

Bullying fosters interpersonal distrust and degrades adolescent mental health as predicted by Social Safety Theory

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Supplementary Information (SI) for:

Bullying fosters interpersonal distrust and degrades adolescent mental health as predicted by Social Safety Theory

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Sample bias and missingness in the data

Compared to the rest of the Millennium Cohort Study (MCS) survey wave at age 14 years, our analytic sample included slightly more advantaged strata in all countries except Northern Ireland (Cramer's $V = 0.13$), and slightly more White and Indian ethnic backgrounds ($V = 0.12$). In line with typical MCS attrition and non-response patterns [1], our sample had higher income (Cohen's $d = 0.58$). However, the outcome variable (mental health difficulties: total SDQ), maternal mental health, and sleep (chronotype) were no different between the two groups, as can be seen in Table S1.

In a separate analysis, we established that data were Missing at Random. Moreover, our sample had no missing data at all, or had missingness of less than 3%, on the exposure variable (peer bullying), distrust, sex, ethnicity, strata, and income, among others. The outcome variable (SDQ at age 17 years) had 1,908 (19%) missing values, which was the maximum amount of missingness in any variable.

Correlations among interval variables

Pearson's correlation coefficients between all the interval variables in our model are shown in Table S2. All correlations were weak, except for income and maternal education, $r(n = 9355) = .55, p < .001$.

Additional descriptive statistics about the analytic sample

In Table S3 we present an additional analysis by interpersonal distrust group. The three cases of *low* (values ≤ 3), *medium* (values 4 – 8), and *high* (values ≥ 9) distrust groups were used to understand the structure of the analytic sample in terms of different levels of distrust at age 14 years. We found that the roughly 6% of adolescents in the group who reported the highest values of distrust were over-represented by females and disadvantaged areas with lower family incomes (there were roughly double the number of females or those from disadvantaged strata in the high distrust group). Comparisons between high and low distrust groups are presented, and other differences are reported as well (in ethnicity, maternal mental health difficulties, etc.) in Table S3.

Statistical assumptions

Following commonly accepted recommendations [2], we checked the key assumptions for the main structural equation model, as below. These checks followed considerations regarding statistical power (which are straightforward, given that the size of our analytic sample was more than 110 times larger than the degrees of freedom in the main model). In brief, relations between the variables are linear; there is no collinearity among the variables; the variables of interest are continuous and broadly normally distributed; and the covariances of the error terms are zero. Figure S1 captures most of these points with suitable linearity, homogeneity, and normality calculations (corresponding to the equivalent multiple regression model, a general linear model with much stricter assumptions than those imposed for our structural equation models).

Results for the exogenous variable as a numerical variable (peer bullying)

In the main text, the results of the structural equation model were provided for the case when the exogenous variable of interest, bullying, was dichotomous. However, the numerical case (i.e., where bullying can take values 0, 1, 2, 3, 4, or 5) may also be of interest. Importantly, treating bullying as numerical yielded the same main findings and ranking of path coefficients by relative strength. Table S4 contains the full results for all three models for the case when the main predictor variable, 'Bullied', is continuous.

Sensitivity analysis

The "Peer problems" subscale of the SDQ includes an item on bullying. Therefore, this may be a cause for concern in relation to potential bias (since the exogenous variable at age 11 years is peer bullying and the outcome—endogenous—variable at age 17 years is the total SDQ (or the internalizing problems), which contain the bullying item contained in the Peer subscale. However, the present sensitivity analysis reveals that our results are robust to this item. In the first step, we split out the internalizing problems scale into Emotion and Peer problems, and we focus on the Emotion problems only. In the second step, we confirm our findings by using an entirely different scale, namely, the Kessler short form (6-item) scale for psychological distress [3, 4], which was also self-reported by cohort members in the same sweep (age 17 years). We note that, in line with previous reports in the literature, the Kessler-6 scale was strongly

correlated with the total SDQ ($r = .71$) and had excellent internal consistency (Cronbach's alpha was .86) in our sample. The results for these two steps are presented in full in Tables S5 and S6. Note that, in both cases, we report results for the fully adjusted model as well as a minimally adjusted model, where we control only for biological sex and the stratum variable.

