An Empirical Introduction to Youth

Joseph Bronski

Table of Contents

Preface

This book is about youth, a term which describes people from the age of 13 or 15 to the age of 21 or 25. The precise sociological and biological features of youth vary between eras and areas, but in general youth is always a stage of sub-adulthood, following childhood and preceding total social maturity.

This book contains an empirical examination of the history of youth norms, the reality of youth development, and the history and function of the American education system. It seeks to establish empirical facts that nobody of any honest persuasion should disagree with: for instance, that puberty ends around the age of 15 years on the average for boys and 14 for girls, that the best psychometric and neurometric data reveal the brain finishes developing by the end of puberty, that those who claim otherwise do so wrongly or even misleadingly, that youth norms varied much less extremely from adult norms in the past, even while puberty finished later on the average, that the current norms largely came about in the last 50 to 100 years after the establishment of the modern education system, that the modern education system was unpopular among the masses and was constructed by the elite class, that education does not increase intelligence, and that starting roughly no later than when students enter youth (7th-9th grade), the education system becomes dramatically economically exploitative, with no returns to either the economy or people able to be measured.

There is strong evidence for each of these claims. I believe that it morally follows that the education system should be dramatically restructured, with most students concluding education around the time youth begins, i.e. somewhere between the ages of 13 and 15. This would save hundreds of billions of dollars, stop massive exploitation via the current education system and would most likely, according to survey data, make everyone happier.

In other words, I propose, based on the facts in this book, the abolition of the high school, and the stream-lining of other educational institutions. The result would be the shortening of education by roughly

four years for each student. This would save hundreds of millions of dollars each year in the United States alone, allowing said money to be invested into pursuits that actually benefit the people who create it.

This is completely realistic in my experience. Save for slowly taught math, I learned nothing of value from 7th to 10th grade that wouldn't be repeated later. And from then onwards there have been far too many wasteful humanities classes: English classes that are mere book reading clubs as opposed to places to refine writing skills, history classes that teach bad history, social science classes that teach unempirical musings. Even under the current system, intelligent homeschool students are learning calculus by 8th grade, and are then earning the equivalents of associate degrees through AP testing or community college by the end of what would be 10th grade. And this is with many redundant liberal arts requirements. Such students graduate with bachelor's degrees in valuable subjects such as computer science at 18, when their peers are just graduating high school. And such precocious students are usually "only bright" – these abilities are not restricted to exotic genius.

These claims may sound ridiculous, but they are grounded in firm facts, ones which are valuable to know and understand even if you disagree with my moral leanings. I focus on education because I believe youth is structured around it, for it is only through the modern education system that modern, infantile youth became materially plausible. And furthermore I believe that it is only due to the material conditions of youth that memetic misunderstandings are able to propagate.

I believe that the proper material conditions for youth are the ones that are implied by and, in turn, imply the descriptive truth. It suffices that the engine of morality by which we convert this is into its ought is the one that the average person recognizes.

That morality is what works, what allows society to be minimally healthy. When what we see is not in line with what this morality and the correct facts imply that we should see, we most likely have a source of social malady. I have faith that the average morality is quite correct, and that maladaptive behavior thrives mostly through the misrepresentation of fact. Consequently, I believe that this book requires no overt moral

statements in order to effect positive change. It should be enough that each reader considers the facts at hand and draws their own conclusions.

I ask you to do just that.

I

A Summary of Historical Youth Norms

This chapter is meant as a brief summary of the existing literature and is therefore less intellectually original and briefer than the following chapters. The research in this field is limited but nonetheless allows us to paint a decent picture of past norms. Only European precursors to the modern Anglosphere are considered for the reasons of length. As such, for the sake of brevity and analytic concision, this chapter will focus on the following:

1. Financial independence
    a. Labor norms
    b. Personal financial rights
    c. Educational norms
2. Marital norms
    a. Average age at marriage
    b. Average age at cohabitation
3. Other legal age restrictions
4.

1.1: Ancient Rome and Greece

Ancient Romans failed to infantilize their youth, instead regarding them as young adults, similar to how young adults are regarded today. Upper class Roman boys wore a garment called the toga praetexta, which featured white cloth and a purple or red border. In their mid-teens (14-16), they began to wear the all-white toga virilis, the garment of adult males[1]. From about this point onward, members of the upper classes went through a period of practical secondary education. For the professional class, this meant training in the law or in medicine, which was delivered mostly by shadowing[2]. Legal and medical training in particular took only 2 to 4 years to complete, and in consequence there are myriad examples of young, well-regarded physicians and lawyers from the ages of 17 to 21[3]. These individuals evidently started training around 14, continuing for a few years before assuming full responsibilities in their late teens. And indeed did they have full responsibilities: many inscriptions mourning dead youths include lines such as, "he was a talented doctor who was not greedy to the detriment of the poor"[4]. Their duties were not inflated; other inscriptions speaking of younger men call them medical students[5]. Much the same, inscriptions regarding lawyers often referred directly to their achievements: in one instance, an 18 year old was said to be experienced enough to have represented his town. This meant traveling to an administrative city on his town's behalf. In another case, a 23 year old had represented his town in Rome 5 times[6]. In literary sources there are also examples of teenage lawyers:

"When Cicero took upon himself the defense of Caelius, his opponent was the 17 year old Atratinus. In the pro Sulla his opponent was the youthful Torquatus. Moreover, the young M. Cotta gained great prestige, because on the day that he took the men's toga

[1] Kleijwegt 1991, 53
[2] Ibid., 151
[3] Ibid., 158 & 183
[4] Ibid., 162
[5] Ibid., 158
[6] Ibid., 184

he succeeded in convicting Cn. Carbo, the same man who had given judgement against Cotta's father."[7]

If professionals assumed their duties in their mid-to-late teens after beginning practical training in their early teens, it's likely that unskilled laborers assumed adult labor responsibilities as soon as they were physically able. There was, of course, no public education to be had. Aristocratic youth, on the other hand, could afford a secondary education in liberal arts, eschewing a professional education as beneath their status. These rich youth would often start their education, in a topic like philology or rhetoric, around the same time that the professionals started their education, i.e. 14, finishing around 17 or 18[8]. During this time there might be gaps in their education, or they might do other things, or they may begin their more practical preparation near the age of 17, leaving the liberal arts behind. There are numerous examples of youths aged 17-20 who were to be politicians holding serious offices of smaller responsibility[9]. Kleijwegt provides a list[10] of 27 magistrates below the age of 25. It features three 17 year olds, one 18 year old, and five 20 year olds.

The de jure age of military recruitment was 17, but it is unlikely that this was followed closely. There are a number of individuals who were knighted as children, for instance[11]. In addition, there are numerous examples of talented teenage military officers, who would typically lead a smaller unit, and if things went right, would go onto much grander feats. Alexander the Great is a famous instance of this in classical Greece, as he began his military career at the age of 16, defeating the Thracian Maedi rebels as regent while his father was away waging war against Byzantion. In another instance, this time a Roman,

"the career of M. Macrinius Avitus Catonius Vindex is very illuminating; … He was born around 140 AD. Between 158 and 169 he performed the 'quattuor militiae'; in 170

[7] Ibid., 183
[8] Ibid., 120
[9] Ibid., 192
[10] Ibid., 325
[11] Ibid., 212

he became 'procurator centenaries'. In 173 he was elected to the senate among those of praetorian rank and subsequently he was appointed 'legatus pro praetore' in the province of Moesia. He died in 182 or 183 at the age of forty-two."[12]

Yet another is the career of a man named Marcus Aurelius Magas, who died at the age of 18. This was an aristocratic youth who at 16 began to lead the police of Lycia, assuming the office of archiphylax[13]. There are so many other examples of youth-police that Kleijwegt posits that "we may safely conclude that young men starting from ephebic age frequently functioned as a security-force"[14]. "Ephebic" refers to the Ancient Greek Ephebia, a militaristic organization of teenage youth. In classical Athens they were exclusively 18-20 and performed guard duties on the border of the polis. As such duties became obsolete due to technology the order changed. The age of entrance became lower (14+) and it is likely that policing was among their tasks.

Professionals and soldiers were unencumbered by age restrictions. The general trend is that they would begin adult-style education around the age of 14, and begin their careers around 17. These careers would progress naturally until the end of their lives. Political youth, on the other hand, faced numerous age restrictions. Municipal councils often restricted entrance to those over 25, as did the Roman Senate. Regardless, political youth often held other serious offices of lesser responsibility up to that age, as already shown. Kleijwegt states thusly, "From the age of sixteen or seventeen onwards, it can be claimed that youngsters received political responsibility, be it in most cases in minor magistracies."

Financial rights came in Rome only at the father's death. In classical Athens, it was the age of 18[15]. In Rome, then, there was no de jure "age of adulthood" with regards to economic maturity. Functionally, we have seen that it tended to come around the age of 17 for those who could afford secondary education. For the lower classes it is assumed that

[12] Ibid., 210
[13] Ibid., 95
[14] Ibid., 96
[15] Ibid., 59

productive maturity and therefore economic maturity arrived around the time that the upper classes started secondary education, i.e. 14 or 15.

With that said, when did the ancient Roman marry? It should be expected to be around the time of economic maturity, based on modern conditions. Perhaps a few years after.

AGES OF GIRLS AND MEN AT MARRIAGE BY RELIGION

	Girls		Men			Girls		Men	
Age	Pagan	Christian	Pagan	Christian	Age	Pagan	Christian	Pagan	Christian
6-7	2†	—	—	—	29	—	1	3	2
10	6	2	—	—	30	2	2	5	8
11	6	3	—	—	31	3	3	3	2
12	15	7	—	—	32	7	1	3	1
13	16	14	—	—	33	—	1	—	2
14	18	9	—	—	34	2	1	—	2
15	14	19	2	2	35	—	1	1	2
16	7	22	—	1	36	—	1	—	2
17	10	18	7	2	37	—	1	1	3
18	12	16	3	5	38	—	1	—	1
19	5	14	10	1	39	—	—	2	—
20	9	12	11	7	40	—	—	2	2
21	6	11	1	4	—	—	—	—	—
22	1	5	4	5	42	—	2	2	1
23	2	3	4	7	—	—	—	—	1
24	3	2	4	6	44	—	—	1	—
25	4	3	3	3	45 †	1	—	4	4
26	1	—	2	4					
27	1	1	4	5					
28	1	4	5	4	Total	145	180	80	90

***Based on Harkness, Leclercq and CIL, VI, 1-30,000; cf. infra n. 45-46 and 58**
†Not Counted in numbers.

The above table[16] features data from inscriptions set up by the upper classes. The average marriage appears to have been a Romeo and Juliet situation age-wise: that is, the girl was usually 12 to 16 and the man tended to be 17 to 21. This is in line with the hypothesis above: upper class men married soon after functional economic maturity. Hopkins writes that it is unclear whether the lower classes married earlier or later, since the relation of lower class marriage ages to upper class marriage ages has varied by time period.

Cohabitation is assumed to have followed marriage if material conditions allowed. Ancient Romans seemed to have no problem with teens separating from the parental household physically, as has already

[16] Hopkins 1965

been hinted at by the fact that young men of 14 or 15 years often had to travel to receive professional training. Kleijwegt reasons that early father-son separation was instrumental to avoiding deadly conflict between the two[17].

An infantile period of youth similar to modern adolescence did not exist in Ancient Rome. The idea that youths should be treated like young children until at least the age of 18 was foreign to the Romans. Children in general were not infantilized as they are today but rather were expected to be precocious. Professional youths did undergo necessary training, and aristocratic youths experienced liberal arts education and a period of sub-adult responsibility afterwards. Youth as a period of sub-adulthood certainly existed, apparently more so the higher an individual's status was. Save from the age restrictions on entrance into certain high political offices, this period of sub-adulthood was broadly of material necessity. Professionals had to be trained. Even in the case of the aristocrats it can be argued that lesser political experience was of importance to have before the assumption of higher office. The present day is marked by an ideology wherein youth are essentially barred from dipping their toes in the water at all until a certain arbitrary age is reached. The Romans taught their young to swim when they became able to learn; now, as will be argued, youth are totally kept out of the pool until at least the age of 18, by expensive means.

1.2: Preindustrial Europe

It is related in Goldberg & Riddy (2004) that post-antiquity Latin writers tended to conceive of all youth like those of the Roman aristocracy:

> "Adolescentia is a state which continues until twenty-five [it starts at 14] … For Dante, adolescenzia ended at twenty-five. This was by no means universal …"

This, that preindustrial youth was a period lasting from roughly 14 to 25 that was characterized by being a period of sub-adulthood wherein one was generally responsible in the adult world, yet unmarried and

[17] Kleijwegt 1991, 64

withheld certain high level responsibilities, is a conclusion shared by many writers, including but not limited to Kleijwegt, Goldberg & Riddy, Hine, and Epstein. During the ancient and early medieval period, this description of youth seems to have mostly been a reality for aristocrats. Large exceptions exist: 7th century Frankish law placed adulthood at 15, for instance[18]. But as time and technology moved on, markers of adulthood, such as the average age at marriage, grew later for the lower classes.

The scholarship on the average marriage ages of preindustrial Western Europe is dominated by a hypothesis called the European Marriage Pattern, introduced by Hajnal in 1965. The claim is that, in contrast to the youthful marriages of antiquity, mean marriage ages were generally in the mid-twenties, and sometimes as high as 30, in Western Europe from about 1400 onwards. The data provided by Hajnal is quite extensive and appears to be valid, but it generally consists of the matching of parish marriage certificates to baptism certificates, such that the birthdays of the people on the marriage certificates could be obtained. What this means is that these estimates are for common people, not the upper class like the Roman data. What were the marriage ages of the makers of culture, the elites?

The scholarship on this question appears to be lacking, but there are enough signs that the upper class tended to marry earlier than the lower classes. A few examples may suffice, though no average may be established:

> Bianca of Savoy, Duchess of Milan was married aged 13 (1350), and aged 14 when she gave birth to her eldest son, Giangaleazzo (1351).
>
> Theodora Comnena was aged 13 when she was married King Baldwin III of Jerusalem (1158).
>
> Agnes of France was 12 when, widowed, she was married to Andronicus Comnenus, Byzantine Emperor (1182).
>
> St Elizabeth of Portugal was aged 12 when she was married to King Denis of Portugal and gave birth to three children shortly thereafter.

[18] Goldberg & Riddy 2004, 29

Caterina Sforza was betrothed aged 9, married aged 14, and gave birth aged 15.

Lucrezia Borgia was married to her first husband aged 13 and bore a son within a few years.

Beatrice d'Este was betrothed aged 5 and married aged 15.

Aristocratic youths were, at least at times, married in their teens or even before, while the lower classes married much later. The behavior of the elite reveals that there was no ideology of being too young to marry apart from the physical reality of the matter – as shown above, young children could be "betrothed," with the planned marriage following in their teens. It is commonly understood that these arranged marriages were for material-political purposes. Similarly, the late marriage age of the lower classes is generally explained by their material conditions.

For instance, Goldberg & Riddy (2004) show, using migrational data from late medieval York, that the average age of traveling workers was 18 for males and 19 for females[19]. It is also conveyed that "Clark, using some 7,000 depositions from the period of 1660-1730, found that most migrants were aged between eleven and thirty years." It appears to have most likely worked as such: around the time of the beginning of puberty, youth would often (not universally!) travel to live as servants and apprentices in other households. It wasn't until about the age of 25 that men were released to earn adult wages and marry, if they were so lucky. Some men had to travel or work in other mens' households their whole lives, and consequently the upper class outbred the lower class.

Women also served, and servants were bound, so brides were older by Roman standards. "Binding" was considered normative for youth under 25, as indicated by a few primary sources. One of these is that an English act of legislation from 1547, withdrawn 2 years later due to severity, permitted the indenturing of male beggars until the age of 24[20]. Furthermore, the apprenticeship statutes of 1601 required that orphaned

[19] Ibid., 94
[20] Gillis 1974, 20

children be apprenticed and bounded by the parish until the age of 24[21]. And

> Until 1814, apprenticeship arrangements in Britain were governed by the Elizabethan Statute of Artificers in 1563, which codified and systematized at the national level preexisting customary and statutory practices. For entry into skilled trades the Statute of Artificers mandated an apprenticeship term of seven years or longer, terminating at age 24 or older (reduced to age 21 by legislation of 1778).
>
> Little machinery was established, however, to administer and enforce the law. Guilds provided the essential means by which apprentices were registered and infractions detected. Guilds also carried out periodic inspections of job performance, work conditions, and quality of instruction.[22]

A BBC article shares some interesting sources (this field is slim and this article of particularly high quality for the news):

> Around the year 1500, an assistant to the Venetian ambassador to England was struck by the strange attitude to parenting that he had encountered on his travels.
>
> He wrote to his masters in Venice that the English kept their children at home "till the age of seven or nine at the utmost" but then "put them out, both males and females, to hard service in the houses of other people, binding them generally for another seven or nine years". The unfortunate children were sent away regardless of their class, "for everyone, however rich he may be, sends away his children into the houses of others, whilst he, in return, receives those of strangers into his own".
>
> It was for the children's own good, he was told - but he suspected the English preferred having other people's children in the household because they could feed them less and work them harder.
>
> His remarks shine a light on a system of child-rearing that operated across northern Europe in the medieval and early modern period. Many parents of all classes sent their children away from home to work as servants or apprentices - only a small minority went into the church or to university. They were not quite so young as the Venetian author suggests, though. According to Barbara Hanawalt at Ohio State University, the aristocracy did occasionally dispatch their offspring at the age of seven, but most parents waved goodbye to them at about 14.[23]

Gillis (1974) concurs:

---

[21] Ibid.
[22] Elbaum 1989
[23] Kremer 2014

We know that peasant sons rarely inherited their father's property until their late twenties, at the time their parent either died or voluntarily retired and settled the farm, in the latter case, on the oldest male in return for assurance of support for the rest of his life. … Life expectations of the fathers established the marriage age of the sons at 27 or 28, their wives being 3 or 4 years younger.

In late sixteenth century Ealing, an English village, it appears that boys ordinarily left home between the ages of 8 and 15, while girls were moving out between the ages of 9 and 14. Alan MacFarlane has estimated that between puberty (by which he means 14) and marriage, two-thirds of the males and three-fourths of the females were living away from their parents, mainly as servants in other households. Poorer families absorbed fewer servants, and so it was the well-to-do who benefitted from this supply of cheap surplus labor. "The institution of servanthood might, therefore, be regarded as a disguised means whereby wealth and labour flowed from the poorer to the richer."

[As for the upper classes,] This was also the time of life when young men were sent off to schools, apprenticeships, or novitiates in the church. Lawrence Stone has been able to show that sons of the aristocracy entered Oxford at a little over 15 in the seventeenth century, almost a year and a half earlier than did commoner students.

Kremer (2014) shares more evidence, this time from Germany:

[There is] a rare collection of letters from the 16th Century, written by members of the Behaim family of Nuremberg and documented by Stephen Ozment. Michael Behaim was apprenticed to a merchant in Milan at the age of 12. In the 1520s, he wrote to his mother complaining that he wasn't being taught anything about trade or markets but was being made to sweep the floor. Perhaps more troubling for his parents, he also wrote about his fears of catching the plague.

Another Behaim boy towards the end of the 16th Century wrote to his parents from school. Fourteen-year-old Friedrich moaned about the food, asked for goods to be sent to keep up appearances with his peers, and wondered who would do his laundry. His mother sent three shirts in a sack, with the warning that "they may still be a bit damp so you should hang them over a window for a while". Full of good advice, like mothers today, she added: "Use the sack for your dirty washing."

It would appear that in the middle ages, economic maturity and therefore marriage was artificially delayed so that the higher classes could benefit from lower class youth-labor. It can be inferred that the richer one's family was, the less severe this might have been. For the average person, between the ages of about 14 and 24, one was a bounded servant or apprentice to an older master. During this bondage the master was essentially a guardian:

Many adolescents were contractually obliged to behave. In 1396, a contract between a young apprentice named Thomas and a Northampton brazier called John Hyndlee was witnessed by the mayor. Hyndlee took on the formal role of guardian and promised to give Thomas food, teach him his craft and not punish him too severely for mistakes. For his part, Thomas promised not to leave without permission, steal, gamble, visit prostitutes or marry. If he broke the contract, the term of his apprenticeship would be doubled to 14 years.[24]

…

Patriarchal government in its many forms was a necessary agent in maintaining the long period of semidependency that constituted "youth" in the preindustrial life cycle. Masters and heads of households had a vested interest in keeping from their charges the full rights of adulthood; for, as long as their life style remained simple and austere, the cost of keeping resident servants and apprentices was relatively cheap. Youths dressed in the manner of adults, but were forbidden luxury clothing. In 1603 three London apprentices were sent to jail for refusing to cut their hair and renounce the sartorial splendor that was causing distress among both their own masters and the local authorities. Masters were also to see to it that youth did not drink, gamble, or seek the company of the opposite sex; and there were curfew laws keeping apprentices and servants off the streets after dark. But perhaps the most effective preventative of the youthful appropriation of adult roles was the fact of living in. There were, as in Germany, laws that forbade youths to marry before they had completed their apprenticeships, but the very fact that young people were dependent on the households in which they lived and were rarely paid for their services in money wages prevented them from setting up their own families and thus from putting pressures on already limited resources.[25]

Aristocratic youth were unlikely to have been bound to some artisan master, meaning (though there are not a lot of sources on this) their youth is likely to have been more continuous with that of ancient aristocratic youth; i.e. , a period of political training wherein serious responsibilities are entrusted yet the most important ones are withheld. We know that they started their secondary education at roughly the same time, 14, but Oxford was perhaps stricter and more infantilizing than the more personal and informal ancient liberal arts education. "Even the children of the rich and the powerful were made to feel their inferiority;

[24] Kremer 2014
[25] Gillis 1974, 22

and until the mid-eighteenth century, Oxford students were still subject to corporal punishment, the symbol of the subordination they shared with servants and apprentices of lower station in life"[26]. We know little about the ancient lower classes, and so it is possible that lower class medieval youth is greatly discontinuous or mostly continuous with that of ancient times. What we know a lot about in both cases are the skilled laborers, the "middle class." In Ancient Rome, apprenticeships were less formal and shorter, lasting about three years. I have not seen evidence that apprentices were "bound" to their masters. In contrast, medieval professional youth faced severer restrictions on their autonomy, and a much longer period of economic immaturity. It appears that the typical Roman professional would begin adult labor around the age of 17 or 18, marrying soon after, while the same would not come until 24 or 25 for Western medieval professional youth. Related to this is that the ancient Roman economy appears to have been less restricted:

> [Ancient Roman 'guilds'] differed from the European craft guilds of the Middle Ages and early modern period. … All guilds allowed their members to compete freely with each other, and nonguild workers could also find employment in tasks normally performed by guild members. There were significant benefits to membership…although there is no evidence that guilds acted as unions to control wages.[27]

(And while this book is not about economics, Temin's thesis happens to be that "The quality of life for ordinary Roman citizens at the height of the Roman Empire probably was better than that of any other large group of people living before the Industrial Revolution." It is unclear if a short youth (and the beauty of Roman culture relative to the putridness of late medieval for that matter) contributed to this prosperity or if prosperity allowed for a short youth. This is a very complicated question, but the rest of this book aims to help answer it by advancing a scientific understanding of youth as a physical period and of the outcomes of the education of youth in the modern world).

Though we have focused on Britain, things appear to be similar throughout Western Europe. Marriage ages were similarly high, and

[26] Gillis 1974, 9
[27] Temin 2013, 109

similar economic systems were used. But industrialization and the New World would change much of this.

1.3: America and Industrialization

The following is a table featuring average American marriage ages by year, from Fitch & Ruggles (2000).

Age at which 10, 25, 50 and 75 Percent of Native-born White Men and Women Have Married United States. 1850-1999

	10%	25%	50%	75%	Inter-quartile range
Native-born white men					
1850	20.7	22.3	25.3	29.7	7.4
1860	20.5	22.3	25.0	29.6	7.2
1870	20.5	22.3	25.0	29.5	7.2
1880	21.0	22.8	25.4	29.1	6.3
1900	20.6	23.1	26.0		
1910	20.5	22.3	25.2	29.2	6.9
1920	19.9	21.7	24.8	28.3	6.6
1940	20.2	22.0	24.5	28.0	6.1
1950	19.3	20.9	22.8	25.5	4.6
1960	19.0	20.4	22.2	24.8	4.4
1970	19.1	20.6	22.4	24.9	4.3
1980	19.6	21.4	23.9	27.4	6.0
1990	20.5	22.7	25.8	30.1	7.4
1999	21.7	23.3	26.6	31.3	8.0
Native-born white men					
1850	17.0	18.8	21.3	24.9	6.0
1860	17.3	19.2	21.4	25.7	6.5
1870	17.3	19.1	21.2	25.5	6.4
1880	17.6	19.3	21.8	25.5	6.2
1900	17.4	19.2	22.1	22.1	
1910	17.5	19.2	21.7	25.4	6.2
1920	17.4	19.0	21.5	25.0	6.0
1940	17.6	19.1	21.5	24.7	5.6
1950	16.9	18.3	20.1	22.3	4.0
1960	17.0	18.3	19.9	21.9	3.5
1970	17.6	19.0	20.7	22.8	3.8
1980	18.0	19.6	22.0	25.1	5.5
1990	18.8	20.8	23.6	27.2	6.3
1999	18.1	21.2	24.5	28.6	7.4

Sources: Integrated Public Use Microdata Series; Current Population Survey (Basic Monthly Survey January - July 1999)

These figures are 3-6 years earlier than the relevant European figures from Hajnal (1965), something which is probably a signal that the American economy was expanding faster than the European one. Gillis (1974) describes how, due to factors like decreased child mortality, the middle class in Europe expanded faster than the need for middle class workers, leading to an increase in the time during which adulthood was deferred:

Already, in the 1830s, German parents were being told that "the number of young people who have completed their studies is already more than sufficient to occupy all the

positions." … In both Germany and France, industrial development was still proceeding too slowly to absorb more than small numbers of educated youth. … As the crisis of overcrowding worsened, access to salaried position, marriage, and, in effect, to adulthood itself was progressively delayed. Among candidates for the Prussian higher bureaucracy, the age of tenured appointment was increasingly postponed. In the 1830s a Prussian administrative trainee of the Assessor rank waited an average of 6.6 years for his first salaried post; by the 1850s the waiting period was over 10 years. As the educational process became more rationalized and bureaucratized, schooling itself was extended. Students were arriving later at the university (median age of 17 years at Oxford in the 1590s; median age of 19.7 in 1900) and staying longer. Lawrence Stone estimates that the whole English educational process was extended 5 or 6 years between the seventeenth and nineteenth centuries, a trend apparent on the Continent as well. Precocity, so much desired by the parents, had become socially and professionally unattainable for the sons.[28]

It is likely that lower American marriage ages during the industrial time period simply reflects a greater availability of opportunity for material "precocity" relative to Europe. This makes sense geographically, and when considering the futures of the American and European economies along with the histories of the demographics of both continents. Throughout industrialization, immigration to America from Europe was common; Americans were desperate for more people, Europeans for less.

