.19, 3.26]	2.20
prs [5]	2.95	[1.42, 4.49]	3.77
age cat [30-35] × sep [2]	0.19	[-0.81, 1.20]	0.38
age cat [35-40] × sep [2]	-0.22	[-1.23, 0.78]	-0.44
age cat [40-45] × sep [2]	-0.32	[-1.37, 0.73]	-0.60
age cat [45-50] × sep [2]	-0.03	[-1.16, 1.11]	-0.05
age cat [50+] × sep [2]	0.33	[-1.12, 1.78]	0.45
age cat [30-35] × sep [3]	-0.23	[-1.32, 0.85]	-0.42
age cat [35-40] × sep [3]	-0.17	[-1.27, 0.94]	-0.30
age cat [40-45] × sep [3]	-0.82	[-1.97, 0.33]	-1.40
age cat [45-50] × sep [3]	-0.10	[-1.35, 1.15]	-0.16
age cat [50+] × sep [3]	0.83	[-0.78, 2.43]	1.01
age cat [30-35] × sep [4]	-0.85	[-2.06, 0.35]	-1.39
age cat [35-40] × sep [4]	-0.75	[-1.99, 0.49]	-1.19
age cat [40-45] × sep [4]	-0.69	[-1.98, 0.60]	-1.05
age cat [45-50] × sep [4]	-0.32	[-1.70, 1.06]	-0.46
age cat [50+] × sep [4]	0.34	[-1.39, 2.07]	0.38
age cat [30-35] × sep [5]	0.30	[-1.64, 2.24]	0.31
age cat [35-40] × sep [5]	0.66	[-1.30, 2.63]	0.66
age cat [40-45] × sep [5]	-0.03	[-2.04, 1.97]	-0.03
age cat [45-50] × sep [5]	0.45	[-1.62, 2.52]	0.42
age cat [50+] × sep [5]	0.82	[-1.47, 3.12]	0.70
age cat [30-35] × prs [2]	0.65	[-0.56, 1.87]	1.05
age cat [35-40] × prs [2]	0.12	[-1.17, 1.40]	0.18
age cat [40-45] × prs [2]	0.38	[-0.98, 1.74]	0.55

age cat [45-50] × prs [2]	0.01	[-1.44, 1.46]	0.02	
age cat [50+] × prs [2]	-0.14	[-1.90, 1.63]	-0.15	
age cat [30-35] × prs [3]	0.82	[-0.46, 2.09]	1.25	
age cat [35-40] × prs [3]	0.79	[-0.56, 2.14]	1.15	
age cat [40-45] × prs [3]	1.04	[-0.38, 2.46]	1.44	
age cat [45-50] × prs [3]	1.68	[0.15, 3.21]	2.16	
age cat [50+] × prs [3]	1.67	[-0.20, 3.53]	1.75	
age cat [30-35] × prs [4]	0.87	[-0.39, 2.14]	1.35	
age cat [35-40] × prs [4]	0.51	[-0.83, 1.85]	0.74	
age cat [40-45] × prs [4]	0.71	[-0.70, 2.13]	0.99	
age cat [45-50] × prs [4]	0.16	[-1.37, 1.68]	0.20	
age cat [50+] × prs [4]	1.08	[-0.86, 3.02]	1.09	
age cat [30-35] × prs [5]	-0.15	[-1.38, 1.08]	-0.25	
age cat [35-40] × prs [5]	-0.28	[-1.60, 1.05]	-0.41	
age cat [40-45] × prs [5]	0.12	[-1.29, 1.52]	0.16	
age cat [45-50] × prs [5]	-0.18	[-1.70, 1.34]	-0.23	
age cat [50+] × prs [5]	-0.68	[-2.55, 1.18]	-0.72	
sep [2] × prs [2]	0.27	[-0.60, 1.13]	0.61	
sep [3] × prs [2]	-0.20	[-1.25, 0.84]	-0.38	
sep [4] × prs [2]	-0.06	[-1.23, 1.10]	-0.10	
sep [5] × prs [2]	0.06	[-1.28, 1.40]	0.09	
sep [2] × prs [3]	0.13	[-0.80, 1.06]	0.27	
sep [3] × prs [3]	0.23	[-0.87, 1.33]	0.41	
sep [4] × prs [3]	0.60	[-0.62, 1.81]	0.96	
sep [5] × prs [3]	0.50	[-0.86, 1.86]	0.72	
sep [2] × prs [4]	-0.26	[-1.24, 0.73]	-0.51	
sep [3] × prs [4]	9.08e-03	[-1.12, 1.14]	0.02	
sep [4] × prs [4]	0.05	[-1.21, 1.31]	0.08	
sep [5] × prs [4]	-0.08	[-1.50, 1.33]	-0.11	
sep [2] × prs [5]	-0.02	[-1.02, 0.98]	-0.05	
sep [3] × prs [5]	-0.72	[-1.87, 0.43]	-1.22	
sep [4] × prs [5]	-0.50	[-1.78, 0.77]	-0.78	
sep [5] × prs [5]	-0.66	[-2.11, 0.78]	-0.90	
AICc				10905.59

```
R2 (conditional)          |             |                |        |     0.90
R2 (marginal)             |             |                |        |     0.08
Sigma                     |             |                |        |     1.00
Log_loss                  |             |                |        |     0.14


Analysis of Deviance Table (Type III Wald chisquare tests)

Response: ovo
               Chisq Df Pr(>Chisq)
(Intercept)   3.7834  1  0.0517629 .
waveC        92.5672  1  < 2.2e-16 ***
sex         101.4150  1  < 2.2e-16 ***
age_cat       2.5453  5  0.7696644
sep           1.4636  4  0.8330665
prs          19.4993  4  0.0006269 ***
age_cat:sep  22.7124 20  0.3031340
age_cat:prs  24.4162 20  0.2246829
sep:prs       8.5696 16  0.9300766
---
Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1
```

