

Supplementary material for

"Persistent Trends or Pandemic Effects? A Multi-cohort Longitudinal Study on Student Well-being, Inequality, and Educational Transitions"

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Table A1 Dropout by year

Cohort	Grade 5	Grade 6	Grade 7	Grade 8	Grade 9
Pre-pandemic Cohort	49252	45203	41780	37274	19733
% Missing	-	8.22	15.17	24.32	59.93
Early-pandemic Cohort	51716	45578	41564	39370	31891
% Missing	-	11.87	19.63	23.87	38.33
Full-pandemic Cohort	49765	43787	41706	35680	33969
% Missing	-	12.01	16.19	28.30	31.74

Table A2. Dropout analysis. Comparisons of responders/non-responders. Full-pandemic cohort

Variable	Pre-pandemic			Early-pandemic			Full-pandemic		
	Grade 6-9 missing	Grade 5-9 completed	Difference	Grade 6-9 missing	Grade 5-9 completed	Difference	Grade 6-9 missing	Grade 5-9 completed	Difference
Age	0.034 (1.036)	-0.027 (0.987)	0.061***	0.077 (1.082)	-0.029 (0.976)	0.106***	0.061 (1.079)	-0.014 (0.983)	0.075***
Female	0.490 (0.500)	0.482 (0.500)	0.008	0.492 (0.500)	0.483 (0.500)	0.010*	0.515 (0.500)	0.477 (0.500)	0.038***
Immigrant background	0.106 (0.308)	0.103 (0.304)	0.003	0.102 (0.302)	0.115 (0.319)	- 0.014***	0.093 (0.290)	0.128 (0.334)	- 0.035***
Parental education	-0.003 (1.015)	0.012 (0.994)	-0.015	-0.014 (1.014)	0.010 (1.000)	-0.024**	-0.013 (1.024)	0.009 (0.996)	-0.021*
GPA	-0.074 (1.023)	0.075 (0.975)	- 0.149***	-0.162 (1.049)	0.063 (0.978)	- 0.225***	-0.134 (1.040)	0.040 (0.988)	- 0.175***
Academic Self-efficacy, Grade 5	-0.001 (1.011)	0.085 (0.968)	- 0.086***	-0.037 (1.045)	0.130 (0.981)	- 0.167***	-0.052 (1.066)	0.137 (0.976)	- 0.190***
School Connectedness, Grade 5	-0.038 (1.026)	0.082 (0.967)	- 0.120***	-0.033 (1.044)	0.188 (0.953)	- 0.222***	-0.061 (1.077)	0.196 (0.954)	- 0.257***

Note: Means, with standard deviations in parentheses. All continuous variables are standardized.

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table A3 Correlations at baseline (grade 5)

	1. Academic Self- efficacy	2. School Connectedness	3. Age	4. Parental Education	5. GPA
1	1.000				
2	0.522***	1.000			
3	-0.033***	-0.018***	1.000		
4	0.175***	0.074***	-0.135***	1.000	
5	0.380***	0.152***	-0.170***	0.387***	1.000

* $p < 0.05$. ** $p < 0.01$. *** $p < 0.001$

Table A4 Trajectories – School connectedness

	Pre-pandemic Cohort			Early-pandemic Cohort			Full-pandemic Cohort		
School Connectedness	Mean	SD	N	Mean	SD	N	Mean	SD	N
Grade 5	0.054	0.989	49260	0.137	0.989	51742	0.038	1.020	49807
Grade 6	0.126	0.979	45221	0.105	0.975	45605	0.029	1.000	43815
Grade 7	0.040	0.964	41809	-0.023	0.990	41613	-0.087	0.997	41743
Grade 8	-0.020	0.967	37341	-0.022	0.969	39422	-0.187	1.007	35742
Grade 9	-0.033	1.040	19806	-0.085	1.034	31991	-0.259	1.031	34068

Table A5 Trajectories – Academic self-efficacy

	Pre-pandemic Cohort			Early-pandemic Cohort			Full-pandemic Cohort		
School Connectedness	Mean	SD	N	Mean	SD	N	Mean	SD	N
Grade 5	0.088	0.975	49258	0.080	1.009	51726	0.011	1.024	49778
Grade 6	0.127	0.976	45210	0.084	0.979	45584	0.012	0.987	43796
Grade 7	0.031	0.968	41788	-0.062	0.997	41572	-0.130	1.010	41714
Grade 8	-0.023	0.970	37282	-0.056	0.978	39382	-0.158	1.009	35688
Grade 9	0.013	1.031	19742	-0.005	1.028	31901	-0.112	1.035	33976