In both America and Europe, the desire for cheap child labor increased. Instead of immigrating to another village and being bound into an apprenticeship around the time of puberty, working class youths would often continue to live with their parents while performing low skilled labor, using their income to help support the whole family. This could last until the age of 21[29]:

Under British common law [the system the States inherited], full majority was reached at the age of 21. Anyone under 21 was legally an infant. Only persons who had reached majority could perform certain legal actions:

- Buy or sell land without restriction
- Vote or hold public office
- Patent land
- Devise land in a will

[28] Gillis 1974, 75
[29] Blackstone 1765

- Execute a bond or promissory note
- Bring suit in one's own name
- Be sued in one's own name
- Serve on a jury
- Act as a guardian
- Marry without parental consent

Some legal actions did not require that a person be 21. For some legal actions, the law merely required that the person be judged capable of discretion. The age of 14 was generally accepted under common law as the age of discretion, and in rare individual cases (particularly females) it could be even lower. A minor could be judged by courts to be capable, just as an elderly person or an idiot could be judged to be incapable. Further, a father could give or withhold some or all of the rights of majority to a child, by "giving freedom", though actually finding such a record is quite rare.

Generally speaking, children aged 14 and over could legitimately perform a variety of legal actions:

- Choose their guardian, or replace an existing guardian
- Apprentice themselves without parental consent
- Bequeath personal property (but not real property) in a will
- Witness deeds and contracts
- Testify in court
- Boys aged 16 and over were obliged to serve in militias and could obligate themselves to military service without the consent of parents in most of the colonies.
- Children aged 17 and over could act as an executor so long as other actions by adults were not required. (This is a relatively rare occurrence.)[30]

According to the law, parents could legally demand that their children work for them until the age of 21. This only changed in the United States as education became compulsory and as the age of majority was lowered to 18 in the 20th century. That said, parental rights were not unlimited, especially after the age of 14, as the above passage shows. If willing to enter conflict with their parents, it was not unprecedented for 14 year olds or older to choose who to enter a binding apprenticeship with (which was essentially choosing a new guardian). As apprenticeships faded away, this right became less socially relevant and in consequence it is likely that the duty to one's parents became more legally absolute.

[30] http://www.genfiles.com/articles/legal-age/

In practice, however, as Gillis (1974) stated, a significant number of parents desired precocity for their children. This desire likely varied by class, with professional classes wanting precocity to a greater extent than lower classes due to professional-class parents being less reliant on the income of their children's labor. Gillis relays the following:

> In the mining industry, too, early industrialization seems to have reinforced patriarchism. It was reported there that "the collier boy is, to all intents and purposes, the property of his father (as to wages) until he attains the age of 17 years, or marries." … Newcomers to the city were heavily concentrated in the age brackets we associate with youth. Charles Booth found that of those migrants from English villages to London in the 1880s, some 80% were 15 to 25 years of age; and these figures seem representative of European internal migration as a whole. … Mid-nineteenth-century English doctors and lawyers were typically older as a group than businessmen or entrepreneurs, a condition that reflected their extended preparation. By mid-century, the cost of domestic education or grammar schooling to the age of 17 or 18, plus 5 to 7 years of articled apprenticeship beyond that, was often over £2,000.

He also includes the following tables:

TROUBLED YOUTH: THE CONSEQUENCES OF MODERNIZATION, 1770-1870

Household Composition of Residents Other Than Parents

	kin	Lodgers	Servants and apprentices
Preindustrial Households, 1564 to 1821	10%	<1%	29%
Preston, 1851	20%	23%	10%

*Figures from Michael Anderson, "Household Structure," P. 220.

Children Residing with Their Families in 1851

		Preston	Villages in surrounding Lancashire
Boys	10-14	92%	77%
	15-19	79%	56%
	20-24	65%	53%
Girls	10-14	86%	86%
	15-19	67%	62%
	20-24	62%	46%

*Figures from Michael Anderson, "Household Structure," P. 220.

It would appear that in the middle of the era of industrialization, children might be sent away from their parents as early as in their preteens or as late as their twenties. This reflects the distribution of marriage ages represented in the table from Fitch & Ruggles; in the US of 1850, 1 in 10 women married by their 17th birthday, but 1 in 4 married after their 25th. As precocity was apparently in demand, it's likely that the higher classes tended to marry earlier and the lower later.

19th century youth, like medieval before it, tended to be long. The typical youth was labor-bound to his parents, or tied up in lengthy educational processes if a member of the higher classes. Precocity had more demand than supply, unlike in Ancient Rome. Some were able to marry young, but for many marriage took until their mid-twenties or even later.

The variability of industrial youth is strikingly different than what can be observed today. As the 19th century came to a close, something important to this topic began to emerge, a homogenizing force: universal education. The establishment of public education systems and consequently compulsory attendance led to the death of significant child and youth labor and to a great homogenization of the social course of youth. The next chapter deals with the history of this system in the United States.

1.4: Conclusion

We have seen how youth has varied between different ages; precocity negatively correlates with years since the death of Christ and positively correlates with economic prosperity. Even as the average length of youth increased from that of the Ancient world to that of the medieval world, great variability could still be observed. For instance, while the lower classes married late in medieval times, it was not uncommon for the aristocratic class to marry as young teens or even preteens, similar to the practice of the Ancients. Even in the 19th century, youth could wrap up at the classical age of 17 or 18 or extend medievally to the mid-twenties or even the early thirties.

But as industrialization progressed, public education became increasingly common. This would dramatically change the character of youth; whereas previously young people were generally participants in the adult world, commonly engaging in practical training, lesser yet serious responsibilities, and labor, the education system would decisively segregate youth from the "real" world.

After the rise of universal education, an ideology of extreme youth immaturity emerged. Whereas, almost universally in the past, 14 year olds were considered old enough to leave their parents for full time training or labor, people now fret about whether youth that age and older are "mature" enough to choose which divorced parent they want to live with. Whereas in ancient Rome couples would more often than not marry in their teens, whether by their own choice or by external pressure, now high-school sweethearts are considered reckless if they consensually wed when they are first legally allowed. Whereas in ancient Rome there

were 17 year old lawyers and physicians, people now believe it is right and proper to require a 17 year old to retrieve permission from his parents so that he may be vaccinated. Whereas in the past youth were routinely exploited for their full-time labor into their twenties, today people worry about whether a high-school aged youth is mature enough to handle working an equitably compensated full-time job. And so on to infinity.

All of these common feelings and considerations are shown to have no basis in the history of youth. Three other modern dogmas are likewise weakened: the widely held belief that 18 is a special birthday, and to lesser degrees, the same belief for the ages of 21 and 25. We have found, in the case of the first birthday, that 18 was only given any significance in classical Athens, where it was the age of majority and of entrance into the Ephebes. This arrangement was quickly destroyed by technological advancement during the Roman epoch. Recall that the age of entrance into the Ephebes shifted downwards, towards the age of 14, and Roman patriarchal custom was adopted with regards to the age of majority, rendering 18 meaningless, making it just another year within a continuous youth stage. Contrast this to the special significance many laws and laymen give 18 today. Even in classical Athens it was only significant with regards to political participation and conscription. Over time, the former moved upwards towards 25 and the ladder moved downwards towards the end of puberty, indicating that even the limited belief in the 18th birthday's special significance was in fact a luxury belief that could not withstand the passage of time and external pressure. It is likewise a luxury belief today, even more so, as the birthday is given heightened significance relative to Athens in that turning 18 today finally grants a young person traveling rights, medical autonomy, labor rights, many privileges ranging from the right to smoke, in some places drink, get tattoos, and so on, in addition to being a common conscription age and voting age as it was in classical Athens.

The significance of 21 is largely absent from the world today save for the exception of the unusually high American drinking law. We found that in history it was only significant as the age of majority under British common law. This law was transferred to the United States and the age of majority was only changed to 18 after the latter became the materially-

de-facto age of adulthood due to the high school system and the failure of the luxury-belief conscription age of 21 during World War II.

Lastly, 25 appears only as an age of higher political participation as established in Rome, and as the age at which bounded youth-labor tended to cease during the Middle Ages. It was, however, widely considered to be the age at which youth ended by a number of authors, and today is the subject of a scientific claim regarding brain development, that the brain reaches "maturity" at the age of 25. As such, I find it a compelling age and devote the latter part of this book to exploring it and the true age at which we may say that a young person reaches maturity.

Spoiler alert: I find that, scientifically speaking, maturity is reached at the beginning of youth, not the end. The beginning, of course, is 10 or 11 years prior to the age of 25, and we found that those ages are prominent milestones throughout history. This suggests that youth is a time of learning and, perhaps, exploitation, but not a time of significant physiological development.

The history supports this conclusion. We have seen how, in antiquity, the economy had less parasitism than that of middle ages, was superior in strength, and at the same time youth was very short with no social downside. The length of youth, furthermore, varied by class, and was longer for the upper class, who required more learning. Then, in the Middle Ages, youth was largely a form of economic exploitation, or at least extraction. It was shorter for the upper classes, who were less exploited, and ended upon the completion of learning and the beginning of skilled labor. Finally, during the industrial era, the age of majority was not justified by youth immaturity but rather by the idea that youth owed their parents a certain amount of economic activity before keeping it all for themselves[31].

Aristotle and others did comment on the active temperament of youth. The Romans, for instance, justified their age restriction on entrance into higher political bodies with comments on youth inexperience and active temperament. Based on testosterone levels by age, their observations on temperament are probably correct. But today is the first time that the subordination of youth has been justified by the

[31] Hine 1999

claim that youth are infantile, that the subordination is actually good for the young, that they are like babies who must be totally shielded from the adult world by educational institutions. These charges of infantilism are historically bizarre, and as we will see in chapters three and four, are incorrect.

Rather, as in the Middle Ages, contemporary youth appears to be a mix of learning and exploitation. The exploitation is, unlike during the Middle Ages, always through learning, which when not useful to society or to the young individual becomes economic exploitation when payed for by the student. Indeed, much of what is taught to youth in school serves the purpose of indoctrinating them or exists solely to justify the exploitation of youth and their families.

More precisely, what we have is exploitation mixed into and justified by necessary learning. Doubtlessly, future physicians should attend medical school. But should they attend high school? Should they attend college? Perhaps they should attend parts of each. But when forced to take a class on Intersectional Feminism in Arabian Film or an introductory class they already took in high school in order to receive the paper slip they need so that the medical schools might have them, they are being exploited. When in high school they are forced to take class after class that either teaches them nothing of value or wastes their time by progressing too slowly, they and their families are being exploited. But is said exploitation intended? Examining the history of the system can reveal the answer to this question.

II

Education

2.1: The History of American Education

The education system is massive, costing Americans about a trillion dollars a year[32]. I and many others have deep concerns over its true utility and purpose. Do people actually benefit from years of education? With regards to the ordinary man, my bias is no – no, most people do not benefit from most of their education. The West is overeducated. This bias will be examined in the latter part of this chapter. First, the history of the system:

Throughout history there were individuals who labored thoroughly so that the United States could be marked with today's system of education. The earliest of these men lived no later than the early 19th century. Compulsory education in Germany was underway in the days of Martin Luther. But forced education in America was largely unknown to the average citizen until about the year 1900.

[32] Caplan 2018

	1820	1830	1840	1850	1860	1870	1880	1890	1900	1910	1920	1930	1940	1960
States With Compulsory Education (%) (DC inc) (1p8)	0	0	0	0	1(3%)	3(8%)	18(42%)	26(62%)	33(73%)	42(91%)	49(100%)	49(100%)	49(100%)	49(~100%)
States that compelled high school education (>15y/o) (1p11) (2p29)	0	0	0	0	0	0		10(24%)			29(60%)		49(90%)	49(~100%)
States With public school laws (first 21 states)	57%	80%	86%	86%	90%	100%	100%	100%	100%	100%	100%	100%	100%	100%
States With centralized public schools (first 21 states)	0%	0%	14%	24%	38%	86%	95%	100%	100%	100%	100%	100%	100%	100%
States With laws establishing public high school (first 21 states)	0%	5%(ma)	5%	5%	5%	10%	14%	19%	48%	86%	100%	100%	100%	100%
Total Number of states	21%	24	26	31	33	37	38	42	45	46	48	48	48	50
1. https://files.eric.ed.gov/fulltext/ED542358.PDF														
2. https://digitalcommons.lsu.edu/cgi/viewcontent.cgi?article=2339&context=gradschool_disstheses														
1. https://nces.ed.gov/pubs93/93442.pdf														

The system as it is known today came in waves: first came the public schools, then came the laws requiring students to attend them, and finally came the machinery needed to enforce those laws[33]. In general, these early laws only targeted people under the age of 14. After the system had been put in place for children, the high school was expanded and made more ubiquitous, with most states then requiring youth up to the age of 16 or 18 to stay in school[34]. Some of the earliest important men behind the ascendancy of the system were Horace Mann and his clique:

By the middle of the nineteenth century America had its first group of professional educationists. The principal figures in this close though informal body of professionals were a group led by Horace Mann of Massachusetts and including Henry Barnard of Connecticut, James G. Carter of Massachusetts, Caleb Mills of Indiana, and Samuel Lewis and Calvin Stowe of Ohio. The tireless efforts of these few men were instrumental in expanding the public school system, in establishing a compulsory system, and in gaining for themselves positions of power in its structure. One method used to achieve their goals was to establish a welter of interlocking educational organizations. One of the first was the American Lyceum, organized in 1826 by Josiah Holbrook to influence and dominate state and local boards of education. In 1827 the first Society for the Promotion of Public Schools was organized in Pennsylvania to engage in an extensive program of correspondence, pamphleteering, and press releases. Similar societies were formed in the early 1830s, featuring lectures, meetings, and legislative lobbying. Hundreds of such associations arose throughout the country, like the American Institute of Instruction, founded in New England in 1830. The annual meetings and papers of this institute served as a clearing house and discussion center for the educationist movement.[35]

[33] Katz 1975
[34] Tyack 1976
[35] Rothbard & Rickenbacker 1974

In 1827, Massachusetts passed a law that required towns of more than 500 families to provide a public high school[36], becoming the first state to do so. Massachusetts people historically possessed an amiable attitude to the idea of schooling, in part due to their Puritan religion which held that theological education was for every man of God. Perhaps it was this belief that made this state the earliest population upon which this system was constructed.

While Massachusetts, in the 17th century, mandated that all children were to be literate, and was the first state to set up public grammar schools (for religious purposes), it was not until the mid-19th century that it was mandated that all children attend school[37]. And coincidentally, the 1827 high school decree was not popular: "Michael Katz, writing about the successful struggle in 1860, in Beverly, Massachusetts, to abolish the public high school, points out that the wealthy groups were almost unanimously in favor of keeping the public high school while the working classes and poorer groups—the farmers, shoemakers, mariners, fishermen, and laborers—were almost unanimously in favor of its abolition"[38]. The establishment of the public education system was unpopular wherever we look.

But before more instances of unpopularity are discussed, a general history is in order. The usual method of historical analysis has already been done and reveals little in regards to the creation of institution called the American education system - the typical babble about what ideas were permeating the brain lobes of the common folk at the time as well as what mixture of immigration, poverty, and unemployment could have contributed to the making of this system is practically worthless. Like all decisions, the American education system has been willed into existence by the minds of men, elite men with the power to see their vision become reality. Who these men were and what they wanted is what will be determined here. This is a more difficult task than bleating about Ideas and Economies, but its result is a far superior

[36] American Educational History: A Hypertext Timeline : http://www.eds-resources.com/educationhistorytimeline.html#2000
[37] Katz 1975
[38] Rothbard & Rickenbacker 1974

history that makes few presuppositions, since the extent to which Ideas and the Economy influenced the decision makers should be clear upon examination of their motives.

Massachusetts, being the trend-setting state, has an educational history that can serve as an excellent case study that should reveal the people behind the rise of the contemporary American education system. The hypothesis that the same type of people were behind the national rise of this system can be tested by comparing the history of the system in Massachusetts to the history of it in another state. For every law there are people who passed that law - in the case of the 19th century American republic, those people were democratically elected. But behind the decision of the voters are the elite supporters who fund campaigns and behind the decisions of Congressmen are mostly elite pressures.

Horace Mann served in the Massachusetts state legislature from 1827 to 1837, as the majority leader for a time, and afterwards he became the Secretary of the Massachusetts State Board of Education, the first man to hold such a position in the nation. He was given that position by the Unitarian governor Edward Everett, a former president of Harvard. Graduating from Brown University, a modern day "Ivy League" university, and marrying Brown President Asa Messer's daughter, it was not surprising that Mann joined the Whig party, the more elite and progressive of the parties of his day[39] which existed solely in its united support of the central bank and its opposition to Jacksonian-Democratic attacks on that bourgeois institution.

It was the Whig party that championed public education: "Many voting Americans opposed the intervention of state government into the process of education, even in the 1840s and 1850s. People in small rural districts feared the interference of the state, as did some religious groups. … The fears of these various opponents were well founded. Common school reformers moved gradually to … eliminate sectarian religious practices from the schools … many Democrats looked upon the common school reform as a Whig invention"[40]. The word "reform" is used because local towns naturally established education to the extent

[39] Mondale 2001, 25
[40] Ibid., 15

that they needed it for their prosperity, as evidenced by the fact that the establishment of the centralized and compulsory American education system did not improve Massachusetts literacy rates[41]. This means that Mann and his clique were not forcing the lowly masses to open schools and enlighten their souls, rather, what is meant when their "public education laws" are mentioned is laws that force the establishment of unnecessary schools that, due to their wastefulness, did not exist before compulsion, such as the high school, and laws that standardize the curriculum which appears to have been mostly intended to root out religion from town schools.

The United States had no shortage of the type of schooling which benefitted individuals by teaching them productive skills:

> And certainly the problem was not economic, for the poor could always get an education if they wanted it. In some towns there were more charity and free schools, supported by private philanthropy and school funds, than poor pupils to go round. In Pennsylvania, for example, the state paid the tuition of any child whose parents could not afford to send him to a private School.[42]

Despite these material circumstances, public, centralized, secular, and ultimately compulsory education was shoved down the throat of America. And so it was a chamber led by the future Whig Horace Mann that passed the 1827 Massachusetts law that required every sizeable town to spend precious local funds on a high school. Mann himself had no large fortune, indicating that someone or some group

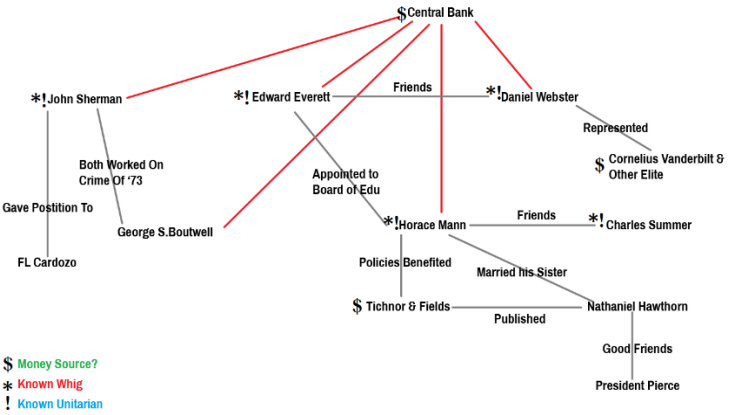
---

[41] Simpson, 2004: "In 1650, male literacy in America was 60%. Between 1800 and 1840, literacy in the Northern States increased from 75% to 90%, and in Southern States from 60% to 81%. These increases transpired before the famous Common School Movement led by Horace Mann caught steam. Massachusetts had reached a level of 98% literacy in 1850. This occurred before the state's compulsory education law of 1852. Senator Edward Kennedy's office released a paper in the 1980s stating that literacy in Massachusetts was only 91%."

[42] Blumenfeld 1984, 2

probably bequeathed him with funding for campaigns and trips to Prussia.

Direct evidence of Mann's monetary backers is largely lost to the sands of time. There is no Secret Six, and there are no accessible documents that tell of campaign contributions to Mann or of lobbying. What is accessible, however, is information on Mann's elite social network, from which funding may be inferred.



Possible sources of funding range from Cornelius Vanderbilt, to whoever funded Josiah Holbrook's lyceums which Hawthorne and Webster were speakers in, to a President of the USA, to two Ivy League Presidents (to whatever extent they were rich) to a world famous author. Another possibility, which will seem ever more likely in light of later developments, is support from the central bankers. What many of these people have in common is their Unitarian faith, a faith which rejects Jesus as the Christ and holds that God is a unity, not a trinity. It masquerades as Christianity by holding that Jesus made some good points and was historical.

Edward Everett, Daniel Webster, Nathaniel Hawthorne, and Horace Mann were all official Unitarians. An as of yet unmentioned multi-millionaire, Stephen Girard, was an atheist who established an irreligious college with his passing in Pennsylvania in the 1830s. It is entirely possible that the Unitarians received funds from Girard or

someone similar, although it was likely not John Jacob Astor, who Horace Mann publicly denigrated[43].

The Unitarians had big money, enough to open up their own college, Antioch College, of which they installed Horace Mann as the president. That type of money doesn't come from worship donations, especially considering that Unitarians are fonder of debating on the day's political topics than worshiping the God they allegedly believe in. Sadly, it will probably never be proven incontrovertibly exactly who funded Horace Mann.

But there is a small list of likely candidates to go with the fact that Horace Mann was indeed funded. For the establishment of this system was by no popular will; as we have already seen, and as I will provide more evidence for later, the public opposed the system's establishment and its continuation for decades. It seems that it was only after a generation or two had been thoroughly "educated" that the nation as a whole came to be fond of the system.

What should also be established are the motives for the passage of the 1827 law, such that we can conceptualize the events in this chain in the following format: "[Power-group X] did [event Y] because [motive(s) Z]." Here are where Ideas and the Economy may come in to play. The important concept to keep in mind is that these environmental variables are always filtered through the nature of the people making decision Y. Not every group will respond to change in Ideas or the Economy identically.

The first obvious motive for the establishment of the public education system is religious: our oligarchy is largely Unitarian, and laws of the early phase largely functioned to push Christianity out of schools, although the 1827 Massachusetts law was only to establish public high schools. Nonetheless, many other laws these same people pushed were characterized by dictating a centralized, secular curriculum. This is generally what is meant when schooling is described as becoming more "centralized." The second motive is financial. Consider the 1827 law. Why would they pass such a thing when they could and did simply pass

[43] Charles Astor Bristed – A Letter to the Hon. Horace Mann.

bills ridding grammar schools of religion, if religion were their only motive? How is it that they benefit from the high school?

Here is Horace Mann's own account of his motives:

> It [public school] does better than to disarm the poor of their hostility towards the rich; it prevents being poor....The spread of education, by enlarging the cultivated class or caste, will open a wider area over which the social feelings will expand; and, if this education should be universal and complete, it would do more than all things else to obliterate factitious distinctions in society.
>
> The main idea set forth in the creeds of some political reformers, or revolutionizers, is, that some people are poor because others are rich. This idea supposes a fixed amount of property in the community, which, by fraud or force, or arbitrary law, is unequally divided among men; and the problem presented for solution is, how to transfer a portion of this property from those who are supposed to have too much, to those who feel and know that they have too little. At this point, both their theory and their expectation is of reform stop. But the beneficent power of education would not be exhausted, even though it should peaceably abolish all the miseries that spring from the coexistence, side by side, enormous wealth and squalid want. It has a higher function. Beyond the power of diffusing old wealth, it has the prerogative of creating new. It is a thousand times more lucrative than fraud; and adds a thousand fold more to a nation's resources than the most successful conquests. Knaves and robbers can obtain only what was before possessed by others. But education creates or develops new treasures,--treasures not before possessed or dreamed of by any one.
>
> For the creation of wealth, then,--for the existence of a wealthy people and a wealthy nation,--intelligence is the grand condition.[44]

Here we see a definite class-consciousness, a proto-Fordism, i.e. a desire to "disarm the poor of their hostility towards the rich" by elevating the workers' quality of life, "peaceably abolishing all the miseries that spring from the coexistence [of] enormous wealth and squalid want." New wealth is to be created; America's capital will increase by a thousand fold more by education than by imperialism. "For the existence of a wealthy people … intelligence is a grand condition." Mann wanted nothing less than to secure the existence of his wealthy class by means of mass education.

It would appear that Ideas and the Economy did in fact play important roles in the establishment of public education in the United

[44] Mann 1991

States, just not in the way that scholars like Tyack usually allege. Secularization was not a kamikaze strike against Catholic immigrants by the protestant masses; rather, it was motivated by the proto-atheistic Unitarianism of the upper classes. The system was also not the prerogative of workers who naturally wanted to be made more economically productive such that they may be paid more. Instead, the curricula were set up by elites for their own benefit; any pay raise for workers was Fordist in nature, motivated by the desire to secure the existence of the elite class by staving off revolutionary sentiments with bread and circus.

As such, we see the roots of education's partially exploitative nature. The original intent of Mann and his friends was, in part, to raise the quality of life of everyone. But it was also to secure their rule and enhance their own wealth. Consequently, economically useful training given in public school is, in a way, exploitative, because a large portion of the capital generated by such training goes into the pockets of the ruling class, while the education is paid for entirely by workers, and mandated by the ruling classes earliest laws. Yes, we finally see the meaning behind the wealthy pushing an unpopular law that mandated public high schools; the high schools were job training, and public meant that workers themselves were taxed in order to fund it, when more equitably, employers should pay for such training as an investment in the student's improved human capital, while workers benefit from the higher wage. Public funding for practical education is a way for capital to offload overhead onto the working class. Everyone may get richer as total national productive increases, but the rich get richer more quickly by saddling workers with significant expenses (about a trillion dollars a year nowadays) that capital should be paying for.