4.2.2 Table and figure by PRS

Table 8: Estimated probability of overweight/obese (95% CI) across adulthood by family disadvantage (SEP) quintile (1=most, 5=least disadvantage), stratified by PRS quintile (1=lowest, 5=highest risk)

sep	prs	<30	30-35	35-40	40-45	45-50	50+
1	1	0.43 (0.14, 0.92)	0.49 (0.30, 0.79)	0.55 (0.39, 0.80)	0.56 (0.32, 0.72)	0.44 (0.21, 0.66)	0.62 (0.19, 0.94)
1	2	0.69 (0.35, 0.98)	0.66 (0.39, 0.97)	0.63 (0.35, 0.98)	0.69 (0.43, 0.95)	0.54 (0.29, 0.75)	0.57 (0.30, 0.81)
1	3	0.63 (0.29, 0.98)	0.63 (0.42, 0.89)	0.65 (0.49, 0.83)	0.71 (0.50, 0.95)	0.71 (0.49, 0.99)	0.53 (0.11, 1.00)
1	4	0.69 (0.38, 0.98)	0.80 (0.59, 0.93)	0.81 (0.67, 0.94)	0.85 (0.68, 0.98)	0.78 (0.54, 0.97)	0.80 (0.40, 1.00)

sep	prs	<30	30-35	35-40	40-45	45-50	50+
1	5	0.85 (0.57, 1.00)	0.82 (0.61, 0.99)	0.87 (0.69, 0.99)	0.88 (0.68, 1.00)	0.83 (0.61, 1.00)	0.70 (0.20, 1.00)
2	1	0.42 (0.14, 0.69)	0.53 (0.33, 0.78)	0.49 (0.32, 0.71)	0.55 (0.30, 0.81)	0.51 (0.26, 0.76)	0.44 (0.02, 0.84)
2	2	0.51 (0.10, 0.98)	0.71 (0.42, 0.99)	0.59 (0.40, 0.82)	0.63 (0.41, 0.87)	0.61 (0.37, 0.86)	0.50 (0.24, 0.79)
2	3	0.47 (0.19, 0.94)	0.69 (0.40, 0.94)	0.66 (0.41, 0.92)	0.69 (0.48, 0.89)	0.62 (0.37, 0.87)	0.60 (0.21, 1.00)
2	4	0.71 (0.29, 0.99)	0.77 (0.52, 0.99)	0.73 (0.59, 0.88)	0.74 (0.57, 0.91)	0.73 (0.47, 0.94)	0.93 (0.75, 1.00)
2	5	0.80 (0.53, 1.00)	0.74 (0.49, 0.96)	0.78 (0.57, 0.96)	0.77 (0.56, 0.97)	0.82 (0.61, 0.99)	0.73 (0.39, 0.97)
3	1	0.44 (0.11, 0.81)	0.40 (0.21, 0.65)	0.42 (0.24, 0.63)	0.43 (0.23, 0.67)	0.52 (0.21, 0.85)	0.56 (0.20, 0.89)
