

Supplementary tables

Table S1: Differences in key characteristics between students completing all surveys and those completing baseline only

		Complete Case	Baseline data only	P value	Total
Covariate	Category	N (%) N=2297	N (%) N=1040		N (%) N=3337
School size	Small	1032 (44.93)	542 (52.12)	0.12	1574 (47.17)
	Large	1265 (55.07)	498 (47.88)		1763 (52.83)
School neighbourhood deprivation	Low score	1071 (46.63)	525 (50.48)	0.41	1696 (47.83)
	High score	1226 (53.37)	515 (49.52)		1741 (52.17)
Free school meal eligibility	Low score	1136 (49.46)	527 (50.67)	0.80	1663 (49.84)
	High score	1161 (50.54)	513 (49.33)		1674 (50.16)
Student gender	Female	1129 (49.98)	515 (50.54)	0.86	1644 (50.15)
	Male	1130 (50.02)	504 (49.46)		1634 (49.85)
Student ethnicity	White British	937 (41.19)	446 (43.34)	0.55	1383 (41.46)
	Other	1338 (58.81)	583 (56.66)		1921 (58.54)
Family structure	Two parents	1741 (76.13)	647 (62.75)	<0.0001	2388 (71.97)
	Other	546 (23.87)	384 (37.25)		930 (28.03)
Parental working	Not in work	172 (8.99)	115 (14.32)	0.0006	287 (10.57)
	In work	1741 (91.01)	688 (85.68)		2429 (89.43)
Family affluence	Low affluence	823 (36.77)	371 (36.88)	0.97	1194 (36.81)
	High affluence	1415 (63.23)	365 (63.12)		2050 (63.19)

Table S2: Adjusted and stratified associations between school-level exposures (rigid boundaries and value-added education) and student risk behaviours, complete case analysis

Student risk behaviour	Prevalence N (%) / Mean (SD)	School-level exposures											
		Rigid boundaries						Value-added education					
		Unadjusted association		Adjusted association				Unadjusted association		Adjusted association			
		Association	P	Potential confounders adjusted for	Variables for which evidence of moderation indicates need for stratified analysis	Association – overall or stratified where evidence of moderation	P	Association	P	Potential confounders adjusted for	Variables for which evidence of moderation indicates need for stratified analysis	Association – overall or stratified where evidence of moderation	P
Bullying perpetration	2.76 (0.26)	0.87 (-0.07, 1.82)	0.07	Size, deprivation, ethnicity, family structure, parent working, family affluence	Sex	Female 0.04 (-0.68, 0.76) Male 0.98 (0.26, 1.70)	Female 0.92 Male 0.01	0.11 (-0.29, 0.5)	0.6	Size, sex, deprivation, family structure, parent working	Family affluence	Low -0.34 (-0.70-0.007) High 0.19 (-0.12, 0.48)	Low 0.056 High 0.21
Bullying victimisation	0.33 (0.02)	0.09 (0.02, 0.16)	0.01	-	Family affluence, sex	Low affluence female 0.10 (-0.01, 0.20) Low affluence male 0.26 (0.16, 0.36) High affluence female -0.04 (-0.14, 0.05) High affluence male 0.11 (0.02, 0.20)	Low affluence female 0.07 Low affluence male <0.0001 High affluence female 0.35 High affluence male 0.02	-0.01 (-0.04, 0.02)	0.53	-	-	-0.01 (-0.04, 0.02)	0.53
Smoking tobacco ever	468 (21.1%)	1.46 (0.80, 2.64)	0.22	Parent working, sex	-	1.47 (0.78, 2.78)	0.24	0.89 (0.69, 1.16)	0.39	-	Family affluence	Low 0.70 (0.52, 0.95) High 0.98 (0.75, 1.20)	Low 0.02 High 0.87
Smoking tobacco in previous week	155 (7.0%)	1.44 (0.70, 2.93)	0.32	Deprivation, parent working	-	1.48 (0.74, 2.95)	0.27	0.87 (0.63, 1.20)	0.39	-	Family affluence	Low 0.62 (0.42, 0.91) High 0.99 (0.70, 1.41)	Low 0.02 High 0.98

Alcohol in previous week	247 (11.1%)	1.28 (0.54, 3.03)	0.57	Size, deprivation, FSM	-	1.49 (0.81, 2.76)	0.2	0.93 (0.66, 1.32)	0.68	-	-	0.93 (0.66, 1.32)	0.68
Really drunk ever	505 (22.7%)	1.27 (0.55, 2.91)	0.58	Deprivation, size	Family affluence	Low 0.99 (0.50, 1.95) High 2.09 (1.14, 3.86)	Low 0.98 High 0.02	0.83 (0.58, 1.18)	0.3	-	-	0.83 (0.58, 1.18)	0.3
Binge drinking ever	304 (13.6%)	1.83 (0.75, 4.51)	0.19	Size, deprivation	-	2.44 (1.33, 4.45)	0.00	0.87 (0.59, 1.29)	0.49	-	-	0.87 (0.59, 1.29)	0.49
Drugs ever	798 (35.7%)	1.39 (0.91, 2.45)	0.11	-	-	1.49 (0.91, 2.45)	0.11	0.89 (0.73, 1.10)	0.29	-	-	0.89 (0.73, 1.10)	0.29
Drugs in previous month	194 (8.5%)	2.97 (1.20, 7.32)	0.02	Size, parent working	-	2.84, (1.22, 6.61)	0.02	0.86 (0.56, 1.32)	0.50	-	-	0.86 (0.56, 1.32)	0.5

