

Self-Control, IQ, and Academic Achievement in Adolescence

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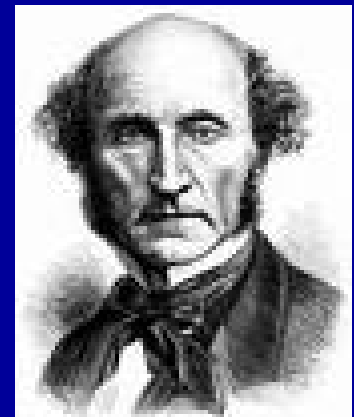
Overview

- Definition And Measurement Of Self-Control
- *Study 1: Self-Control Outdoes IQ among College-Bound Adolescents*
- *Study 2: Self-Control Gives Girls The Edge*
- *Study 3: Replication Study in Low-Performing School*
- *Study 4: National Sample of Youth Aged 14 To 22*
- Implications And Future Directions

Self-Control: The control of impulses, emotions, attention, or behavior in the service of a valued goal (Baumeister)

“...many who are capable of the higher pleasures, occasionally, under the influence of temptation, postpone them to the lower. But this is quite compatible with a full appreciation of the intrinsic superiority of the higher. Men often, from infirmity of character, make their election for the nearer good, though they know it to be the less valuable...”

--John Stuart Mill, *Utilitarianism*



Mischel's Marshmallow Test

- Four-year old preschoolers
- One marshmallow now vs. two later
- Wait time in seconds predicts SAT scores more than 10 years later, as well as a range of social-cognitive, personal and other competencies.
($r = .42$ with verbal SAT and $r = .57$ with math SAT)



Measuring self-control

- Reported correlations among measures are moderate and often inconsistent in magnitude
- Self-control measures tap multiple constructs whose reliable variance has both specific and general elements
- This suggests a multimethod, multisource approach to measurement

Study 1: Self-Discipline Outdoes IQ

A prospective longitudinal study of college-bound adolescents

- Eighth graders ($N = 164$) at urban school
- Self-control and IQ measured in the fall
- Academic performance measured in the spring
 - GPA
 - Achievement test scores
 - Attendance
 - Studying and lifestyle habits

Questionnaires

- Brief Self-Control Scale (Tangney, Baumeister, & Boone, 2004)
 - Example item: “Pleasure and fun sometimes keep me from getting work done.”
 - Completed by students, parents, homeroom teachers
- Eysenck Impulsiveness Scale
 - Example item: “Do you save regularly?”
 - Completed by students

Monetary Choice Questionnaire

1. Would you prefer \$54 today, or \$55 in 117 days?
2. Would you prefer \$55 today, or \$75 in 61 days?
3. Would you prefer \$19 today, or \$25 in 53 days?
4. Would you prefer \$31 today, or \$85 in 7 days?
5. Would you prefer \$14 today, or \$25 in 19 days?
6. Would you prefer \$47 today, or \$50 in 160 days?
7. Would you prefer \$15 today, or \$35 in 13 days?
8. Would you prefer \$25 today, or \$60 in 14 days?
9. Would you prefer \$78 today, or \$80 in 162 days?

