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Supplementary file

Table S1: Model fit statistics for current cigarette use by predictor

	Non- competitive sport		Competitive sport		Outside of School sport		MVPA guidelines	
	Male	Female	Male	Female	Male	Female	Male	Female
ICC=	0.122	0.128	0.122	0.128	0.122	0.128	0.122	0.128
Step #	AIC	AIC	AIC	AIC	AIC	AIC	AIC	AIC
Step 1	19996.3	17214.4	19996.3	17214.4	19996.3	17214.4	19996.3	17214.4
Step 2	18408.5	16030.6	18920.6	16467.0	18973.7	16448.7	19368	16751.7
Step 3	14772.3	12882.7	15184.6	13228.8	15238.5	13232.9	15555.9	15555.9
Step 4	8565.5	8025.0	8744.2	8245.8	8820.2	8234.5	8963.1	8356.7
Step 5	8140.8	7642.5	8140.8	7642.5	8140.8	7642.5	8140.8	7642.5

Notes. ICC=intraclass coefficient, AIC= Akaike information criterion. MVPA=moderate-to-vigorous physical activity. Step 1= base model, step 2=predictor of interest, step 3= demographic covariates, step 4 = social and mental health variables, step 5 =controlling for other sport participation and MVPA guidelines.

Table S2: Model fit statistics for current e-cigarette use by predictor

	Non- competitive sport		Competitive sport		Outside of School sport		MVPA guidelines	
	Male	Female	Male	Female	Male	Female	Male	Female
ICC=	0.068	0.063	0.068	0.063	0.068	0.063	0.068	0.063
Step #	AIC	AIC	AIC	AIC	AIC	AIC	AIC	AIC
Step 1	43817.3	40378	43817.3	40378	43817.3	40378	43817.3	40378
Step2	41722.5	38640.4	42449.6	39383.3	42699.2	39565.1	39655.7	39655.7
Step 3	32731.2	30952.6	33285.3	31540.7	33417.7	31672.2	33613.6	31826.6
Step 4	23062.7	23414.7	23481.0	23808.3	23572.9	23909.6	25437	24027.6
Step 5	21657.4	22330.5	21657.4	22330.5	21657.4	22330.5	21657.4	22330.5

Notes. ICC=intraclass coefficient, AIC= Akaike information criterion. MVPA=moderate-to-vigorous physical activity. Step 1= base model, step 2=predictor of interest, step 3= demographic covariates, step 4 = social and mental health variables, step 5 =controlling for other sport participation and MVPA guidelines.

Table S3: Model fit statistics for current cannabis use by predictor

	Non- competitive sport		Competitive sport		Outside of School sport		MVPA guidelines	
	Male	Female	Male	Female	Male	Female	Male	Female
ICC=	0.103	0.122	0.103	0.122	0.103	0.122	0.103	0.122
Step #	AIC	AIC	AIC	AIC	AIC	AIC	AIC	AIC
Step 1	29723.8	24301.0	29723.8	24301.0	29723.8	24301.0	29723.8	24301.0
Step2	27948.1	22961.7	28553.9	23503.9	28685.9	23499.0	28884.4	23796.1
Step 3	23213.9	19644.1	23696.3	20065.9	23792.8	20069.8	23986.1	20331.3
Step 4	14295.3	12899.8	14599.1	13147.6	14649.1	13128.5	14764.7	13280.8
Step 5	13372.1	11970.9	13372.1	11970.9	13372.1	11970.9	13372.1	11970.9

Notes. ICC=intraclass coefficient, AIC= Akaike information criterion. MVPA=moderate-to-vigorous physical activity. Step 1= base model, step 2=predictor of interest, step 3= demographic covariates, step 4 = social and mental health variables, step 5 =controlling for other sport participation and MVPA guidelines.

Table S4: Model fit statistics for current binge drinking by predictor

	Non- competitive sport		Competitive sport		Outside of School sport		MVPA guidelines	
	Male	Female	Male	Female	Male	Female	Male	Female
ICC=	0.101	0.072	0.101	0.072	0.101	0.072	0.101	0.072
Step #	AIC	AIC	AIC	AIC	AIC	AIC	AIC	AIC
Step 1	34612.2	30993.1	34612.2	30993.1	34612.2	30993.1	34612.2	30993.1
Step 2	32756.3	29523.0	33201.4	30103.4	33506.2	30242.7	33663.4	30422.1
Step 3	25546.2	23826.7	25856.5	24257.6	26011.4	24360.9	26319.3	24582.5
Step 4	17662.2	17209.3	17966.3	17539.6	18044.7	17604.0	17728.2	17728.2
Step 5	16749.6	16532.7	16749.6	16532.7	16749.6	16532.7	16749.6	16532.7

Notes. ICC=intraclass coefficient, AIC= Akaike information criterion. MVPA=moderate-to-vigorous physical activity. Step 1= base model, step 2=predictor of interest, step 3= demographic covariates, step 4 = social and mental health variables, step 5 =controlling for other sport participation and MVPA guidelines.

