

Risk preferences of children and adolescents in relation to gender, cognitive skills, soft skills, and executive functions

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Appendix I: Risk Elicitation Tasks

Child Risk Experiment Script

There are 5 pencils in this jar. 1 pencil has a red mark on the bottom. The rest do not have a red mark. You can't see the red mark on the pencil until you take it out of the jar.

You will decide how many pencils to take from the jar. You get to keep ALL the pencils you take, IF there is no red mark on the pencil. But if there is a red mark on ANY pencil that you take, you have to give all the pencils back and stop taking pencils.

1. How many pencils in this jar have a red mark on it?

Yes/No, 1 pencil has a red mark, the others do not have a red mark.

2. If any pencil you take has a red mark on it, do you give it back to me or do you keep it?

Yes/No, you give me back ALL the pencils you took.

3. If none of the pencils you take has a red mark on it, do you give the pencils back to me or do you keep the pencils?

Yes/No, you get to keep all the pencils you took.

How many pencils do you want to take?

Adolescent Risk Experiment Script

Circle how many pencils you would like to have drawn from the cup. Remember, 1 pencil has a red mark on the bottom. 9 pencils do not have a mark. You won't be able to see the mark on the pencil until the helper takes it out of the cup.

- Picture of 10 pencils for circling here. -

Appendix II: Index Components

Description of Children Assessments

The Peabody Picture Vocabulary Test III (Receptive Vocabulary, 5-10 minutes). An untimed test of verbal ability and receptive vocabulary, the Peabody Picture Vocabulary Test III (PPVT-III) is a norm-referenced standardized assessment that can be used with subjects ages 2-90+. While the test is said to take 10-15 minutes for adult subjects, early childhood experts estimate that the test takes 5-10 minutes to complete for that population.

	Children	Adolescents
Cognitive	Peabody Picture Vocabulary, Woodcock Johnson Applied Problems, Quantitative Concepts, Letter-Word Identification, Spelling	MAP math, MAP reading
Executive Functions	Operation Span Task, Preschool Self-Regulation Assessment, Spatial Conflict Task, Same Game	NIH Toolbox Dimensional Change Card Sort Test, Flanker Inhibitory Control and Attention Test, List Sorting Working Memory Test, Picture Sequence Memory Test
Soft Skills		Grit, Self-Control, Big Five Openness and Conscientiousness

The PPVT-III is available in both English and Spanish. The PPVT includes an A and B form, and A and B were alternated in each testing period to reduce potential for learning.

Woodcock Johnson III Tests of Achievement (Cognitive achievement, 5-10 minutes per test). This norm-referenced assessment allows researchers to track subjects from ages 2 to 85+ and contain most of the key outcomes highlighted by the experts with whom we have spoken. Of the 22 tests that compose the WJ-III ACH, there are four specific tests that are applicable for a preschool population that we used. The WJ includes an A and B form, and A and B were alternated in each testing period to reduce potential for learning. All WJ-III ACH tests are available in both English and Spanish.

Letter Word Identification: Measures the subject's ability to identify letters and words.

Spelling: Measures the subject's ability to write orally presented words correctly.

Applied Problems: Measures the subject's ability to analyze and solve math problems.

Quantitative Concepts: Measures the subject's knowledge of mathematical concepts, symbols, and vocabulary.

Non-cognitive assessments (attention shifting, working memory, inhibitory

control, 15 minutes) are used to understand levels of executive function among young children. In the first task, which tests attention, children are asked to identify the direction arrows are pointing over a series of different examples. In the second task, which tests working memory, children are asked to remember the colors and animals pictured on the previous page over a series of different examples. In the third task, which tests attention shifting, children are asked to identify which aspects of 2-3 objects are similar based on color, shape or size. These tests were developed by Professor Clancy Blair at NYU (see Blair and Willoughby, 2006a, b, c).