$$V = \frac{A}{1 + kD}$$

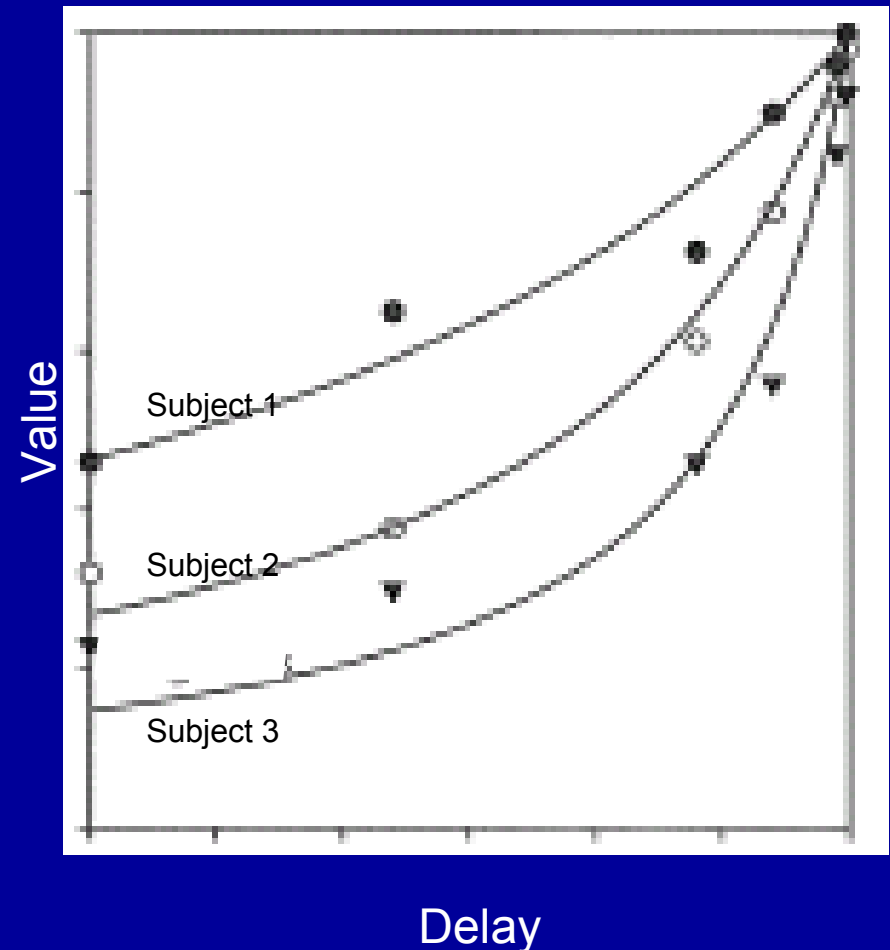



Figure adapted from Green, Frey, and Myerson, 1994

Choice Delay Task

- Participants are given a \$1
- The choice is posed: \$1 now or \$2 in a week
- About 20% of participants choose \$1 now



Intercorrelations among self-control measures averaged .32

Correlations

		GPA, school year 2003/2004	Delay Choice (a3)	Brief Self-Control Scale Teacher Rating (a3)	Brief Self-Control Scale Parent Rating (a3)	Brief Self-Control Scale Self-Report (a3)	Eysenck Junior Impulsivity (a3)	KDD mean (natural log) (a3)
GPA, school year 2003/2004	Pearson Correlation	1	.340**	.559**	.465**	.339**	-.407**	-.456**
	Sig. (2-tailed)		.000	.000	.000	.000	.000	.000
	N	162	154	158	151	155	155	142
Delay Choice (a3)	Pearson Correlation	.340**	1	.237**	.102	.061	-.073	-.232**
	Sig. (2-tailed)	.000		.003	.220	.456	.372	.006
	N	154	156	152	145	150	150	137
Brief Self-Control Scale Teacher Rating (a3)	Pearson Correlation	.559**	.237**	1	.365**	.445**	-.326**	-.320**
	Sig. (2-tailed)	.000	.003		.000	.000	.000	.000
	N	158	152	160	149	153	153	139
Brief Self-Control Scale Parent Rating (a3)	Pearson Correlation	.465**	.102	.365**	1	.519**	-.444**	-.308**
	Sig. (2-tailed)	.000	.220	.000		.000	.000	.000
	N	151	145	149	153	147	147	133
Brief Self-Control Scale Self-Report (a3)	Pearson Correlation	.339**	.061	.445**	.519**	1	-.728**	-.288**
	Sig. (2-tailed)	.000	.456	.000	.000		.000	.000
	N	155	150	153	147	157	157	143
Eysenck Junior Impulsivity (a3)	Pearson Correlation	-.407**	-.073	-.326**	-.444**	-.728**	1	.394**
	Sig. (2-tailed)	.000	.372	.000	.000	.000		.000
	N	155	150	153	147	157	157	143
KDD mean (natural log) (a3)	Pearson Correlation	-.456**	-.232**	-.320**	-.308**	-.288**	.394**	1
	Sig. (2-tailed)	.000	.006	.000	.000	.000	.000	
	N	142	137	139	133	143	143	143

