A gradient of childhood self-control predicts health, wealth, and public safety

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Edited by James J. Heckman, University of Chicago, Chicago, IL, and approved December 21, 2010 (received for review July 13, 2010)

Policy-makers are considering large-scale programs aimed at self-control to improve citizens' health and wealth and reduce crime. Experimental and economic studies suggest such programs could reap benefits. Yet, is self-control important for the health, wealth, and public safety of the population? Following a cohort of 1,000 children from birth to the age of 32 y, we show that childhood self-control predicts physical health, substance dependence, personal finances, and criminal offending outcomes, following a gradient of self-control. Effects of children's self-control could be disentangled from their intelligence and social class as well as from mistakes they made as adolescents. In another cohort of 500 sibling-pairs, the sibling with lower self-control had poorer outcomes, despite shared family background. Interventions addressing self-control might reduce a panoply of societal costs, save taxpayers money, and promote prosperity.

life course | longitudinal | public policy

The need to delay gratification, control impulses, and modulate emotional expression is the earliest and most ubiquitous demand that societies place on their children, and success at many life tasks depends critically on children's mastery of such self-control. We looked at the lives of 1,000 children. By the age of 10 y, many had mastered self-control but others were failing to achieve this skill. We followed them over 30 y and traced the consequences of their childhood self-control for their health, wealth, and criminal offending.

Interest in self-control unites all the social and behavioral sciences. Self-control is an umbrella construct that bridges concepts and measurements from different disciplines (e.g., impulsivity, conscientiousness, self-regulation, delay of gratification, inattention-hyperactivity, executive function, willpower, intertemporal choice). Neuroscientists study self-control as an executive function subserved by the brain's frontal cortex (1, 2) and have uncovered brain structures and systems involved when research participants exert self-control (3). Behavioral geneticists have shown that self-control is under both genetic and environmental influences (4) and are now searching for genes associated with self-control (5). Psychologists have described how young children develop self-control skills (6, 7) and have traced population patterns of stability and change in self-control across the life course (8). Health researchers report that self-control predicts early mortality (9); psychiatric disorders (10); and unhealthy behaviors, such as overeating, smoking, unsafe sex, drunk driving, and noncompliance with medical regimens (11). Sociologists find that low self-control predicts unemployment (12) and name self-control as a central causal variable in crime theory (13), providing evidence that low self-control characterizes lawbreakers (14, 15).

Economists are now drawing attention to individual differences in self-control as a key consideration for policy-makers who seek to enhance the physical and financial health of the population and reduce the crime rate (16, 17). The current emphasis on self-control skills of conscientiousness, self-discipline, and perseverance arises from the empirical observation that preschool programs that targeted poor children 50 y ago, although failing to achieve their stated goal of lasting improvement in children's intelligence quotient (IQ) scores, somehow produced byproduct reductions in teen pregnancy, school dropout, delinquency, and work absenteeism (18).* To the extent that self-control influences outcomes as disparate as health, wealth, and crime, enhancing it could have broad benefits. Given that self-control is malleable, it could be a prevention target, and the key policy question becomes when to intervene to achieve the best cost–benefit ratio, in childhood or in adolescence (19, 20)? Regardless of its malleability, however, if low self-control is influential, policy-makers might exploit this by enacting so-called "opt-out" schemes that tempt people to eat healthy food, save money, and obey laws by making these the default options that require no effortful self-control. If citizens were obliged to opt out of default health-enhancing programs or payroll-deduction retirement savings schemes, individuals with low self-control should tend to take the easy option and stay in programs, because opting out requires unappealing effort and planning (21, 22). Similarly, the idea behind the crime-reduction policy of "target hardening" is to discourage would-be offenders by making law-breaking require effortful planning (e.g., antitheft devices require more advance planning to steal a car).