For the Emotion problems subscale of the SDQ, we confirmed that distrust was the only significant indirect pathway (from bullying to the Emotion problems subscale), with $\alpha\beta = .01, z(9910) = 4.72, p < .001$; and the link between interpersonal distrust (age 14 years) and subsequent Emotion difficulties (age 17) corresponded to the strongest direct effect after gender, $\beta = .11, z(9910) = 8.09, p < .001$. Unstandardized coefficients are shown in Table S5.

For the Kessler 6-item scale for psychological distress, we also confirmed that distrust was the only significant indirect pathway, $\alpha\beta = .02, z(9910) = 5.54, p < .001$; and the link between interpersonal distrust (age 14) and subsequent psychological distress (age 17) corresponded to the strongest direct effect, $\beta = .16, z(9910) = 11.30, p < .001$ (after gender). We highlight that the standardized coefficient in this case, namely, for the association between distrust and non-specific psychological distress (captured by the Kessler-6 scale), is equal to the standardized coefficient (up to the second decimal) predicting total mental health difficulties (captured by the SDQ). Unstandardized coefficients are shown in Table S6. Exact p-values and regression coefficients with more decimal points are included in the SOM [5].

Supplemental Online Material (SOM)

For completeness, further information can be found in Supplemental Online Material [5] published on the Open Science Framework repository. This includes details on the sample bias, missingness and MAR analyses, normality, and other characteristics of the data, as well as full details on the correlations, regressions, and on the results presented in the text.

Table S1. Analytic sample bias: unweighted variable distribution between the analytic sample and the rest of the MCS at age 14 years.

		Sample <i>n</i> = 10000 (85%)	Rest of MCS <i>n</i> = 1717 (15%)	<i>statistic</i>	<i>p</i>
<i>Categorical, n (%)</i>					
Sex	Female	5075 (51%)	763 (44%)	23.10	<.001
	Male	4925 (49%)	954 (56%)		
Stratum	England – Adv.	2937 (29%)	300 (18%)	205.11	<.001
	England – Dis.	2388 (24%)	486 (28%)		
	England – Ethnic	1196 (12%)	365 (21%)		
	Wales – Adv.	473 (5%)	69 (4%)		
	Wales – Dis.	928 (9%)	198 (11%)		
	Scotland – Adv.	617 (6%)	71 (4%)		
	Scotland – Dis.	488 (5%)	86 (5%)		
	N. Ireland – Adv.	396 (4%)	61 (4%)		
	N. Ireland – Dis.	577 (6%)	81 (5%)		
Ethnicity	White	7910 (79%)	1054 (61%)	156.41	<.001
	Mixed	443 (4%)	91 (5%)		
	Indian	262 (3%)	41 (2%)		
	PaBan	638 (6%)	188 (11%)		
	Black	266 (3%)	97 (6%)		
	Other ethnic	219 (2%)	58 (3%)		
Mat mental health (Yes)		2515 (25%)	301 (18%)	0.11	.741
<i>Interval, mean (se)</i>					
SDQ	(min 1, max 41)	12.28 (.06)	12.39 (.18)	-0.55	.584
Distrust	(min 1, max 11)	4.83 (.02)	4.99 (.06)	-2.49	.013
Income	(min 1, max 5)	3.29 (.01)	2.50 (.03)	22.61	<.001
Mat Edu	(min 1, max 6)	3.99 (.01)	3.20 (.04)	18.07	<.001
Chronotype	(min 1, max 5)	2.94 (.01)	2.93 (.03)	0.32	.747
Word Score	(min 1, max 20)	8.14 (.03)	7.51 (.07)	8.67	<.001
Phys Activity	(min 1, max 5)	3.25(.01)	3.15(.03)	2.90	.004
NO2	(min 1, max 10)	6.21 (.03)	6.86 (.07)	-2.58	.010
Parent-reported SDQ age 11		8.17(.05)	11.28(.43)	-7.21	<.001

Note. Statistic and p-values are for two-sided χ^2 -tests (or t-tests) for categorical (interval) variables. | ‘Adv.’ (‘Dis.’) stands for Advantaged (Disadvantaged) | ‘Mat’ for Maternal | ‘Edu’ for ‘Education’ | ‘PaBan’ for Pakistani and Bangladeshi.