Preschool Self Regulation Assessment - Assessor Report (Self Regulation, 10 minutes) is designed to assess self-regulation in emotional, attentional, and behavioral domains. The Assessor report is a global report of children's behavior during a series of tasks. In our assessment, the assessor reports on subject behavior during the assessment battery.

Description of Adolescent Assessments

NIH Toolbox Dimensional Change Card Sort Test (DCCS) is a measure of cognitive flexibility. Two target pictures are presented that vary along two dimensions (e.g., shape and color). Participants are asked to match a series of bivalent test pictures (e.g., yellow balls and blue trucks) to the target pictures, first according to one dimension (e.g., color) and then, after a number of trials, according to the other dimension (e.g., shape). Switch trials are also employed, in which the participant must change the dimension being matched. For example, after four straight trials matching on shape, the participant may be asked to match on color on the next trial and then go back to shape, thus requiring the cognitive flexibility to quickly choose the correct stimulus. This test takes approximately four minutes to administer and is recommended for ages 3-85.

NIH Toolbox Flanker Inhibitory Control and Attention Test (Flanker) measures both a participant's attention and inhibitory control. The test requires the participant to focus on a given stimulus while inhibiting attention to stimuli (fish for ages 3-7 or arrows for ages 8-85) flanking it. Sometimes the middle stimulus is pointing in the same direction as the flankers (congruent) and sometimes in the opposite direction (incongruent). Twenty trials are conducted for ages 8-85; for ages 3-7, if a participant scores = 90% on the fish stimuli, 20 additional trials with arrows are presented. The test takes approximately three minutes to administer. This test is recommended for ages 3-85.

NIH Toolbox List Sorting Working Memory Test (List Sorting) requires immediate recall and sequencing of different visually and orally presented stimuli. Pictures of different foods and animals are displayed with accompanying audio recording and written text (e.g., elephant), and the participant is asked to say the items back in size order from smallest to largest, first within a single dimension (either animals or foods, called 1-List) and then on two dimensions (foods, then animals, called 2-List). The test takes approximately seven minutes to administer and is recommended for ages 7-85, though it is available for use as young as age 3, if desired.

NIH Toolbox Picture Sequence Memory Test (PSMT) is a measure developed for the assessment of episodic memory for ages 3-85 years. It involves recalling increasingly lengthy series of illustrated objects and activities that are presented in a particular order on the computer screen, with corresponding audio-recorded phrases played. The participants are asked to recall the sequence of pictures demonstrated over two learning trials; sequence length varies from 6-18 pictures, depending on age. Participants are given credit for each adjacent pair of pictures they correctly place (i.e., if pictures in locations 7 and 8 are placed in that order and adjacent to each other anywhere, such as slots 1 and 2, one point is awarded), up to the maximum value for the sequence, which is one less than the sequence length. (That is, if 18 pictures are in the sequence, the maximum score is 17 the number of adjacent pairs of pictures that exist). The test takes approximately seven minutes to administer. This test is recommended for ages 3-85.

Grit, Self-Control, Openness (big five), and Conscientiousness (big five) were measured using a self-report survey. Grit is a measure of trait-level perseverance and passion for long-term goals (Duckworth and Quinn 2009). Impulsivity (reverse to generate self control) is a measure of the tendency to act on a whim without reflection or consideration of consequences (Tsukayama et al., 2013). Openness is a measure of open-mindedness of a subject, and conscientiousness is a measure of care and vigilance (John et al., 1991, John et al., 2008).