** . Correlation is significant at the 0.01 level (2-tailed).

A composite self-control score predicted academic performance better than did IQ

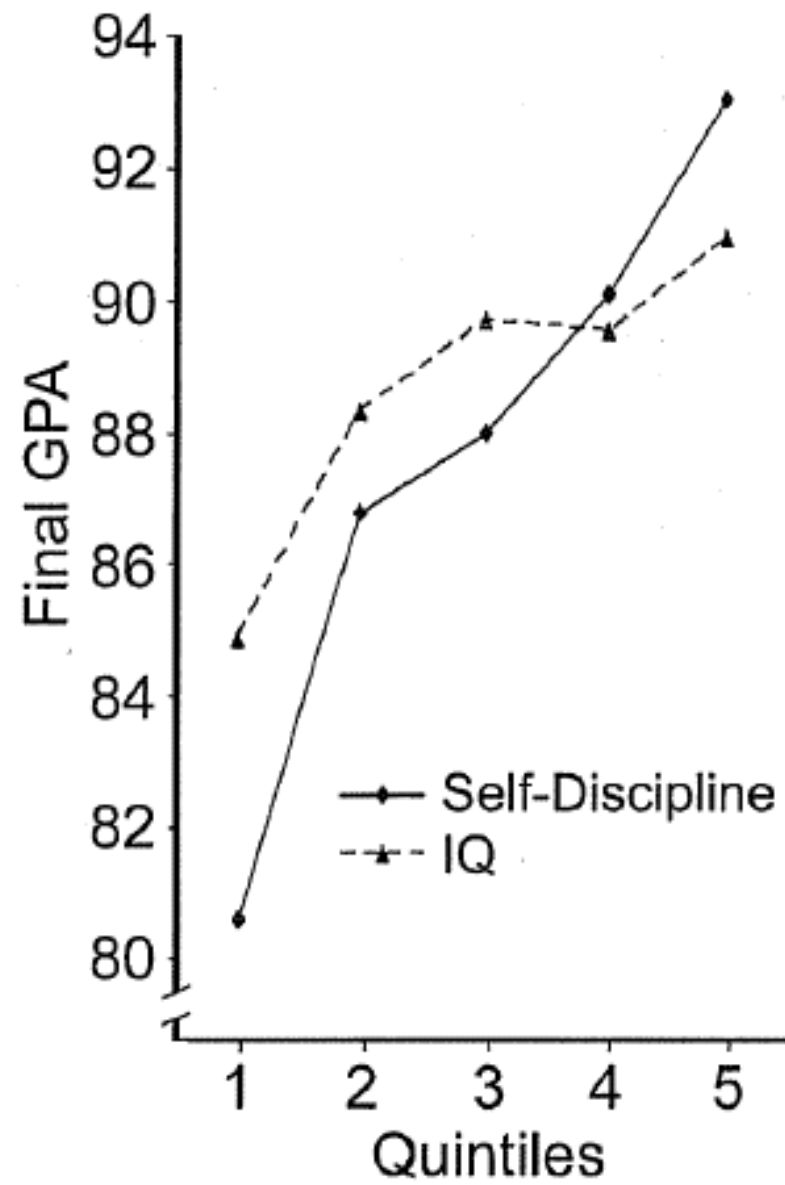
TABLE 2

Intercorrelations Between Academic-Performance Indicators and Composite Self-Discipline Score and IQ

Academic-performance variable	Study 1 (<i>N</i> = 140)	Study 2 (<i>N</i> = 164)		Two-tailed <i>p</i> of difference between the IQ and self-discipline correlations
	Self-discipline	Self-discipline	IQ	
First-marking-period GPA	.52***	.66***	.34***	<.001
Final GPA	.55***	.67***	.32***	<.001
Spring achievement test	.29**	.43***	.36***	n.s.
Selection to high school	.42***	.56***	.26**	<.001
School absences	-.17*	-.26**	-.07	.06
Homework hours	—	.35***	-.09	<.001
Television hours	—	-.33***	-.06	.01
Time of day homework is begun	—	-.26**	.18*	<.001

Note. GPA = grade point average.

p* < .05. *p* < .01. ****p* < .001.



Self-control was still a significant predictor holding first-marking period GPA and IQ constant

TABLE 3

Summary of Simultaneous Multiple Regression for Variables Predicting Final Grade Point Average (GPA) in Study 1 (N = 137) and in Study 2 (N = 154)

Variable	<i>B</i>	<i>SE B</i>	β
Study 1			
First-marking-period GPA	0.96	0.04	.87***
Self-discipline	0.95	0.39	.10*
Study 2			
IQ	0.01	0.01	.01
First-marking-period GPA	0.84	0.04	.89***
Self-discipline	0.76	0.33	.08*

* $p < .05$. *** $p < .001$.