Table S3: Adjusted and stratified associations between school-level exposures (student commitment and sense of belonging) and student risk behaviours, complete case analysis

Student risk behaviour	School-level exposures											
	Student commitment						Student belonging					
	Unadjusted association		Adjusted association				Unadjusted association		Adjusted association			
	Association	P	Potential confounders adjusted for	Variables for which evidence of moderation indicates need for stratified analysis	Association – overall or stratified where evidence of moderation	P	Association	P	Potential confounders adjusted for	Variables for which evidence of moderation indicates need for stratified analysis	Association – overall or stratified where evidence of moderation	P
Bullying perpetration	0.42 (-0.53, 1.36)	0.39	Size, sex, IDACI, ethnicity, family structure, parent working, family affluence		-0.28 (-1.06, 0.05)	0.49	-0.28 (-0.65, 0.08)	0.13	Size, deprivation	Sex	Female -0.06 (-0.32, 0.20) Male -0.77 (-1.03, -0.48)	Female 0.64 Male <0.0001
Bullying victimisation	-0.05 (-0.13, 0.02)	0.14	Parent working	Ethnicity	White British 0.11 (0.00, 0.22) Other -0.14 (-0.21, -0.06)	White British 0.06 Other 0.00	-0.03 (-0.06, 0.00)	0.07	-	Sex	Female -0.002 (-0.37, 0.03) Male -.77 (-1.03, -0.48)	Female 0.91 Male 0.002
Smoking tobacco ever	0.67 (0.36, 1.26)	0.21	Deprivation, FSM, size	Family affluence	Low affluence White British 0.84 (0.33, 2.17) Low affluence other ethnicity 0.40 (0.18, 0.90) High affluence White British 1.68 (0.69, 4.11) High affluence other ethnicity 0.80 (0.36, 1.79)	Low affluence White British 0.72 Low affluence other ethnicity 0.03 High affluence White British 0.26 High affluence other ethnicity 0.59	0.79 (0.63, 1.00)	0.05	-	Ethnicity	White British 0.67 (0.51, 0.86) Other 0.88 (0.69, 1.13)	White British 0.002 Other 0.32
Smoking tobacco in previous week	0.71 (0.31, 1.60)	0.41	Deprivation, FSM, ethnicity, parent working	Family affluence, family structure	Low affluence two parents 0.95 (0.29, 3.07)	Low affluence two parents 0.94	0.77 (0.57, 1.04)	0.09	Deprivation	-	0.69 (0.53, 0.91)	0.39

					Low affluence other family structure 0.34 (0.10, 1.18) High affluence two parents 3.17 (1.13, 8.90) High affluence other family structure 1.15 (0.35, 3.72)	Low affluence other family structure 0.09 High affluence two parents 30.03 High affluence other family structure 0.82						
Alcohol in previous week	0.43 (0.20, 0.96)	0.04	Size, deprivation, FSM, ethnicity, parent working	Family affluence	Low 0.31 (0.12, 0.78) High 1.08 (0.51, 2.31)	Low 0.01 High 0.84	0.89 (0.63, 1.25)	0.50	-	FSM	Low = 1.04 (0.80, 1.36) High=0.54 (0.40, 0.73)	Low 0.77 High <0.0001
Really drunk ever	0.44 (0.19, 1.00)	0.05	Size, deprivation, FSM, ethnicity	-	0.67 (0.32, 1.40)	0.29	0.86 (0.60, 1.23)	0.41	Deprivation, FSM	Family affluence	Low = 0.88 (0.66, 1.15) High = 0.66 (0.52, 0.84)	Low 0.34 High 0.001
Binge drinking ever	0.41 (0.16, 1.02)	0.06	Size, deprivation, FSM, ethnicity	-	0.73 (0.31, 1.71)	0.47	0.83 (0.57, 1.22)	0.35	Deprivation	Family structure	Two parents = 0.67 (0.50, 0.91) Other = 0.96 (0.69, 1.35)	Two parents 0.009 Other 0.83
Drugs ever	0.8 (0.48, 1.33)	0.39	Size, deprivation, FSM, ethnicity	-	0.80 (0.46, 1.40)	0.44	0.87 (0.71, 1.05)	0.15	-	-	0.87 (0.71, 1.05)	0.15
Drugs in previous month	0.73 (0.24, 2.16)	0.56	Size, deprivation, ethnicity, parent working, FSM	-	0.64 (0.21, 1.97)	0.44	0.63 (0.44, 0.90)	0.01	-	-	0.63 (0.44, 0.90)	0.01