Table S5: Male stratified school connectedness and MVPA moderation model for current cigarette use

Characteristic	OR	95% CI	p-value	BH p-value
Grade				
9	—	—		
10	1.02	0.85, 1.22	0.8	0.84
11	1.23	1.03, 1.46	0.025	0.037
12	1.53	1.26, 1.87	<0.001	<0.001
Ethnicity				
White	—	—		
Mixed	1.31	1.05, 1.63	0.017	0.03
Black	1.62	1.20, 2.18	0.002	0.003
Asian	1.15	0.88, 1.51	0.3	0.35
Latin	1.27	0.89, 1.81	0.2	0.23
Other	1.96	1.59, 2.42	<0.001	<0.001
Pocket money				
None	—	—		
1-20\$	1.07	0.85, 1.36	0.6	0.58
21-100\$	1.10	0.88, 1.37	0.4	0.47
>100\$	1.28	1.03, 1.59	0.024	0.037
"I don't know"	1.08	0.84, 1.40	0.5	0.577
GAD-7				
0 (minimal)	—	—		
1 (mild)	1.19	1.04, 1.37	0.013	0.024
2 (Moderate)	1.36	1.13, 1.64	0.001	0.003
3 (severe)	1.63	1.31, 2.01	<0.001	<0.001
School connectedness	0.93	0.91, 0.95	<0.001	<0.001
Current e-cigarette use				
No	—	—		
Yes	7.61	6.43, 9.00	<0.001	<0.001
Current cannabis use				
No	—	—		
Yes	3.93	3.45, 4.48	<0.001	<0.001
Current binge drinking				
No	—	—		

Characteristic	OR	95% CI	p-value	BH p-value
Yes	2.63	2.30, 3.00	<0.001	<0.001
Ever-use opiates				
No	—	—		
Yes	4.77	3.42, 6.64	<0.001	<0.001
Competitive school sport				
No	—	—		
Yes	0.67	0.57, 0.78	<0.001	<0.001
Non-competitive school sport				
No	—	—		
Yes	0.88	0.76, 1.03	0.11	0.146
Outside of school sport				
No	—	—		
Yes	0.72	0.63, 0.82	<0.001	<0.001
MVPA guidelines				
No	—	—		
Yes	0.61	0.34, 1.09	0.10	0.132
School connectedness x MVPA guidelines				
School connectedness x no				
School connectedness x yes	1.04	1.00, 1.07	0.035	0.049

Notes. OR = Odds Ratio, CI = Confidence Interval, **Bold**= p-value <0.05.

MVPA=Moderate to vigorous physical activity. GAD-7=Generalized anxiety disorder-7.

Table S6: Male stratified school connectedness and outside of school sport participation moderation for e-cigarette use

Characteristic	OR	95% CI	p-value	BH p-value
Grade				
9	—	—		
10	1.07	0.98, 1.17	0.12	0.146
11	1.06	0.96, 1.16	0.2	0.265
12	0.88	0.78, 0.99	0.029	0.037
Ethnicity				
White	—	—		
Mixed	0.82	0.71, 0.93	0.003	0.004
Black	0.59	0.49, 0.72	<0.001	<0.001
Asian	0.57	0.49, 0.66	<0.001	<0.001
Latin	0.93	0.75, 1.14	0.5	0.515
Other	0.79	0.68, 0.91	0.001	0.002
Pocket money				
None	—	—		
1-20\$	1.45	1.28, 1.63	<0.001	<0.001
21-100\$	1.93	1.71, 2.16	<0.001	<0.001
>100\$	2.19	1.95, 2.47	<0.001	<0.001
"I don't know"	1.32	1.16, 1.51	<0.001	<0.001
GAD-7				
0 (minimal)	—	—		
1 (mild)	1.35	1.25, 1.47	<0.001	<0.001
2 (Moderate)	1.24	1.10, 1.40	<0.001	<0.001
3 (severe)	1.22	1.05, 1.42	0.010	0.014
School connectedness	1.00	0.98, 1.01	0.7	0.748
Current cigarette use				
No	—	—		
Yes	6.55	5.51, 7.79	<0.001	<0.001
Current cannabis use				
No	—	—		
Yes	7.24	6.52, 8.04	<0.001	<0.001
Current binge drinking				
No	—	—		