In the context of this timely, ubiquitous, and intense policy interest in self-control, we report findings from the Dunedin Multidisciplinary Health and Development Study, a longitudinal study of a complete birth cohort of 1,037 children born in one city in a single year, whom we have followed from birth to the age of 32 y with 96% retention (Fig. 1 and *SI Appendix*). Our study design is observational and correlational; this is in contrast to experimental behavioral-economics studies that ascertain the association between performance on laboratory self-control tasks (e.g., delay of gratification, discounting, intertemporal choice tasks) and behavioral proxy measures of wealth, health, and crime. Such laboratory experiments yield compelling information about self-control, although economists have debated whether behavior in the laboratory faithfully represents real-world behavior (23). The naturalistic Dunedin study complements experimental research on self-control by providing badly needed information about how

Author contributions: T.E.M. and A.C. designed research; T.E.M., L.A., N.D., R.J.H., R.P., B.W.R., S.R., M.R.S., W.M.T., and A.C. performed research; T.E.M., D.B., H.L.H., R.H., and A.C. analyzed data; and T.E.M. and A.C. wrote the paper.

The authors declare no conflict of interest.

This article is a PNAS Direct Submission.

Freely available online through the PNAS open access option.

See Commentary on page 2639.

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This article contains supporting information online at www.pnas.org/lookup/suppl/doi:10.1073/pnas.1010076108/-/DCSupplemental.

*Heckman JJ, Malofeeva L, Pinto R (2010) Economics of Crime Working Group, National Bureau of Economics Summer Institute, July 30, 2010, Cambridge, MA.

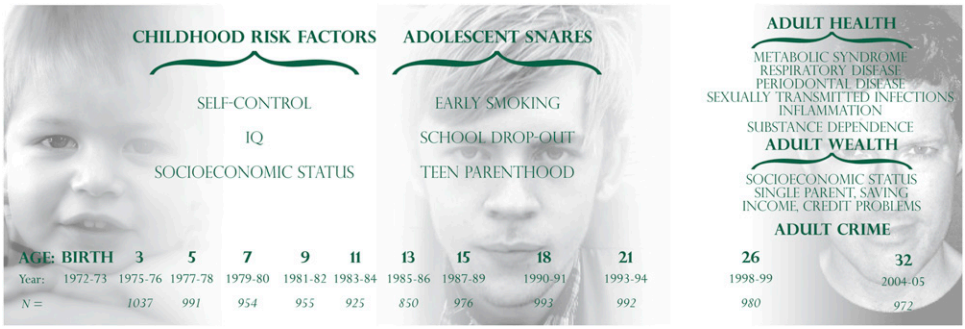

Fig. 1. Design of the Dunedin Multidisciplinary Health and Development Study.

well children's self-control, as it is distributed in the population, predicts real-world outcomes after children reach adulthood. We examined adult health outcomes, such as substance dependence, inflammation, and metabolic abnormalities (e.g., overweight, hypertension, cholesterol), because these are known early-warning signs for costly age-related diseases and premature mortality. We examined wealth outcomes, such as low income, single-parent child rearing, credit problems, and poor saving habits, because these are early warning signs for late-life poverty and financial dependence. We also examined convictions for crime, because crime control poses major costs to government.

The Dunedin study's birth-cohort members with low self-control and poor outcomes have not dropped out of the study. This enabled us to study the full range of self-control and to estimate effect sizes of associations for the general population, information that is requisite for informed policy making. The Dunedin study's design allowed us to address four policy-relevant hypotheses. First, we tested whether children's self-control predicted later health, wealth, and crime similarly at all points along the self-control gradient, from lowest to highest self-control. If self-control's effects follow a gradient, interventions that achieve even small improvements in self-control for individuals could shift the entire distribution of outcomes in a salutary direction and yield large improvements in health, wealth, and crime rate for a nation. Second, although this study did not include an intervention, some Dunedin study members moved up in the self-control rank over the years of the study, and we were able to test the hypothesis that improving self-control is associated with better health, wealth, and public safety. Third, because we assessed whether study members smoked tobacco as adolescents, left secondary school early, or became teen parents, we were able to test the hypothesis that children with low self-control make these mistakes as teenagers that close doors of opportunity and ensnare them in lifestyles harmful to their health and wealth as well as the public's safety. If self-control's influence is mediated through adolescents' mistakes, adolescence could be an ideal window for intervention policy. Fourth, because the Dunedin study assessed self-control as early as the age of 3 y, we were able to test the hypothesis that individual differences in preschoolers' self-control predict outcomes in adulthood. If so, early childhood would also be an intervention window.