Table A6. Random effects regressions predicting growth in well-being measures – w. controls

	School Connectedness	School Connectedness, interactions	Academic Self- Efficacy	Academic Self- Efficacy, interactions
Grade level 6	-0.004 (0.004)	0.059*** (0.007)	0.003 (0.004)	0.032*** (0.006)
Grade level 7	-0.127*** (0.005)	-0.038*** (0.008)	-0.133*** (0.004)	-0.067*** (0.007)
Grade level 8	-0.202*** (0.005)	-0.122*** (0.009)	-0.180*** (0.005)	-0.147*** (0.008)
Grade level 9	-0.296*** (0.007)	-0.168*** (0.013)	-0.165*** (0.006)	-0.146*** (0.011)
Early pandemic	-0.042*** (0.009)	0.040*** (0.011)	-0.154*** (0.007)	-0.118*** (0.009)
Full pandemic	-0.098*** (0.009)	0.002 (0.011)	-0.086*** (0.007)	-0.035*** (0.010)
Grade level 6 # Early pandemic		-0.102*** (0.010)		-0.039*** (0.009)
Grade level 6 # Full pandemic		-0.084*** (0.009)		-0.048*** (0.008)
Grade level 7 # Early pandemic		-0.145*** (0.012)		-0.095*** (0.010)
Grade level 7 # Full pandemic		-0.121*** (0.011)		-0.101*** (0.009)
Grade level 8 # Early pandemic		-0.083*** (0.012)		-0.029** (0.010)
Grade level 8 # Full pandemic		-0.160*** (0.013)		-0.072*** (0.011)
Grade level 9 # Early pandemic		-0.137*** (0.016)		-0.014 (0.013)
Grade level 9 # Full pandemic		-0.215*** (0.016)		-0.048*** (0.013)
Parental education	0.002 (0.005)	0.002 (0.005)	0.048*** (0.005)	0.048*** (0.005)
Female	-0.303*** (0.005)	-0.303*** (0.005)	-0.256*** (0.005)	-0.256*** (0.005)
Age	-0.036*** (0.006)	-0.036*** (0.006)	0.034*** (0.005)	0.034*** (0.005)
First generation	-0.082*** (0.013)	-0.081*** (0.013)	0.201*** (0.013)	0.201*** (0.013)
Second generation	-0.008 (0.011)	-0.008 (0.011)	0.186*** (0.011)	0.186*** (0.011)
GPA	0.063*** (0.001)	0.063*** (0.001)	0.168*** (0.001)	0.168*** (0.001)

Constant	0.269*** (0.071)	0.207** (0.071)	-1.362*** (0.064)	-1.390*** (0.064)
Observations	608961	608961	608373	608373

Standard errors in parentheses. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table A7 Multinomial logistic regression of educational choice. Cohort variation in Association between well-being and choice (reference group = leaving school)

	Academic track		Vocational track	
	Academic self-efficacy	School connectedness	Academic self-efficacy	School connectedness
9th grade well-being	0.428*** (0.028)	0.307*** (0.025)	0.198*** (0.027)	0.224*** (0.024)
Early-pandemic cohort	-0.113** (0.036)	-0.044 (0.033)	0.023 (0.035)	0.034 (0.033)
# 9th grade well-being				
Early-pandemic cohort	-0.866*** (0.049)	-0.873*** (0.044)	-0.365*** (0.048)	-0.376*** (0.044)
GPA	0.770*** (0.013)	0.807*** (0.013)	0.181*** (0.013)	0.198*** (0.013)
Constant	-1.261*** (0.071)	-1.539*** (0.067)	1.263*** (0.066)	1.146*** (0.061)
Observations	93032	93033	93032	93033

Standard errors in parentheses. + $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. Includes pre-pandemic (reference) and early-pandemic cohort.