Table S2. Correlation matrix for interval variables in the fully adjusted model.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
¹ SDQ age 7										
² SDQ age 17	.22									
³ Distrust	.10	.27								
⁴ BMI	.07	.08	.07							
⁵ Bullied (age 11)	.15	.20	.10	.05						
⁶ NO2 Pollution	.08	-.04	.05	.00	-.01					
⁷ Sleep: Chrono	.01	.16	.13	.08	.00	-.07				
⁸ Phys Activity	-.05	-.12	-.11	-.13	-.02	-.05	-.06			
⁹ Word Score	-.18	-.03	-.03	-.04	-.02	-.01	.04	-.04		
¹⁰ Mat Education	-.21	-.06	-.03	-.08	-.01	-.12	-.02	.05	.24	
¹¹ Income	-.27	-.11	-.10	-.12	-.02	-.13	-.08	.05	.25	.55

Note. Pearson's correlation coefficients (values in bold correspond to $p < .05$, two-sided t-test with Bonferroni correction for multiple comparisons)

Table S3. Descriptive statistics by distrust group at age 14 in the analytic sample (unweighted).

Distrust Group		High <i>n</i> = 626 (6%)	Medium 6131 (63%)	Low 2998 (31%)	Statistic (High v. Low)
<i>Categorical, n (%)</i>					
Sex	Female	414 (4%)	3121 (32%)	1432 (15%)	69.19***
	Male	212 (2%)	3010 (31%)	1566 (16%)	
Stratum	England – Adv.	145 (1%)	1844 (19%)	893 (9%)	54.71***
	England – Dis.	174 (2%)	1477 (15%)	664 (7%)	
	England – Ethnic	101 (1%)	777 (8%)	284 (3%)	
	Wales – Adv.	28 (.3%)	287 (3%)	147 (2%)	
	Wales – Dis.	62 (.6%)	557 (6%)	287 (3%)	
	Scotland – Adv.	24 (.2%)	371 (4%)	210 (2%)	
	Scotland – Dis.	41 (.4%)	282 (3%)	149 (2%)	
	N. Ireland – Adv.	20 (.2%)	225 (2%)	142 (1%)	
	N. Ireland – Dis.	31 (.3%)	311 (3%)	222 (2%)	
Ethnicity	White	460 (5%)	4914 (51%)	2510 (26%)	39.79***
	Mixed	42 (.4%)	278 (3%)	119 (1%)	
	Indian	18 (.2%)	171 (2%)	71 (.7%)	
	PaBan	57 (.6%)	409 (4%)	163 (2%)	
	Black	27 (.3%)	171 (2%)	67 (.7%)	
	Other ethnic	18 (.2%)	149 (2%)	51 (.5%)	
Mat mental health (Yes)		181 (2%)	1557 (19%)	708 (8%)	12.56***
<i>Interval, mean (se)</i>					
SDQ-total (min 1, max 41)		15.64 (.26)	12.69 (.08)	10.71 (.10)	17.41***
Bullied (age 11)		1.60 (.07)	1.35 (.02)	1.09 (.03)	6.71***
Income (min 1, max 5)		2.97 (.06)	3.27 (.02)	3.43 (.02)	-7.49***
Mat Edu (min 1, max 6)		3.96 (.06)	3.99 (.02)	4.05 (.03)	-1.25
Word Score (min 1, max 20)		7.98 (.11)	8.13 (.03)	8.25 (.05)	-2.24*
Parent-reported SDQ age 11		9.03(.22)	8.34(.07)	7.49 (.09)	6.37***

Note. Statistic is for two-sided χ^2 -tests (or t-tests) for categorical (interval) variables between the high and low distrust groups only. | **p* < 0.05, ***p* < 0.01, ****p* < 0.001 | Exact p-values can be found in the SOM document [5].

Table S4. Weighted, imputed model 1 (total difficulties, SDQ); model 2 (internalizing problems, INT); and model 3 (externalizing problems, EXT). Showing unstandardized coefficients (standard errors) for the full analytic sample ($N = 10,000$). The exogenous variable, bullying (“Bullied”) is an interval variable.