Policy-making requires evidence that isolates self-control as the active ingredient affecting health, wealth, and crime, as opposed to other influences on children's futures, such as their intelligence or social class origins. Dunedin study data allowed the requisite statistical controls for IQ and social class. We also exploited another longitudinal study, a birth cohort of siblings, to ask whether the sibling in each pair who had lower self-control subsequently developed worse outcomes, despite both siblings having the same home and family. This design disentangles the individual child's self-control from all other features on which families differ (and which siblings share while growing up).

Results

This research aimed to ascertain whether childhood self-control predicts important adult outcomes along a population gradient. We assessed children's self-control during their first decade of life. Reports by researcher-observers, teachers, parents, and the children themselves gathered across the ages of 3, 5, 7, 9, and 11 y were combined into a single highly reliable composite measure. Mean levels of self-control were higher among girls than boys ($t = 8.39$, $P < 0.001$), but the health, wealth, and public safety implications of childhood self-control were equally evident and similar among boys and girls (*SI Appendix*, Table S1). We therefore combined the genders in all subsequent analyses (but controlled for gender). Dunedin study children with greater self-control were more likely to have been brought up in socioeconomically advantaged families ($r = 0.25$, $P < 0.001$) and had higher IQs ($r = 0.44$, $P < 0.001$), raising the possibility that low self-control could be a proxy for low social class origins or low intelligence. We thus tested whether childhood self-control predicted adults' health, wealth, and crime independent of their social class origins and IQ (the study design and measures are described in *SI Appendix*).

Predicting Health. When the children reached the age of 32 y, we assessed their cardiovascular, respiratory, dental, and sexual health as well as their inflammatory status by carrying out physical examinations and laboratory tests to assess metabolic abnormalities (including overweight), airflow limitation, periodontal disease, sexually transmitted infection, and C-reactive protein level, respectively. We summed these five clinical measures into a simple physical health index for each study member: 43% of study members had none of the biomarkers, 37% had one, and 20% had two or more. Childhood self-control predicted adult health problems (Table 1, model 1), even after accounting for social class origins and IQ (Table 1, model 2). *SI Appendix*, Table S1 shows associations between self-control and each individual health measure.

We also conducted clinical interviews with the study members at the age of 32 y to assess depression and substance dependence (tobacco, alcohol, and cannabis dependence as well as dependence on other street and prescription drugs), following the *Diagnostic and Statistical Manual of Mental Disorders*, 4th edition (DSM-IV) criteria (24). As adults, children with poor self-control were not at elevated risk for depression. They had elevated risk for substance dependence (Table 1, model 1), however, even after accounting for social class and IQ (Table 1, model 2). This longitudinal link between self-control and substance dependence was verified by people whom study members had nominated as informants who knew them well. As adults, children with poor self-control were rated by their informants as having alcohol and drug problems (Table 1).

Predicting Wealth. Childhood self-control also foreshadowed the study members' financial situations. Although the study members' social class of origin and IQ were strong predictors of their adult socioeconomic status and income, poor self-control offered significant incremental validity in predicting the socioeconomic position they achieved and the income they earned (Table 1). By the age of 32 y, 47% of study members had become parents. Childhood self-control predicted whether or not these study

Table 1. Does poor self-control in childhood lead to poor health, wealth-related problems, and criminal convictions in adulthood?