Table A8 Multinomial logistic regression of educational choice. Cohort variation in Association between well-being and choice (reference group = leaving school) - w/o GPA control

	Academic track		Vocational track	
	Academic self-efficacy	School connectedness	Academic self-efficacy	School connectedness
9th grade well-being	0.801*** (0.018)	0.405*** (0.016)	0.177*** (0.017)	0.204*** (0.017)
Early-pandemic cohort	-0.022 (0.024)	-0.025 (0.021)	0.028 (0.022)	0.039+ (0.023)
# 9th grade well-being				
Early-pandemic cohort	-0.184*** (0.029)	-0.191*** (0.028)	-0.141*** (0.033)	-0.142*** (0.031)
Constant	2.406*** (0.030)	2.313*** (0.029)	1.117*** (0.030)	1.090*** (0.028)
Observations	93032	93033	93032	93033

Standard errors in parentheses. + $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$ Includes pre-pandemic (reference) and early-pandemic cohort.

Table A9 Multinomial logistic regression of educational choice. Cohort variation in Association between well-being and choice (reference group = leaving school). W. full set of controls

	Academic track		Vocational track	
	Academic self-efficacy	School connectedness	Academic self-efficacy	School connectedness
9th grade well-being	0.416*** (0.030)	0.300*** (0.025)	0.146*** (0.029)	0.163*** (0.025)
Early-pandemic cohort # 9th grade well-being	-0.104** (0.037)	-0.031 (0.034)	0.015 (0.037)	0.026 (0.033)
Early-pandemic cohort	-0.908*** (0.050)	-0.914*** (0.045)	-0.415*** (0.049)	-0.419*** (0.045)
Parental education	0.314*** (0.043)	0.318*** (0.043)	-0.399*** (0.044)	-0.399*** (0.044)
Female	-0.074+ (0.041)	-0.072+ (0.041)	-0.936*** (0.040)	-0.902*** (0.040)
Age	-0.751*** (0.048)	-0.717*** (0.048)	-0.436*** (0.047)	-0.415*** (0.047)
First generation	1.119*** (0.119)	1.209*** (0.120)	0.365** (0.115)	0.409*** (0.115)
Second generation	1.468*** (0.077)	1.537*** (0.077)	0.048 (0.079)	0.070 (0.080)
GPA	0.769*** (0.013)	0.809*** (0.013)	0.219*** (0.013)	0.232*** (0.013)
Constant	7.290*** (0.586)	6.590*** (0.583)	6.655*** (0.572)	6.300*** (0.570)
Observations	93032	93033	93032	93033

Standard errors in parentheses. + $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$ Includes pre-pandemic (reference) and early-pandemic cohort.

Coefficients refer to the change in multinomial log-odds for choosing academic/vocational track over leaving school associated with a one unit change in the specific variable. Leaving the education system (i.e., not attending either the academic or vocational track after 2 years observation period) is the base category in all models. Models are run separately by well-being measure (academic self-efficacy and school connectedness).

Table A10. KHB decomposition of logistic regression model of choice of academic track (reference: vocational track/leaving school). Cohort variation in gap by college/non-college educated parents in choice of academic track explained by academic self-efficacy (9th grade level) and GPA (reference group = leaving school/vocational track)

	Academic self-efficacy		School connectedness	
	Pre-pandemic	Early-pandemic	Pre-pandemic	Early-pandemic
Reduced	1.566*** (0.031)	1.525*** (0.030)	1.550*** (0.031)	1.519*** (0.030)
Full	0.555*** (0.030)	0.475*** (0.028)	0.561*** (0.030)	0.476*** (0.028)
Diff	1.011*** (0.020)	1.050*** (0.021)	0.989*** (0.020)	1.043*** (0.020)
Observations	45225	47460	45225	47461

Standard errors in parentheses

+ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table A11 KHB decomposition of logistic regression model of choice of academic track (reference: vocational track/leaving school). Cohort variation in gap by college/non-college educated parents in choice of academic track explained by academic self-efficacy (9th grade level) and no GPA control (reference group = leaving school/vocational track)

	Academic self-efficacy		School connectedness	
	Pre-pandemic	Early-pandemic	Pre-pandemic	Early-pandemic
Reduced	1.319*** (0.026)	1.293*** (0.024)	1.247*** (0.026)	1.220*** (0.024)
Full	1.106*** (0.026)	1.085*** (0.024)	1.216*** (0.026)	1.194*** (0.024)
Diff	0.213*** (0.008)	0.209*** (0.007)	0.031*** (0.003)	0.026*** (0.002)
Observations	45225	47460	45225	47461

Standard errors in parentheses

+ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table A12 KHB corrected results from logistic regression model of choice of academic track explained by academic self-efficacy (reference group = leaving school/vocational track)