We have made sense of the meaning of the creation of early technical high schools by the wealthy. What remains mysterious is the meaning and origin of the impracticalities in the contemporary education system, the lessons that seem to benefit no-one except for the teachers who are paid to teach them. Perhaps the ruling class really thinks that abstract thinking skills and obedience are being taught. They are not, after all, infallible. Let us examine other motives, and maybe we can shine some light on the existence of modern high school poetry courses.

Another set of people involved with the creation of the American system are those who directly profit off of the mandated existence of public schools. How do they do this? One way was through textbook sales to the new high schools. For example, Houghton Mifflin, then known as Ticknor & Fields, was one of the earliest educational publishing companies, and was then based in Boston. William D. Ticknor was friends with Nathaniel Hawthorne, and James Fields was a Unitarian. Their firm was also known for publishing progressive, feminist works. In addition, William D. Ticknor was a banker. Textbook companies would later give NEA its authority by allowing the organization to shape textbooks to their liking, affecting the knowledge available to the whole nation.

The other way the creation of high schools was rendered directly profitable was by making high schools feeder schools for the university system. Today, this means loads of money coming in indirectly from workers through taxes and directly from workers through tuition.

Edward Everett and Asa Messer were directly linked to the university system. It is possible that broad credential inflation was the goal from the very beginning for those heavily involved in the administration of higher education. After the Morrill Act, this goal would clearly come to fruition.

The Morrill Act, also known as the Land-Grant Act of 1862, allocated land for the creation of public universities. Passed in the midst of the Civil War (without the more anti-education southern states), this act was named for Justin S. Morill, a former Whig-turned-abolitionist Republican. Like George S. Boutwell, another educationist who was important in the creation of the system, Morill "also opposed the various proposals for the use of silver as a monetary standard"[45]. Later, in 1890, the act was expanded to provide colleges to "persons of color [direct quote from 1890]." Most high schools were only established after many less-prestigious land grant colleges were erected; the majority of the expansion of the high school system was achieved in the early part of the

[45] Encyclopedia Britannica – "Justin S. Morrill." https://www.britannica.com/biography/Justin-S-Morrill

20th century, after the text book companies had become well established and after the University system had been expanded from the top down.

Keep this in mind; we will return to this topic later when we study the spread of the high school system across the country. Suffice it to say that the 1827 law was for the establishment of technical high schools, and it was motivated by elite class consciousness and religious ideals. The expansion of the university system had not yet begun. It is the transition to that expansion that is likely responsible for the existence of high school poetry classes. We will discover the specific people behind credentialism, but before that a few facts should be given regarding the early educationists as a whole.

> Consider the occupational histories of fourteen educational leaders singled out by Ellwood Cubberley and Lawrence Cremin as key reformers: Henry Barnard, Robert Breckinridge, James Carter, Isaac Crary, Ninian Edwards, Samuel Galloway, Samuel Lewis, Charles Mercer, Caleb Mills, John Pierce, Calvin Stowe, John Swett, and Calvin Wiley. Collectively they paralleled Mann's multi-faceted career as lawyer, state and federal legislator, secretary of the Massachusetts Boar of Education, president of Antioch College. Eleven of the fourteen were elected to political office; nine were lawyers; ten (like Mann) edited journals; six were college presidents or professors; and four were ministers …
>
> Using a larger sample of seventy-four prominent state leaders in education in the years from 1840 to 1890, … Michael Imber found similar multiple career patterns. 34 percent were also ministers; 40 percent were lawyers or judges; 30 percent were college presidents and 22 percent college professors; 18 percent were businessmen; …
>
> In addition to the career fluidity of educational promoters, many were highly mobile geographically. Nine of the fourteen men we named above – who pursued their educational campaigns in seaboard states ranging from Massachusetts to North Carolina – came from New England. 73 percent of Imber's 1840-1890 sample came from New England and the Middle Atlantic states but worked all over the nation.[46]

All of these men were upper class. A surprising minority were Unitarian ministers and college professors. A majority achieved public office and were from New England, where the major wealth resided. These are all clear signs that a minority class of great wealth was the impetus behind the early rise of public schooling in the United States.

---

[46] Tyack 1982, 45

It is currently most pressing to move on to the passage of compulsory education laws in Massachusetts, now that it has been shown that Horace Mann's clique passed the 1827 law for their own minority religious and economic motives. The first of these laws came in 1852, 25 years after the 1827 law. Horace Mann was still alive and was just about to end his time in the federal Congress to become the President of Antioch College. In the intervening years, he had served as the Secretary of the Massachusetts State Board of Education, and while in that position he engaged in financial activities that are revealing of connections:

> No sooner had Mann been appointed Secretary of the Board of Education by Gov. Edward Everett than he got to work setting up the first normal school in Lexington. It was done through the financial help of a prominent Unitarian industrialist, whose funds were matched by the state legislature. It was established in 1838 as experiment. Opposition to the idea of state-controlled teacher training remained strong, until 1845 when the opposition was finally overcome. In March 1845, the Massachusetts Legislature voted to appropriate $5,000 in matching funds to the $5,000 raised by Mann's Harvard-Unitarian friends to build two additional normal schools.[47]

The governor who signed the 1852 law into effect, which forced all children from the age of 8 to 14 to attend 12 weeks of school per year, was George S. Boutwell, a state Banker and a member of the Democratic Party[48]. Although a Democrat, it was two parties that Horace Mann was linked to that passed the 1852 bill. These parties, the Whigs and the Free Soil party, were probably both recipients of the same sources of wealth as Horace Mann. This is evidenced by the Whigs' unifying support of the central bank and by the fact that Horace Mann ran unsuccessfully for governor on behalf of the Free Soil Party in 1852.

During Boutwell's first term in 1851, "Laws governing the issuance of bank charters were streamlined, and the Harvard Board of Overseers was reorganized … In his second term, Whigs controlled the House of Representatives, and were thus able to thwart most of the reform agenda. Boutwell's call to increase taxes for spending on

---

[47] Blumenfeld 1984, 17

[48] https://classic.nga.org/cms/home/governors/past-governors-bios/page_massachusetts/col2-content/main-content-list/title_boutwell_george.default.html

education, prisons, and mental hospitals went unheeded"[49]. The Free Soil Party also possessed a sizeable share of the Massachusetts General Court during Boutwell's second term in 1852, when he signed the compulsory education law into effect.

After the Civil War, Boutwell gained a reputation as a "Radical Republican," that is, a Republican who was viciously opposed to slavery and discrimination against the black man. Boutwell strongly supported the Civil War and a North-imposed end to slavery. In 1869, acting as Secretary of the Treasury, Boutwell commissioned the creation of the Coinage Act of 1873 which would become known as the "Crime of '73"[50]. This act abolished the silver exchange and replaced it with a gold one:

> The silver exchange was abolished and replaced by a gold standard by means of an Act Revising and Amending the Laws Relative to the Mints, Assay Offices and the Coinage of the United States. On 17 January 1873 this act was passed by the Senate. According to a sworn affidavit of Mr. Frederick A. Luckenbach dated 9 May 1892, he had learnt from Mr. Ernest Seyd in London that the demonetisation of American silver had been expressly ordered by the Governors of the Bank of England, who had furthermore paid £100,000 ($500,000) in order to have a sufficient number of committee members of the US Congress dealing with financial matters bribed. This nefarious deed became known as the "Crime of 1873". The forced abandonment of the people's money, silver, was also instituted in the German Empire when the government inexplicably ceased to mint silver thaler coins in 1871. There seems to be little doubt that this was part of a synchronised scheme co-ordinated by the Rothschilds in order to further entrench the gold standard.[51]

What a grand coincidence that the man who signed the first compulsory education bill in the United States into law was also the Treasurer behind the Crime of '73! This is, in combination with the party policy breakdown, is strong evidence available that signals that the construction of the education system heavily supported by elite bankers.

It seems reasonable to conclude, then, that both the 1827 law and the 1852 law were funded by the same interests for the same reasons.

---

[49] https://en.wikipedia.org/wiki/George_S._Boutwell 7-31-19
[50] https://en.wikipedia.org/wiki/Coinage_Act_of_1873 7-31-19
[51] Goodson 2017, 60

These laws and those that occurred between them meant the establishment of State controlled education and the forced schooling of children either in those schools or one with the same curriculum. The only phase that was left was the spread of this system to the other states and the establishment of the mechanisms that would be used to actually enforce these laws on the then-unwilling American public.

If a cursory study of the progression of education laws in another state reveals the same interests, it's reasonable to conclude that these interests were the primary forces behind the national spread of the public education system. Indeed, Horace Mann, and with him his funders, aided people such as "Henry Barnard of Connecticut, … Caleb Mills of Indiana, and Samuel Lewis and Calvin Stowe of Ohio"[52] in setting up similar systems in their respective states. They also established national organizations: "One of the first was the American Lyceum, organized in 1826 by Josiah Holbrook to influence and dominate state and local boards of education. In 1827 the first Society for the Promotion of Public Schools was organized in Pennsylvania to engage in an extensive program of correspondence, pamphleteering, and press releases. Similar societies were formed in the early 1830s, featuring lectures, meetings, and legislative lobbying. Hundreds of such associations arose throughout the country, like the American Institute of Instruction, founded in New England in 1830"[53].

In Delaware, it was a future Whig named Charles Polk who signed the "Free School Act of 1829"[54] into law. The Whigs of that state would go on to expand the law in 1830, 1832, 1835, and 1837. In Florida, 1831, the "Florida Education Society" was established, staffed by David Floyd, Edward Aiken, B.D. Wright, and Moses Levy. This organization, so similar to those just described, "had considerable influence in the way of arousing public interest in the sacred cause of education"[55]. In particular, this organization helped agitate for laws that forced land to be reserved for common schools. Later, from 1849 under Whig Governor

[52] Rothbard & Rickenbacker 1974
[53] Ibid.
[54] Weeks 1917
[55] Cochran 1921

Thomas Brown, a series of laws were passed in Florida that forced the establishment of common schools in properly sized towns.

Almost twenty years later, the common school system was further entrenched in Florida when it was written into the new state constitution of 1868 that, among other commandments, "the legislature shall provide a uniform system of common schools and a university, and shall provide for the liberal maintenance of the same. Instruction in them shall be free"[56]. The next year, a law was passed in Florida that further centralized the control of these common schools, creating a complex bureaucracy which was to dictate what was taught, and from whose textbooks, along with specifying that these schools were to serve "all the youth residing in the State between the ages of six and twenty-one years"[57].

Analogous laws and constitutional mandates were forced upon most if not all of the southern states after the Civil War. In fact, "The only state whose education provision was merely perfunctory was Georgia, whose convention was dominated by Southern whites"[58]. This legislation was possible only because the Northern government of Republicans forced all of the Confederate States to rewrite their constitutions in accordance with specific rules. These rewrites were crafted by assemblies which were composed of "carpetbaggers and negroes"[59] thanks to the fact that any politician who held office in the Confederacy was barred from running and "No Southern male could vote who participated in the war effort in any way, including contributing food or clothing to the Confederate army"[60].

[56] Ibid., 34
[57] Ibid., 37
[58] Tyack 1986
[59] Cochran 1921
[60] DiLorenzo 2000

Educational Provisions in the Reconstruction Constitutions (1868-70) of Ten Former Confederate States

Provisions	% of States
Requirement of states free school system	100
Provision for states superintendent	100
Provision for state board of education	60
Provision for county superintendents	40
Provision for common school fund	90
Provision for county or local taxation	50
Provision for state taxation	100
Minimum school term prescribed for state aid	60
Clauses concerning compulsory attendance	50
Clauses concerning federal land grants	80
Clauses forbidding aid to sectarian schools	40

Source.----Franklin B. Hough, Constitutional Provisions in Regard to Education in the several American States of the American Union, U.S. Bureau of Education, Circular no. 7, 1875 (Washington, D.C: Government Printing Office, 1875). Note.----Alabama, Arkansas, Florida, Georgia, Louisiana, Mississippi,North, Carolina, South Carolina, Taxas, and Virginia are the states included.

Tyack 1986. Note: The frequency of highly specific clauses such as those "forbidding aid to sectarian schools" and those "for a common school fund" indicates that carpet-baggers were following the Northern model.

The voter suppression was so severe that in South Carolina, the first state to secede, Francis L. Cardozo, a half-black, half Sephardic man, was elected to the state's 1868 constitutional convention just three years after slavery was abolished, where he was successful in getting school integration written into the constitution and where he argued for compulsory education, acting as the head of the "Committee on Education"[61]. Later, Cardozo was "elected" to be Secretary of State for South Carolina. He was also eventually given a position in the federal Treasury Department by John Sherman, a crafter of the Coinage Act of 1873 (Crime of '73).

Shortly after the astroturfing of the South, a massive new push for compulsory education laws went underway. As of 1870, only 3% of states had compulsory education laws on their books, while by 1880, that number jumped to 48%. This push was not popular. How could it be? Parents who wanted their children to attend school sent their kids, while those who were suspicious of schooling withheld their children.

[61] Tyack 1986

These new compulsory education laws were astroturfed just like the previous education laws, and likely by the same interests:

> Although every State in the Union has enacted a compulsory attendance law, each State had to overcome much opposition on the part of those who considered such a law un-American in principle, in that its provision interferes with the personal liberty of the parents. In 1891 and in 1893 Governor Patterson, of Pennsylvania, vetoed compulsory education bills on these general grounds. In 1895 when Governor Hastings signed a similar bill, he did so only because he did not wish to obtrude his judgment in the matter, which was against the bill. In 1872 when Connecticut was considering the enactment of a compulsory school attendance law, some of the arguments against its enactment that the secretary of the State Board of Education discussed in his annual report, were: (1) A new crime is created (2) it interferes with the liberty of parents; (3) new powers are abrogated by the Government (4) it is un-American and not adapted to our 'free institutions; (5) compulsory education is monarchical in its origin and history; (6) attendance is just as great without the law. In practically every State, such contentions had to be met when bills providing for compulsory school attendance were introduced in the State legislature. As might be expected, the constitutionality of compulsory school attendance laws was a question that found its way into the courts. Decisions on the constitutionality of such legislation have been rendered in at least four States: Indiana, New Hampshire, Ohio, and Pennsylvania.[62]

Connecticut was one of the first states to fall to this campaign for compulsory education. In 1872, Connecticut Governor Marshall Jewett signed a bill into law which forced all children aged 8 to 14 to attend school for at least 3 months of the year. As expected, Jewett was a devout Whig and a Radical Republican who had personal ties to the infamously corrupt, banker backed President Ulysses S. Grant. This President, who signed into law the Crime of '73, shared parties with Jewett and made Jewett both Minister to Russia and United States Postmaster General.

New York's similar 1874 law was also signed into effect by a corrupt, banker backed Republican (whose term was directly before and after that of Democrats) with ties to President Grant. This man, John Adams Dix, was a Union major general who served as Secretary of the Treasury under Buchanon for a short time before the start of the war. During the war, "On October 10, 1862, Lincoln's Secretary of the Navy,

[62] Deffenbaugh & Keesecker 1935, 10

Gideon Welles wrote that 'a scheme for permits, special favors, Treasury agents, and improper management' existed and was arranged by Treasury Secretary Salmon P. Chase [Chase Bank is named for him] for General John A. Dix"[63]. After the war, he was made Minister to France by President Johnson and for a time under Grant. Last but not least, Dix also had ties to the Free Soil Party, although he seemingly lacked ties to the Whigs. And so it goes with those behind this distasteful push for compulsory education laws which were markedly unpopular among the actual public, so much so that less entrenched politicians feared the backlash for passing this law so much as to veto it.

If it is not already clear enough, at every step of the way, the American people resisted these changes. They were not successful, but nonetheless they did not support even the establishment of a public schooling system, which is a measure far more "American" than the extreme centralization and compulsion that eventually occurred. No, despite what Stanford historian David Tyack claimed, along with Michael B. Katz, "Protestants in the United States were" NOT "unified in support of the common school"[64], as Tyack himself proves on the exact same page: "[in Massachusetts, educational] traditions of local Yankee towns remained strong despite attempts to strengthen the role of the State by coupling fiscal support with state standards and by enacting a compulsory attendance law in 1852."

That quote on the people's resistance to state control of schooling clearly shows that no typical American wanted the government to control what was taught in schools, how much schooling children will have, for how long, and where. But nonetheless Horace Mann and his people continued to push for these measures by funding their Unitarian "protestant" foot soldiers, and before long all those things had come to pass throughout every state of the Union.

There was even massive resistance to states simply subsidizing schools, before and without the centralization that enabled these governments to remove the people's religion from the schools. In New Jersey,

---

[63] https://en.wikipedia.org/wiki/John_Adams_Dix 8-8-19
[64] Tyack 1982, 31

"1829, a law to establish 'common' schools was passed that provided for appropriations from the State School Fund. It also authorized the election of township school committees of three members each, the licensing of teachers, the provision of school houses, and reports to the state. The reaction to that law was decisive, and in 1830 and 1831, it was substantially repealed. There was opposition to being taxed for schools, and non-English speaking schools feared that state schools would supplant instruction in their own language, while church-associated schools feared that state schools would affect their progress and welfare. Meanwhile, there were also fears that state schools would lead to a state church."[65]

In Georgia, post-reconstruction leaders faced difficult problems because "many Georgians viewed the common schools … as 'Yankee Schools'"[66].

In Pennsylvania

"In 1834 the Free School Act was adopted. It encouraged the establishment of a free school system in each community. The school system was to be supported by local taxes supplemented by state support. The law was optional, however, and three Luzerne County Townships, Hanover, Newport and Nescopeck, elected to reject the Free School Act and these three 'nonaccepting' towns had to maintain schools without state support. The Free School Act of 1834 was very controversial. Several religious denominations opposed the act because the free school system would disrupt the tradition of religion-based schools. Many schools in the state were taught in the German language and the Free School Act was viewed as a threat to the German heritage. Others argued that free education of the people was dangerous as 'free schools would furnish the hot-beds wherein idle drones too lazy for honest labor would be reared and maintained.'"[67]

In South Carolina

[65] Thorough and Efficient: The Evolution of Public Education (2014): https://www.njsba.org/news-publications/school-leader/septemberoctober-2014-volume-45-2/thorough-and-efficient-the-evolution-of-public-education/

[66] Walker 1991

[67] THE PENNSYLVANIA SCHOOL SYSTEM - http://harveyslake.org/text/pdf/paschools.pdf

"In the 1840s, a truly radical reform idea was introduced to use local property taxes for public education. The idea met with a roar of disapproval, particularly from the Upcountry, where resistance to "infernal taxation" remained strong."[68]

In New Hampshire

"After a period of keen resistance, a law was passed in 1895 which made each town the administrative and financial center for the support of its own schools."

In Virginia, after an education system had been forced on them, leaders, at the will of the people

"[The General Assembly] drastically slashed the school budget from more than $1,000,000 in 1877 to $570,000 in 1879. About half the schools in the state closed, their teachers lost their jobs, and half the students in the state received no education."[69]

In Rhode Island, after the passage of a bill that simply established local taxes in order to fund a decentralized, town controlled school house: "The law met with great opposition and was repealed in a few years"[70].

In Tennessee, after the passage of a simple, decentralized public school law,

"In 1847 the remnants of the state's educational reform forces convened in Knoxville to conduct an inquiry into the condition of the public schools. The convention concluded that the state's school districts were refusing to comply with the conditions of the school law which required the regular election of school commissioners and the provision of physical facilities for schools"[71] In other words, towns were simply refusing to comply with the law and build schools.

In Illinois,

---

[68] Bartels 2000
[69] Julienne & Tarter 2019
[70] Tockwell 1876, 21
[71] Fleming, C. Elementary and Secondary Education (Tennessee Encyclopedia) - https://tennesseeencyclopedia.net/entries/elementary-and-secondary-education/

"For Illinois, which attained statehood in 1818, the first significant education legislation was the Free School Law of 1825. The law provided for "free-of-charge" common schools, open to white children between the ages of five and twenty-one. The provision also established that school districts be operated by a board of trustees and dictated that two percent of revenue received by the state department of treasury, as well as a small portion of the interest derived from that revenue, would go to schools. The 1826–1827 General Assembly subsequently "cut the heart out" of the measure provoking the provisions which had established taxation to fund the common school, instead determining that funds for education may only be raised through voluntary taxation"[72].

I did not go looking for these sources; I have not cherry picked. It is hard to prove beyond what I have done here, but everywhere I have looked it appears that public school was not a popular movement. I have found no examples of the public petitioning the upper classes for tax funded, centralized, and compulsory education. These laws were able to survive in a "representative democracy" because a great portion of the public is complacent with whatever happens. But those who cared were opposed. Educationists were almost exclusively bourgeois.

The Stanford professor's analysis of the situation was so bad because he and his friends assumed in their work, honestly or not, that the American people must have agreed on wanting these changes before they were enacted. This assumption, that in a Republic all policy changes are a result of the organic and unmanipulated will of the masses, is a dogmatic view of history and relies on ignorance. Regardless, the actual historical record clearly shows that these people are wrong and that this system, every step of the way, was beyond a doubt a project of elite influences. This is also why compulsory education laws were widely dead-letter until increased economic prosperity could provide the State with the footsoldiers it needed.

While centuries old records of the activities of state legislatures and the politicians that they were composed of are sparse, the available evidence demonstrably points to the very same Whig money that funded Horace Mann funding similar laws in states as geographically diverse as

[72] The Development of Education in Indiana - https://scholarworks.iupui.edu/bitstream/handle/1805/1001/03_ch_one_doc.pdf?sequence=3

Delaware and Florida. At this point, the laws that established state schools and compelled children to attend them have been covered. What occurred on a more national basis was the establishment of the State organs needed to enforce these laws, and the push towards the high school. In this phase, national organizations such as NEA (the National Education Association) played a more instrumental role than seemingly smaller groups of educationists.

NEA was formed in 1857 as an organization for educational leaders to join and discuss where they wanted the system they were building to go next. While today it functions as a massive teacher's union that uses most of its funds to lobby the federal Congress, until about 1880 it was nothing more than a club for those who already had power in the system that served as an excuse to meet in a day without significant communications technology. In 1880, at the behest of Thomas Bicknell, the Nation Council of Education was created as a subgroup in NEA that was intended to attempt to push certain policies on the whole nation, utilizing NEA's membership, which was educational leaders from many states[73].

By 1880, the push for compulsory education laws was well underway, although most that were passed would be dead-letter laws until the 1890s. About 95% of school systems were centralized, and every state had a public schooling system established. From 1880 to about 1920, national groups like NEA and the Rockefeller Foundation pushed for increased enforcement of compulsory education laws, the establishment of the high school system (which lead to the society of credentials of today), and certain policies within schools like age-grading.

NEA was a formalized communication network of the same moneyed powers that were involved in the erecting of this system from its earliest days. For example, Thomas Bicknell was made Rhode Island Commissioner of Public Schools by Seth Padelford in 1869, who was a Unitarian and a Radical Republican with ties to an anti-slavery activist group financed to help spark the Civil War called the New England Emigrant Aid Company. NEA was also known for hosting lengthy speeches from the likes of Charles F. Adams, who was not a teacher but

[73] Tyack 1982, 99

rather a President of the Union Pacific Railroad, a position also occupied by John Adams Dix[74].

From 1880 to 1900, school centralization was finalized, compulsory education laws continued to be pushed in the states that had not yet adopted them, and the high school system came to be established in about every other state. And from about 1890 onwards, even the greatly biased David Tyack of Stanford cannot help but admit changes were anything but by the people or for the people: "From 1890 to 1930, no other lay group had as much an impact on public education as did businessmen … Businessmen were active in the political movement … to refashion urban systems on the corporate model; they and their wives pushed hard for such reforms as vocational schooling and the kindergarten; they served … disproportionately on city school boards; they lavishly supported educational research and educational campaigns, such as the movement to upgrade education in the South"[75]. Their tool, like the Whig Party before it, was the Republican Party: "From 1874 to 1892 … the governorships were nearly equally divided between Republicans and Democrats, but twice as many compulsory schooling laws were passed under Republican governors as under Democratic. Republican dominated legislatures passed over five times as many compulsory schooling laws as did Democratic. … In California, for example, there was a straight party vote in 1874 on a compulsory schooling law, the Republicans for and the Democrats against. By contrast, the only repeals or vetoes of compulsory schooling laws we have been able to find were carried out by Democratic governors or legislatures"[76].

The 1880s were mostly uneventful, mostly consisting of a continuation of the push for compulsory education laws of the 1870s by the same moneyed interests using the same party of foot soldiers. For example, Rhode Island's 1883 compulsory education law was allowed by Governor Alfred Littlefield, a former Whig, Republican, and President of the First National Bank of Pawtucket. In the 1890s, the high school

[74] Tyack 1982, 96
[75] Ibid., 110
[76] Ibid., 103

system began to be heavily pushed, and by the first years of the 1900s, formal organizations directly established and funded by names such as Rockefeller and Carnegie were driving educational policy.

In the 1890s, the Republicans began to push for the establishment of public high schools, with about half of all states having laws that at least funded a public high school for each town by 1900. The steady push for compulsory education laws that had taken off in the 1870s continued, as it wouldn't be until about 1920 when every state forced education and actually enforced their compulsory education laws. In the year 1890, every state had a public schooling system and practically every state had the machinery in place to control the operations of these systems centrally. The push for the public high school system, then, was the feature that distinguished this decade from the others so far.

One example of a law that created a public high school system that was passed in the 1890s was the 1898 Rhode Island law that provided towns with funds from the State that they could use if they established a public high school. This law was passed by Governor Elisha Dyer Jr., a Republican who had attended Brown University. He was also the son of former Rhode Island Governor Elisha Dyer Sr., a Whig, Freemason, and an inheritor of a mercantile and real estate business.

Same people, same story. Another interesting and revealing happening during this decade was the "Committee of Ten", a group of NEA members, licensed by the NEA department known as the National Council of Education, with massive control in the education system that decided to dictate what the curriculum of high schools would be across the country. This group formed in 1892, and finished their report in 1894, 16 years before the start of the "high school movement" that would complete the establishment of high school systems across the country and herd 14-18 year olds into them in massive numbers. This committee was headed by Charles W. Eliot, who was known for strongly opposing limits to the number of Jews at Harvard as President of that institution and who would go on to head the Rockefeller Foundation from 1914-1917. Here we see the first inklings of the contemporary Professional Managerial Class (PMC) that will go on to significantly shape the process of youth. In contrast to the proto-PMC of the 19th

century, this class, employed by the money of capitalists, is composed almost exclusively by those with direct ties to the university system.

