

Online Appendix for Relative Obesity and the Formation of Non-cognitive Abilities During Adolescence

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September 7, 2020

1 Appendix for Online Publication

NLSY79 Child Behavior Problems Index: Composition of the BPI subscales

Cheats or tells lies	E
Bullies or is cruel/mean to others	E
Does not seem to feel sorry after misbehaving	**
Breaks things deliberately (<12 yrs)	E
Is disobedient at school (>5 yrs)	E
Has trouble getting along with teachers (>5 yrs)	E
Has sudden changes in mood or feeling	E
Feels/complains no one loves him/her	I
Is too fearful or anxious	E/I
Feels worthless or inferior	I
Is unhappy, sad, or depressed	E/I
Clings to adults (<12 yrs)	I
Cries too much (<12 yrs)	I
Demands a lot of attention (≥12 yrs)	I
Is too dependent on others (<12 yrs)	I
Is rather high strung, tense, and nervous	E
Argues too much	E
Is disobedient at home	E
Is stubborn, sullen, or irritable	E
Has strong temper and loses it easily	E
Has difficulty concentrating/paying attention	E
Is easily confused, seems in a fog	E/I
Is impulsive or acts without thinking	E
Has trouble getting mind off certain thoughts	E
Is restless, overly active, cannot sit still	E
Has trouble getting along with other children	E
Is not liked by other children	E
Is withdrawn, does not get involved with others	I
Feels others are out to get him/her	**
Hangs around with kids who get into trouble	**
Is secretive, keeps things to self	**
Worries too much	**

Note: E=Externalizing and I=Internalizing. ** Does not load on the E-I dimensions. This can also be found on the following url: <https://www.nlsinfo.org/content/cohorts/nlsy79-children/other-documentation/codebook-supplement/appendix-d-behavior-proble-0>

Table A1: Individual and Household Characteristics by Relative Weight Change from Moving among Overweight Children

	Gain Relative Weight	Lose Relative Weight	P-values for T-tests
Body Size Measures			
BMI Z score (gender-age) _{t-1}	1.91 (.93)	1.63 (.47)	0.01
BMI percentile (MSA-gender-race) (0..100) _{t-1}	80.38 (17.74)	82.13 (12.24)	0.41
Overweight _{t-1}	1 (0)	1 (0)	.
Individual Characteristics			
Behavioral Problem Index (BPI) Percentile _{t-1}	63.28 (29.85)	58.3 (29.27)	0.12
Self Worth Index percentile _{t-1}	39.21 (26.9)	32.4 (37.18)	0.98
Black dummy	.25 (.43)	.17 (.38)	0.40
Hispanic dummy	.35 (.48)	.15 (.36)	0.75
Female dummy	.52 (.5)	.45 (.5)	0.65
Age _{t-1}	7.49 (3.06)	6.87 (2.7)	0.17
Mother's and Household Characteristics			
Mother's age at birth of child	25.43 (4.94)	25.87 (5.26)	0.99
Mother's highest grade completed	12.61 (2.74)	13.37 (2.23)	0.20
Household income/1000 (2006 dollars) _{t-1}	.07 (.07)	.06 (.05)	0.05
Household income/1000 (2006 dollars) _t	.06 (.06)	.07 (.13)	0.74
Mother is married _t	.68 (.47)	.63 (.49)	0.14
Mother is married _{t-1}	.66 (.47)	.67 (.47)	0.81
Home Investment Score _t	50.28 (27.34)	52.74 (26.76)	0.39
Home Investment Score _{t-1}	49.25 (27.42)	52.23 (27.15)	0.73
Observations	110	129	

Note: Data is from NLSY-CYA (1986-2012) sample of children between ages 5 and 16 who are in a reference group (MSA / race / gender) with more than 15 unique respondents who moved MSAs between two consecutive survey waves. Unweighted means and standard deviations are presented. Standard deviations in parentheses. Column 1 restricts sample to children who gain relative weight as a result of moving. Column 2 restricts to children who lose relative weight as a result of moving. Column 3 presents p-values from t-tests for equality between Column 1 and Column 2.

Table A2: Determinants of BPI

	(1)	(2)
Overweight=1 _t	0.0232 (1.310)	
Overweight=0 _t *BMI percentile _t	0.0319 (0.0235)	
Overweight=1 _t *BMI percentile _t	0.0933** (0.0420)	
BMI Z-score _t	-0.431 (0.406)	
Mother's age at birth of child	-0.769*** (0.0686)	-0.0233 (0.333)
Maternal years of education	-1.009*** (0.160)	0.449 (0.577)
Maternal marital status	-6.714*** (0.698)	-5.850** (2.288)
Overweight=0 _{t-1}		3.529 (2.732)
Overweight=0 _{t-1} *Δ BMI percentile _{t-1, t}		0.0367 (0.0428)
Overweight=1 _{t-1} *Δ BMI percentile _{t-1, t}		0.206** (0.0766)
Black=1		-7.745 (4.748)
Hispanic=1		-4.965* (2.934)
Female=1		-2.162 (1.928)
BPI _{t-1}		0.593*** (0.0439)
N	25652	735

Column 1 present the regression results for Column 3 of Table ?? . Column 2 presents the regression results for Column 1 of Table 4. Column 1 includes reference group fixed effects. Column 2 includes origin-destination state pair fixed effects

Table A3: Falsification Check

	(1)
Δ BMI percentile _{t-1, t}	-0.0231 (0.0660)
N	364

Dependent variable is the change in BPI between period $t - 1$ and period $t - 2$. The regression restricts to those who move MSAs between period t and period $t - 1$. The equation is specified as below:

$$\Delta \text{BPI percentile}_{t-2,t-1} = \alpha + \beta_1 \Delta \text{BMI percentile}_{t-1,t} + \beta_2 I\{\text{Overweight}\}_{t-1} + \beta_3 \text{BMI Z-score}_{t-1} + \gamma X_{i,t} + \varepsilon_{i,t}$$

$X_{i,t}$ includes race, gender, age, mother's age at first birth, mother's highest grade completed, mother's marital status, and a set of dummies for the origin and destination state pair of the moves. The regression also includes lagged overweight status, lagged absolute BMI Z-score.