	Model 1: Baseline bivariate associations			Model 2: Co-occurring childhood risk factors hypothesis		
Adult outcomes and predictors	Coefficient	95% CI/SE	*P*	Coefficient	95% CI/SE	*P*
Health						
Physical health index*						
Low family SES	1.218	1.127–1.316	<0.001	1.154	1.058–1.258	0.001
Low IQ	1.224	1.133–1.323	<0.001	1.092	0.993–1.20	0.069
Low self-control	1.196	1.113–1.285	<0.001	1.111	1.020–1.209	0.016
Recurrent depression†						
Low family SES	1.038	0.876–1.229	0.667	0.955	0.790–1.153	0.629
Low IQ	1.232	1.031–1.470	0.022	1.208	0.978–1.493	0.080
Low self-control	1.187	0.944–1.419	0.059	1.099	0.849–1.352	0.369
Substance dependence index*						
Low family SES	1.343	1.184–1.523	<0.001	1.281	1.116–1.470	<0.001
Low IQ	1.218	1.074–1.382	0.002	1.012	0.870–1.177	0.880
Low self-control	1.299	1.156–1.460	<0.001	1.186	1.038–1.355	0.012
Informant-reported substance problems‡						
Low family SES	0.118	0.033	<0.001	0.076	0.036	0.033
Low IQ	0.081	0.034	0.014	−0.026	0.041	0.507
Low self-control	0.178	0.035	<0.001	0.169	0.039	<0.001
Wealth						
SES‡						
Low family SES	−0.266	0.033	<0.001	−0.124	0.034	<0.001
Low IQ	−0.400	0.033	<0.001	−0.312	0.039	<0.001
Low self-control	−0.263	0.035	<0.001	−0.082	0.038	0.023
Income‡						
Low family SES	−0.214	0.032	<0.001	−0.107	0.034	0.002
Low IQ	−0.291	0.033	<0.001	−0.199	0.039	<0.001
Low self-control	−0.238	0.034	<0.001	−0.112	0.038	0.002
Single-parent child rearing†§						
Low family SES	1.301	1.067–1.586	0.009	1.140	0.909–1.430	0.255
Low IQ	1.395	1.117–1.741	0.003	1.126	0.869–1.458	0.369
Low self-control	1.633	1.304–2.046	<0.001	1.479	1.147–1.908	0.003
Financial planfulness‡						
Low family SES	−0.151	0.032	<0.001	−0.090	0.036	0.011
Low IQ	−0.160	0.034	<0.001	−0.059	0.040	0.124
Low self-control	−0.195	0.034	<0.001	−0.141	0.039	<0.001
Financial struggles‡						
Low family SES	0.095	0.033	0.003	0.077	0.036	0.032
Low IQ	0.029	0.035	0.369	−0.068	0.041	0.078
Low self-control	0.152	0.035	<0.001	0.156	0.039	<0.001
Informant-reported financial problems‡						
Low family SES	0.131	0.033	<0.001	0.035	0.036	0.317
Low IQ	0.192	0.035	<0.001	0.077	0.041	0.045
Low self-control	0.274	0.034	<0.001	0.230	0.039	<0.001
Public safety						
Criminal conviction†						
Low family SES	1.578	1.337–1.863	<0.001	1.373	1.140–1.654	0.001
Low IQ	1.431	1.218–1.680	<0.001	0.967	0.792–1.179	0.737
Low self-control	1.830	1.559–2.148	<0.001	1.714	1.425–2.063	<0.001

Additional details are provided in *SI Appendix*, Table S1. SES, socioeconomic status.

*Incident-rate ratio.

†OR.

‡Standardized ordinary least squares regression coefficient.

§This analysis is restricted to 47% of the study members who have had a child.

members' offspring were being reared in one-parent vs. two-parent households (e.g., the study member was an absent father or single mother), also after accounting for social class and IQ (Table 1).

At the age of 32 y, children with poor self-control were less financially planful. Compared with other 32-y-olds, they were less likely to save and had acquired fewer financial building blocks for the future (e.g., home ownership, investment funds, retirement plans). Children with poor self-control were also struggling financially in adulthood. They reported more money-management difficulties and had accumulated more credit problems (Table 1). Poor self-control in childhood was a stronger predictor of these financial difficulties than study members' social class origins and IQ. This longitudinal link between self-control and self-reported financial problems was verified by informants who knew them well. As adults, children with poor self-control were rated by their informants as poor money managers (Table 1).

Predicting Crime. We obtained records of study members' court convictions at all courts in New Zealand and Australia by searching the central computer systems of the New Zealand Police; 24% of the study members had been convicted of a crime

by the age of 32 y. Children with poor self-control were more likely to be convicted of a criminal offense, even after accounting for social class origins and IQ (Table 1).