For instance, the Committee of Ten consisted of the following individuals:

- Charles William Eliot, President of Harvard University, Cambridge, Massachusetts Chairman
- William T. Harris, Commissioner of Education, Washington, D.C.
- James B. Angell, President of the University of Michigan, Ann Arbor, Michigan
- John Tetlow, Head Master of the Girls' High School, Boston, Massachusetts
- James M. Taylor, President of Vassar College, Poughkeepsie, New York
- Oscar D. Robinson, Principal of the High School, Albany, New York
- James H. Baker, President of the University of Colorado, Boulder, Colorado
- Richard Henry Jesse, President of the University of Missouri, Columbia, Missouri
- James C. Mackenzie, Head Master of the Lawrenceville School, Lawrenceville, New Jersey
- Henry Churchill King, Professor in Oberlin College, Oberlin, Ohio

Though it was a committee formed to decide the curriculum of the public high school, six out of ten were primarily involved with the Universities. The committee's recommendations were four possible paths, one of which survives to today, thanks to the fact that NEA had mostly members who staffed state Boards of Education and textbook companies: "English, offering only one foreign language-ancient or modern-and stressing English and the other subjects [math, science,

geography, history]"[77]. Many at the time hated this recommendation, as "The classicists warned that discarding Latin and Greek would only serve to undermine the cultural foundations of our civilization"[78]. The fact that this committee's so-called recommendations, made when over half the states didn't even have a public high school system and when the states that did lacked compulsion laws for high school students, "shaped the high school experience decisively and for a long time"[79] speaks seriously to the truly massive amount of power behind these people who together composed NEA, now the largest teacher's union in the nation.

The other paths were Classical, Latin Scientific, and Modern Languages. Not a single path was highly technical, but among the four possible paths presented "English" was the most practical. This most likely represents a push and pull between the PMC and their employers; capital pays the PMC to think but ultimately has the final say. Thus the PMC presents four paths, all conducive to the expansion of their own influence and institutions, and the result is that capital, not thinking for itself, simply chooses the most practical of the paths presented by its "expert" employees. What we have today is potentially explained by a dialectical push and pull between the PMC and capital; the wasted time in high school represents the desire of the PMC, who want college to be necessary for further training and who need students for their poetry departments, while the relatively well-spent time reflects the desire of capital, which benefits from offloading the training of workers onto the public via taxation.

It is clear, then, that the same moneyed interests, who were soon to explicitly reveal themselves in the following decade, were at play in the 1890s as in the 1830s with Horace Mann. NEA, before it was a union, was nothing more than a club for PMC foot soldiers and their employers where they would discuss what they planned to push next in terms of education. This is how some committee of elites could make "recommendations" that manifested so concretely for so long; as soon as NEA ratified the proposal, it became national law.

---

[77] Blumenfeld 1984, 64
[78] Ibid.
[79] Hine 1999, 156

It wouldn't be until 1920 that a public high school system could be found in every state, alongside well-enforced compulsory education laws for children. By 1940, practically every state had implemented compulsory education for high school aged youth as well, causing a swell in attendance to the public high schools and ultimately the credentialism of today. Luckily, from the historian's perspective at least, the developments that took place in the 20th century were heavily pushed for by formal education funding organizations named for and created by the richest men of then and of today.

The General Education Board (GEB), which would later be subsumed into the Rockefeller Foundation, was founded in 1903 with a one million dollar endowment from John D. Rockefeller. It would so blatantly influence educational policy in the first part of the 20th century that in 1914, a NEA department formally condemned it:

> "At an annual meeting in St. Paul Minnesota, a resolution was passed by the Normal School Section of the NEA. An excerpt stated:
>
> 'We view with alarm the activity of the Carnegie and Rockefeller Foundations—agencies not in any way responsible to the people—in their efforts to control the policies of our State educational institutions, to fashion after their conception and to standardize our courses of study, and to surround the institutions with conditions which menace true academic freedom and defeat the primary purpose of democracy as heretofore preserved inviolate in our common schools, normal schools, and universities.'"[80]

Regardless of nice sounding words about "the people," this really represented an internal squabble between the PMC and capital that Rockefeller and his allies would eventually win due to capital's general ascendency to the PMC. In fact, "By 1917, the major administrative jobs in American schooling were under the control of a group referred to in the press of that day as 'the Education Trust.' The first meeting of this trust included representatives of Rockefeller, Carnegie, Harvard, Stanford, the University of Chicago, and the National Education Association. Their chief end, wrote Benjamin Kidd, the British

[80] This is, of course, ironic coming from NEA, a highly undemocratic organization both then and today. The key part of that statement is "and universities."

evolutionist, in 1918, was to 'impose on the young the ideal of subordination'"[81]. This Education Trust

"held annual meetings under an umbrella called the Cleveland Conference, named thus because the first conference had been held in Cleveland in 1915. This exclusive club began with 19 members … Among the others were James R. Angell, a colleague of Dewey's at the University of Chicago [Funded and built by Rockefeller] who became its president and later president of Yale. Angell had gotten his M.A. under William James at Harvard, his Ph.D. at Leipzig and was the first president of the American Psychological Association and later became a trustee of the Rockefeller Foundation; Leonard Ayres, director of the Russell Sage Foundation; Abraham Flexner, director of the Rockefeller Institute; Paul Hanus, who set up Harvard's Graduate School of Education with the help of Rockefeller's General Education Board; Frank E. Spaulding, another Leipzig Ph.D. who organized Yale's Department of Education, was its chairman and later also a member of the General Education Board; Paul Monroe, director of Columbia's school of education and later founder and president of the World Federation of Education Associations; and Edward L. Thorndike"[82].

"The guiding spirit of [the Educational Trust] was Charles Judd who got his Ph.D. in 1896 from Prof. Wundt at Leipzig and became head of the Department of Education at the University of Chicago in 1909. … Judd urged the members of the Cleveland Conference to jump into the breach and undertake 'the positive and aggressive task of ... a detailed reorganization of the materials of instruction in schools of all grades .... It is intended that we make the undertaking as broad and democratic as possible by furnishing the energy for organizing a general movement at the same time we stimulate each other to make direct contributions wherever possible'"[83].

The Education Trust also set up a group to build upon the Committee of Ten, meant to dictate what would occur in high schools. This group was NEA's Commission on the Reorganization of Secondary Education, which released its major report in 1918.

The Commission had been created in 1913 to redefine the functions of the American high school whose student population had grown from 202,963 in 1890 to 1,645,171 in 1918. The reforms recommended by the Commission were called Cardinal Principles of Secondary Education … The Cardinal Principles were: (1) Health, (2) Command of Fundamental Processes, (3) Worthy home-membership, (4) Vocation, (5) Citizenship, (6) Worthy use of leisure time, and (7) Ethical Character.

---

[81] Gatto 2000, 83
[82] Blumenfeld 1984, 58
[83] Ibid., 59

In addition, the Cardinal Principles put forth its own collectivist view of democracy with this curious definition: 'The purpose of democracy is so to organize society that each member may develop his personality primarily through activities designed for the well-being of his fellow members and of society as a whole … Consequently, education in a democracy, both within and without the school, should develop in each individual the knowledge, interests, ideals, habits, and powers whereby he will find his place and use that place to shape both himself and society toward ever nobler ends.'

The driving force behind the commission was its chairman, Clarence Darwin Kingsley, State Superintendent of High Schools in Massachusetts, who had gotten his Master's degree at Teachers College in 1904 and his job in 1912 through David Snedden, Massachusetts Commissioner of Education, a 1907 Ph.D. from Teachers College. Snedden became a member of the semi-secret Cleveland Conference in 1915 and in 1916 became a professor of education at Teachers' College. The radical reform and reorganization advocated by the Cardinal Principles was exactly what the Cleveland Conference ...wanted.

Another interesting member was Otis W. Caldwell, professor of education at Teachers College and director of the experimental Lincoln School, founded in 1917 with the help of Rockefeller money as a laboratory in which to test the new science of education.[84]

This would appear to be a push by capital to increase the practicality of the high school curriculum. Aside from internal high school policy, what was pushed in terms of laws was the creation of the high school system, and of course the compulsion of students to attend these schools. In 1900, about half of all states had a high school system. By 1920, every state compelled towns to provide public high schools, and about two thirds of states compelled students to attend them. By 1940, practically every state would compel students to attend, but by that time credential inflation had taken hold and the "high school dropout" would be doomed to be forever unemployed. This late phase of the construction of the American education system has come to be called the "high school movement" (as if the people wanted it) by educational historians.

As before, there are no records available that feature a list of politicians whose campaigns received donations from these foundations, but biographical details can serve to heavily implicate some individuals. For example, North Carolina was one of the first states of the South to

[84] Ibid., 65-70

pass a law mandating the creation of a public high school system, doing so in 1907. Charles B. Ayock was governor from 1901 to 1905. During his campaign,

> "The political campaign of 1900, like others during and immediately following the Reconstruction Era, began with a major focus on race and a platform calling for white supremacy. The Democratic candidate for governor, Charles B. Aycock, recognized the dangers inherent in such a campaign, and managed to turn public attention toward a crusade for universal education."[85]

In 1902, Ayock installed James Y. Joyner as Superintendent of Public Instruction, who would hold that position until 1919. Under Joyner and Ayock, with "help" from men like Charles D. McIver, "The number of local tax districts increased, and approximately 300 ineffective districts were eliminated by consolidation. In 1901, the General Assembly for the first time made a direct appropriation of tax funds for public schools $100,000 for each year of the biennium. At the same time, the old State Literary Fund was reorganized to provide a revolving loan fund for building schools"[86]. Charles D. McIver was a member of the Southern Education Board[87]. "A number of other organizations were related to or associated with the Conference for Education in the South and the Southern Education Board. The most important was the General Education Board, which was established in 1902 by John D. Rockefeller to facilitate the promotion of education in the United States. The General Education Board made appropriations to state universities to develop high schools"[88].

In 1907 when the North Carolina high school law was passed, Ayock was still Superintendent and still receiving "help" from the Southern Education Board. At this time, Robert B. Glenn was governor.

---

[85] The History of Education in North Carolina (NC State Dept. Of Public Instruction) - https://files.eric.ed.gov/fulltext/ED369713.pdf

[86] Ibid.

[87] Southern Education Board Records, 1898 – 1925. https://finding-aids.lib.unc.edu/00680/

[88] Southern Education Board Records, 1898 – 1925. https://finding-aids.lib.unc.edu/00680/

"Glenn was known as the 'Prohibition Governor' for his successful 1908 campaign to ban liquor statewide"[89]. This is extremely interesting considering Rockefeller's "contributions to the Women's Christian Temperance Union – which, in turn, used the funds to persuade U.S. Congressmen to pass the 18th Amendment and the subsequent Volstead Act – totaled millions of dollars and helped vault the temperance movement to the national stage"[90]. Many believe Rockefeller so ardently supported Prohibition because he wanted it to discourage the development of alcohol based fuel.

The other high school laws were passed under similar circumstances. New Jersey's was also passed in 1907 under a Republican governor named Edward C. Stokes, a Brown University graduate and President of the New Jersey Bankers Association[91]. The Rockefellers have known connections to the Rothschilds and Girards, among other banker families, who appear to have been the capital pushing for the system before John D. Rockefeller became the richest man in history and took the obviousness of moneyed influence to the next level.

By 1920 those types of high school laws had passed and been refined in just about every state in the Union. Compulsory education laws were generally enforced, unlike the situation circa 1890. About 50% of states forced high school aged students to attend the new public high schools. It wouldn't be until 1940 that every state had similar, heavily enforced measures, a fact which is reflected in the large growth in high school attendance during the period from 1920 to 1940. Furthermore, the Great Depression meant high unemployment, which meant not enough jobs for both the family patriarch and his teenage son. It was likely in this decade of hardship that the American public began to really accept the new idea of youth as extended childhood via the universal schooling of young adults. In the 1930s, media personnel effectively argued for high school as both a way to keep youth out of the labor force, where older men with wives and children at home already fought

[89] https://en.wikipedia.org/wiki/Robert_Broadnax_Glenn 8-13-19
[90] Strohl 2017
[91] Noble 1946

between each other for a job, and as a way to magically lift the nation out of the economic crisis.

The direction the education system took in the 20th century was fully planned and anticipated by Rockefeller and his central banking friends. As early as 1901, Rockefeller was funding efforts to end child labor to the tune of $50 million, perhaps another instance of Fordism[92]. Why would someone who seemingly could profit off of the large scale corporate labor of children want to drive them out of the workforce?

Let Frederick T. Gates, the principal business and philanthropic advisor to John D. Rockefeller, inform us:

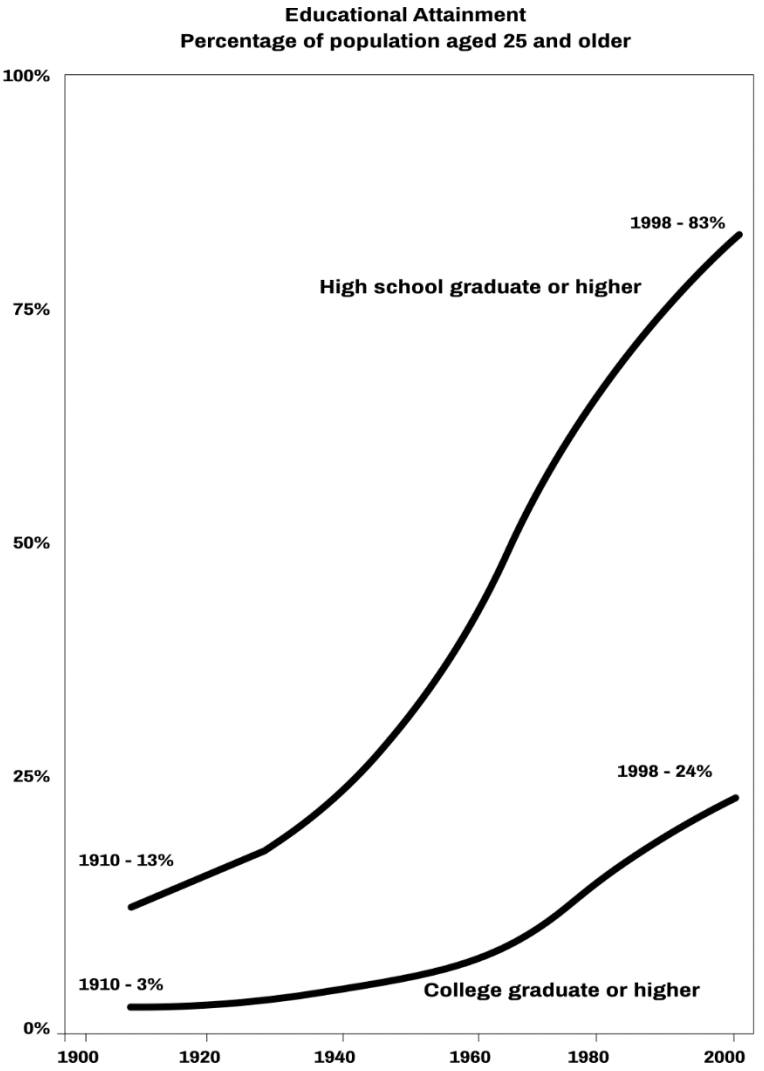
> In our dream, we have limitless resources and the people yield themselves with perfect docility to our molding hand. The present educational conventions fade from their minds; and, unhampered by tradition, we work our own good will upon a grateful and responsive rural folk. We shall not try to make these people or any of their children into philosophers or men of learning, or men of science. We have not to raise up from among them authors, editors, poets or men of letters. We shall not search for embryo great artists, painters, musicians nor lawyers, doctors, preachers, politicians, statesmen, of whom we have an ample supply…The task we set before ourselves is very simple as well as a very beautiful one, to train these people as we find them to a perfectly ideal life just where they are… So we will organize our children into a little community and teach them to do in a perfect way the things their fathers and mothers are doing in an imperfect way, in the homes, in the shops and on the farm.[93]

There is something of a desire here to corporatize the Yeoman farmer via the school, while also making him a more productive unit of human capital. Regardless, it must appear to capital as a benefit for more children to be in school. This fact alone disproves the naive notion that school was created for and by the people in order to benefit the proletariat. Rather, what history shows is the extreme unpopularity of the education system, even in its earliest days, for even its weakest measures. It also shows the great deal of elite support for such a system from the days of its earliest conception, which in the United States country goes back to about the year 1820. Foundations with the names Ford, Carnegie, and Rockefeller, created in the early years of the 20th century, only serve

[92] Nugent 2009
[93] Gates 1916, 6

to highlight the fact that the schooling system was created for the benefit of the elites by the elite class, as a tool for impression upon the lower classes.

We have covered the role of capital and its PMC in the creation of the American high school system. Before transitioning to the science of education, let us explore the establishment of the system in which many older youth reside, the University.



Snyder 1993.

First consider the chart above. We see how from 1940 to 2000, college became the new high school. In 1940, roughly 25% of people graduated high school (though about 80% of 5-19 year olds were

enrolled in school; many dropped out of high school due to compulsory education laws only extending to the age of 16 in the majority of states) while in 2000, roughly 25% of people graduated college. As laws mandating the existence of and attendance to high schools were already in place across the nation by 1940, the top-down policies that inspired this change were ones which expanded the university system. Specifically, there were two important policies in this vein; both were implemented by the federal government. The first was the 1944 G.I. bill and the second, the Higher Education Act, emerged in the 1960s from a set of bills passed by Lyndon B. Johnson as a part of his "Great Society" policy program.

Of these two, I will focus on the latter because the theme of the G.I. bill was to reward veterans; it was not permanent, and gave no money to Academia. Rather, it merely provided a scholarship for returning soldiers among other financial benefits, such as low interest mortgages and business loans. Franklin D. Roosevelt had furthermore ignored the pleas of Academia for money in his New Deal agenda. The impact the G.I. bill had on higher education attendance was also lower than that of Johnson's policies: veterans were only 10% more likely than non-veterans to attend college during the relevant time period. The powers we are looking for may lurk somewhere behind the G.I. bill, but an investigation of Johnson's policies appears much more promising.

The Great Society policy bundle include reforms in areas ranging from poverty to civil rights to healthcare, but the primary reforms were educational. There were two major education bills that Johnson signed into law: the first was the Elementary and Secondary Education Bill and the second was the Higher Education Act. Johnson's stated motives appear to be quite noble; in his speeches he claims that he merely wants every American to be as educated as their abilities permit, and that he wishes to see the nation benefit from increased productivity and scientific competitiveness with the Soviet Union. Perhaps he was telling the truth. He grew up somewhat poor, though his father was a legislator (he was also a bad businessman), and alleges that it was his education that allowed him to become a teacher and rise out of poverty.

Johnson is quoted as saying, in 1965 after signing the education reform bills:

I shall never forget the faces of the boys and the girls in that little Welhausen Mexican School, and I remember even yet the pain of realizing and knowing then that college was closed to practically every one of those children because they were too poor. And I think it was then that I made up my mind that this nation could never rest while the door to knowledge remained closed to any American.

As nice as they may seem, Johnson's public motives should be taken with a grain of salt. While, in the open, Johnson supported Civil Rights and was responsible for signing the landmark 1964 Civil Rights Act, in private he made statements like this:

These Negroes, they're getting pretty uppity these days and that's a problem for us since they've got something now they never had before, the political pull to back up their uppityness. Now we've got to do something about this, we've got to give them a little something, just enough to quiet them down, not enough to make a difference. For if we don't move at all, then their allies will line up against us and there'll be no way of stopping them, we'll lose the filibuster and there'll be no way of putting a brake on all sorts of wild legislation. It'll be Reconstruction all over again.[94]

Those who knew Johnson furthermore described him as hyper-ambitious and extremely power hungry. As Senate Majority leader he was known for physically intimidating his underlings by staring them down for a quarter of an hour. Robert Caro, Johnson's biographer, stated "Johnson's ambition was uncommon – in the degree to which it was unencumbered by even the slightest excess weight of ideology, of philosophy, of principles, of beliefs."

So what were his true motives for pushing education reform? For one, Johnson's Great Society plan and his focus on education may have been inherited from Kennedy's New Frontiers plan:

Johnson's decision to push for health and education legislation ahead of housing proposals and the granting of home rule to the District of Columbia resulted from his carefully considered judgment as to the amount of time each of the bills would consume and which measures were most likely to provoke the kind of debate and controversy that would drain valuable energy. Recognizing that John Kennedy had lost a full legislative year in pursuit of federal aid to education, Lyndon Johnson refused to let the education

[94] Goodwin 1991

bill go to the Congress until administration officials had secured the agreement of two major lobbying groups—the National Education Association, which spoke for the public schools, and the National Catholic Welfare Conference, which represented parochial schools. The seemingly irreconcilable conflict between these lobbies had been largely responsible for the earlier failure to pass an education bill. Now an agreement was fashioned by means of an ingenious formula by which assistance would go, not to the schools, but to impoverished children, whether they attended P.S. 210 or St. Joseph's. Immediately thereafter the President dispatched the program to the Hill, and within four months the Elementary and Secondary Education Act was the law of the land.[95]

Johnson can best be summarized as an ambitious man who wanted power for the sake of leaving some sort of mark on the world. What that mark was, exactly, mattered very little, so long as it was positive. Johnson had no life-long passion for education, no familial connections to it aside from a dead great-grandfather who founded Baylor, and no sophisticated view on the subject. In 2007 the Department of Education's headquarters were named after Johnson – it would appear that this was ultimately Johnson's goal, i.e., to have something named after him, not necessarily the Department of Education, but that department would do.

Where is the real impetus behind Johnson's education reform? The President is not a dictator; as we have already seen, he required the bill-shaping approval of NEA and a Catholic organization before he could win the approval of Congress. In general, we will find the same forces we have already seen, capital and its PMC, behind the two bills.

For instance, the Elementary and Secondary Education Act (ESEA) was written by Kennedy's Commissioner of Education, Francis Keppel. Keppel spent fourteen years as the dean of the Harvard Graduate School of Education prior to his position in the Kennedy administration. In 1974, after his time in the government, Keppel became a founding chairman of the Lincoln Center Institute and director of the education policy program at the Aspen Institute. The latter was largely funded by foundations such as the Carnegie Corporation, the Rockefeller Brothers Fund, the Gates Foundation, the Lumina Foundation, and the Ford Foundation. Lastly, after leaving the federal government, Keppel became

[95] Ibid., 255

chief executive officer of the General Learning Corporation, a joint venture between General Electric and Time Incorporated.

We barely had to scratch the surface to find a bona-fide PMC man, a brain employed by capital, the same capital which was so instrumental in the earlier system construction efforts we have covered. What did his bill do?

The ESEA essentially threw federal funds at the K-12 system, solidifying its legitimacy and enhancing its reach:

> In its original conception, Title I was designed to close the skill gap in reading, writing, and mathematics between children from low-income households who attend urban or rural school systems and children from the middle-class who attend suburban school systems.
>
> Title II supported school libraries and textbook acquisition for both private and public schools, and it funded preschool programs. Title III, cited as the Adult Education Act of 1966, stated that supplementary educational centers and services would receive funding for additional support services to bolster school attendance. In addition, Title III mandated educational programming even when school was not in session, and it provided for special education and related services in isolated or rural areas. An amendment to the act in 1968 provided the basis for The Bilingual Education Act and the Education of the Handicapped Act. Title IV allocated $100 million over a five year period to fund educational research and training, and Title V supplemented grants created under Public Law 874 to state departments. Lastly, Title VI provided definitions and limitations related to the law.[96]

Title I accounts for 5/6 of the funds authorized by the ESEA; while it appears noble, it is indeed wasteful. The United States spends much more money per student than do nations with superior educational outcomes such as Finland. Research shows that "school quality," at least in the 21st century, hardly impacts student outcomes; there is a threshold that the schools targeted by the ESEA probably exceeded (more on this research in the next section). Indeed, Keppel's Wikipedia article states:

> While its motives were praiseworthy, its [the ESEA's] transformations, supported by private foundations like the Ford Foundation and progressive reformers in leading schools of education, had a negative effect on school performance. The National Commission on Excellence in Education in 1983 found that SAT scores declined every

[96] Jeffrey 1978

year for 14 years from 1964, and that "nearly 40 percent of 17-year olds could not draw inferences from written materials."

Regardless of the way in which the ESEA changed educational outcomes, it empowered an exploitative system, the publicly funded and compulsory high school. The correct way to improve education is to cut down on the two forms of exploitation it entails, the first being the offloading of corporate overhead onto the workers, and the second being the forced liberal arts training of students who neither want it nor will use it. Johnson claimed the ESEA was to equalize educational opportunity, but this was only cynical code for broadening and strengthening the system's exploitation, as a key mechanism by which the exploitation takes place is the economic discrimination against the "uneducated;" that is, not those unable to perform a task, but those who either have not paid proper tribute the system with their own time or money or those who have refused to pay for their own narrow corporate training with no guarantee of employment afterwards.

The same can be said for the Higher Education Act (HEA), which threw money at students to go to college and at colleges themselves. Most importantly, it, in combination with a 1972 bill passed by Nixon and a Democrat Congress, established generous federal subsidies for a certain type of business. Based on who we know was involved in early education system building efforts, what sort of business do you think this was? If you guessed bankers, you're correct! The federal government established generous subsidies for bankers to provide students with college loans, enticing them to go to university, which was then-affordable, as an easy get-ahead.

It worked and college attendance spiked. In tandem, capital began requiring bachelor's degrees to be considered for many jobs that formerly required either no degree or a simple high school degree. This drove more people to college, simultaneously enriching bankers and the PMC. Both ends of our dialectic enjoyed this arrangement, so much so that it has spread all over the Anglospere. Contrary to popular belief, college is not free in Canada, the UK, Australia, New Zealand, and Ireland. In fact, once-free tuition was abolished in the UK and Australia, where college now costs students $11,000 dollars a year on average. Capital resists any

changes to their end of the bargain, the right to practice usury upon college students. When Bill Clinton established a program that loaned students money from the federal government directly instead of subsidizing bankers, it backfired and was ripped apart by future congresses, alongside remaining consumer protections for student loan holders.[97] Interest rates on student loans, once low due to subsidies, are now as high as 28% , and with the system entrenched the student has little choice but to bear this uncancleable debt.