	Model 1 (SDQ) Estimate (Std.Err.)	Model 2 (INT) Estimate (Std.Err.)	Model 3 (EXT) Estimate (Std.Err.)
<u>Regression Slopes</u>			
<u>Mental Health Difficulties</u>			
Bullied – interval var. (<i>c</i>)	0.45(0.05)***	0.14(0.02)***	0.09(0.01)***
Interpersonal Distrust (<i>b</i>)	0.41(0.04)***	0.15(0.02)***	0.07(0.01)***
Sex: Male	-0.99(0.15)***	-1.08(0.06)***	0.19(0.04)***
Stratum: EN Disadvantaged	-0.12(0.22)	0.01(0.09)	-0.05(0.05)
Stratum: EN Ethnic	-0.14(0.40)	0.03(0.16)	-0.08(0.09)
Stratum: NI Advantaged	-0.72(0.42)	-0.28(0.17)	-0.09(0.10)
Stratum: NI Disadvantaged	-0.17(0.41)	-0.10(0.17)	0.03(0.10)
Stratum: SC Advantaged	-0.05(0.33)	-0.03(0.14)	-0.01(0.08)
Stratum: SC Disadvantaged	-0.21(0.39)	-0.06(0.18)	-0.06(0.08)
Stratum: WA Advantaged	0.04(0.32)	0.04(0.15)	-0.01(0.08)
Stratum: WA Disadvantaged	-0.13(0.29)	0.03(0.12)	-0.06(0.08)
Ethnicity: Black	-1.97(0.57)***	-0.86(0.25)***	-0.24(0.12)*
Ethnicity: Indian	-0.78(0.65)	-0.54(0.27)*	0.08(0.12)
Ethnicity: Mixed	0.02(0.39)	-0.08(0.16)	0.11(0.10)
Ethnicity: Other	-0.67(0.58)	-0.20(0.24)	-0.17(0.14)
Ethnicity: PaBan	-1.98(0.53)***	-0.78(0.21)***	-0.25(0.13)
Income	-0.25(0.07)***	-0.07(0.03)*	-0.05(0.02)**
Maternal Education	0.07(0.06)	-0.01(0.03)	0.03(0.02)*
Word Score	0.02(0.03)	0.04(0.01)**	-0.02(0.01)*
<u>Prior Mental Health Difficulties</u>			
(Age 7)	0.14(0.02)***	0.03(0.01)***	0.03(0.00)***
Body mass index	0.00(0.00)	0.00(0.00)*	-0.00(0.00)
Maternal Mental Health: Yes	0.55(0.16)***	0.30(0.07)***	0.04(0.04)
NO2	-0.04(0.04)	-0.02(0.01)	-0.00(0.01)
Diet: Fruit Eating (<i>b</i> ₁)	-0.62(0.12)***	-0.20(0.05)***	-0.12(0.03)***
Sleep: Chronotype (<i>b</i> ₂)	0.47(0.08)***	0.12(0.03)***	0.14(0.02)***
Physical Activity (<i>b</i> ₃)	-0.12(0.07)	-0.14(0.03)***	0.04(0.02)*

Interpersonal Distrust

Bullied (a)	0.14(.02)***	0.14(.02)***	0.14(.02)***
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Diet: Fruit Eating

Bullied (a_1)	-0.01(.00)*	-0.01(.00)*	-0.01(.00)*
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Sleep: Chronotype

Bullied (a_2)	-0.00(.01)	-0.00(.01)	-0.00(.01)
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Physical Activity

Bullied (a_3)	0.00(.01)	0.00(.01)	0.00(.01)
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Indirect and Total Effects

$a*b$	0.06(.01)***	0.02(.00)***	0.01(.00)***
$a*b_1$	0.01(.00)*	0.00(.00)*	0.00(.00)*
$a*b_2$	-0.00(.00)	-0.00(.00)	-0.00(.00)
$a*b_3$	-0.00(.00)	-0.00(.00)	0.00(.00)
total	0.51(.06)***	0.17(.02)***	0.10(.01)***

Fit Indices

χ^2	2962.48***	3678.76***	3067.62***
CFI	0.98	0.97	0.98
TLI	0.97	0.96	0.97
Robust RMSEA	0.06	0.06	0.05
SRMR	0.03	0.03	0.03
Scaled χ^2	1571.90(90)***	1995.56(115)***	1663.91(115)***