Self-Control Gradient. We observed a self-control gradient in which boys and girls with less self-control had worse health, less wealth, and more crime as adults than those with more self-control at every level of the distribution of self-control (Fig. 2). To document further that self-control relates to outcomes all along its gradient, we removed 61 study members who were diagnosed with attention-deficit hyperactivity disorder (a childhood psychiatric disorder of impaired impulse control) and repeated this analysis. The gradient associations in Fig. 2 remained unaltered. In addition, we tested whether self-control effects operate throughout the distribution or are confined to the least self-controlled children. We repeated analyses after removing children in the least self-controlled quintile and continued to observe significant linear associations. The self-control gradient was even apparent when we removed children in the least and most self-controlled quintiles (*SI Appendix*, Table S2).

An interesting question is what would happen if we were able to intervene and improve children's self-control. Would an increase in self-control predict better outcomes? Although the study did not include an experimental intervention, we were able to address this question by studying children who moved up the rank in their self-control from childhood to young adulthood. The childhood measure of self-control was significantly correlated with a personality measurement of self-control administered to our cohort in young adulthood ($r = 0.30$, $P \leq 0.001$), at a moderate magnitude, consistent with expectations (25) (*SI Appendix*). This stability coefficient implies that some children also changed their rank order in self-control. Moreover, those children who became more self-controlled from childhood to young adulthood had better outcomes by the age of 32 y, even after controlling for their initial levels of childhood self-control (*SI Appendix*, Table S3). As a caveat, it is not clear that natural history change of the sort we observed in our longitudinal study is equivalent to intervention-induced change. Nevertheless, these suggestive findings should stimulate consideration of interventions to raise self-control.

Self-Control and Adolescent Mistakes. Data collected at the ages of 13, 15, 18, and 21 y showed that children with poor self-control were more likely to make mistakes as adolescents, resulting in "snares"