Appendix III: Additional Tables

Table A1: Children (Restricting to Children who Chose 1-4 Pencils)

	1	2	3
Female	-0.04 (0.14)	-0.01 (0.13)	-0.01 (0.14)
Cognitive Index			0.23** (0.09)
Executive Functioning Index			0.03 (0.09)
Constant	2.25*** (0.22)	1.17** (0.46)	2.32*** (0.62)
Demo & SES		✓	✓
Observations	213	213	161
R^2	0.00	0.15	0.20
Adjusted R^2	-0.01	0.10	0.11

This table is similar to Table 4 in the paper, but shows coefficients from OLS regressions where the dependent variable is the number of pencils taken, restricting the observations only to children who chose between 1 and 4 pencils. Standard errors are in parentheses. * $p < .1$, ** $p < .05$, *** $p < .01$

Table A2: Adolescents (Restricting to Adolescents who Chose 1-9 Pencils)

	1	2	3
Female	-0.78*** (0.11)	-0.75*** (0.12)	-0.80*** (0.12)
Cognitive Index			0.25*** (0.08)
Executive Functioning Index			0.24** (0.11)
Self Control, Grit and Personality			-0.25** (0.10)
Constant	5.70*** (0.09)	7.30*** (0.86)	7.36*** (0.86)
Demo & SES		✓	✓
Observations	1288	1288	1288
R^2	0.04	0.06	0.07
Adjusted R^2	0.04	0.04	0.06

This table is like Table 5 in the paper and shows coefficients from OLS regressions where the dependent variable is the number of pencils taken, but restricting to adolescents who chose 1-9 pencils. Standard errors are in parentheses (clustered at the quarter-school-class level). * $p < .1$, ** $p < .05$, *** $p < .01$

Table A3: Children (Using Factor Analysis Variables)

	raw comp.	stand. comp.
Female	-0.10 (0.16)	-0.11 (0.15)
Cognitive skills (Factor 1)	0.30*** (0.11)	
Executive Functions (Factor 2)	-0.21* (0.11)	
Cognitive Skills (Factor 1)		0.29*** (0.10)
Executive Functions (Factor 2)		-0.33** (0.15)
Constant	3.34*** (0.61)	3.33*** (0.60)
Demo & SES	✓	✓
Observations	231	231
R^2	0.14	0.15
Adjusted R^2	0.08	0.09

This table shows coefficients from OLS regressions where the dependent variable is the number of pencils taken. Standard errors are in parentheses (clustered at the family level).

* $p < .1$, ** $p < .05$, *** $p < .01$

Table A4: Adolescents (Using Factor Analysis Variables)

	raw comp.	stand. comp.
Female	-0.80*** (0.12)	-0.80*** (0.12)
Cognitive Skills (Factor 1)	0.16** (0.08)	
Executive functions (Factor 2)	-0.17*** (0.06)	
Cognitive skills (Factor 1)		0.17** (0.09)
Executive Functions (Factor 2)		-0.16** (0.06)
Constant	7.42*** (0.92)	7.43*** (0.92)
Demo & SES	✓	✓
Observations	1295	1295
R^2	0.06	0.06
Adjusted R^2	0.05	0.05

This table shows coefficients from OLS regressions where the dependent variable is the number of pencils taken. Standard errors are in parentheses (clustered at the quarter-school-class level). * $p < .1$, ** $p < .05$, *** $p < .01$

Table A5: Adolescents, Bootstrap

	1	2	3
Female	-0.80*** (0.28)	-0.77*** (0.29)	-0.81*** (0.30)
Cognitive Index			0.25 (0.20)
Executive Functioning Index			0.21 (0.30)
Self Control, Grit and Personality			-0.23 (0.26)
Constant	5.71*** (0.19)	7.35*** (1.40)	7.42*** (1.58)
Demo & SES		✓	✓
Observations	1295	1295	1295
R^2	0.04	0.06	0.08
Adjusted R^2	0.04	0.04	0.06

We use the vce (bootstrap) command in order to replicate the regressions and to get the bootstrap simulations of the standard errors. In the vce (bootstrap) option we specify the number of repetitions we want to run (1000) and the size of the subsample (230). This table shows coefficients from bootstrap regressions where the dependent variable is the number of pencils taken. Standard errors are in parentheses (clustered at the quarter-school-class level). * $p < .1$, ** $p < .05$, *** $p < .01$

Table A6: Adolescents, Rescaled (ceiling)