Characteristic	OR	95% CI	p-value	BH p-value
Yes	4.49	4.12, 4.90	<0.001	<0.001
Ever-use opiates				
No	—	—		
Yes	1.02	0.65, 1.61	>0.9	0.928
Competitive school sport				
No	—	—		
Yes	1.41	1.29, 1.54	<0.001	<0.001
Non-competitive school sport				
No	—	—		
Yes	0.92	0.85, 1.00	0.052	0.064
MVPA guidelines				
No	—	—		
Yes	1.16	1.08, 1.24	<0.001	<0.001
Outside of school sport				
No	—	—		
Yes	2.74	1.84, 4.08	<0.001	<0.001
School connectedness x outside of school sport				
School connectedness x no				
School connectedness x yes	0.96	0.94, 0.98	<0.001	<0.001

Notes. OR = Odds Ratio, CI = Confidence Interval, **Bold**= p-value <0.05. MVPA=Moderate to vigorous physical activity. GAD-7=Generalized anxiety disorder-7.

Table S7: Male stratified school connectedness and MVPA moderation for e-cigarette use

Characteristic	OR	95% CI	p-value	BH p-value
Grade				
9	—	—		
10	1.07	0.98, 1.17	0.13	0.15
11	1.06	0.96, 1.16	0.2	0.27
12	0.87	0.78, 0.98	0.025	0.032
Ethnicity				
White	—	—		
Mixed	0.82	0.71, 0.93	0.003	0.004
Black	0.60	0.49, 0.72	<0.001	<0.001
Asian	0.58	0.50, 0.66	<0.001	<0.001
Latin	0.93	0.75, 1.14	0.5	0.504
Other	0.79	0.68, 0.92	0.002	0.003
Pocket money				
None	—	—		
1-20\$	1.45	1.29, 1.64	<0.001	<0.001
21-100\$	1.93	1.72, 2.17	<0.001	<0.001
>100\$	2.20	1.96, 2.48	<0.001	<0.001
"I don't know"	1.33	1.17, 1.52	<0.001	<0.001
GAD-7				
0 (minimal)	—	—		
1 (mild)	1.36	1.25, 1.47	<0.001	<0.001
2 (Moderate)	1.24	1.10, 1.40	<0.001	<0.001
3 (severe)	1.21	1.04, 1.41	0.014	0.02
School connectedness	0.99	0.98, 1.01	0.3	0.29
Current cigarette use				
No	—	—		
Yes	6.49	5.46, 7.71	<0.001	<0.001
Current cannabis use				
No	—	—		
Yes	7.21	6.49, 8.00	<0.001	<0.001
Current binge drinking				
No	—	—		
Yes	4.51	4.13, 4.91	<0.001	<0.001

Characteristic	OR	95% CI	p-value	BH p-value
Ever-use opiates				
No	—	—		
Yes	1.01	0.64, 1.60	>0.9	>0.9
Competitive school sport				
No	—	—		
Yes	1.41	1.29, 1.54	<0.001	<0.001
Non-competitive school sport				
No	—	—		
Yes	0.92	0.85, 1.00	0.055	0.067
Outside of school sport				
No	—	—		
Yes	1.29	1.19, 1.39	<0.001	<0.001
MVPA guidelines				
No	—	—		
Yes	1.82	1.24, 2.69	0.002	0.004
School connectedness x MVPA guidelines				
School connectedness x no				
School connectedness x yes	0.98	0.96, 1.00	0.019	0.0262

Notes. OR = Odds Ratio, CI = Confidence Interval, **Bold**= p-value <0.05. MVPA=Moderate to vigorous physical activity. GAD-7=Generalized anxiety disorder-7.

Table S8: Female stratified school connectedness and MVPA moderation for cannabis use