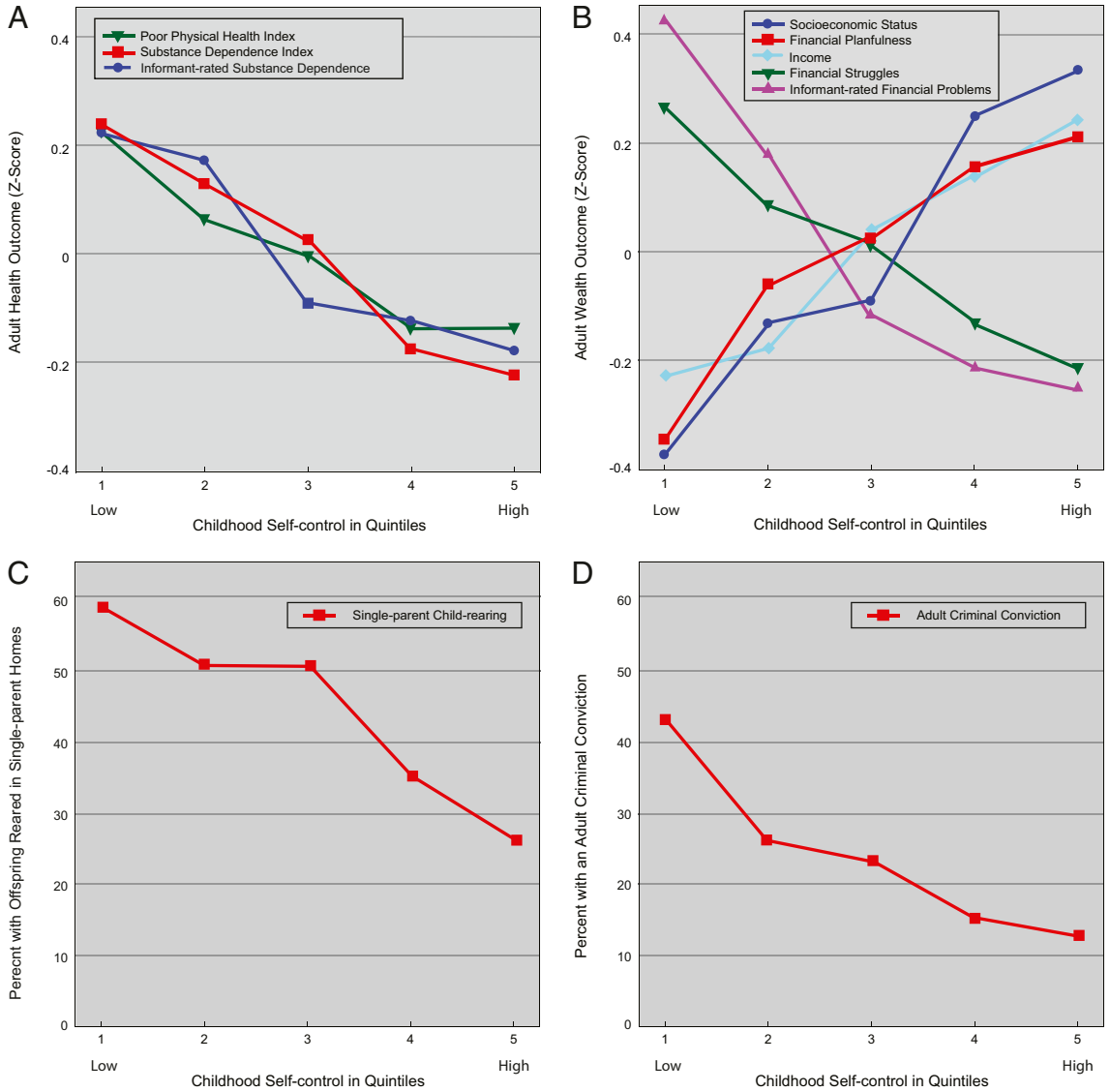

Fig. 2. Self-control gradient. Children with low self-control had poorer health (*A*), more wealth problems (*B*), more single-parent child rearing (*C*), and more criminal convictions (*D*) than those with high self-control.

that trapped them in harmful lifestyles. More children with low self-control began smoking by the age of 15 y [odds ratio (OR) = 1.69, 95% confidence interval (CI): 1.45–1.96], left school early with no educational qualifications (OR = 2.28, 95% CI: 1.92–2.72), and became unplanned teenaged parents (OR = 1.79, 95% CI: 1.40–2.29). The lower their self-control, the more of these snares they encountered (incident rate ratio = 1.48, 95% CI: 1.38–1.59) (*SI Appendix*, Fig. S1). In turn, the more snares they encountered, the more likely they were, as adults, to have poor health, less wealth, and criminal conviction (*SI Appendix*, Table S4). We tested whether snares explained the long-term predictive power of self-control in two ways. First, using statistical controls, we partialled out the portion of the association between childhood self-control and each adult outcome that was accounted for by adolescent snares. The snares attenuated the effect of self-control on health by 32%, substance dependence by 63%, socioeconomic status by 35%, income by 29%, single-parent child rearing by 61%, financial planfulness by 35%, financial struggles by 47%, and crime by 42%. The direct effect of self-control remained statistically significant for nearly every outcome measure, however (*SI Appendix*, Table S4). Second, we tested the association between childhood self-control and the adult outcomes among adolescents who did not encounter any snares, a so-called "utopian" control group (26). Again, prediction from childhood self-control to the adult measures remained significant even among this group of nonsmoking, non–teen-parent, high-school graduates (*SI Appendix*, Table S4).

How Early Can Self-Control Predict Health, Wealth, and Crime? Our composite measure of self-control in the Dunedin study included assessments from the age of 3–11 y. To answer this question, we isolated staff ratings of the children's self-control observed during 90-min data collection sessions at the research unit in the mid-1970s, when they were 3–5 y old (27). This standardized observational measure of preschoolers' self-control significantly predicted health, wealth, and convictions at the age of 32 y, albeit with modest effect sizes (*SI Appendix*, Table S5).