The hired brains, the PMC, also resist changes to their end of the bargain, the lack of price control by the federal government. For the PMC do not want to be teachers beholden to a school-board and a government; they do not want to be told how much money may be spent per student, no, rather, they want the government beholden to them. They don't want to make teacher-wages, they want to be enriched. As a consequence the student must always pay tuition, unlike at the high school, now by loan, maybe in the future by generous government scholarship, but never must tuition be abolished.

The following passage relates how academics feared federal control, and settled on the federal supplementation of students themselves as the solution to the potential problem:

> Not everyone regarded federal aid as an unalloyed benefit to higher education. Skeptics harbored misgivings over federal support for university research at the expense of instructional support and needed capital improvements. Even when construction costs for buildings were paid for by the government, it was noted, increased operating cost and overhead returns were rarely adequate. Thus, while it was apparent that a marked increase in the availability of federal funds was fast becoming a prevailing pattern in the postwar period, critics wondered whether federal support would entail federal dictation or direction, with some consequent loss of autonomy for colleges and universities. At the very least, it seemed a question worth posing.
>
> The response of many student dissidents as well as of many outside critics of academe in the turbulent 1960s was strongly in the affirmative-that federal support did in fact pose a major threat to the ostensible independence and autonomy of colleges and universities. Defenders of the federal connection, on the other side, could point to the Higher Education Act of 1965 authorizing federal financing to enable academic institutions to assist in solving community problems of public health, poverty, and housing by means of research, extension, or continuing education. Such legislation and

[97] Collinge 2009

other acts like it, it was pointed out, were helping to expand libraries, construct capital facilities, and otherwise keeping academic efforts in the forefront of the struggle for social improvement. Furthermore, without federally funded national teaching fellowships, and low-interest loans or outright grants, as provided in the Higher Education Act of 1972, to cite but one of several instances, hundreds of thousands of students who otherwise lacked the necessary resources were afforded the means to attend college and pursue an education. The connection between federal and state governmental agencies and the groves of academe, it became fashionable to claim in the decade of the eighties, was more akin to a working partnership, a collaboration, than a dependency relationship. Increasingly, federal policy was to channel funds to students in the form of low-interest loans and outright grants rather than directly to the institutions themselves. Hence, presumably, the potential for undue governmental influence upon colleges and universities was somewhat mitigated.[98]

What of state governments? Well, the attitude among the PMC is "centralization for thee, and not for me":

The role of state-government control over public higher education similarly became a topic of concern and debate, beginning in the late sixties, intensifying in the seventies and eighties, and continuing with great fervor well into the 1990s. As academics saw it, state legislatures could best serve the cause of higher learning by providing adequate funding for public colleges and universities, while otherwise leaving matters of internal governance to individual institutions' governing boards and administrative leaders.[99]

They largely fought off centralization:

Coordinating patterns and degrees of control varied by individual states. Florida, North Carolina, and Virginia empowered highly centralized governance structures. Indiana allowed its four major public institutions-Purdue, Indiana, Indiana State, and Ball State-considerable latitude and autonomy. Tennessee developed a two-tiered system, as did Pennsylvania. In the latter case, Pitt, Penn State, and Temple as major state-assisted institutions were more or less allowed to set policies for themselves. More coordination attended the operations of the state's other regional colleges or universities, most of them former normal schools or state teachers' colleges. Rural western states, such as Montana, Nevada, Wyoming, and North Dakota, were largely unaffected by the trend toward centralized control. Nor were tightly controlled systems common throughout the southern states. Elsewhere, the situation was quite different. Ohio's Board of Regents repeatedly sought to expand its policy role in higher education (though, it must be said, its efforts were often successfully resisted by the state's regional universities and

[98] Lucas 2016, 254
[99] Ibid., 256

sometimes were undermined by separate legislative initiatives). The power and authority of Missouri's Coordinating Board were precariously set off against local institutional prerogatives. Michigan retained its tradition of decentralized governance. Maryland experimented with some centralized planning in the eighties, then in the 1990s led a counter-trend toward more local independence for each of its public institutions.[100]

So we have it. The rise of mass university education in the United States was largely the result of top-down processes initiated by the PMC-capital dialectic. The synthesis to this dialectic is to destroy both thesis and antithesis, to cut usurers out of the equation and institute hardcore centralization for the University system, tightly regulating its prices and forbidding even an inch of student-exploitation. Whereas the high school system exploits by having no tuition, the University system exploits by having high tuition, and so whereas the high school's tuition must be raised to infinity via that institution's abolition, the University's tuition must be reduced to zero via federal funding. With that said, free college is only non-exploitative for those who should receive lengthy educations. In the next section, we will address the question as to who should go to college, and why, by beginning with an examination of the effects of education upon the mind.

2.2: Education and Intelligence

The United States is over -educated. Only 20% of Americans report using Algebra or higher level math on the job, so it follows that 80% of high school algebra students are wasting their time. Defenders of the system usually rebut this by claiming that learning algebra "teaches students how to think." This is their most important claim, because if it can be disproven, the actual utility of education can easily be estimated by determining what percent of the curriculum teaches measurably useful skills. So, how can we evaluate the claim that seemingly useless classes "teach students to think?"

For any class where this claim is true, that the class supposedly teaches students how to solve any or many types of problems outside of those worked on in class or even beyond those included in the class's

[100] Ibid., 257

main subject. The claim implies that teaching students algebra, for example, not only enables them to solve equations but also enables them to be able to reason more efficiently in general. A student who is taught algebra well now knows the ropes of reasoning itself and can make better arguments and understand complex problems even outside of the world of equations better than a student who has not taken algebra, according to the claim.

The actual evidence indicates that this is not what happens. Basically, skills learned in academia don't transfer to other domains. Take two cases: in two studies, political scientist Andrew Hacker found that only a third of students who score over a 700 on the SAT math section also score over a 700 on the SAT English section[101]. This implies that coaching students in the math that's found on the math SAT will fail to raise their English scores. This is the case in my experience. Additionally, there was no correlation between history grades and students' score on a standardized math exam given at an elite high school.

Learning math fails to make students better at other subjects taught in school. It is doubtful, then, that math skills transfer to real world skills. Other data on the general transference of cognitive skills affirms this doubt:

> Being an air-traffic controller is not easy. At the heart of the job is a cognitive ability called "situational awareness" that involves "the continuous extraction of environmental information [and the] integration of this information with prior knowledge to form a coherent mental picture". Vast amounts of fluid information must be held in the mind and, under extreme pressure, life-or-death decisions are made across rotating 24-hour work schedules.
>
> In the 1960s, an interesting series of experiments was done on air-traffic controllers' mental capacities. Researchers wanted to explore if they had a general enhanced ability to "keep track of a number of things at once" and whether that skill could be applied to other situations. After observing them at their work, researchers gave the air-traffic controllers a set of generic memory-based tasks with shapes and colours. The extraordinary thing was that, when tested on these skills outside their own area of expertise, the air-traffic controllers did no better than anyone else. Their remarkably sophisticated cognitive abilities did not translate beyond their professional area.

[101] Hacker 2016, 84

As the 1960s studies on air-traffic controllers suggested, to be good in a specific domain you need to know a lot about it: it's not easy to translate those skills to other areas. This is even more so with the kinds of complex and specialised knowledge that accompanies much professional expertise: as later studies found, the more complex the domain, the more important domain-specific knowledge. This non-translatability of cognitive skill is well-established in psychological research and has been replicated many times. Other studies, for example, have shown that the ability to remember long strings of digits doesn't transfer to the ability to remember long strings of letters. Surely we're not surprised to hear this, for we all know people who are "clever" in their professional lives yet who often seem to make stupid decisions in their personal lives.[102]

Knowing how to factor a quadratic equation will not make a student better at solving interpersonal conflicts at work or better at coming up with new advertising ideas. Knowing how to analyze poetry won't make a student a better doctor, lawyer, or engineer. Air traffic controllers show us that transference occurs less than common sense would indicate. It is therefore absurd to believe that anything but teaching medicine will make a good doctor – in other words, Calculus and English class won't make a good physician.

Calculus does, however, serve as a filter to weed out untalented, or low-IQ, candidates. In the same vein, Algebra I makes students used to solving difficult problems for no reason other than that they have been ordered to do so. Useless subjects don't make students smarter in other domains, but they do *contain* one hidden "skill": the tolerance of taking and obeying arbitrary orders.

The air traffic controller data is what would be expected knowing that IQ is generally genetic and immutable (at least in the upward direction). This data is only surprising to people who believe that training can make a person more generally intelligent. And it would seem that people who think teaching algebra to people can make them "better thinkers" or stronger at "reasoning" in a general sense probably also believe, falsely, that education can increase IQ.

What is IQ exactly? It is most technically a measure of g, or the general intelligence factor. *g* is the monolithic factor behind a person's mental intensity and efficiency. Scoring a higher IQ usually means a

[102] https://blogs.lse.ac.uk/impactofsocialsciences/2017/01/26/why-students-should-not-be-taught-general-critical-thinking-skills/

person has higher g which means they are more efficient at reasoning without mistakes, learning, and problem solving. *g* is highly identified with learning ability and pattern recognition (and learning may simply be a form of pattern recognition).

The hypothesis is that *g* cannot be raised by education and any boost in IQ score from education is illusory and hollow for g. It does not signify increased intelligence. Generally, IQ tests are highly g loaded, so education fails to raise IQ scores.

How can we set out to test this directly? Identical twin studies would be preferable. Sadly, such data does not exist, but there is a small literature that utilizes other methods in order to estimate how much education increases IQ.

Before we review this literature, understand that IQ is psychology's biggest success; it is the single most predictive psychometric in existence[103]. That IQ measures a person's g factor, his general intelligence, is a concept that has been validated again and again for more than a century[104].

One major paper regarding our question a 2018 meta-analysis titled "How much does education improve intelligence?"[105] which examined 42 different studies consisting of three main designs: "control prior intelligence", which tracked people with similar IQs into later life and found how IQ tended to change with more education, "policy change," which compared the IQs of people from similar communities that had different education standards, and "school age cutoff," which looked at how IQ varied with education in Israeli children. Only the first two methods tested adults, and they revealed that an increase of about one point per year may be associated with education.

I believe this to be an over-estimate. There are multiple issues with these data sets that might lead to a false positive. The first is the failure of both study designs to control for genetics. The ideal study design would be a twin study where one twin goes on to higher education and the other does not, and after education their IQs are measured. This was

[103] Strenze 2007
[104] Jensen 1998
[105] Ritchie & Tucker-Drob 2018

almost the design of the "control prior intelligence" studies, but they did not use twins. To date, no such twin study has been performed. It is possible that many of the "control prior intelligence" studies acquired a false positive for education's influence on IQ due to neglecting the idea that individuals with different IQ-relevant genes are more likely to go on to higher education than others[106]. The likelihood of this error having weight is increased by the fact that the mean age at which the "control prior intelligence" study design first measured IQ was 12 years, and the mean age at which they followed up was at 63 years! IQ is an age-relative measure, and those who begin puberty earlier have a higher IQ at the age of 12 compared to their prepubescent peers, probably because their brains are more mature[107]. This means that the relative position of a person among their age-peers may drastically change by the time everyone has completed puberty. Those who rise in their relative position after puberty will in turn be more likely to go onto higher education than their IQ at 12 would predict. If there are a decent amount of these cases, when their IQs are measured at 63 years old, it will appear that their higher education improved their position when in reality it was solidified as they completed puberty. This flaw, in combination with the low magnitude of IQ change measured by the "control prior intelligence" type of study, which tended to show small change in IQ of a single point per year or less, means that the acceptance of the null hypothesis that education does not affect IQ is compelling, at least in regards to this study type.

The "policy change" study type is different. In these studies, men of an average age of 48 years were tested for their IQs, and two groups were compared: those who completed two extra years of compulsory education that had been added on while they were in school and those who did not. Researchers were able to control for age and nationality because the policy came into effect in different localities at different times. On average, this type of study indicated that a year of adult education increases IQ by about two points. But this could also be a false positive: the study design compared two groups of people, those who

[106] Strenze 2007
[107] Noipayak et al. 2016

had been affected by a policy change to provide more schooling and those who had not. It is conceivable that the factors explaining why some students were provided more years of education and some were not could correlate with IQ, like socioeconomic status does, for example[108]. This, unsurprisingly, seems to be the case: richer and more educated communities tended to adopt the reform in Norway much more quickly than poorer and less educated communities[109]. Combine this with the already low effect size found in the policy change studies, and accepting the null hypothesis that education does not affect IQ becomes much more compelling than at first glance.

There are a few other types of studies that indicate that education does not raise intelligence. One measures the effects of "interventions" on intelligence, where "interventions" refer to the practice of enrolling at-risk students in programs specifically designed to make them more intelligent for the purpose boost their general educational performance level. A recent meta-analysis[110] found that, out of 67 intervention programs for children, IQ increased by about three points on average at first, but after four years the effect entirely faded out. In other words, education programs for children, who tend to have more environmentally influenced IQs than adults[111], that are specifically designed to increase intelligence do cause an increase in IQ at first, but the effect disappears in just a few years. This is strong evidence for the null hypothesis regarding adult education and its effect on IQ considering the fact that if general intelligence could be raised by education at all, it should be raised by education specifically designed to do so.

Another study examined whether brain-training programs work to increase IQ. It looked at the relevant literature and replicated a result that has been known since the experiments on air-traffic controllers in the 1960s: "Based on this examination, we find extensive evidence that brain-training interventions improve performance on the trained tasks,

[108] Strenze 2007
[109] Raaum et al 2003
[110] Bailey et al. 2018
[111] Bouchard 2013

less evidence that such interventions improve performance on closely related tasks, and little evidence that training enhances performance on distantly related tasks or that training improves everyday cognitive performance"[112]. Furthermore, the fadeout over the course of five years was intense, often halving the already barely measurable effects, replicating the results of the meta-analysis on intervention programs. Again, it is unlikely that schooling can raise IQ when tasks specifically designed to raise it fail to do so.

These studies aside, suppose the change in IQ found in the meta-analysis on school and its effect on IQ was taken at face value to be caused by education. What would this mean in regards to general intelligence? Does g increase along with IQ scores, meaning the skills are transferable to work performance and other domains? Or did school simply teach the students to score more highly on an IQ test, without conferring a true increase in overall intelligence?

The data already reviewed suggests that if school does cause students to score more highly on IQ tests, it is simply because the skills they were taught were probably those needed to do well on IQ tests. In other words, students did not become more generally intelligent. This is not hard to intuit, since schooling revolves around test taking. This means that, while school might increase IQ, it is not likely to increase general intelligence and all of the life outcomes associated with it. Furthermore, any intelligence conferred by education is likely to suffer from extreme fadeout over the course of just five years.

But there is more evidence to be considered that can give an idea as to how g loaded any supposed increase in IQ by education is likely to be. One line of evidence situates the alleged increase in IQ due to education in the context of the Flynn effect, which is the phenomenon where the average raw score on IQ tests tend to increase each decade. While it is controversial as to what exactly causes the Flynn effect, there is good evidence that education may be a heavily contributing factor. First, while the Flynn effect has continued monotonically for a century, most of its proposed causes have not. For this reason, nutrition, television, and the

[112] Simons et al. 2016

internet cannot explain most of the Flynn effect[113]. Schooling, however, has increased in length and rigor throughout the whole period that the Flynn effect has been detected. Throughout this period, from roughly 1920 to now, compulsory education laws have raised the age of forced education from an average age of 14 to 17, university has become ever more popular, and as Baker et al. (2015) found, reasoning content in elementary school math textbooks has skyrocketed.

In other words, education is a compelling cause of the Flynn effect. So how g loaded is the Flynn effect, and if this data is correct and schooling is a major cause of it, how g loaded is the effect of schooling? A 2013 meta-analysis found, on average, a correlation of r = -0.21 for the relationship between g loading and the Flynn effect increase on a subtest[114]. These results suggest that any increase in g is outmatched by an increase in the ability to perform specific, test relevant skills, meaning that this is affirmative evidence for the hypothesis that if education increases IQ, a majority of that increase is due to teaching to the test, and does not reflect an increase in g. A two point increase in IQ, considering this data, implies less than a point of increase in general intelligence.

A study published in 2000 (Kane & Thomas) converges with this evidence. In this paper, researchers found that the extent to which g explains variance in IQ in the population decreased from 1950 to 2000. This means that more variance in familiarity with items on the test entered into the population during the course of those decades, the same decades during which the Flynn effect emerged. This is good evidence for the hypothesis that if the Flynn effect is related to education, education is introducing variance in familiarity with IQ test items into the population instead of simply raising the general intelligence of the population it affects. While none of the data we have reviewed is sufficient evidence for the claim that school cannot raise general intelligence to some small degree, the whole of the data paints a picture that education is not likely to significantly raise g. It is therefore preferable to argue that adult education does not meaningfully increase

[113] Baker et al. 2015
[114] Nijenhuis & van der Flier 2013

general intelligence. In other words, algebra does not teach students How To Think.

We may consider the body of research reviewed here to vindicate Bryan Caplan's economic argument in his 2018 book, *The Case against Education*. The education system can be trimmed, and those who object by claiming that school "teaches people how to think" have little empirical ground to stand on. The evidence indicates that if this claim is true to any extent, it is an impractibly small one. Education is fine at teaching specific skills, but teaching students how to factor quadratic equations does not make them better at analyzing poetry, nor does it make them better at producing value that does not directly involve factoring equations, and nor does it raise their intelligence.

Before finishing this chapter, one more tidbit should be addressed. Some people think universally long education is vital in a universal democracy, because otherwise voters would be hopelessly misinformed. This notion can't withstand the slightest empirical scrutiny. Not only does education fail to raise general intelligence, most people don't even retain the civic factoids that may or may not have been shoved into their heads[115]. For instance, only a minority of Americans could correctly answer the following multiple choice question: "Which of the following rights is not protected by the Bill of Rights?" (Choices: Freedom of speech, Trial by Jury, Right to bear arms, Right to vote). Retention of stuff nobody uses is generally poor. Some people might think math sticks more easily once it's learned, but one study found that most people forget about half of the algebra and geometry they learn in 5 years, and almost everything in 25 years, so most 40 year olds effectively quit school after 7th grade[116]. My own life confirms this; by 8th grade my own parents were hopeless when it came to understanding my math homework, despite the fact that both of them have college degrees and fine GPAs.

The takeaway is that the average voter may have well just not gone to high school considering the level of their scholarly knowledge.

[115] Caplan 2018, 44
[116] Ibid., 40

2.3: Conclusion

We have now seen both the variability of youth and the details of the genesis of the system which encapsulates youth today. Enough information should have been presented to show that

- youth norms varied much less extremely from adult norms in the past
- the modern education system was unpopular among the masses and was constructed by the ruling class
- education does not increase intelligence

And here, I will argue that

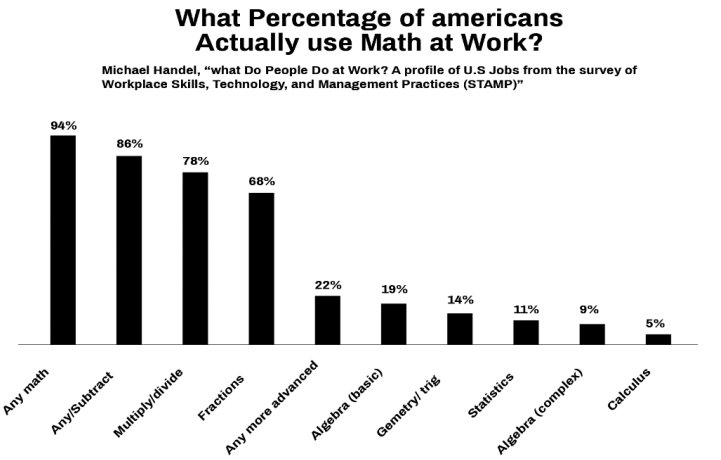
- starting roughly no later than when students enter youth (7th-9th grade), the education system becomes dramatically economically wasteful
- the current norms largely came about in the last 50 to 100 years after the establishment of the modern education system

Regarding the fifth point: Epstein (2010) gives an age-restriction timeline:

1916 – First federal law restricting labor by young people; struck down by Supreme Court in 1918
1918 – All states have compulsory education laws in place
1933- First federal law explicitly restricting alcohol consumption by young people
1936 and 1938 – First successful federal laws restricting labor by young people, establishing 16 and 18 as minimum ages for work; still in effect
1940 – Most states have laws in place restricting driving by people under 16
1968 – Supreme Court upholds states' right to prohibit sale of obscene materials to minors
1968 – Movie rating system established, prohibiting young people of various ages from attending certain movies
1980s – Many cities and states pass laws restricting teens' access to arcades and other places of amusement; Supreme Court upholds such laws in 1989
1980s – Courts uphold states' rights to prohibit sale of lottery tickets to minors
1984 – First national law effectively raising drinking age to 21; all states in compliance by 1998
1990s – Curfew laws for young people spread widely among cities and states

1992 – Federal law prohibits sale of tobacco products to minors
2000+ - New laws restricting a minor's right to get tattoos, piercings, and to enter tanning salons
2000+ - Tougher driving laws being passed by many states; full driving rights obtained gradually over a period of years
2009 – New federal law making it tougher for anyone under eighteen to get a credit card and limiting credit granted to people between eighteen and twenty-one.

Regarding the fourth point: if one book is read subsequent to this one thanks to the references contained herein, it should be Caplan's *The Case against Education*. It would be unjust to attempt to fully regurgitate it, but concisely, Caplan directly attacks what he calls the "Human Capital model of education." This model is the idea that education is valuable because it strengthens the nation's economy by making workers more productive. Caplan says this is wrong, and that education is actually just a signal of in born traits that are economically relevant. The evidence he uses includes the sheepskin effect (that only degrees have value, not classes or semesters), the fact that corporations care about grades that should be irrelevant, and knowledge retention rates. He ultimately calculates that the "social return" of higher education is actually negative, especially when it comes to worse students. This means the economy suffers from over-education, and it would be more productive to encourage less schooling for many people.



There is evidence that even high school is a waste of time for a great number of people. The fact that most 40 year olds don't remember any algebra and that 81% of Americans don't use it or any higher math on the job[117] is an elegant and simple point that is in favor of this hypothesis, since Algebra I is the math that's taught in 7th-9th grade. Say people were allowed to quit school after 8th grade to go receive practical training and do work. 81% of jobs evidently have no business requiring otherwise. What would ideally result from such a liberty is a situation where about 80% of people enter the labor market at the age of 14 or 15, and the rest continue their education for various lengths of time, depending on their ultimate goal (since this remaining 20% would be the top 20% of the nation cognitively, their education would be much faster than it is now). This means the nation would suffer from no shortage labor and yet would be able to massively cut education spending, saving hundreds of billions of dollars a year and relocating teachers to much more useful positions.

OECD data on Bachelor's degree attainment also suggests that the United States is over-educated. Germany, for instance, which has a thriving, advanced economy, only sends 28% of its youth to university, relative to the United States' 46%. Italy likewise only sends 24%. Many countries, other than the US, appear to be overeducated, however; Lithuania sends 53%; Canada tops the list at 58%. Among Western countries, there is no statistically significant correlation between GDP per capita and this educational attainment figure. In other words, there is no evidence that sending 46% of American youth to college instead of 28% has a positive effect on the American economy.

What about jobs? How many jobs should require a college education? Using table 1.2, "Employment by detailed occupation, 2019 and projected 2029" from the US Bureau of Labor Statistics, I judged which careers should require a college degree and calculated what percent of the population those workers constitute. I included Computer and Mathematical Occupations, Architecture and Engineering Occupations, Life, physical, and social science occupations, Legal Occupations, and Healthcare practitioners and technical occupations. The result? People

[117] Handel 2016

who work in those careers constitute only 11.98% of the population. America is over-educated indeed.

Though it may seem subjective, this result is intriguingly convergent with other evidence. First, an independent amateur scholar had used the same method and reached the same conclusion four years prior to mine[118]. Second, only 27 percent of college grads have a job related to their major[119]. 27 percent of 44 percent is, amazingly, 11.88 percent. I only became aware of these facts after performing my original tabulation. It seems that no matter how I approach the question, approximately 12% of the population should attend university.

I also wanted to estimate the percent of people that should attend high school, and what I found converged with the statistic that only 20% of people use algebra or higher math on the job. The only category from the Bureau of Labor Statistics data I felt I could reasonably say should attend high school but not college was "Business and financial operations occupations," or in other words finance people and accountants. Some of the jobs in this category sounded more demanding than others, so I figured that adding in the whole category would be charitable to my opponents and help offset for a stray job here or there that I might have missed. The whole category constituted 5.5% of the population, giving us the figure that 17.5% of people should attend high school. This is startlingly close to the 19% figure for higher math usage, suggesting that 1 in 5 is probably the right estimate of the portion of people who should attend high school.

How should we act on this knowledge? Consider that a student is ostensibly in school to learn. A tautology: if he is not learning something useful, he or his family is experiencing exploitation, because exploitation is the extraction of time or wealth from someone with no social or individual benefit. What we have, then, materially speaking, at any moment in school where a student is not learning something valuable, is exploitation wherein wealth is being transferred from the student or their family (depending on the age of the student) to teachers, the State, and education corporations.

---

[118] See https://devinhelton.com/how-many-jobs-require-college
[119] Plumer 2013

Now it may be asked, in place of a naive question as to whether schooling is valuable or not, to what degree some education system is exploitative. This can be roughly quantified by considering whether an individual class is valuable or not. More precisely, each class can be assigned a degree to which it is exploitative, depending on what approximate percent of the class was useful.

Now I can personally estimate how exploitative my education was at different points in time based on my personal experience. In high school, for instance, I took one math class a year. They were all important for me, as someone pursuing a career involving a lot of math, but they were taught too slowly. I estimate that a yearlong math class could have been reduced to a single semester, so I charitably assign those classes a 50% exploitation rate. Every other class was totally useless or repeated in college except one English class where I actually learned how to write. To make this clean, I'll assign that a 0% exploitation rate, or a 100% non-exploitation rate. I took 7 classes * 4 years = 28 classes. The degree to which high school was exploitation for me was therefore 25/28, or 89%. In other words, for me, high school was 89% exploitation.

The singular goal of education reform should be to minimize the average exploitation rate.

Our statistics we covered earlier allow us to estimate that for roughly 80% of the population, high school is 100% exploitation since they end up using none of the knowledge they are taught.