Study 1 findings

- Self-control accounted for more variance in academic outcomes than did IQ
- More importantly, because self-control was not strongly related to IQ ($r = .13$, *ns*), self-control provided incremental predictive validity over and beyond IQ
- Multi-method, multi-source measurement may increase predictive validity of personality measures



Study 2: Self-Discipline Gives Girls the Edge

Underprediction

- Girls earn higher grades than boys in all subjects at all grade levels
- Girls do not consistently outperform boys on standardized tests of achievement or aptitude
- Hence, standardized tests tend to *underpredict* grades earned by girls and to *overpredict* grades earned by boys

Girls in our study earned significantly higher grades but not achievement test or IQ scores

Table 8

Summary Statistics for Academic Performance and IQ Variables in Study 2

Measure	Girls		Boys		<i>d</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	
Algebra II final grade (<i>n</i> = 31)	3.53	0.82	2.98	0.83	.80*
Algebra I final grade (<i>n</i> = 133)	3.25	0.78	2.98	0.83	.25
English final grade	3.52	0.65	3.04	0.68	.69***
Social studies final grade	3.64	0.49	3.41	0.47	.53**
Overall GPA	3.47	0.63	3.13	0.57	.54***
TerraNova Second Edition Achievement Test normal curve equivalent score	77.89	9.72	76.37	10.81	.15
Otis-Lennon School Ability Test—Seventh Edition	106.94	9.95	111.21	9.43	.48**

Note. *n* = 164, unless otherwise indicated. Effect size and statistical significance of independent-sample *t* tests were conducted with normal curve equivalent, not school ability index, scores.

* $p < .05$. ** $p < .01$. *** $p < .001$.

Girls were more self-controlled

Table 10
Summary Statistics for Self-Discipline Measures in Study 2

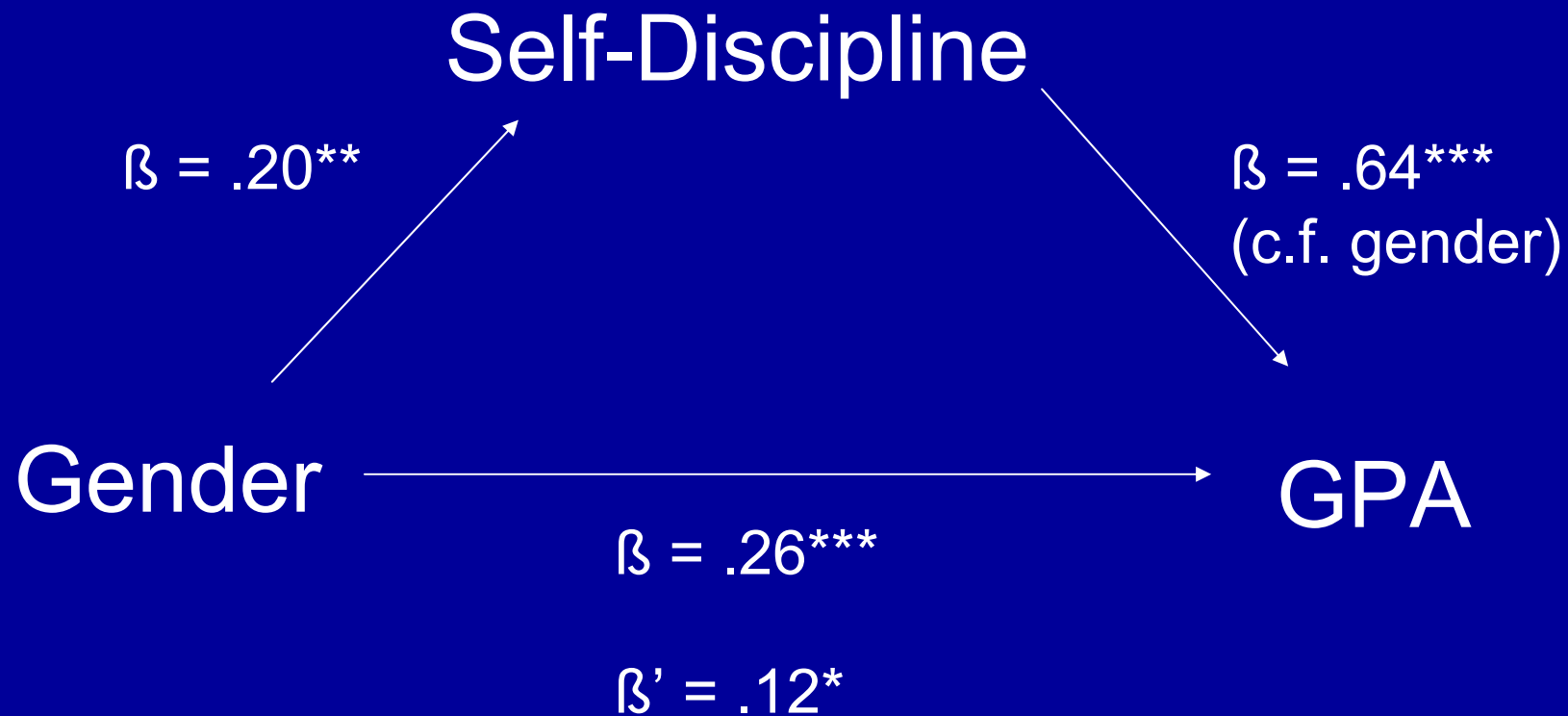
Measure	Internal consistency	Girls		Boys		<i>d</i>
		<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	
Eysenck I ₆ Junior Questionnaire Impulsivity subscale ^a	.83	10.56	4.86	11.63	5.19	.21
Brief Self-Control Scale						
Self-report	.86	3.40	0.65	3.10	0.79	.42**
Teacher report	.97	4.38	0.81	3.79	1.09	.61***
Parent report	.91	3.98	0.74	3.83	0.75	.19
Kirby Delay-Discounting Rate Monetary Choice Questionnaire ^a	.98	0.02	0.03	0.03	0.04	.14
Delay choice task		84%		80%		.08
Composite self-discipline score	.90	0.13	0.64	-0.14	0.67	.41***