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$ for two-sided Wald z-test. | Exact p-values can be found in the SOM document [5]. | Abbreviations: EN (England), NI (Northern Ireland), SC (Scotland), WA (Wales), Black (Black or Black British), PaBan (Pakistani and Bangladeshi), Other (Other Ethnic group, inc. Chinese, Other) | CFI (comparative fit index), TLI (Tucker–Lewis index), RMSEA (root mean square error of approximation), SRMR (standardized root mean square residual)

Table S5. Weighted, imputed models for the Emotion subscale of the SDQ only. The minimally adjusted model only controls for Sex and Stratum. Showing unstandardized coefficients (standard errors) for the full analytic sample ($N = 10,000$).

	Minimally adjusted	Fully adjusted
<u>Regression Slopes</u>		
<u>EMOTION (SDQ)</u>		
Bullied (<i>c</i>)	0.36(0.06)***	0.30(0.07)***
Interpersonal Distrust (<i>b</i>)	0.13(0.02)***	0.13(0.02)***
Sex: Male	-1.29(0.06)***	-1.34(0.07)***
Stratum: EN Disadvantaged	-0.03(0.08)	-0.00(0.09)
Stratum: EN Ethnic	-0.46(0.11)***	0.03(0.17)
Stratum: NI Advantaged	-0.07(0.15)	-0.19(0.18)
Stratum: NI Disadvantaged	0.09(0.15)	0.01(0.19)
Stratum: SC Advantaged	0.06(0.12)	0.01(0.14)
Stratum: SC Disadvantaged	0.06(0.16)	-0.07(0.18)
Stratum: WA Advantaged	0.01(0.13)	0.02(0.14)
Stratum: WA Disadvantaged	0.04(0.11)	0.03(0.13)
Diet: Fruit Eating (<i>b</i> ₁)	-0.17(0.05)***	-0.16(0.05)***
Sleep: Chronotype (<i>b</i> ₂)	0.15(0.03)***	0.14(0.03)***
Physical Activity (<i>b</i> ₃)	-0.16(0.03)***	-0.13(0.03)***
Ethnicity: Black		-0.90(0.26)***
Ethnicity: Indian		-0.51(0.25)*
Ethnicity: Mixed		-0.05(0.17)
Ethnicity: Other		-0.27(0.27)
Ethnicity: PaBan		-0.71(0.22)**
Income		-0.03(0.03)
Maternal Education		0.00(0.03)
Word Score		0.04(0.01)**
Prior Mental Health Difficulties (Age 7)		0.02(0.01)***
Body mass index		0.00(0.00)
Maternal Mental Health: Yes		0.30(0.08)***
NO2		-0.02(0.02)

<u>Interpersonal Distrust</u>		
Bullied (a)	0.42(0.05) ^{***}	0.42(0.06) ^{***}
<u>Diet: Fruit Eating</u>		
Bullied (a_1)	-0.01(0.01)	-0.01(0.01)
<u>Sleep: Chronotype</u>		
Bullied (a_2)	0.01(0.03)	-0.01(0.03)
<u>Physical Activity</u>		
Bullied (a_3)	-0.01(0.03)	0.01(0.03)
<u>Indirect and Total Effects</u>		
$a*b$	0.05(.01) ^{***}	0.05(.01) ^{***}
$a*b_1$	0.00(.00)	0.00(.00)
$a*b_2$	0.00(.00)	0.00(.00)
$a*b_3$	0.00(.00)	0.00(.00)
total	0.41(.06) ^{***}	0.35(.07) ^{***}
<u>Fit Indices</u>		
χ^2	1869.55 ^{***}	2996.33 ^{***}
CFI	0.42	0.98
TLI	0.18	0.97
Robust RMSEA	0.07	0.06
SRMR	0.04	0.03
Scaled χ^2	1466.67(42) ^{***}	1590.35(90) ^{***}