High school is, then, on average, about 97.8% exploitation. College is less severe. If we suppose that 27% of those who attend college experience only, say, 20% exploitation (due to having to take classes like "Feminism is Arabian Film"), while the rest are totally exploited, college is only 78.4% exploitation on average.

It follows that, because high school is highly exploitative for everyone, it should be abolished, while because college is only mildly exploitative for a segment of the population, only that segment of the population should be encouraged to go. In other words, the ideal education system would have primary schooling available to all. After that is finished, about 20% of the population should begin to attend an institution of higher learning. These would essentially be like universities and not high schools, because they would not be universal and they

would certainly not be located in every town. The State should encourage this 20% to attend with scholarships. About a quarter to a half of those who attend would, after a few years, find it boring or difficult, and would quit with the equivalent of a Bachelor's degree. These people might be engineers, financiers, or programmers. The rest would finish some sort of doctorate, whether it be a PhD, an MD, or a JD. These people would be physicians, lawyers, researchers, and professors.

Furthermore, as we have seen, there are two types of exploitation, each corresponding to one of the two classes involved in the establishment of the system. The first, less destructive type is that of the capitalist class, where the workers are made to pay entirely for their own job training, which is itself work. The solution to this type of exploitation is to force the capitalist class to contribute an equitable amount to this type of education. This can be done by taxing corporations upon the hiring of a worker trained elsewhere, by forcing or encouraging more internships, by mandating that a certain fraction of education be paid for specifically by corporate taxes, or perhaps by other means. The second type of exploitation is far more destructive and is that of the PMC; this type occurs when a student is forcefully educated in something that will never benefit him. Compared to the first type of exploitation, the second type is more harmful because while the first type at least involves the conferment of some marketable skills onto the student, the second type is as expensive as the first type but is totally wasteful. The only solution to this second type of exploitation is its complete abolition.

The reason most often cited, in my experience, by people who are opposed to this educational proposal, is that the age group involved is too immature to handle such a situation. The history discussed thus far should cast doubt on this common supposition. The rest of this book should strengthen that doubt and ultimately kill it. In particular, there is a popular notion that the "brain doesn't develop until the age of 25." This will be shown to be an unscientific narrative propagated by educationists via the corporate media starting in 1999. First, however, should come a general discussion of human development.

III

Development

3.1: Puberty

A proper understanding of the physical development of the brain and body is integral to the understanding and critical analysis of youth. Physically, when do children become adults? In other species, biologists typically define an adult as an organism with the ability to reproduce. Such an organism is said to be sexually mature; Puberty is defined as the process of developing to sexual maturity. When is man sexually mature?

There have been a number of studies concerning the average age at which puberty begins and ends in humans. Perhaps the most well-known are Tanner's 1969 and 1970 studies.

Marshall and Tanner
Females

Age at Which Each State of Puberty was Reached

Stage	Mean (Yr)	SD	SE	Number of Subjects*				
				Exactly Specified	Lower Bound	Upper Bound	Confined	Missing
B2	11-15	1-10	0-10	0	41	51	97	3
PH2*	11-69	1-21	0-11	0	51	44	94	3
PHV (inst.)	12-14	0-88	0-14	39	0	0	0	153
B3	12-15	1-09	0-10	0	58	38	93	3
PH3	12-36	1-10	0-10	0	59	39	91	3
PH3	12-95	1-06	0-10	0	70	26	93	3
B4	13-11	13-15	0-11	0	70	27	92	3
Menarche	13-47	1-02	0-20	91	77	4	1	19
PH5	11-41	1-12	0-11	0	101	11	77	3
B5	15-33	1-74	0-19	0	119	6	64	3

Male

Age (years) on Reaching Each Stage of Genital and Pubic Hair Development and Peak Height Velocity (Last for columns are numbers of boys (see text))

	Mean	SD	SEM	Exactly Specified	Lower Bound	Upper Bound	Confined
G3	11.64	1.07	0.09	0	35	64	129
G3	12.85	1.04	0.09	0	61	46	121
PH2*	13.44	1.09	0.09	0	70	30	125
G4	13.77	1.02	0.09	0	81	23	124
PH3	13.90	1.04	0.08	0	77	22	126
Mid-year PHV	13.97	1.01	0.13	60	0	0	0
Inst. PHV	14.06	0.92	0.14	41	0	0	0
PH4	14.36	1.08	0.09	0	92	19	114
G5	14.92	1.10	0.09	0	110	10	108
PH5	15.18	1.07	0.09	0	112	7	106

Tanner found that, on average, puberty ends before the age of 15 for both males and females. He may have overestimated the time it takes to reach maturity in females, however, as his scheme for measuring breast development had a flaw: a few participants actually regressed from stage 5 to stage 4, meaning the scheme was potentially arbitrary. It is likely that Tanner conflated the addition of superficial dietary fat with the development of mammary tissue. Furthermore, Tanner recorded the mean age at menarche (first period) as 13.5, when today it is less than 12.5. While he did not record data on "spemarche" (the age of onset of sperm emission), a 1985 study (Hirsch et al.) found that the average age of first sperm emission is about 13. The genitals therefore function early in what is called puberty; historically the record for youngest birth is about 10 years old and the youngest fathers are 13.

The metric used in the Tanner study (and in most if not all studies like it) is called the Tanner Scale. In both sexes it pays attention to the development of pubic hair. In males, genital development was staged via the measurement of the penis and the testicles. In females, they measured breast volume. Tanner also collected data on skeletal growth in both his 1969 and 1970 study – "PHV" refers to "peak height velocity," the time at which the acceleration of skeletal growth became negative. The median male was found to have stopped growing at about 15.5 years, a fact consistent with my records of my own growth.

Tanner's studies have replicated numerous times:

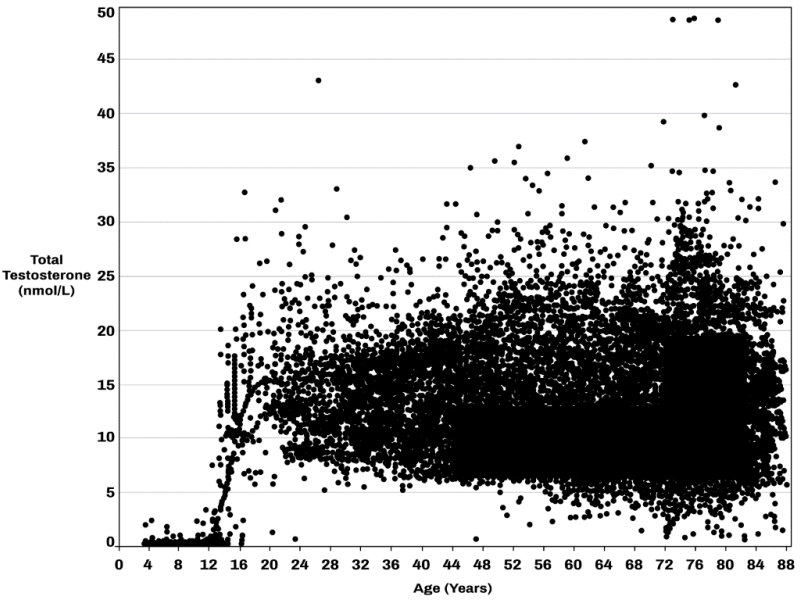
Age of Pubertal Events in Males in US and the British Marshall and Tanner Studies

Study/ Authors	Data Collected Year Span	Types of Study	Country	Subjects	Age Range, y	Mean Age, Y								
						TV≥ 3 mL	TV≥ 4 mL	G_2	G_3	G_4	G_5	PH_2	PH_3	PH_4	PH_5
Marshall and Tanner[11]	1950s-1970s	Mixed	England	228 white	≥8	—	—	11.6 white	12.9 white	13.8 white	14.9 white	—	13.9	14.4 white	15.2 white
Fels Institute[21]	1930s-1940s	L	United States	59 white	9-21	—	—	11.5 white	12.7 white	13.4 white	17.3 white	12.2 white	13.3	13.9 white	16.1 white
NHES II/III[22]	1963-1970	C-S	United States	3047 white	12-17	—	—	"Similar Marshall & Tanner, white and African American"				"Similar Marshall & Tanner, white and African American"			
Lee Study[38]	1969-1973-	L	United States	36 Not clearly Specified	9-17	—	—	11.9 white	13.2 white	14.3 white	15.1 white	12.3 white	13.9	14.7 white	15.3 white
Bogalusa Heart Study	1973-1974	C-S	United States	1153 white, 676 African American	5-14	—	—	11.8 white; 11.2 African American	—	—	—	12.6 white; 11.7 African American	—	—	—
HHANES[24]	1982-1984	C-S	United States	704 Mexican American	10-17	—	—	12.4 Mexican American	12.4 Mexican American	14.6 Mexican American	16.3 Mexican American	12.8 Mexican American	13.6 Mexican American	13.6 Mexican American	16.1 Mexican American
HHANES III[5]	1988 1994	----	United States	536, white 797 African American; 781 Mexican American	8-19	—	—	10.1 White; 9.5 African American 10.4 Mexican American	12.4 White; 11.8 African American; 12.5 Mexican American	13.6 White; 13.4 African American; 13.7 Mexican American	16.9 White; 14.9 African American; 16.7 Mexican American	12.0 White; 11.2 African American; 12.3 Mexican American	12.6 White; 12.5 African American; 13.1 Mexican American	13.5 White; 13.7 African American; 14.1 Mexican American	16.7 White; 15.4 African American; 16.8 Mexican American
Biro Study[15]	1984-1987	L	United States	278 white 237 African American	10-18	12.18 White; 12.16 African American	—	—	—	—	—	12.8 white/ African American	13.7 white/ African American	14.6 white/ African American	15.2 white/ African American
Susman Study[15]	2000-2006	L	United States	364 white, 64 African American	9.5-15.5		—	10.4 white; 9.6 African American	12.4 white; 11.6 African American	13.6 white; 12.8 African American	14.9 white; 14.3 African American	11.5 white; 10.5 African American	12.8 white; 11.9 African American	13.7 white; 13.0 African American	15.1 white; 14.5 African American
SSCIB	2005-2010	C-S	United States	2070 White 1062 African American; 999 Hispanic	6-16	9.95 White; 9.71 African American; 9.63 Hispanic	11.46 White; 11.75 African American 11.29 Hispanic	10.4 white; 9.14 African American 10.04 Hispanic	12.49 white; 11.58 African American; 12.31 Hispanic	13.72 white; 13.04 African American; 13.45 Hispanic	15.57 white; 15.51 African American; 15.58 Hispanic	11.47 white; 10.25 African American; 11.43 Hispanic	12.89 white; 11.79 African American; 12.57 Hispanic	13.76 white; 13.06 African American; 13.38 Hispanic	15.83 white; 15.72 African American; 15.89 Hispanic

Herman-Giddens (2012).

All of the figures in the above table are in the same general ball park, but it appears that cross-sectionals tend to overestimate the age at which puberty ends. This is because they generally take a sample up to the age of 16 or 17 and stage each subject. The numbers they report are therefore the average age of all the subjects in some stage. Since most, if not all, of the older teens will show maturity, the average age of "G5" or "PH5" is driven upwards.

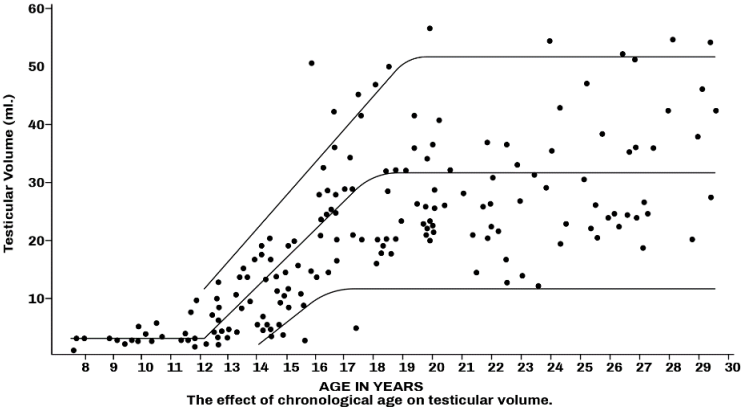
Data on testosterone levels and testicular volume agree with these studies:



Age	1	2.5	10	20	30	40	50	60	70	80	90	97.5	99
1	0.0	0.0	0.1	0.2	0.3	3	0.4	0.4	0.5	0.6	0.7	0.9	1.0
4	0.0	0.0	0.1	0.2	0.3	3	0.4	0.5	0.5	0.6	0.7	0.9	1.0
5	0.0	0.0	0.1	0.2	0.5	3	0.4	0.4	0.5	0.6	0.7	0.8	0.9
6	0.0	0.0	0.1	0.2	0.2	3	0.3	0.4	0.4	0.5	0.6	0.8	0.9
7	0.0	0.0	0.0	0.1	0.2	3	0.3	0.3	0.4	0.5	0.6	0.7	0.8
8	0.0	0.0	0.0	0.1	0.1	3	0.2	0.3	0.3	0.4	0.5	0.7	0.8
9	0.0	0.0	0.0	0.0	0.1	3	0.2	0.3	0.4	0.5	0.5	0.5	0.9
10	0.0	0.0	0.0	0.1	0.2	3	0.3	0.4	0.5	0.7	0.9	1.2	1.3
11	0.0	0.0	0.2	0.3	0.5	3	0.7	0.9	1.1	1.3	1.5	2.1	2.4
12	0.0	0.0	0.3	1.1	1.3	3	1.7	2.0	2.4	2.3	3.4	4.3	4.8
13	0.9	1.4	2.2	2.7	3.1	3	3.3	4.4	5.1	5.9	7.0	8.8	9.7
14	2.3	3.0	4.4	5.2	5.9	3	6.9	8.0	9.2	10.5	12.4	15.3	16.9
15	3.6	4.6	6.5	7.9	8.3	3	10.3	11.8	13.4	15.4	18.0	22.1	24.3
16	4.6	5.9	8.3	9.5	11.0	3	12.9	14.7	16.7	19.0	22.2	27.2	29.9
17	5.1	5.5	9.3	11.1	12.3	3	14.4	16.4	13.6	21.1	24.6	30.0	32.9
18	5.5	7.0	9.5	11.7	13.0	3	15.2	17.2	19.4	22.0	25.6	31.1	34.0
19	5.6	7.2	10.0	11.9	13.2	3	15A	17.4	19.6	22.2	25.7	31.1	34.1
20	5.8	7.3	10.1	11.9	13.2	3	15A	17.4	19.5	21.9	25.4	30.7	33.5
21	5.8	7.3	10.0	11.8	13.1	3	15.2	17.1	19.2	21.6	24.9	30.0	32.8
22	5.9	7.3	10.0	11.7	12.9	3	15.0	16.8	13.3	21.2	24.4	29.3	32.0
23	5.9	7.3	9.9	11.5	12.8	3	14.8	16.6	12.5	20.7	23.9	28.7	31.3
24	5.9	7.2	9.3	11.4	12.6	3	14.5	16.3	13.2	20.4	23.4	28.1	30.6
25	5.9	7.2	9.7	11.3	12.4	3	14.3	16.0	17.9	20.0	23.0	27.6	30.0
26	5.8	7.2	9.6	11.1	12.3	3	14.1	15.8	17.6	19.7	22.0	27.1	29.5
27	5.8	7.1	9.5	11.0	12.1	3	14.0	15.6	17.4	19.5	22.3	26.7	39.1
28	5.8	7.1	9.4	10.9	12.0	3	13.8	15.5	17.2	19.2	22.1	25.4	28.8
29	5.8	7.0	9.3	10.8	11.9	3	13.7	15.3	17.0	19.1	21.8	26.2	28.5
30	5.7	7.0	9.3	10.8	11.8	3	13.6	15.2	16.9	18.9	21.7	25.9	28.2
31	5.7	6.9	9.2	10.7	11.7	3	13.5	15.1	16.8	18.8	21.5	25.8	28.0
32	5.7	5.9	9.1	10.6	11.7	3	13.4	15.0	16.7	18.7	21.4	25.6	27.9
33	5.6	6.8	9.1	10.6	11.6	3	13.3	14.9	16.6	18.6	21.3	25.5	27.8
34	5.6	6.8	9.0	10.5	11.5	3	13.3	14.9	16.5	18.5	21.2	25.4	27.7
35	5.6	6.8	9.0	10.5	11.5	3	13.2	14.8	16.5	18.4	21.2	25.4	27.6
36	5.5	6.7	9.0	10.4	11.5	3	13.2	14.7	16.4	18.4	21.1	25.3	27.6
37	5.5	6.7	8.9	10.4	11.4	3	13.1	14.7	16.4	18.4	21.1	25.3	27.6
38	5.4	6.7	8.9	10.3	11.4	3	13.1	14.7	16.4	18.3	21.1	25.3	27.6
39	5.4	6.6	8.9	10.3	11.3	3	13.1	14.7	16.3	18.3	21.1	25.3	27.6
40	5.4	6.6	8.8	10.3	11.3	3	13.0	14.6	16.3	18.3	21.1	25.3	27.6
41	5.3	6.3	8.8	10.2	11.3	3	13.0	14.6	16.3	18.4	21.1	25.3	27.7
42	5.3	6.5	8.8	10.2	11.3	3	13.0	14.6	16.3	18.3	21.1	25.4	27.7
43	5.3	6.5	8.7	10.2	11.3	3	13.0	14.6	16.3	18.3	21.1	25.4	27.8
44	5.2	6.4	8.7	10.2	11.2	3	13.0	14.6	16.3	18.4	21.2	25.5	27.8
45	5.2	6.4	8.7	10.2	11.2	3	13.0	14.6	16.3	18.4	21.2	25.6	27.9

Kelsey et al. 2014.

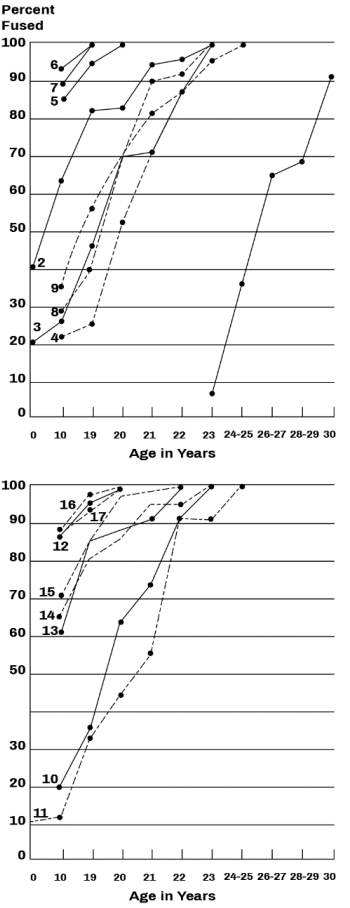
Kelsey et al. (2014) shows mature testosterone levels when expected (starting 14-16) while Rundle & Sylvester (1962) shows mature testicular volume starting at 15 or 16.



The effect of chronological age on testicular volume.

Rundle & Sylvester 1962.

In males particularly, certain bones may continue to grow even after vertical growth essentially stops around the age of 15. This I term "latent growth," because it's essentially useless and hidden, an artifact of deceleration.

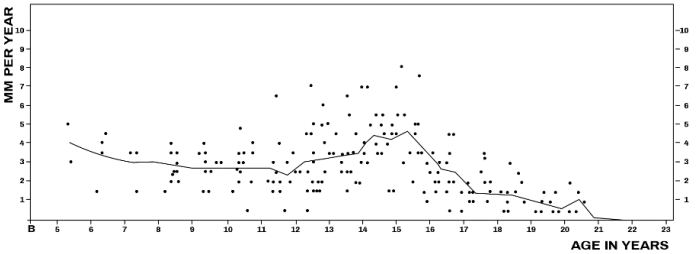


Ages of fusion for various male skeletal elements. Data on fusion from McKern and Stewart (1957). These standards, derived from U.S military personnel who died in the Korean War, show considerable variation in fusion for any given element. For example, in the medial clavicle, McKern and Stewart (1957) found that of 10 individuals aged 17 years,none had fused epiphyses. For the clavicle, the epiphyscal cap begins to unite to the medial end of the clavicle as early as 18 years but can begin to unite at any time between 18 and 25 years. The earliest complete fusion came among some soldiers who died at 23 years, but the study showed that others lived at age 31 before fusion was complete. To use this table, choose a numbered epiphysis from above or below the waist and find its graph to the right of the skeleton. The graph shows what percentage of adult male individuals showed full fusion of each epiphysis at any given age.

McKern & Stewart (1957)

Fig. 10. Photographs of five males and five females taken at ages of approximately 5, 10, 15, and 25.5 years. No attempt was made to standardize face size of photographs at different ages.

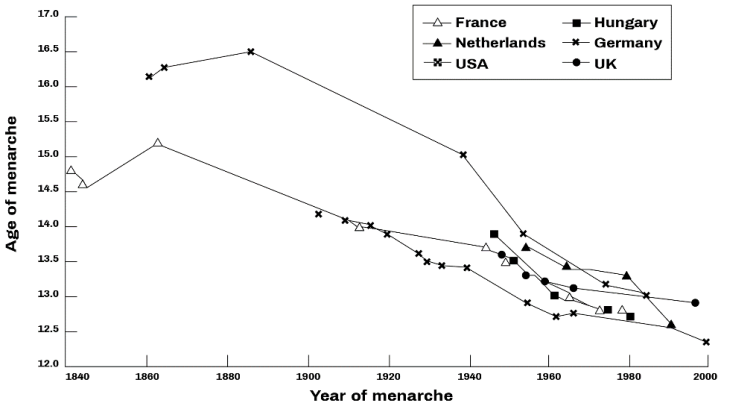
Bishara et al. (1984)



Annual rate of growth at the mandibular condyles in the male sample, measured in the Direction of growth. The 209 points represent annual observations, marked at the middle of the year observation. The curve represents the mean annual growth.

Bjork (1963)

Back to puberty: there is some evidence that puberty took longer, but started around the same time in the past.



Source: NHS

Average age (year) at which puberty milestones are achived

	York		Barton		London		Average Medieval
Pubertal stage	Male	Female	Male	Female	Male	Female	
Initiation	10-12	10-12	10-12	10-12	10-12	10-12	10-12
Acceleration	12-16	10-11	12-14	10-12	10-16	10-13	10-13
PHV	12-16	12-16	11-16	11-16	12-17	12-18	15-16
Menarche		10-15		12-16		15-17	15-17
Deceleration/ Maturation	14-21	15-11	13-19	14-17	14-25	12-25	15-17
Completion	16-19	16-19	17-19	16-22	17-25	18-25	16-22

Lewis et al. (2015)

Peak height velocity was estimated by Lewis et al. (2015) to have been around the age of 15.5 in medieval skeletons, a year and a half later than Tanner's modern estimates. The age at which puberty initiated, however, appears to have been similar to that of now. Like PHV, menarche has been widely estimated as being later on average in the past. It is interesting to note that medieval Londoners were particularly late in maturation. Their development was probably delayed by a poor diet.

Lewis et al. (2015) also reported that male skeletons appeared to grow vertically until the age of 20 or 21. The extent to which these findings hold true in all past time periods is questionable and is probably

dependent on what the dietary conditions were. Nonetheless, it is interesting to note how much more responsible youth were expected to be in past times despite potentially being physiologically less mature than youth of the same age today.

It is also interesting to recall per Temin (2013) that Romans had the best diet of any preindustrial civilization. It's quite possible that Roman puberty was more akin to modern puberty in timing than it was to medieval puberty. If so, that's a sign that modern youth might be improved by being adjusted to more resemble the precocity Ancient Roman youth.

The data on this topic suggests that the hypothesis that ancient puberty was more rapid is correct. A 2016 review indicates that classical menarche occurred from 12-14 years of age[120]. It includes a quote by Aristotle: "when twice seven years old, in most of the cases, the male begins to engender seed, and at the same time hair appears upon the pubes….At the same time in the female, the breasts swell and the so called catamenia are noticed by the time the breasts have grown to the height of two fingers' breadth." Another paper states:

> The trend ranges from a maximum of 17 years in Norway of 1840 to around 13 years in Europe of 1960. The purpose of this article is to present evidence that may establish the age of menarche in classical Greece and Rome. The primary sources are drawn from medical and judicial writing … Resolution of the apparent discrepancy between medical and judicial sources is possible if one assumes that the legal age of 12 used for legal purposes was a rough lower limit for menarcheal age based on observation. Medical sources suggest a modal age of 13-14 years. Variation in age between individuals was noted, but menarche in Classical Greece and Rome most typically occurred during the 14th year of life.[121]

The average age of menarche being 13 or 14 is roughly consistent with Lewis et al.'s data regarding York and Barton. London, on the other hand, shows a significantly delayed menarche similar to that of 19th century Norway. Evidently, the time it took to develop slowed down as industrialization progressed and robbed individuals of quality diets. As limitations were overcome throughout the 20th century, the

[120] Papadimitriou 2016
[121] Amundsen & Diers 1969

speed of development increased again and has now reached a maximum. The norms of youth, however, have failed to change with the speed of development.

What of behavioral maturity, and behavioral change during puberty? A large portion of the rest of this book will deal with measuring that in humans, but let's first turn briefly to the animal kingdom in an attempt to generate some hypotheses. Already we can notice the overlap of developmentally significant ages with the social practices of youth at different points in history. For instance, Roman youth would have adopted the toga virilus around the time their puberty was coming to an end. Roman girls began to marry once puberty began. Medieval youth tended to enter apprenticeships and Roman youth tended to enter education near the end of puberty. Clearly, puberty is and was a significant developmental event with regards to social roles.

Is this similar in social mammals? The data on this subject is poor. One of the only books I have been able to find is about the "teenage brain." The two women who wrote it, one of whom is an editor for the Atlantic and CNN, say things like this (this is the editor speaking!):

> Bowers: The "teenage brain" has gotten a lot of attention over the past couple of decades. Compared to children's brains and adult brains, adolescent brains show unique patterns of development. In Wildhood we add a crucial piece of knowledge: humans are not the only creatures with teenage brains. Other animals show distinct neurobiological changes during adolescence that affect their behavior. After synthesizing our research, we found that adolescents must learn to handle four core life challenges in order to survive as adults.[122]

I should not get ahead of myself here. Suffice it to say I confidently conclude in the remaining portion of this book that the teenage brain as they refer to it does not exist, and that quotes like the above are a part of a mythos manufactured by the media. Their book is mostly fluffy nonsense, and their personal claims can't be trusted. Still, it would be useful to search for claims that overlap with more trustworthy

[122] Psychology Today – "Astounding Connections Between Human and Animal Adolescents"

sources, but the book is so sparse in facts that I can't be bothered. Death to the NYT bestseller format wherein 5 pages of data are increased to 250 pages filled with stupid jokes, anecdotes, and word games!