Note. For the dichotomous delay choice task, effect size was first calculated as Φ , according to Cohen (1988), and then converted to *d*.

^a Higher scores for these measures indicate lower self-discipline.

** $p < .01$. *** $p < .001$.

An advantage in self-control partially explains superior report card grades



Summary of Studies 1 & 2

- Self-control—measured precisely—can be shown to be a more robust predictor of academic achievement than previously thought
- Advantages in trait self-control help explain why girls bring home better report cards than boys, but not better standardized test scores

A prospective longitudinal study of low-achieving adolescents

- Ninth graders ($N = 115$)
- Self-control and IQ measured in the fall
 - Average IQ about 80, about 2 SD below that of college-bound sample
- Academic performance measured in the spring
 - About 40% of students were below grade-level on state tests, compared to only 1% of college-bound sample

Study 3 findings

- Self-control predicted GPA better than did IQ
- However, IQ predicted standardized achievement test scores better than did self-discipline
- Girls were more self-disciplined ($d = .4$, $p < .01$) and earned higher GPAs ($d = .8$, $p < .001$), despite roughly equivalent IQ and standardized test scores

Study 4: National Annenberg Risk Survey of Youth

Cross-sectional study of youth

- Adolescents and young adults aged 14 to 22 years ($N = 900$)
- Sample matched US Census estimates of gender, ethnicity, and region of the country
- Demographic variables controlled
 - Household income by zip code, urban/rural/suburban, public/non-public school, region of country
- Self-reported GPA

Self-Control Measure

- Four self-report items
 - Monetary Choice Series: “Suppose you had an offer to get paid \$1000 for doing a job if you could wait six months from completion of the job to get paid. If you didn’t want to wait the six months, you could get \$500 as soon as you finished.”
 - “Living for the moment is more important than planning for the future”
 - “I spend a lot more time thinking about today than thinking about the future”
 - “I have a good sense of what my long-term priorities are in life.” (reverse-scored)