	1	2	3
Female	-0.38*** (0.06)	-0.37*** (0.06)	-0.39*** (0.06)
Cognitive Index			0.12*** (0.04)
Executive Functioning Index			0.10 (0.06)
Self Control, Grit and Personality			-0.13** (0.05)
Constant	3.07*** (0.05)	3.87*** (0.56)	3.93*** (0.56)
Demo & SES		✓	✓
Observations	1295	1295	1295
R^2	0.03	0.05	0.06
Adjusted R^2	0.03	0.03	0.04

This table shows coefficients from OLS regressions where the dependent variable is the number of pencils taken, rescaled to ceiling of half numbers of pencils taken. Standard errors are in parentheses (clustered at the quarter-school-class level).

* $p < .1$, ** $p < .05$, *** $p < .01$

Table A7: Adolescents, Rescaled (floor)

	1	2	3
Female	-0.42*** (0.06)	-0.40*** (0.06)	-0.42*** (0.06)
Cognitive Index			0.13*** (0.04)
Executive Functioning Index			0.11* (0.06)
Self Control, Grit and Personality			-0.10* (0.05)
Constant	2.64*** (0.05)	3.48*** (0.34)	3.50*** (0.35)
Demo & SES		✓	✓
Observations	1295	1295	1295
R^2	0.04	0.06	0.08
Adjusted R^2	0.04	0.05	0.07

This table shows coefficients from OLS regressions where the dependent variable is the number of pencils taken, rescaled to the floor of half number of pencils taken. Standard errors are in parentheses (clustered at the quarter-school-class level).

* $p < .1$, ** $p < .05$, *** $p < .01$

Table A8: Adolescents (rescaled ceiling), Bootstrap

	1	2	3
Female	-0.38*** (0.15)	-0.37** (0.15)	-0.39** (0.16)
Cognitive Index			0.12 (0.11)
Executive Functioning Index			0.10 (0.15)
Self Control, Grit and Personality			-0.13 (0.14)
Constant	3.07*** (0.10)	3.87*** (0.89)	3.93*** (0.97)
Demo & SES		✓	✓
Observations	1295	1295	1295
R^2	0.03	0.05	0.06
Adjusted R^2	0.03	0.03	0.04

The dependent variable is the number of pencils taken, rescaled to the ceiling of half number of pencils taken so the range of outcomes is from 0-5. We use the vce (bootstrap) command in order to replicate the regressions and to get the bootstrap simulations of the standard errors. In the vce (bootstrap) option we specify the number of repetitions we want to run (1000) and the size of the subsample (230). This table shows coefficients from bootstrap regressions where the dependent variable is the number of pencils taken. Standard errors are in parentheses (clustered at the quarter-school-class level). * $p < .1$, ** $p < .05$, *** $p < .01$

Table A9: Adolescents (rescaled floor), Bootstrap

	1	2	3
Female	-0.42*** (0.14)	-0.40*** (0.15)	-0.42*** (0.15)
Cognitive Index			0.13 (0.10)
Executive Functioning Index			0.11 (0.15)
Self Control, Grit and Personality			-0.10 (0.13)
Constant	2.64*** (0.10)	3.48*** (0.63)	3.50*** (0.72)
Demo & SES		✓	✓
Observations	1295	1295	1295
R^2	0.04	0.06	0.08
Adjusted R^2	0.04	0.05	0.07

The dependent variable is the number of pencils taken, rescaled to the floor of half number of pencils taken so the range of outcomes is from 0-5. We use the vce (bootstrap) command in order to replicate the regressions and to get the bootstrap simulations of the standard errors. In the vce (bootstrap) option we specify the number of repetitions we want to run (1000) and the size of the subsample (230). This table shows coefficients from bootstrap regressions where the dependent variable is the number of pencils taken. Standard errors are in parentheses (clustered at the quarter-school-class level). * $p < .1$, ** $p < .05$, *** $p < .01$