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$ for two-sided Wald z-test. | Exact p-values can be found in the SOM document [5]. | Abbreviations: EN (England), NI (Northern Ireland), SC (Scotland), WA (Wales), Black (Black or Black British), PaBan (Pakistani and Bangladeshi), Other (Other Ethnic group, inc. Chinese, Other) | CFI (comparative fit index), TLI (Tucker–Lewis index), RMSEA (root mean square error of approximation), SRMR (standardized root mean square residual)

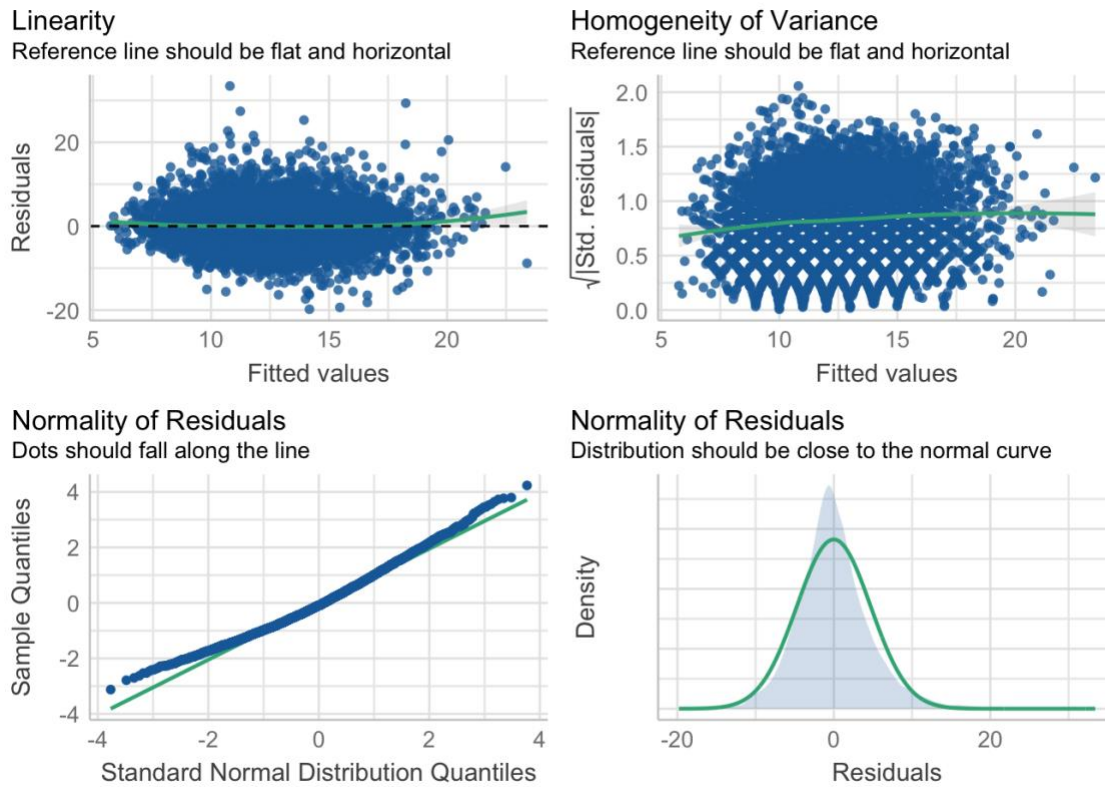
Table S6. Weighted, imputed models for the Kessler 6-item psychological distress scale. The minimally adjusted model only controls for Sex and Stratum. Showing unstandardized coefficients (standard errors) for the full analytic sample ($N = 10,000$).