	Pre-pandemic	Early-pandemic
Parental education	0.555*** (0.030)	0.475*** (0.028)
9 th grade academic self-efficacy	0.251*** (0.015)	0.119*** (0.014)
GPA	0.573*** (0.007)	0.590*** (0.007)
Constant	-2.734*** (0.050)	-3.348*** (0.053)
Observations	45225	47460

Standard errors in parentheses

+ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table A13 KHB corrected results from logistic regression model of choice of academic track explained by academic self-efficacy (reference group = leaving school/vocational track) w/o. GPA control

	Pre-pandemic	Early-pandemic
Parental education	1.106*** (0.026)	1.085*** (0.024)
9 th grade academic self-efficacy	0.618*** (0.012)	0.581*** (0.012)
Constant	0.559*** (0.008)	0.458*** (0.018)
Observations	45225	47460

Standard errors in parentheses

+ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table A14 KHB corrected results from logistic regression model of choice of academic track explained by school connectedness (reference group = leaving school/vocational track)

	Pre-pandemic	Early-pandemic
Parental education	0.561*** (0.030)	0.476*** (0.028)
9 th grade school connectedness	0.107*** (0.013)	0.040** (0.013)
GPA	0.600*** (0.007)	0.607*** (0.007)
Constant	-2.945*** (0.049)	-3.487*** (0.050)
Observations	45225	47461

Standard errors in parentheses

⁺ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table A15 KHB corrected results from logistic regression model of choice of academic track explained by academic self-efficacy (reference group = leaving school/vocational track) w/o. GPA control

	Pre-pandemic	Early-pandemic
Parental education	1.216*** (0.026)	1.194*** (0.024)
9 th grade school connectedness	0.245*** (0.011)	0.197*** (0.010)
Constant	0.445*** (0.018)	0.333*** (0.018)
Observations	45225	47461

Standard errors in parentheses

⁺ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table A16 Difference-in-difference analysis of well-being measures

	School Connectedness	School Connectedness, student FE	Academic Self- Efficacy	Academic Self- Efficacy, student FE
Pandemic	0.084** (0.033)	0.125*** (0.032)	-0.506*** (0.027)	-0.470*** (0.026)
Grade level	-0.056*** (0.002)	-0.066*** (0.002)	-0.051*** (0.002)	-0.057*** (0.002)
Pandemic#Grade level	-0.022*** (0.004)	-0.025*** (0.004)	0.058*** (0.003)	0.056*** (0.003)
Constant	0.373*** (0.014)	0.467*** (0.012)	0.329*** (0.012)	0.388*** (0.010)
Observations	608985	608985	608397	608397

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table A17 Fixed effects regressions predicting growth in school connectedness and academic self-efficacy

	School Connectedness	Academic Self- Efficacy
Baseline Cohort Differences		
Early pandemic	-0.833*** (0.218)	-0.709 (0.365)
Full pandemic	-0.795 (0.481)	-0.729 (0.521)
Developmental Effects / Age-related Growth		
Grade level 6	0.048** (0.007)	0.026*** (0.006)
Grade level 7	-0.052*** (0.008)	-0.073*** (0.007)
Grade level 8	-0.140*** (0.009)	-0.152*** (0.007)
Grade level 9	-0.191*** (0.012)	-0.147*** (0.010)
Pre-pandemic Cohort Differences in Growth		
Grade level 6 # Early pandemic	-0.104*** (0.009)	-0.039*** (0.008)
Grade level 6 # Full pandemic	-0.081*** (0.009)	-0.043*** (0.008)
Grade level 7 # Early pandemic	-0.149*** (0.011)	-0.096*** (0.009)
Grade level 8 # Early pandemic	-0.087*** (0.012)	-0.029** (0.010)
During-pandemic Cohort Differences in Growth		
Grade level 7 # Full pandemic	-0.123*** (0.011)	-0.098*** (0.009)
Grade level 8 # Full pandemic	-0.155*** (0.012)	-0.069*** (0.010)
Grade level 9 # Early pandemic	-0.139*** (0.015)	-0.019 (0.013)
Grade level 9 # Full pandemic	-0.210*** (0.015)	-0.049*** (0.013)
Constant	0.674** (0.211)	0.578* (0.282)
Observations	608985	608397

Note. Estimates for the interaction terms represent the rate of change from the baseline until the current grade level, compared to those of the pre-pandemic cohort. Standard errors in parentheses. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$