3	2	0.20 (0.00, 0.58)	0.56 (0.32, 0.83)	0.60 (0.34, 0.89)	0.54 (0.30, 0.84)	0.60 (0.27, 0.92)	0.65 (0.27, 0.94)
3	3	0.65 (0.16, 0.99)	0.53 (0.27, 0.80)	0.63 (0.41, 0.88)	0.62 (0.40, 0.85)	0.63 (0.40, 0.86)	0.82 (0.52, 1.00)
3	4	0.74 (0.38, 0.99)	0.79 (0.56, 0.99)	0.71 (0.50, 0.94)	0.72 (0.52, 0.92)	0.69 (0.34, 0.98)	0.81 (0.35, 1.00)
3	5	0.73 (0.28, 1.00)	0.77 (0.55, 0.97)	0.76 (0.51, 0.97)	0.71 (0.52, 0.89)	0.68 (0.40, 0.93)	0.72 (0.42, 0.94)
4	1	0.40 (0.01, 1.00)	0.34 (0.13, 0.61)	0.39 (0.18, 0.65)	0.48 (0.26, 0.73)	0.43 (0.25, 0.66)	0.45 (0.10, 0.78)
4	2	0.46 (0.01, 0.99)	0.52 (0.17, 0.93)	0.51 (0.22, 0.84)	0.56 (0.29, 0.84)	0.49 (0.23, 0.75)	0.63 (0.30, 0.88)
4	3	0.40 (0.08, 0.78)	0.52 (0.31, 0.75)	0.60 (0.41, 0.80)	0.66 (0.51, 0.84)	0.62 (0.42, 0.85)	0.67 (0.27, 0.97)
4	4	0.50 (0.01, 1.00)	0.56 (0.33, 0.84)	0.68 (0.36, 0.97)	0.75 (0.52, 0.96)	0.70 (0.42, 0.95)	0.81 (0.55, 0.99)
4	5	0.76 (0.44, 1.00)	0.64 (0.39, 0.92)	0.62 (0.38, 0.89)	0.70 (0.44, 0.93)	0.65 (0.43, 0.92)	0.50 (0.04, 0.94)
5	1	0.24 (0.00, 0.97)	0.33 (0.10, 0.64)	0.30 (0.14, 0.53)	0.29 (0.16, 0.44)	0.35 (0.18, 0.61)	0.50 (0.22, 0.83)
5	2	0.41 (0.00, 0.98)	0.38 (0.12, 0.75)	0.48 (0.17, 0.82)	0.42 (0.20, 0.67)	0.46 (0.22, 0.68)	0.42 (0.14, 0.80)
5	3	NA	0.39 (0.13, 0.65)	0.47 (0.30, 0.67)	0.52 (0.36, 0.71)	0.66 (0.49, 0.85)	0.66 (0.32, 0.94)
5	4	0.40 (0.04, 0.90)	0.55 (0.30, 0.86)	0.57 (0.36, 0.80)	0.57 (0.34, 0.81)	0.52 (0.33, 0.76)	0.55 (0.20, 0.91)
5	5	0.50 (0.00, 0.99)	0.45 (0.23, 0.70)	0.60 (0.35, 0.87)	0.60 (0.37, 0.85)	0.57 (0.30, 0.87)	0.64 (0.19, 0.99)