Sibling Comparisons. In the Dunedin study, statistical controls revealed that self-control had its own associations with outcomes, apart from childhood social class and IQ. Each Dunedin study member grew up in a different family, however, and their families varied widely on many features that affect children's outcomes. A compelling quasiexperimental research design that can isolate the influence of self-control is to track and compare siblings. Does the sibling with poorer self-control have worse outcomes than his or her more self-controlled sibling growing up in the same family environment? To apply this design, we turned to a second sample, the Environmental-Risk Longitudinal Twin Study (E-Risk), where we have been tracking a birth cohort of British twins since their birth in 1994 to 1995 with 96% retention (*SI Appendix*). When the E-Risk study twins were 5 y old, research staff rated each child on the same observational measure of self-control originally used with Dunedin study children as preschoolers. Although the E-Risk study children have been followed only up to age of 12 y, their self-control already forecasts many of the adult outcomes we saw in the Dunedin study. We applied sibling fixed-effects models to same-gender dizygotic pairs (n = 509 pairs) because they are no more alike than ordinary siblings (with the added advantages of being the same age and gender). Models showed that the 5-y-old sibling with poorer self-control was significantly more likely to begin smoking as a 12-y-old (a precursor of adult ill health; B = 0.07, SE = 0.003; $P < 0.03$), perform poorly in school (a precursor of adult wealth; B = −0.13, SE = 0.007; $P < 0.001$), and engage in antisocial behaviors (a precursor of adult crime; B = 0.09, SE = 0.007; $P = 0.007$), and these findings remained significant even after controlling for sibling differences in IQ (B = 0.07, SE = 0.003, $P = 0.02$ for smoking; B = −0.07, SE = 0.006, $P = 0.01$ for school performance; and B = 0.09, SE = 0.007, $P = 0.005$ for antisocial behavior).

Comment

Differences between individuals in self-control are present in early childhood and can predict multiple indicators of health, wealth, and crime across 3 decades of life in both genders. Furthermore, it was possible to disentangle the effects of children's self-control from effects of variation in the children's intelligence, social class, and home lives of their families, thereby singling out self-control as a clear target for intervention policy. Joining earlier longitudinal follow-ups (7, 9, 28), our findings imply that innovative policies that put self-control center stage might reduce a panoply of costs that now heavily burden citizens and governments.

Differences between children in self-control predicted their adult outcomes approximately as well as low intelligence and low social class origins, which are known to be extremely difficult to improve through intervention. Effects were marked at the extremes of the self-control gradient. For example, by adulthood, the highest and lowest fifths of the population on measured childhood self-control had respective rates of multiple health problems of 11% vs. 27%, rates of polysubstance dependence of 3% vs. 10%, rates of annual income under NZ $20,000 of 10% vs. 32%, rates of offspring reared in single-parent households of 26% vs. 58%, and crime conviction rates of 13% vs. 43%. This coincidence of low self-control with poor outcomes bolsters the rationale for opt-out programs by demonstrating that the segment of the adult population that is most inclined to avoid the effortful planning necessary to opt out of default programs (i.e., individuals with the lowest self-control) is the same segment of the adult population that accounts for excess costs to society in health care, financial dependency, and crime. Opt-out programs intended to exploit the laziness in all of us may work best for the least conscientious among us.

With respect to timing of programs to enhance self-control, our findings were consistent with "one-two punch" scheduling of interventions during both early childhood and adolescence (29). On the one hand, low self-control's capacity to predict health, wealth, and crime outcomes from childhood to adulthood was, in part, a function of mistakes our research participants made in the interim adolescent period. Adolescents with low self-control made mistakes, such as starting smoking, leaving high school, and having an unplanned baby, that could ensnare them in lifestyles with lasting ill effects. (Our choice of snares was not exhaustive, but we elected to study those that are already high-priority targets of adolescent education policy.) Thus, interventions in adolescence that prevent or ameliorate the consequences of teenagers' mistakes might go far to improve the health, wealth, and public safety of the population. On the other hand, that childhood self-control predicts adolescents' mistakes implies that early childhood intervention could prevent them. Moreover, even among teenagers who managed to finish high school as nonsmokers and nonparents, the level of personal self-control they had achieved as children still explained variation in their health, finances, and crime when they reached their thirties. Early childhood intervention that enhances self-control is likely to bring a greater return on investment than harm reduction programs targeting adolescents alone (30).