	Minimally adjusted	Fully adjusted
<u>Regression Slopes</u>		
<u>Kessler-6</u>		
Bullied (<i>c</i>)	0.88(0.12) ^{***}	0.77(0.14) ^{***}
Interpersonal Distrust (<i>b</i>)	0.36(0.03) ^{***}	0.36(0.03) ^{***}
Sex: Male	-1.60(0.11) ^{***}	-1.68(0.13) ^{***}
Stratum: EN Disadvantaged	-0.02(0.16)	-0.02(0.20)
Stratum: EN Ethnic	-0.73(0.23) ^{**}	-0.17(0.34)
Stratum: NI Advantaged	-0.24(0.29)	-0.33(0.34)
Stratum: NI Disadvantaged	-0.11(0.25)	-0.19(0.32)
Stratum: SC Advantaged	0.26(0.24)	0.28(0.28)
Stratum: SC Disadvantaged	0.27(0.25)	0.12(0.31)
Stratum: WA Advantaged	-0.14(0.24)	-0.11(0.27)
Stratum: WA Disadvantaged	-0.08(0.19)	-0.11(0.25)
Diet: Fruit Eating (<i>b</i> ₁)	-0.24(0.10) [*]	-0.24(0.11) [*]
Sleep: Chronotype (<i>b</i> ₂)	0.38(0.07) ^{***}	0.34(0.08) ^{***}
Physical Activity (<i>b</i> ₃)	-0.21(0.05) ^{***}	-0.16(0.06) ^{**}
Ethnicity: Black		-0.40(0.44)
Ethnicity: Indian		-0.52(0.54)
Ethnicity: Mixed		0.30(0.34)
Ethnicity: Other		-0.03(0.58)
Ethnicity: PaBan		-1.08(0.45) [*]
Income		-0.11(0.07)
Maternal Education		0.06(0.05)
Word Score		0.13(0.03) ^{***}
Prior Mental Health Difficulties (Age 7)		0.05(0.01) ^{***}
Body mass index		0.00(0.00)
Maternal Mental Health: Yes		0.73(0.16) ^{***}
NO2		-0.02(0.03)
<u>Interpersonal Distrust</u>		

Bullied (a)	0.42(0.05) ^{***}	0.42(0.06) ^{***}
<u>Diet: Fruit Eating</u>		
Bullied (a_1)	-0.01(0.01)	-0.01(0.01)
<u>Sleep: Chronotype</u>		
Bullied (a_2)	0.01(0.03)	-0.01(0.03)
<u>Physical Activity</u>		
Bullied (a_3)	-0.01(0.03)	0.01(0.03)
	<u>Indirect and Total Effects</u>	
$a*b$	0.15(.03) ^{***}	0.15(.03) ^{***}
$a*b_1$	0.00(.00)	0.00(.00)
$a*b_2$	0.00(.01)	0.00(.01)
$a*b_3$	0.00(.01)	0.00(.01)
total	1.04(.13) ^{***}	0.92(.15) ^{***}
	<u>Fit Indices</u>	
χ^2	1867.60 ^{***}	3000.36 ^{***}
CFI	0.96	0.98
TLI	0.98	0.97
Robust RMSEA	0.07	0.06
SRMR	0.04	0.03
Scaled χ^2	1464.92(42)	1590.99(90) ^{***}

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$ for two-sided Wald z-test. | Exact p-values can be found in the SOM document [5]. | Abbreviations: EN (England), NI (Northern Ireland), SC (Scotland), WA (Wales), Black (Black or Black British), PaBan (Pakistani and Bangladeshi), Other (Other Ethnic group, inc. Chinese, Other) | CFI (comparative fit index), TLI (Tucker–Lewis index), RMSEA (root mean square error of approximation), SRMR (standardized root mean square residual)

Figure S1. Linearity and normality of the analytic sample



Linearity, homogeneity of variance, and normality assumption checks for the equivalent general linear model of main interest (Model 1), using the statistical analysis packages detailed in full in the SOM document [5].

SI References

1. Joshi, H. and E. Fitzsimons, *The Millennium Cohort Study: The making of a multi-purpose resource for social science and policy*. Longitudinal and Life Course Studies: International Journal, 2016. **7**(4): p. 409–430.
2. Streiner, D.L., *Finding our way: an introduction to path analysis*. Can J Psychiatry, 2005. **50**(2): p. 115-22.
3. Kessler, R.C., et al., *Screening for serious mental illness in the general population*. Archives of general psychiatry, 2003. **60**(2): p. 184-189.
4. Kessler, R.C., et al., *Screening for serious mental illness in the general population with the K6 screening scale: results from the WHO World Mental Health (WMH) survey initiative*. International journal of methods in psychiatric research, 2010. **19**(S1): p. 4-22.
5. SOM, *Supplemental Online Material (SOM), Open Science Framework: Bullying victimization, distrust, and adolescent mental health: Evidence for Social Safety Theory*. 2023. p. <https://osf.io/zjq9a>.