I have found a zoo website and an old textbook in my search for intelligent descriptions of pubescent animal behavior. The former says:

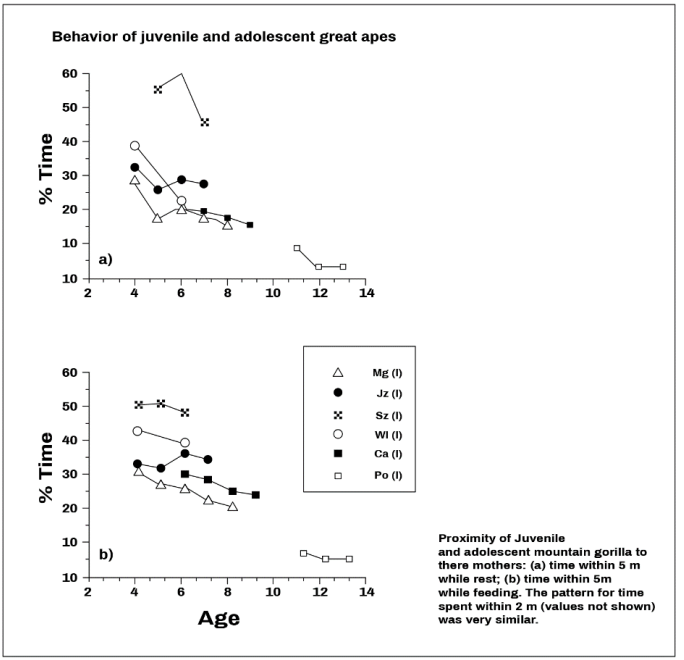
> With early adolescence, 8-12 years of age in males and 8-10 years of age in females, chimpanzees begin to show significant differences in their behavior. Males spend more time with adult males patrolling the perimeters of their home territory, to detect and pursue chimpanzees of other communities. Females remain close to their mothers and begin to show adolescent swellings that signal the reproductive status of the female to males. Young females learn to be mothers by watching their mother and helping her with younger siblings.
>
> At 13-15 years of age, late adolescent male chimpanzees spend most of their time with adult males and females in estrus (sexually receptive), remaining peripheral to the main body of the community. During this period of time, young males attain dominance over all females. Late adolescent chimpanzees, 11-13 or 14 years of age, begins with the onset of estrus cycles and adolescent sterility and ends with females being able to successfully reproduce. Consortships, the distancing of a male and female from the group for sexual privileges, first occur at this time. Some females transfer to another community for a brief period of time, and reproduce with males in that community. Returning females are often pregnant or carrying an infant.[123]

Nothing in particular appears surprising here. The book confirms this picture:

> Male chimpanzees show elements of sexual behavior by 1 year … Adult male chimpanzees tolerate copulations, and interference in their own copulations, by adolescents less than by juveniles, and courting or copulating adolescents are warier than are juveniles. Copulation rates with estrous females are high for juveniles, then decline through adolescence. Immature males copulate mostly with adolescent females, nulliparous adults, and parous adults not near peak estrus. They do so mostly in opportunistic situations and do not form consorts successfully before late adolescence.
>
> … Chimpanzee boundary patrols are primarily a male activity. Participation increases with age to peak among prime adults. Adolescents accompanying adults on silent patrols are touched or threatened if they vocalize and gradually learn to maintain silence and vigilance.[124]

---

[123] http://chimpanzoo.org/african_notecards/chapter_5.html
[124] Pereira & Fairbanks 2002



(Pereira & Fairbanks 2002)

It appears that chimpanzee behavior gradually reaches maturity as puberty comes to a close. Association with other males, reproductive behavior, and relationship with the parents all change as puberty progresses. The parallels with human youth, both past and present, are hard to miss. Ancient youth was characterized by integration with adult males and quick marriage, along with gradual or discrete dissociation from the parents. Medieval youth also involved integration with adult males, but marriage was more often delayed until the end of the young period. Dissociation from the parents was about as early as in ancient youth. In modern youth ("adolescence"), however, individuals are prevented from disassociating from the parents until a much later age than before (18-22 now as opposed to 12-16 in the past). The average age at marriage is now higher than ever, and integration of young males with older males is totally absent until sometime in between 18 or 22,

depending on the educational path of the youth (contrast with 12-16 in the past, when apprenticeships would begin).

It makes sense evolutionarily for there to be certain instincts that emerge at puberty. Years ago, when I first began to research this topic, I hypothesized that youth experience a drive towards sex, meaningful work, and independence. This is startlingly similar to what is observed in chimpanzees, the sex being obvious, the meaningful work being analogous to the integration with adult males, and independence being analogous to dissociation from the parents.

From my own experience, the emergence of a strong drive towards sex during puberty is incontestable. The other two potential instincts can be more or less reduced to a drive towards status. The will to integrate with adult males is a will to integrate into the adult status hierarchy, and the will towards independence from the parents is the will towards the status of independence and the end of that particular brand of subordination. It has long been seen as obvious that status-relevant behavior matures during puberty, with many writers remarking how, around the age of 12 or 13, the social environment of schoolboys dramatically changes, with there being an emphasis on boys that age wanting to spend more and more time away from the family, and on their friend groups engaging in more hierarchical behavior. It is also noted that, despite all social opposition, a most common age to join a street gang of older youth and young adults is 13:

> Thirteen was shown to be a key age in a study of another form of exploitation: recruitment by street gangs. Gang leaders seek out younger adolescents, exploiting their need for acceptance with promises of enhanced connection to a group or cause. Drug dealers target them too, knowing how effective their products are in falsely raising the status—or the feeling of status— in their teen customers.[125]

The potential evolutionary utility of these drives is obvious. The more interesting thing to note is timing: if youth are as infantile as they say, needing to be infantilized such as they currently are, why do behaviors which seem so adult emerge so uncomfortably young? The

[125] Natterson-Horowitz & Bowers 2020, 48

simplest just-so story is that youth was meant to be shorter and/or less infantile. It was potentially maladaptive for youth to be totally segregated.

Is modern youth adaptive or maladaptive? The rest of this book seeks to help answer that question by attacking the claim that the brain doesn't mature until the age of 25. Such a claim makes little sense evolutionarily. If people are essentially children until 25, why are they fully grown 10 year earlier? It's theoretically possible that brain development could continue for a decade in secret, but it isn't plausible. Maybe something is wrong. Could the narrative be flawed?

3.2: Brain Development

Brain development seems to appear in the news on a regular basis. The favorite topic of adolescent bio-psychologists, it is often claimed by attention-seeking scientists that the teenage brain is still developing. This claim, like the quip that "we only use 10% of our brain" is something that everyone knows. Or do they?

"Developed" is used here to mean "to have finished biologically determined change towards a finality." Not everyone agrees with this definition, which is selected based both on the word's denotation and connotation. When somebody says that a person is developing, there is an assumed "still" prior to the word developing. We do not say a balding man's hair or an old man's skin is developing. Development is something which finishes; this puts certain psychologists that have co-opted the word to be synonymous with any change at odds with our definition. When most people talk about physical development, those who are considered to be subjects of development are physically immature; in other words, they're children. An adult growing out hair is not said to be developing. An adult gaining weight is not developing. In contrast, a child is developing when he grows taller or hits puberty. Further still, a man who lifts weight is not a developing man. While his muscles are sometimes said to be developing, the man is not. On the other hand, when a child's bones are developing, the child a whole is said to be developing. Thus development is indicated to mean biologically determined, uncontrollable and inevitable change that eventually ends.

I hold that this definition is what most people actually hear when somebody else says "the brain develops until 25." As such, I treat "development" as asynonym for maturation in this section, the goal of which is to find the age at which the brain reaches maturity. A person's brain changes for the entirety of that person's life, in significant ways at every age. But where is the point in youth when the brain can be said to be mature?

3.2.1: Development of Organ Structure

A Google search on this question leads immediately to a seemingly trustworthy source, Rochester University, which says that, "the rational part of a teen's brain isn't fully developed and won't be until age 25 or so." This source continues,

"It doesn't matter how smart teens are or how well they scored on the SAT or ACT. Good judgment isn't something they can excel in, at least not yet … In fact, recent research has found that adult and teen brains work differently. Adults think with the prefrontal cortex, the brain's rational part … Teens process information with the amygdala. This is the emotional part"[126].

There are countless other sources, mostly news articles featuring the opinions of researchers (these will be systematically torn apart in chapter 4), that regurgitate this claim. Like this piece from Rochester, most lack any reference to primary sources. Only data can be used to assess the claim that the brain doesn't develop until 25. Since the amygdala and the prefrontal cortex were explicitly implicated in the supposed immaturity of teen brains by the Rochester source, the data on these structures will be explored first.

The structural development of the prefrontal cortex beyond infancy is well researched; one great paper on this subject is a 2004 study led by Dr. Jay Giedd. The study was longitudinal, following a group of thirteen people from 1994 to 2004 with ages at the end of the study ranging from 4-21 years old.

[126]https://www.urmc.rochester.edu/encyclopedia/content.aspx?ContentTypeID=1&ContentID=3051

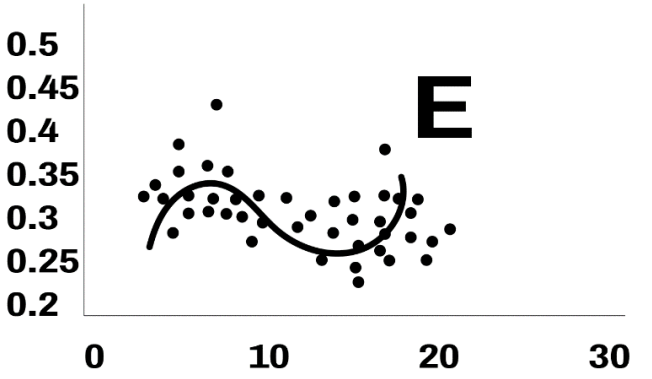
"All subjects were recruited from the community for an ongoing National Institute of Mental Health study of human brain development. Briefly, each subject was given a structured diagnostic interview to rule out any psychiatric diagnoses at each visit. Subjects returned every 2 years for a follow-up MRI together with psychiatric and neurocognitive reassessment. A subset of all children who had three or more usable MRI scans and were between the ages of 4 and 21 years was chosen to be included in this study"[127].

The study found that

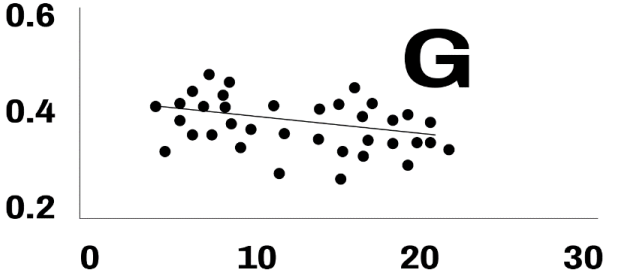
"Overall, the total [gray matter] volume was found to increase at earlier ages, followed by sustained loss starting around puberty … Frontal and occipital poles lose GM early, and in the frontal lobe, the GM maturation ultimately involves the dorsolateral prefrontal cortex, which loses GM only at the end of adolescence."

Taking this statement at face value runs us into another definitional problem that these studies pervasively suffer from: they never define adolescence. Biologically, the analog to adolescence, a social construct, is pubescence.

[127] Giedd et al. 2004



E,dorsolateral prefrontal cortex



G, frontal pole

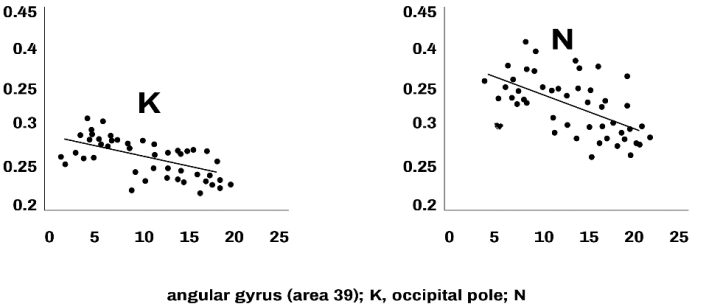


Figure 1. Giedd et al. (2004)

The above figures feature some of the data from the 2004 study. Because the distribution of points tend to show a correlation that looks to be roughly zero from fourteen or fifteen onwards, it seems to show that for Giedd adolescence refers to the period when a person is sexually developing, as opposed to the period in between the beginning of sexual development and the acquisition of full legal rights. Perhaps Giedd's statement was misinterpreted or intended to confuse, leading to the perception that brain development continues on later into life. Nonetheless, this study satisfactorily shows that the structural development of gray matter in the brain is over, on average, by the end of puberty, in the early to mid-teen years, because once gray matter begins to decline, it continues to decline until death.

Whereas the measurement of gray matter is a measurement of the general volume of the brain, a second important structural measurement of the brain exists: white matter, which refers to the connections between cells in the brain and their myelin. In short, more myelination, or white matter, between certain cells or regions of cells indicates they are well connected and that they perform well together functionally[128]. Consequently, this structural measurement is more readily translatable into a functional measurement than is the measurement of gray matter.

Behind the claim that "teens process information with their amygdala [instead of their prefrontal cortex]" should lie structural

[128] Morell & Quarles 1999

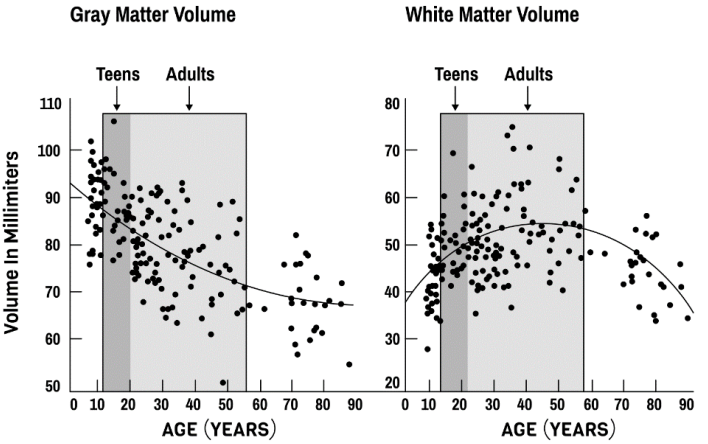
evidence, if not in gray matter, then in white matter. The end of the structural development of white matter in the brain should mean that either white matter totally stops being created or the pattern of change in white matter changes for a final time in life, replaced by a pattern of white matter change that continues to death (This is because gray matter change never stops, its direction only reverses at puberty, from gain in childhood to loss after puberty until death. Therefore, we can call white matter maturity the cessation of white matter change or a reversal in its change's direction). This does not happen. Instead, myelination begins in the womb and continues far into adulthood:

"Overall, there is accumulating evidence that newly formed oligodendrocytes and preexisting oligodendrocytes remodel myelin in the adult brain. This can be potentially altered by experience, and myelin thickness changes have been reported in relation to social isolation or neuronal stimulation studies… Still, it has been proposed that myelination is modulated at least in part by axonal activity. Most evidence of activity-dependent regulation of myelination comes from developmental studies. For instance, in vitro studies demonstrated that increases in neuronal activity, either by high-frequency stimulation or pharmacological manipulation, result in increased myelin sheath formation and myelin compaction within 2–14 days, while low-frequency stimulation inhibits myelination compared to no stimulation… To what extent may similar mechanisms persist into adulthood? A recent study reported that optogenetic stimulation of secondary motor cortex of adult mice increases OPC proliferation within 3 hr and results in increased myelin thickness and behavioral effects 4 weeks later. These effects were not seen in a control group that did not express channelrhodopsin but received the same type of light stimulation … While most studies demonstrating neuronal activity-dependent regulation of myelin have been carried out in developmental models, at least one study has provided evidence of similar mechanisms occurring during adulthood"[129].

Thus the direction of the change of white matter in the brain, increase, does not reverse at puberty as with gray matter. Further, "in humans, the peak of myelination occurs during the first year of life"[130]. This evidence throws much doubt on the common refrain that myelination of the "frontal lobes" ends at the age of twenty-five.

[129] Sampaio-Baptista & Johansen-Berg 2017
[130] Snaidero & Simons 2014

The general picture so far can be summed up by a chart from a book that is ironically otherwise quite unscientific, as we will see in the next chapter:



Jensen & Nutt (2014)

Here we can see that gray matter declines throughout the lifespan (after increasing during childhood per Giedd 2004) while white matter increases on net until about the age of 45. This means that gray matter loss and myelination from 13-25 is not a sign of immaturity; rather, it is a sign of maturity and health.

Here we have reason to doubt the claims made in the Rochester source. But based on the evidence so far, certain aspects of its claims may still be true. So what about the data on the myelination of the prefrontal cortex and the amygdala specifically? One study reports that "Secondary analyses indicated that white matter volume increased until age forty-four

years for the frontal lobes [which includes the prefrontal cortex] and age forty-seven years for the temporal lobes and then declined"[131].

The peak rate of change for white matter, then, is at one year old, and the point when the rate of change turns negative and "reverses" is in the forties, meaning that the evidence thus far reviewed indicates that either the structural development of white matter culminates in maturity at one year or roughly forty-five years. But we know from the gray matter evidence that the brain is not developed at one year old. That evidence indicated that the brain is mature by the end of puberty, which leaves us the ages around puberty and the ages around menopause as possible ages when the brain, in totality, finishes its development.

The evidence concerning the structural development of white matter concerning the amygdala indicates that the answer to the maturity question is the ages around puberty. One 2010 longitudinal study found,

> "Unlike results based on chronological age, which showed significant development during childhood, all the tracts except one cluster (localized in the left IFOF) demonstrated continued immaturities in midpuberty and only became adultlike by the postpubertal stage. This finding suggests that pubertal changes may be more tightly coupled to white matter maturation than had been previously considered"[132].

Puberty stages were determined "by Tanner staging." In 1970, white boys reached the last Tanner stage, the postpubertal stage, on average at the age of 14.9 years[133] and girls around the age of 14 depending on social class and the particular study[134]. In the nearly fifty years since those studies, the ages at which children are beginning puberty has only declined: "The age of puberty, especially female puberty, has been decreasing in western cultures for decades now … for example, at the turn of the 20th century, the average age for an American girl to get her period was 16 or 17. Today, that number has decreased to 12 or 13 years."[135]

---

[131] Bartzokis et al. 2001
[132] Asato et al. 2010
[133] Marshall & Tanner 1970
[134] Marshall & Tanner 1969
[135] https://vitalrecord.tamhsc.edu/decreasing-age-puberty/

The 2010 study looked at, among many, a white matter tract called the "uncinate fasciculus [which] … is a large fiber track connecting three key regions involved in emotion regulation: [the] amygdala, lateral and medial prefrontal cortex"[136]. This connection, which considering the evidence is safely considered to be done with all meaningful structural development by the end of puberty (which is likely to be before the age of fifteen), is exactly what some scientists claim causes a functional difference in teens. Specifically, they claim, among other things, that in teens the amygdala struggles to communicate with the frontal lobe, leading to lower inhibition of primal amygdalic functions. There is no evidence for this claim, since we have seen that the uncinated fasciculus, the main track connecting the amygdala and the frontal lobe, is mature at the end of puberty.

So far we have seen that gray matter, in the prefrontal cortex and the rest of the brain, is accumulated until puberty, when it begins to be pruned. This pruning will continue into old age; there is nothing significant about the age of 25 when it comes to loss of gray matter. We have also seen that the accumulation of white matter reaches its peak rate at the age of one year, and continues at decreasing rates until the age of approximately 45, in the prefrontal cortex and elsewhere in the brain. There is nothing significant about the age of 25 when it comes to the accumulation of white matter. Finally, in direct contrast to the unscientific claim that "Adults think with the prefrontal cortex, the brain's rational part … Teens process information with the amygdala," teens do in fact have working prefrontal cortexes, and the connections between that part of the brain and the amygdala are mature by the end of puberty. There is nothing significant about the age of 25 when it comes to the connection between the hindbrain and the forebrain, or the extent to which one "thinks" with either part of the brain.

How do we now judge the statement that "The rational part of a teen's brain isn't fully developed and won't be until age 25 or so?" Poorly. The proposition is clearly unsupported by the data regarding structural changes in the brain. Based on what we have reviewed, the claim seems totally arbitrary. Let us be charitable and look for other evidence that

[136] Landouceur et al. 2012

might comment on this view. Perhaps the *function* of the brain only reaches mature levels at the age of 25.

3.2.2: Development of Organ Function

Function is what matters. For whatever reason, teen-brain neuroscientists love to obscure the debate on the maturity of the "teen brain" by making claims about its supposed structural immaturities. As we have seen, the actual evidence for these immaturities is sparse at best. Many claims of structural and functional immaturity rest on young, physically immature participants, which are grouped with older teens. Claims are then extended to all teenagers and hyperbolized in the news cycle. For instance, Dr. Giedd, who co-authored the 2004 gray matter study, has gone on the news and made claims about the immaturity of the brain "through adolescence." The definition of adolescence is, of course, slippery. His data shows structural maturity by the age of 14 or 15, which he vaguely refers to as "late adolescence." The WHO then defines adolescence as occurring during the ages 10-19.

Many in the news refer to the age of 25 as the specific age at which the brain reaches maturity. How this came about has already been hinted at: earlier, a source was reviewed which showed that myelination of the frontal lobes continues until the mid-forties. One scientist, BJ Casey, ran an experiment which only featured participants up to the age of 24-25, and found that myelination continued to the highest age featured in the study. Out of this came the claim that the brain is still developing until the age of 25. In reality, further data shows that by this metric, the brain develops until 45!

Dr. Frances Jensen wrote a whole book on this misleading claim, saying in a promotion article published in *Time*,

> The myelination process starts from the back of the brain and works its way to the front. That means the prefrontal cortex, the area of the brain involved in decision-making, planning and self-control, is the last part to mature. It's not that teens don't have frontal- lobe capabilities but rather that their signals are not getting to the back of the brain fast enough to regulate their emotions. It's why risk-taking and impulsive behavior are more common among teens and young adults. "This is why peer pressure rules at this time of life," says Jensen. "It's why my teenage boys would come home without their textbook and realize at 8 p.m. that they have a test the next day. They don't have the fully developed capacity to think ahead at this time."

She also claims in her book that the teenage brain is "only 80% developed," without a source. And, as I will show in the next chapter, for many of the claims in her book are false or unfounded. For every claim I reviewed, she either failed to cite her sources and is demonstrably wrong per other sources, or she cites sources which do not support her claim. Remember that she is one of the leading teen-brain neuroscientists. Based on this level of rigor, it is no wonder that the APA argued in 1990, in favor of extending abortion to teenagers, "that adolescent decision making was virtually indistinguishable from adult decision making by the age of 14 or 15"[137]. Later, after the genesis of the teen-brain myth around 1999, they argued via Lawrence Steinberg (a prominent man of learning who receives money from elite foundations) that teens are actually too immature to be executed when they murder people. Because the ruling class gets to have their cake and eat it too, double-think reigns and to this day murderers under 18 are not allowed to be given the death penalty, but 14 year old girls can receive secret abortions without parental consent (but not other potentially medical operations, like vaccines, blood tests, or surgeries). The evidence will show that the APA was correct in 1990.

What do these people claim about youth cognition today? The functional claims already put forward in the Rochester source say that teens lack "good judgement" and that they think with different parts of the brain. The latter assertion is far easier to investigate than the former because there is a question as to if their concept of "judgement" can be measured, but nonetheless there are certain tests which psychometricians claim measure judgement ability.

Although the Rochester University statement failed to cite any data, it's reasonable to assume that when it claims "adults think with the prefrontal cortex, the brain's rational part … Teens process information with the amygdala," it is referring to one 2008 study that looked at sixty childrens', teens', and adults' brain activity during a go-nogo task using an fMRI machine. This study reported that

[137] Johnson et al. 2009

"Adolescents showed exaggerated amygdala activity relative to children and adults. This age-related difference decreased with repeated exposures to the stimuli, and individual differences in self-ratings of anxiety predicted the extent of adaptation or habituation in amygdala. Individuals with higher trait anxiety showed less habituation over repeated exposures. This failure to habituate was associated with less functional connectivity between ventral prefrontal cortex and amygdala"[138].

The study tested the subject by having them complete

"six runs of a go-nogo task using fearful, happy, and calm facial expressions as targets and non-targets. All runs included only two categories of expressions, one target and one non-target that were pseudorandomized across the run to control for order of presentation. All combinations of expressions were used as both targets and non-targets. Before each run, subjects were given instructions to respond to a particular facial expression by pressing a button but not to respond for any other expression, and to respond as fast as possible without making mistakes. Stimuli were presented for 500 ms and the intertrial interval was varied between 2 and 14.5 sec with a mean intertrial interval of 5.2 sec. Each run lasted 307.5 seconds and consisted of 48 stimulus presentations in a pseudorandom order to ensure an equal number of targets in early, middle and late trials with targets occurring on 75% of trials for all subjects."