Characteristic	OR	95% CI	p-value	BH p-value
Grade				
9	—	—		
10	1.29	1.12, 1.50	<0.001	<0.001
11	1.66	1.43, 1.92	<0.001	<0.001
12	1.91	1.62, 2.25	<0.001	<0.001
Ethnicity				
White	—	—		
Mixed	1.15	0.97, 1.36	0.11	0.12
Black	1.58	1.21, 2.06	<0.001	<0.001
Asian	0.50	0.40, 0.64	<0.001	<0.001
Latin	0.87	0.65, 1.18	0.4	0.41
Other	1.52	1.26, 1.84	<0.001	<0.001
Pocket money				
None	—	—		
1-20\$	1.44	1.18, 1.74	<0.001	<0.001
21-100\$	1.49	1.24, 1.79	<0.001	<0.001
>100\$	1.60	1.33, 1.94	<0.001	<0.001
"I don't know"	1.10	0.88, 1.36	0.4	0.41
GAD-7				
0 (minimal)	—	—		
1 (mild)	1.22	1.06, 1.39	0.004	0.005
2 (Moderate)	1.43	1.24, 1.66	<0.001	<0.001
3 (severe)	1.63	1.40, 1.89	<0.001	<0.001
School connectedness	0.88	0.86, 0.90	<0.001	<0.001
Current cigarette use				
No	—	—		
Yes	4.72	4.12, 5.42	<0.001	<0.001
Current e-cigarette use				
No	—	—		
Yes	4.96	4.46, 5.52	<0.001	<0.001
Current binge drinking				
No	—	—		
Yes	4.16	3.74, 4.63	<0.001	<0.001

Characteristic	OR	95% CI	p-value	BH p-value
Ever-use opiates				
No	—	—		
Yes	11.6	5.65, 24.0	<0.001	<0.001
Competitive school sport				
No	—	—		
Yes	1.02	0.89, 1.16	0.8	0.81
Non-competitive school sport				
No	—	—		
Yes	0.80	0.70, 0.91	<0.001	0.001
Outside of school sport				
No	—	—		
Yes	0.78	0.70, 0.87	<0.001	<0.001
MVPA guidelines				
No	—	—		
Yes	0.54	0.32, 0.92	0.023	0.026
School connectedness x MVPA guidelines				
School connectedness x no				
School connectedness x yes	1.04	1.01, 1.07	0.008	0.01

Notes. OR = Odds Ratio, CI = Confidence Interval, **Bold**= p-value <0.05. MVPA=Moderate to vigorous physical activity. GAD-7=Generalized anxiety disorder-7.

Table S9: Male stratified school connectedness and outside of school sport moderation for cannabis use

Characteristic	OR	95% CI	p-value	BH p-value
Grade				
9	—	—		
10	1.40	1.22, 1.60	<0.001	<0.001
11	1.68	1.47, 1.92	<0.001	<0.001
12	2.25	1.94, 2.62	<0.001	<0.001
Ethnicity				
White	—	—		
Mixed	1.29	1.09, 1.52	0.003	.003
Black	1.84	1.47, 2.29	<0.001	<0.001
Asian	0.57	0.47, 0.71	<0.001	<0.001
Latin	0.98	0.74, 1.28	0.9	0.85
Other	1.65	1.39, 1.96	<0.001	<0.001
Pocket money				
None	—	—		
1-20\$	1.19	1.00, 1.41	0.052	0.061
21-100\$	1.51	1.28, 1.77	<0.001	<0.001
>100\$	1.54	1.31, 1.80	<0.001	<0.001
"I don't know"	1.09	0.90, 1.32	0.4	0.39
GAD-7				
0 (minimal)	—	—		
1 (mild)	1.14	1.02, 1.26	0.016	0.020
2 (Moderate)	1.26	1.09, 1.47	0.002	0.002
3 (severe)	1.32	1.11, 1.58	0.002	0.003
School connectedness	0.91	0.89, 0.93	<0.001	<0.001
Current cigarette use				
No	—	—		
Yes	7.83	7.05, 8.70	<0.001	<0.001
Current e-cigarette use				
No	—	—		
Yes	3.75	3.29, 4.27	<0.001	<0.001
Current binge drinking				
No	—	—		
Yes	3.32	3.00, 3.67	<0.001	<0.001

Characteristic	OR	95% CI	p-value	BH p-value
Ever-use opiates				
No	—	—		
Yes	6.94	4.42, 10.9	<0.001	<0.001
Competitive school sport				
No	—	—		
Yes	1.04	0.93, 1.17	0.5	0.49
Non-competitive school sport				
No	—	—		
Yes	0.83	0.74, 0.93	0.002	0.003
MVPA guidelines				
No	—	—		
Yes	1.09	0.99, 1.19	0.076	0.086
Outside of school sport				
No	—	—		
Yes	0.46	0.28, 0.75	0.002	0.003
School connectedness x outside of school sport				
School connectedness x no				
School connectedness x yes	1.04	1.01, 1.07	0.005	0.007

Notes. OR = Odds Ratio, CI = Confidence Interval, **Bold**= p-value <0.05. MVPA=Moderate to vigorous physical activity. GAD-7=Generalized anxiety disorder-7.