With respect to the scope of programs addressing self-control, our findings raise the question of whether early intervention to enhance self-control should take a targeted approach vs. a universal approach. Health, wealth, and crime outcomes followed a gradient across the full distribution of self-control in the population. If correct, the observed gradient implies room for better outcomes even among the segment of the population whose childhood self-control skills were somewhat above average. Universal interventions that benefit everyone often avoid stigmatizing anyone and also attract widespread citizen support. Testing this gradient in other population representative samples is a research priority. It has been shown that self-control can change (31). Programs to enhance children's self-control have been developed and positively evaluated, and the challenge remains to improve them and scale them up for universal dissemination (32–35). Understanding the key ingredients in self-control and how best to enhance them with a good cost–benefit ratio is a research priority.

Two cohorts born in different countries and different eras support the inference that individuals' self-control is a key ingredient in health, wealth, and public safety as well as a sensible policy target. That many Dunedin study members with low self-control had unplanned babies now growing up in low-income single-parent households reveals that one generation's low self-control disadvantages the next generation. Modern history is seeing a marked increase in human longevity, requiring individuals to pay more strategic attention to their health and wealth to avoid disability and poverty in old age (36). Modern history has also seen marked increases in food availability, sedentary occupations, access to harmful addictive substances, ease of divorce, self-management of retirement savings, and imprisonment of law-breakers. These historical shifts are enhancing the value of individual self-control in modern life, not just for well-being but for survival.

Methods

A more detailed report of the study designs, measures, and analyses is available in *SI Appendix*.

Dunedin Study Sample. Participants are members of the Dunedin Multidisciplinary Health and Development Study, which tracks the development of 1,037 individuals born in 1972–1973 in Dunedin, New Zealand.

Childhood Self-Control. Children's self-control during their first decade of life was measured using nine measures of self-control: observational ratings of children's lack of control (3 and 5 y of age) and parent, teacher, and self-reports of impulsive aggression, hyperactivity, lack of persistence, inattention, and impulsivity (5, 7, 9, and 11 y of age). The nine measures were positively and significantly correlated. Based on principal components analysis, the standardized measures were averaged into a single composite score (M = 0, SD = 1), comprising multiple ages and informants, with strong internal reliability $\alpha = 0.86$. *SI Appendix*, Table S6 shows that whether we examined self-control as measured by observers, teachers, parents, or children's self-reports, individual differences in childhood self-control were significantly related to each of the adult health, wealth, and public safety outcomes; that is, the results were not sensitive to the use of any particular source of information about children's self-control and were robust to the data source in measuring self-control.

Adult Outcomes. Health, wealth, and crime outcomes were assessed at age 32 y by physical examinations, blood tests, personal interviews, record searches, and informant reports.

Sample for Sibling-Comparison Analysis. Participants are members of the E-Risk study, which tracks the development of a nationally representative birth cohort of 2,232 twin children born in England and Wales in 1994–1995.

Childhood Self-Control at the Age of 5 Y. After completing the home visit when siblings were 5 y of age, examiners rated each twin on the measure of self-control that was originally used in the Dunedin study when the children in that study were 3 and 5 y of age (27). In this assessment procedure, the examiners evaluated the following behaviors: lability, low frustration tolerance, hostility, roughness, resistance, restlessness, impulsivity, fleeting attention, and lacking persistence. Each behavioral characteristic was defined in explicit terms, and the examiner evaluated whether each characteristic was not at all (0), somewhat (1), or definitely characteristic (2) of the child. The (interrater) reliability was 0.79.

Children's Outcomes at the Age of 12 Y. Children reported about their delinquent behavior and smoking. Children's educational performance was evaluated by their teachers, who rated each child's performance in English and mathematics.

ACKNOWLEDGMENTS. We thank the New Zealand Police. This research received support from the US National Institute on Aging Grants AG032282 and 2AG21178, National Institute of Mental Health Grant MH077874, National Institute of Child Health and Human Development Grant HD061298, National Institute of Dental and Craniofacial Research Grant DE015260, National Institute on Drug Abuse Grant DA023026, UK Medical Research Council Grants G0100527 and G0601483, and Economic and Social Research Council Grant RES-177-25-0013, as well as from the New Zealand Health Research Council, Lady Davis Fellowship of the Hebrew University, and Jacobs Foundation. L.A. has a Career Scientist Award from the UK Department of Health. A.C. is a Royal Society Wolfson Merit Award holder.

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