Table A4: Heterogeneous Impact of Moving by Race

	BPI _t (1)	Internalizing _t (2)	Externalizing _t (3)
non black*Overweight = $0_{t-1} * \Delta$ BMI percentile _{t-1, t} θ_1	0.0367 (0.0416)	0.0908** (0.0442)	0.0468 (0.0406)
non black*Overweight = $1_{t-1} * \Delta$ BMI percentile _{t-1, t} θ_2	0.227** (0.0881)	0.0335 (0.0979)	0.174** (0.0828)
black*Overweight = $0_{t-1} * \Delta$ BMI percentile _{t-1, t} θ_3	0.0379 (0.128)	-0.0163 (0.114)	0.0675 (0.127)
black*Overweight = $1_{t-1} * \Delta$ BMI percentile _{t-1, t} θ_4	0.108 (0.108)	0.00233 (0.134)	0.0774 (0.145)
P-value for $\theta_1 = \theta_3$.345	.837	.58
P-value for $\theta_2 = \theta_4$.993	.356	.869
N	735	786	750

Table A5: Table for Gain vs Lose Relative Weight

Overweight= 1_{t-1}	6.548 (5.652)
$ \Delta\text{BMI percentile} $	0.0860 (0.0859)
$I(\Delta\text{ BMI percentile} < 0) = 1 \times \text{Overweight} = 1_{t-1}$	-5.959 (7.099)
$I(\Delta\text{ BMI percentile} < 0) = 1 \times \Delta\text{BMI percentile} $	-0.272** (0.134)
$\text{Overweight} = 1_{t-1} \times \Delta\text{BMI percentile} $	-0.107 (0.256)
$I(\Delta\text{ BMI percentile} < 0) = 1 \times \text{Overweight} = 1_{t-1} \times \Delta\text{BMI percentile} $	0.0760 (0.308)
BPI_{t-1}	0.559*** (0.0462)
BMI Z-score_{t-1}	0.333 (1.051)
Black	-5.874 (4.086)
Hispanic	1.882 (3.256)
Female	-1.652 (2.007)
Age	-1.128** (0.441)
Maternal age at the birth of the child	-0.412 (0.342)
Maternal highest grade completed	-0.797 (0.708)
Mother's marital status	-5.463* (2.889)
N	735

All regressions restrict to those moved across MSAs between waves and include controls for destination and origin state pair fixed effects as well as controls for a child's previous-period outcome variable, race, gender, age, mother's age at first birth, BMI Z-score, and mother's highest grade completed. It is as specified in Equation ??.

Table A6: Absolute Weight Change as a Result of Moving

	All (1)	Movers Only (2)
Move $MSA_{t-1, t}$	-0.0135 (0.0508)	
Obesity Rate of New Ref Group-Obesity Rate of Prev Ref Group		1.063*** (0.312)
N	25086	760

Column 1 includes all observations. Column 2 restricts to movers only. Controls include age, gender, and race. Obesity rate is calculated for each MSA/gender/race reference group. Difference in obesity rate equals to obesity rate from destination MSA/race/gender minus obesity rate from origin MSA/race/gender. Dependent variable is the changes in absolute weight between period t and period $t - 1$.

Table A7: mechanism

	Original Specification (1)	Destination and Origin MSA FE (2)	Diff in MSA Char (3)	Income and Rel. Income (4)	Omit Outliers (5)
Change in BMI Z Scores	0.485 (0.965)	0.492 (1.211)	0.563 (0.945)	0.416 (1.376)	1.134 (1.064)
Overweight= $0_{t-1} * \Delta$ BMI percentile $_{t-1, t}$	0.0219 (0.0553)	0.0564 (0.0558)	0.0287 (0.0526)	0.0465 (0.0705)	0.0365 (0.0778)
Overweight= $1_{t-1} * \Delta$ BMI percentile $_{t-1, t}$	0.193** (0.0801)	0.172** (0.0782)	0.189** (0.0882)	0.229** (0.0999)	0.287** (0.137)
N	735	735	729	500	660

Notes: same specifications as Table 4 except we include a variable which capture changes in absolute weight. *: significant at 10% level. **: significant at 5% level. ***: significant at 1% level.

Table A8: The Relationship between Adolescent Noncognitive Abilities and Education Outcome

Dependent Variable:	Highest Grade Completed (1)	Log Hourly Wage (2)	Adult Self-Esteem (3)
BPI Age 4-7	-0.0012 (.0015)	-.00017 (.00027)	.0094 (.033)
BPI Age 8-11	-.0025 (.0018)	-.00048 (.00031)	-.034 (.038)
BPI Age 12-15	-.013*** (.0014)	-.00059** (.00026)	-.12*** (.033)
Mean(dep. var.)	11.57	6.72	50.02
N	18320	7493	3447