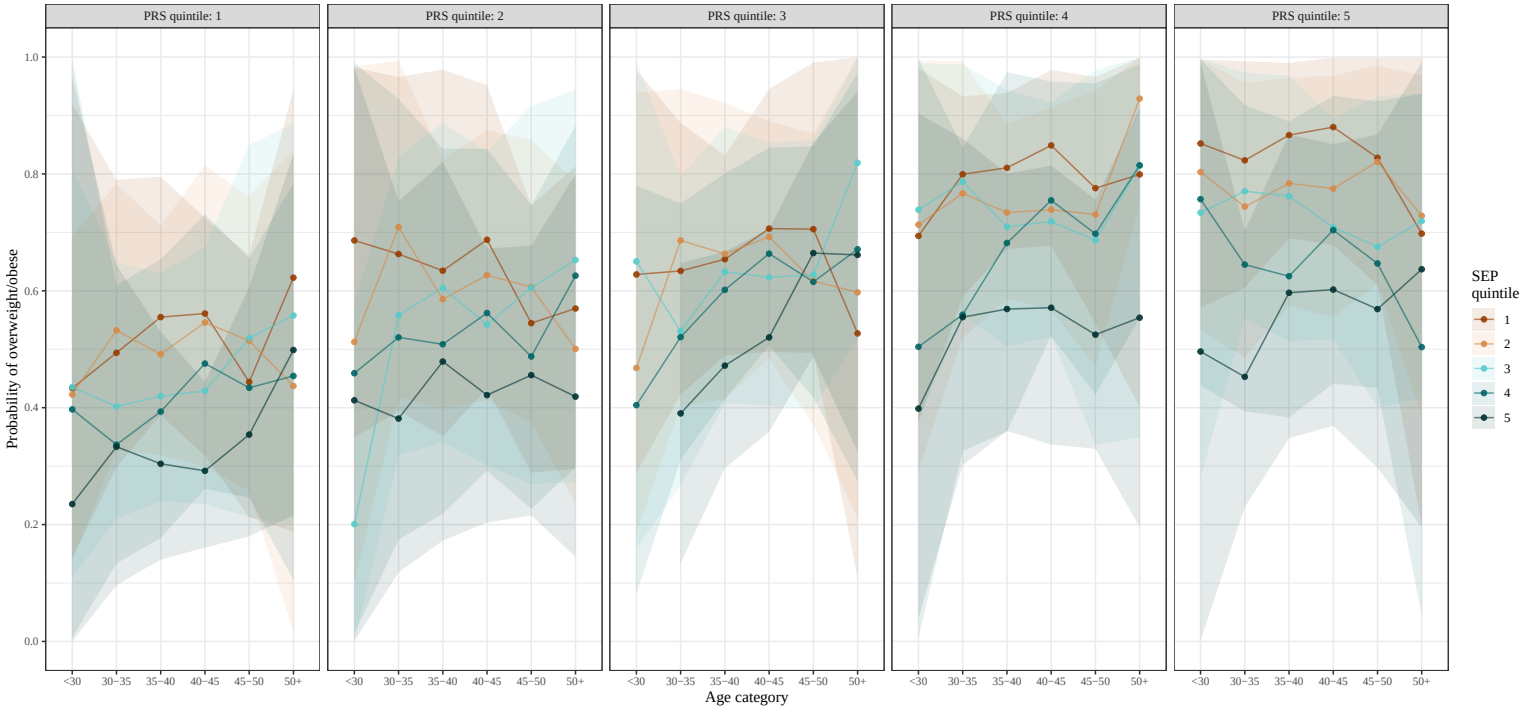

Figure 11: Estimated probability of overweight/obese (95% CI) across adulthood by family disadvantage (SEP) quintile (1=most, 5=least disadvantage), stratified by PRS quintile (1=lowest, 5=highest risk)