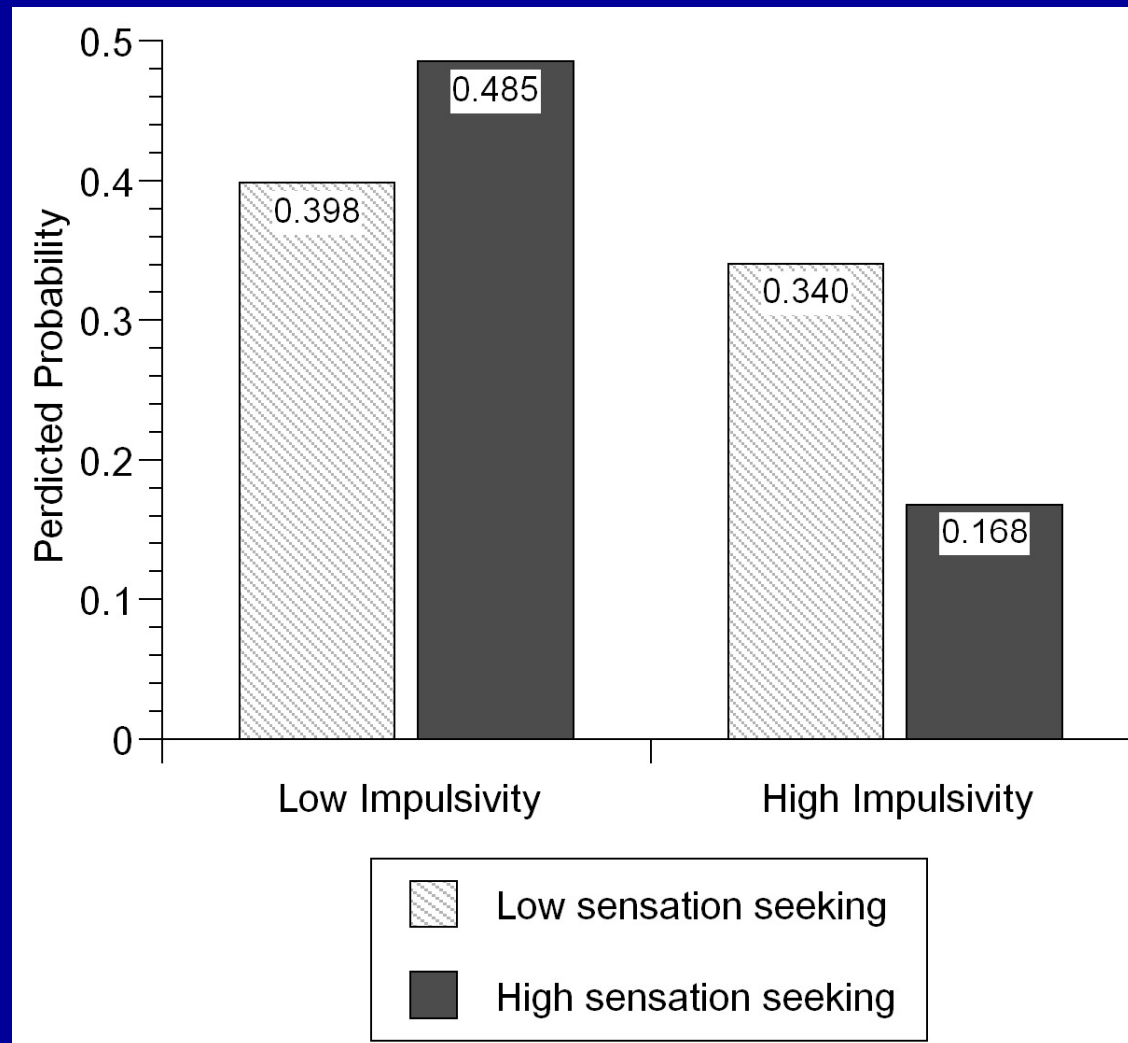
Sensation Seeking Measure

- Four self-report items from Brief Sensation Seeking Scale
 - “I like to explore strange places”
 - “I like to do frightening things”
 - “I like new and exciting experiences, even if I have to break the rules”
 - “I prefer friends who are exciting and unpredictable