4.3 Marginal SEIFA and SEP Figures

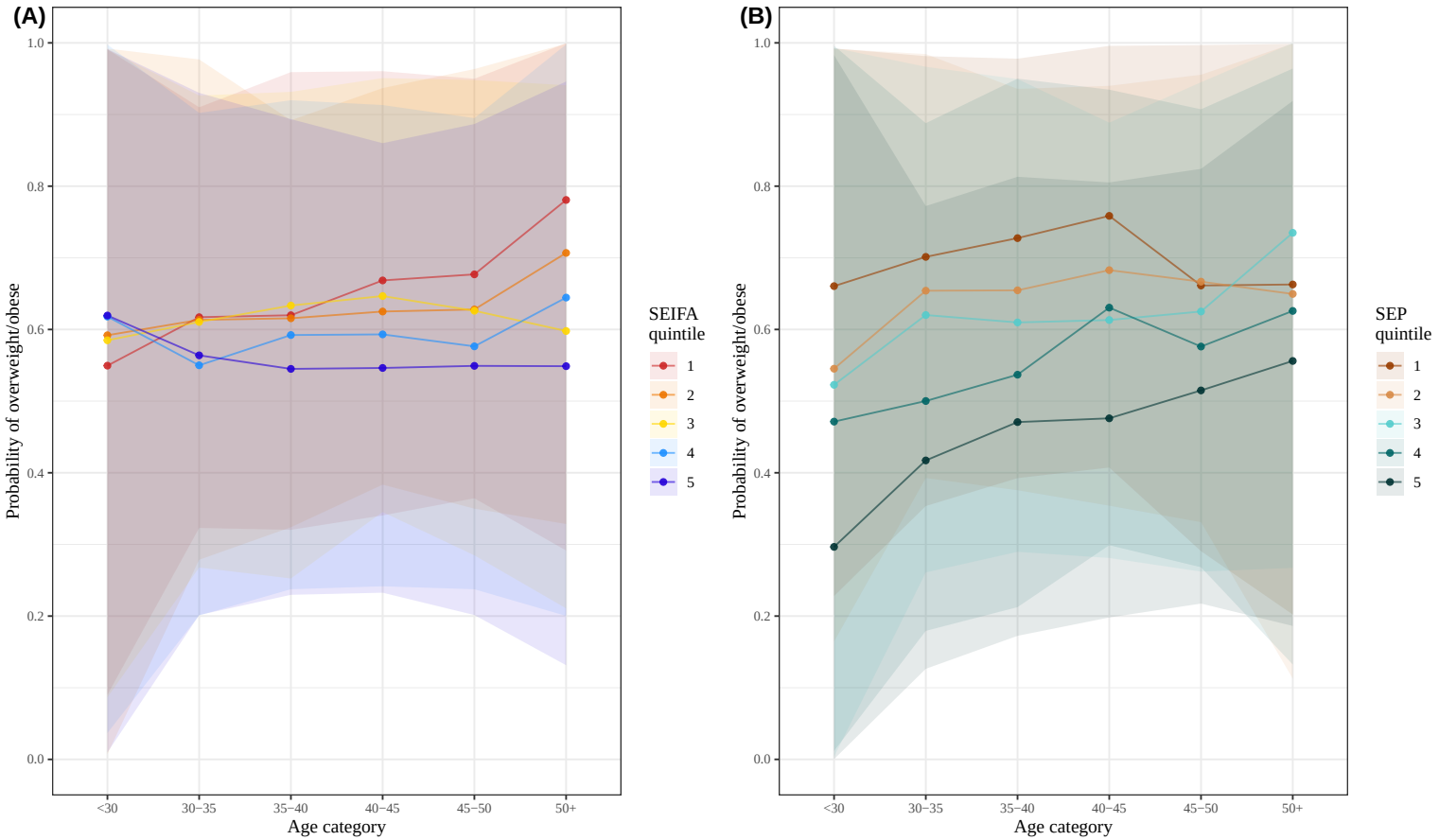

Figure 12: Association of SEIFA neighbourhood disadvantage (Panel A) and SEP family disadvantage (Panel B) with probability of overweight/obese across adulthood. In all cases quintile 1 represents the most disadvantage.

5 Session info

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

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[1] "07-Jun-2023"
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```
sessionInfo()
```

```
R version 4.2.2 (2022-10-31 ucrt)
Platform: x86_64-w64-mingw32/x64 (64-bit)
Running under: Windows 10 x64 (build 19044)

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] tidyselect_1.2.0  xfun_0.37         purrr_1.0.1       carData_3.0-5
 [5] colorspace_2.1-0  vctrs_0.5.2       generics_0.1.3    htmltools_0.5.4
 [9] yaml_2.3.7        utf8_1.2.3        rlang_1.0.6       pillar_1.8.1
```

```
[13] glue_1.6.2        withr_2.5.0       bit64_4.0.5       lifecycle_1.0.3
[17] munsell_0.5.0     ggsignif_0.6.4    gtable_0.3.1      ragg_1.2.5
[21] evaluate_0.20     labeling_0.4.2    tzdb_0.3.0        fastmap_1.1.0
[25] fansi_1.0.4       broom_1.0.3       scales_1.2.1      backports_1.4.1
[29] jsonlite_1.8.4    abind_1.4-5       farver_2.1.1      systemfonts_1.0.4
[33] bit_4.0.5         textshaping_0.3.6 digest_0.6.31     rstatix_0.7.2
[37] grid_4.2.2        cowplot_1.1.1     cli_3.6.0         tools_4.2.2
[41] magrittr_2.0.3    tibble_3.1.8      car_3.1-1         pkgconfig_2.0.3
[45] assertthat_0.2.1  rmarkdown_2.20    rstudioapi_0.14   R6_2.5.1
[49] compiler_4.2.2
```