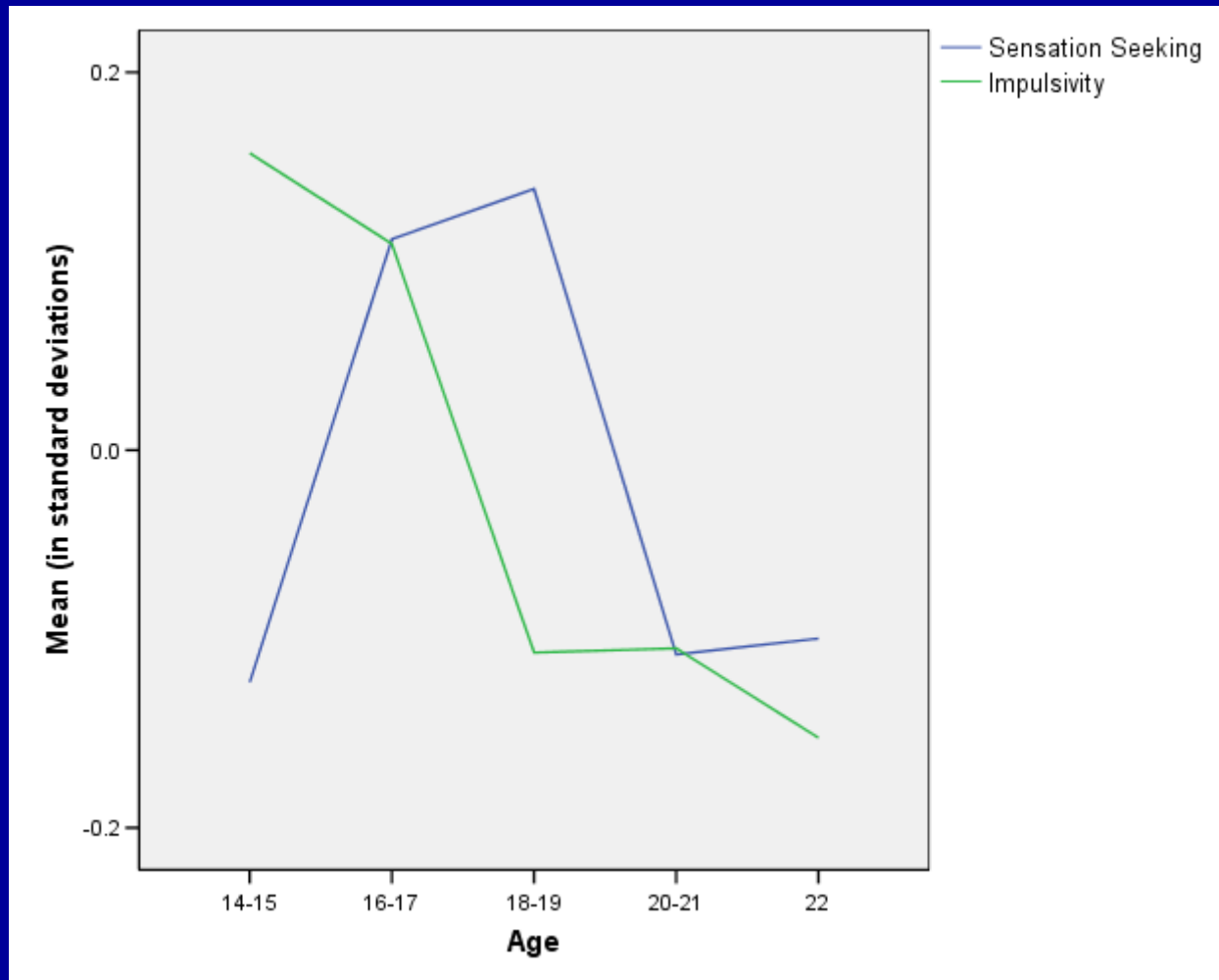
Study 4 findings

- Youth a standard deviation lower in self-control than other respondents were $\frac{1}{3}$ more likely to have lower grades
- Girls were more self-controlled than girls ($d = .13, p < .05$)
- Young adults a standard deviation lower in self-control were $\frac{1}{4}$ less likely to remain in school

Sensation seeking is detrimental only when impulsivity is high



Impulsivity declines over adolescence, whereas sensation seeking peaks then falls



Summary

- Self-controlled children do better in school than their more impulsive peers, even when controlling for IQ
- Girls are slightly more self-controlled than boys
- Measures of academic achievement vary in their relative saturation of IQ and self-control variance
- Other traits, including sensation-seeking and IQ, may moderate the relationship between self-control and academic performance

Future directions:

Construct and Measurement

- Research on self-control is where IQ research was a century ago
 - Construct confusion
 - Unreliable performance measures
- Holy grail: a battery of behavioral measures of self-control with minimal IQ variance suitable for older children, adolescents, and adults
- Dimensionality of self-control
 - “g” and “s” components for self-control

Thank you!