[138] Hare et al. 2008

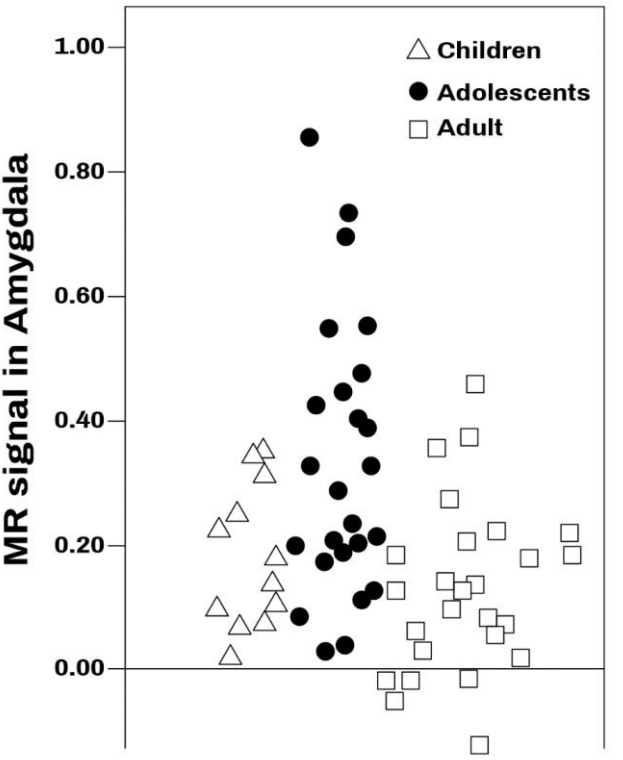


Figure 2. Hare et al. 2008

The previous figure features the actual data the authors of the 2008 study refer to in their report. The main problem with this data is that over 75% of people in the study aged thirteen to eighteen ("adolescents") scored within the normal range for children and adults and therefore do not primarily "process information with the amygdala." The reason for only a minority of the study's adolescents scoring outside the range is most likely puberty. The average age of the 13-18 year olds was 16, and the standard deviation was 1.5. Elementary statistics allow us to estimate that about 25% of the sample would have been 13 or 14, which is roughly

the amount of participants who received immature scores. It is probable that the "adolescents" who scored in the normal range for children or adults are older than 14, and are in terms of puberty not adolescents but adults. Previous structural evidence regarding the amygdala supports this hypothesis, but sadly the authors of the 2008 study failed to both measure the puberty stages of their subjects and to report their individual ages. Essentially, this study is consistent the hypothesis that the end of puberty coincides with the functional maturity of the brain, although it does not strictly imply that proposition.

The following are a number of charts from an assortment of studies whose patterns will be analyzed below.

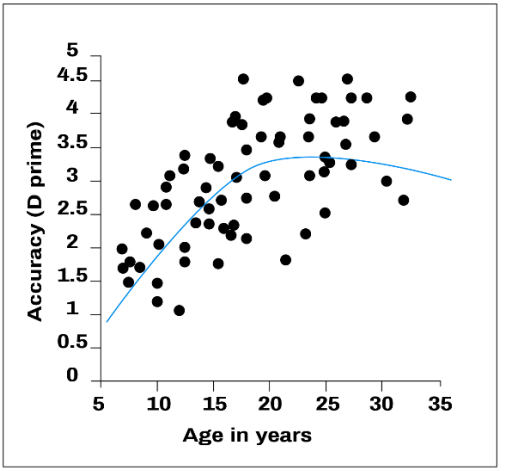


Figure 3. (Casey & Caudle 2013) "Performance of a standard Go/Nogo Task by Age D-prime, a measure of accuracy that includes both hits and false alarms, is plotted as a function of age illustrating improvements in performance with age, but high variability with some adolescents performing as well or better than some adults as indicated in gray box"

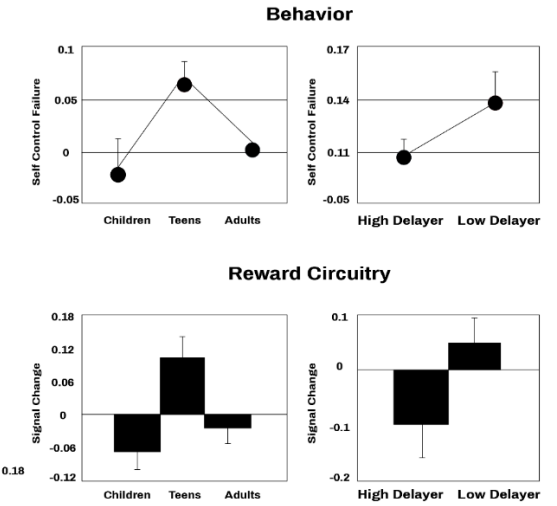


Figure 4. (Casey & Caudle 2013) "Developmental and Individual Differences in Behavior and the Brain: Teens unlike children and adults, make more false alarms to positive social cues than neutral ones on a go/nogo task (A and B). This behavioral performance is paralleled by enhanced activity of the ventral striatum (D and E), part of the reward circuit) to appetitive cues in teens relative to children and adults (bottom left). Low delayers make more false alarms to positive social cues than high delayers on a go/nogo task (C). This behavioral performance is paralleled by enhanced activity of the ventral striatum in low delayers relative to high delayers (F)."

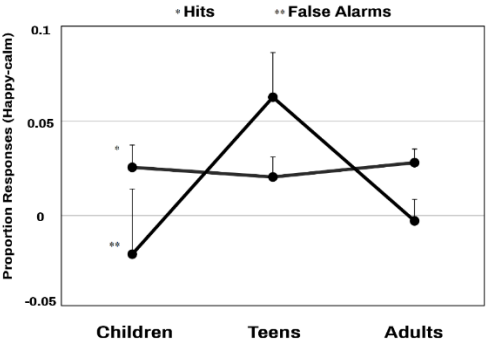


Figure 5. (Somerville et al. 2011)

"Behavioral performance by emotion and development. Gray line represents proportion of correct hits out of total go trials; black line represents proportion of false alarms out of total no-go trials. The y axis represents the proportion of responses for happy trials adjusted for proportion of responses for calm trials."

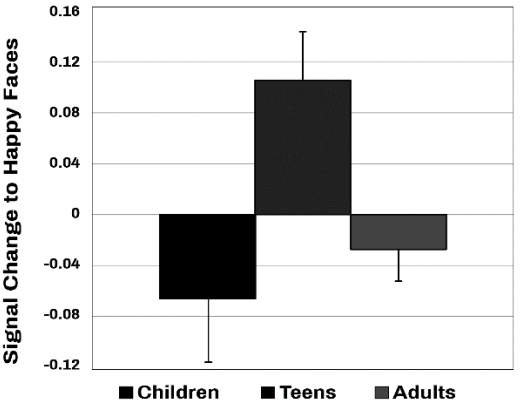


Figure 6. (Somerville et al. 2011)
"A) Brain regions showing differential activity as a function of age. Activations, threshold $p < 0.05$, svc are rendered on a representative high resolution anatomical scan. B) Plot of activity in the ventral striatum (circled in A) response to happy faces (nogo and go conditions collapsed) relative to rest as a function of age. Adolescents show a significantly larger magnitude of activation relative to both children and adults. The left side of image corresponds to the left side of the brain."

These figures have been included to advance the recognition of two patterns seen in development. These two patterns are the quadratic seen on Figure 6, 5, and 2 and the single direction shift where a trait either increases or decreases from childhood to adulthood seen on Figure 3 and 4. It is the quadratic pattern that makes it most obvious that the three separate groups differ by pubertal state. From this the pubertal hypothesis (that the brain is mature at the end of puberty) may also be applied to the other pattern. These patterns support our hypothesis, that puberty is what launches a child into neural maturity, and that there is not a significant maturation event beyond puberty. This hypothesis is not only supported by all the evidence thus far, it is also heavily supported by the evolutionary theory, ethology, and history we have seen.

Because they feature age, Figures 1, 2, and 3 already show that maturity is attained in regards to whatever traits they respectively measured by the age of 15 or 16, which is consistent with the our hypothesis and inconsistent with some sort of process beyond puberty being responsible for development up to the age of 25.

Evidence that directly correlates pubertal stage with change in an important psychometric can provide more evidence for our theory. There is a popular psychometric called sensation seeking, which relates strongly to risk taking and judgement and is defined as "attraction to novel and exciting experiences despite their evident risk"[139]. Research on this metric has shown that it reflects "activity in the midbrain dopamine pathway ascending from the ventral tegmental region." Sensation seeking as a metric often peaks during pubertal years and was long ago directly correlated with pubertal stages: "Boys and girls with more advanced pubertal development had higher ratings of sensation seeking … Sensation-seeking increases from age 10, peaks between 13-16 years, and then declines [quadratic pattern]"[140]. This indicates that puberty causes the underlying change process resulting in change in sensation seeking, and that maturity can be said to be reached for this trait by the end of sexual maturation.

Beyond sensation seeking there are a range of psychometrics that relate to cognitive or "executive functioning" peak at some point in life. This point may be said to be the point at which that trait is mature. Usually, these traits increase during development and hit a plateau at maturity, and then they decline as aging progresses.

So let us examine the literature on cognitive and executive functioning. There are a number of psychometric tests that psychologists use to measure their subjects' cognitive ability, or ability to think. Executive function is a subset of cognitive function and is generally defined as "a family of top-down mental processes needed when you have to concentrate and pay attention … [that] make possible mentally playing with ideas; taking the time to think before acting; meeting novel, unanticipated challenges resisting temptations; and staying focused"[141].

The three most relevant executive functions, i.e. those which have the largest bodies of research, are working memory, fluid intelligence, and inhibition. At what age on average can working memory, fluid intelligence, and inhibition be said to be mature?

---

[139] Romer et al. 2017
[140] Forbes & Dahl 2010
[141] Diamond 2012

Diamond (2012) explains the concept of working memory: "Another core EF [Executive Function] is working memory (WM), which involves holding information in mind and mentally working with it. The two types of WM are distinguished by content—verbal WM and nonverbal (visual-spatial) WM. WM is critical for making sense of anything that unfolds over time, for that always requires holding in mind what happened earlier and relating that to what comes later. … Reasoning would not be possible without WM. WM is critical to our ability to see connections between seemingly unrelated things and to pull apart elements from an integrated whole. "

Dr. Daniel Romer reports that "In one longitudinal study, individual differences in working memory predicted subsequent levels of sensation seeking even after controlling for age, suggesting that sensation-based risk taking rises in concert with executive function. Indeed, executive function rises rapidly during adolescence (as does sensation seeking) and asymptotes well before age 25. Thus, the rise in dopamine expression during adolescence may play a role in both sensation seeking and executive function." It is fair for us to hypothesize that working memory, an important component of executive function, reaches maturity at the end of puberty alongside sensation seeking.

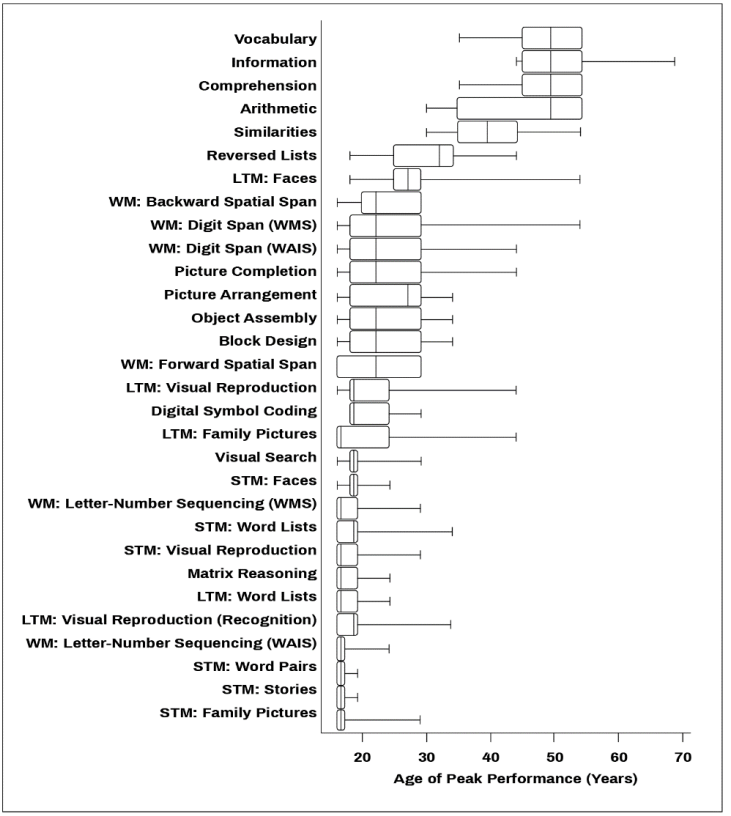


Figure 7. (Hartshorne & Germine 2015)

Hartshorne & Germine (2015) report that many important types of working memory peak at about the age of sixteen. Others appear to peak later. Figure 7 is an extremely useful resource for determining when working memory matures. The graph shows many different psychometrics, some relevant to us and others not, and was constructed from the results of the researchers' earlier experiment, which involved analyzing data from two archives of psychometric data, the WAIS III and the WMS. The data featured over 3,000 subjects whose ages were

distributed uniformly. They summarize their quantitative methods: "We generated bootstrapped estimates for age of peak performance based on norms reported in the WAIS-III and WMS-III. The WAIS-III and WMS-III manuals provide a fine-grained approximation of the normal distribution of scores for each age group (the scaled scores). We used these distributions to draw N samples from each age group, where N is the number of participants used to generate norms for that age group. Resampled scaled scores were then converted back to raw scores using age-specific normative data, and the age group with the highest score was identified. This procedure was repeated 2,500 times for each task in order to provide the distribution on age of peak performance used for analysis and for Figure [7]"[142].

Figure 7 shows a group of working memory measurements that peak earlier and a group that peak later. "Spatial span" and "digit span" peak at around the age twenty-two, and "letter number sequencing" seems to peak at about the age of sixteen (the youngest people in the sample). Hartshorne & Germine (2015) explain that letter number sequencing involves subjects being given a list of interspersed numbers and letters, and repeating signifiers from memory in ascending or alphabetical order or the inverse, digit span involves repeating lists of digits, either in the same or reversed order, and spatial span means indicating the order or reverse order in which the experiment tapped a cube set.

It is interesting that what seems like the most difficult test, letter number sequencing, peaks about half a decade earlier than the other two scores. This may indicate some type of effect from experience on the results of the latter two test scores, whereas the former may more purely measure some innate working memory capacity that is environment resistant. This thought is supported by the great variance present in the peak performance age for the former tests which the latter test mostly lacks. On the other hand, Diamond (2012) made the distinction between verbal and spatial working memory, which corresponds to the distinction between the two number tests and spatial span. It seems then that taken alone, it may be said that spatial working memory typically peaks around the age of twenty-two and verbal working memory around sixteen.

[142] Hartshorne & Germine 2015

Indeed, Epstein (2010, 184) reports that "a 1995 study by Linda S. Siegel of the Ontario Institute for Studies in Education found that working memory … [peaks] at fifteen or sixteen" and yet another source says that "like other cognitive capacities, working memory capabilities change over an individual's lifespan. This is most noticeable in terms of the number of items or chunks that can be held in working memory, which increases steadily with maturation and reaches a peak around the age of sixteen years, a finding which is consistent across many cultures"[143]. This corroborating evidence certainly reinforces the findings of Hartshorne & Germine (2015) as they all indicate that verbal working memory reaches maturity around fifteen or sixteen years of age. Interestingly, Ryan et al. (2000) found, using the same data bank, that the digit span score peaked in the sixteen to seventeen age range, contradicting Hartshorne & Germine (2015), and providing more evidence that verbal working memory peaks by fifteen or sixteen years of age. It is possible that Hartshorne & Germine used different norms, or that the difference between 16 year olds and 22 year olds was so small that the "peak" was estimated at 22 by chance. This latter idea will be vindicated by later data that allows us to calculate the group differences between youth and adult psychometric scores.

These data strongly support the puberty hypothesis. As for other types of memory, Epstein relays that "At or shortly after puberty, our memory is just as good as it will ever be"[144]. Additionally, a 2004 study reported that "response inhibition" and "processing speed" reached adult level performance at the ages of fourteen and fifteen respectively[145].

Diamond (2012) informs us that "Inhibitory control (one of the core EFs) involves being able to control one's attention, behavior, thoughts, and/or emotions to override a strong internal predisposition or external lure, and instead do what's more appropriate or needed. … Examples of psychological measures of inhibitory control include the Stroop task, Simon task, Flanker task, antisaccade tasks, delay-of-gratification tasks, go/no-go tasks, and stop-signal tasks" Another writer says that

[143] Cockcraft 2014
[144] Epstein 2010, 184
[145] Luna et al. 2004

"Inhibitory control is defined as the capacity voluntarily to inhibit or regulate prepotent attentional or behavioral responses. Inhibitory control involves the ability to focus on relevant stimuli in the presence of irrelevant stimuli and to override strong but inappropriate behavioral tendencies"[146].

Essentially, inhibitory control is just the capacity to deny instinct or intuition. Knowing when this faculty matures can inform talk of when a person may be said to have mature "judgement" ability, as it is this ability that enables the individual to step back and evaluate the risk of some activity that at surface level seems to be harmless fun. Furthermore, both definitions concur that inhibitory control includes what may be called selective attention: "actor analyses have found that inhibition of attention and inhibition of action are strongly correlated and fall along a single factor"[147].

One study on selective attention reports that "this study examined visual selective attention across development from 7 years of age to adulthood. … although there were no qualitative differences in changes in processing, there were quantitative differences, with shorter P1 latencies in teens and adults compared with children, suggesting increases in the speed of processing across development"[148].

Mean Accuracy Across Age

	7-9 years		10-12 years		13-15 years		16-18 years		19+ years	
Perceptual load	M	SD	M	SD	M	SD	M	SD	M	SD
Low	86.24	19.2	87.82	12.9	89.71	10.3	94.50	3.8	95.04	5.1
HIGH	74.06	14.3	77.62	10.5	82.33	9.9	86.93	11.6	87.46	7.0
Difference	12.18		10.20		7.38		7.57		7.58	

Source: Couperus 2011

As shown in the above table, Couperus (2011) found that mature scores on a perceptual load task which measures selective attention occur starting around the age of sixteen. Although the mean score for the 19+

[146] ACF 2008
[147] Diamond 2012
[148] Couperus 2011

age group was slightly higher, the difference between the 19+ group and 16-18 group was not statistically significant, so here we have an example of a psychometric that, only considering group means, could technically be said to peak in later adulthood, but which is more appropriately said to actually be stable from the end of puberty onwards. It is not unlikely that this is what happened in Hartshorne & Germine – 22 year olds may have the highest spatial WM scores, but the difference between 22 year olds and 16 years is not necessarily statistically significant.

The go-no-go task from Figure 3[149] also measures inhibition. As is visible from the scatterplot, adult scores begin to be achieved at 15 or 16 years of age. The significance of these findings on inhibition means that people in their mid teens should be considered to have a mature ability to disregard dangerous temptation, insofar as experience is disregarded.

A review on the function of the brain would be incomplete without the most predictive and most controversial psychometric: IQ. David Wechsler, the creator of the most widely used IQ test, wrote that "[There] are not mental age equivalents for ages above fifteen and a half, and … beginning as early as age fourteen, the differences between succeeding half year scores are so small as to make them unreliable"[150]. J.C. Raven, creator of the extremely "g-loaded" progressive matrices test, found that g peaks "around thirteen or fourteen"[151]. This without a doubt supports the thought that the brain is functionally developed by the end of puberty.

Hartshorne & Germine (2015) included data from Raven's matrix test (an IQ test and fluid intelligence test) in their report and its results are reported as "matrix reasoning" in Figure 7. Matrix reasoning peaks at around the same time as verbal working memory: fifteen or sixteen, according to the data. Ryan et al. (2000) found that "scores on Matrix Reasoning are at a peak for persons at 16 to 17 years of age and differences [decline] first become evident for persons 45 to 54 years of age."

---

[149] Casey & Caudle 2013
[150] Epstein 2010, 172
[151] Ibid.

It is safe to say that the human brain is, on average, mature when puberty ends. Available studies that measure pubertal progress and development metrics are sparse, but a synthesis of functional and structural evidence reveals the truth. While Hartshorne & Germine (2015) reported metrics which peak as late as age fifty, such measurements have little to do with maturity. The holisis of evidence paints the picture that the brain generally reaches functional maturity in the mid-teens. Even if certain innate abilities develop later into life, the effect size of the difference between teens and slightly older adults is likely to be like that seen in Couperus (2011): so small as to be statistically insignificant. In other words, the difference between 29 year olds and 16 year olds on a given metric is probably smaller than the difference between women and men. We will review more evidence indicating this is the case in the following section; as for the specific case of Couperous (2011), $d \sim 0.16$ and $p > 0.05$. The important takeaway is that it is hard to spot significant immaturity in youth who have completed puberty. Structural studies report structural maturity and adult patterns of change; and psychometric studies report adult levels of intelligence and executive functioning. Mainstream claims of the immaturity of youth are overstated and in the majority of cases, plain wrong.

3.2.3: Youth Judgement

Next we shall examine youths' capacity for judgment more closely. Teens in particular are often said to lack the ability to make good decisions. This section will review the data on teen decision making ability and reach a clear conclusion on whether or not teenagers of some age can be said to exhibit adult level judgement.

Before the concept of "judgement" can be measured, it has to be defined. Far too often people use "judgement" and "maturity" as meaningless words that teens lack by definition and that are gained magically upon aging into legal rights. But what kind of innate "judgement" ability matters in regards to being able to handle legal rights? The intuitive answer is to define judgement as "the ability to make good decisions." It may be easier to think about it in terms of its

reciprocal: "the ability to avoid bad decisions." In terms of being able to handle legal rights, "bad decisions" should be defined as "choices that cause harm to oneself or others." Good judgement, then, can be said to be a good ability to avoid choices that cause harm. This definition of "judgement" lines up with its use as metric to deny teenagers rights, including the right to work and leave school: they say teenagers have a poor ability when compared to older individuals to avoid harmful decisions, which means allowing teens to handle their finances, a car, and decisions about their future is a bad idea. This definition is flexible: it encompasses the duty to seek information about something before making a decision on it, whereas a definition like "the ability to make good decisions based on information available" might not. It also allows for infinitely diverse situations and the possibility that teens might have good judgement when calm but not when stimulated, whereas a definition that includes "when calm" excludes this possibility. Essentially, our definition of judgement grants the most to those who hold the opposite bias to mine.

There are generally two ways of measuring the judgement ability of an age group: real behavioral outcome statistics and psychometric testing. Structural data (brain scans) alone cannot establish a judgement deficiency but it can explain it. For example, a popular structural myth that we have debunked is that "teens think more with the amygdala." If, in an alternate universe, this were true, it would not show a judgement deficiency where psychometrics and behavioral outcome statistics fail to show one. It can only explain the structural mechanism of one that exists. If no functional immaturity exists, then perhaps the structural data is flawed or perhaps it indicates some benign or immeasurably small behavioral difference. Either way, the place to start in surveying judgement is behavioral and psychometric data.

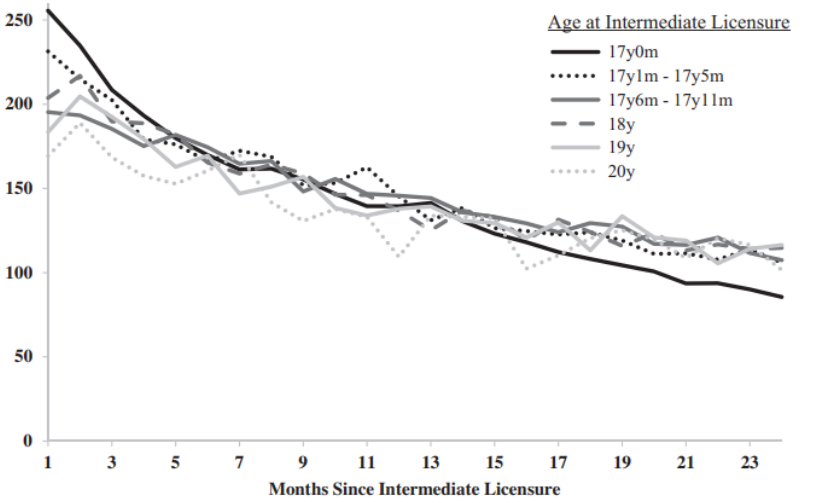
It is often said that teens and youth are hot-headed and are lacking in the ability to avoid bad decisions under emotional circumstances relative to older people. That narrative has doubt casted on it, however, by behavioral data regarding condom usage and STD rates. Teens use condoms at a higher rate than older people: 60% for

teens[152] and about 45% for unmarried older men[153]. STD rates paint a similar picture: "In 2017, the rate of reported chlamydia cases among men aged 15–19 years was 924.5 cases per 100,000 males"[154] while "men aged 20–24 years had the highest rate of reported chlamydia cases among all men (1,705.4 cases per 100,000 males)"[155]. It seems that older people actually display inferior ability to avoid bad decisions compared to teens when it comes to sexual activity, a very emotional situation. This can imply a few things: first, real world judgement may be sensitive to culture and knowledge. Teens know the stigma of teenage pregnancy and might therefore be safer. It can also imply that teens do not have an innate, developmentally inferior capacity for judgement. It might even support the thought that teens have superior judgement when compared to older people, which is not impossible considering how cognitive abilities actually decline after youth. At the least, it clearly shows that teen judgement is not markedly inferior in high arousal situations, casting doubt on the claim that teen judgement is especially depressed under pressure.

Driving is another high pressure activity. Are teens innately bad at it? Of course, driving is an activity that is highly responsive to experience, so teenagers do in fact crash more than older drivers. But this is not due to innate judgment deficiencies: beginning teenage drivers do just as well if not better than older beginners[156]. This casts doubt on the thought that teens have innately inferior judgement ability in stressful driving situations.

The finding that teens are at least equal in driving abilities when compared older people with the same level of is replicated by a 2015 study:

[152] https://pediatrics.aappublications.org/content/107/6/1463
[153] Nasrullah et al. 2017
[154] https://www.cdc.gov/std/stats17/adolescents.htm
[155] Ibid.
[156] Wayne & Miller 2018



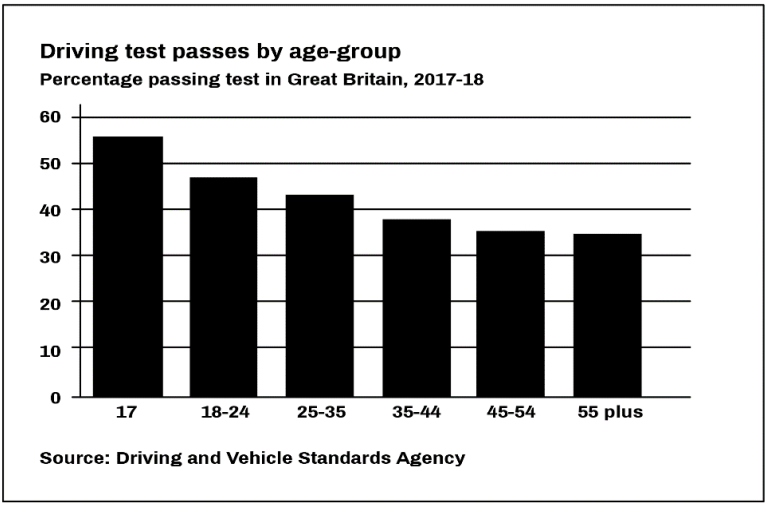
Curry et al. (2015)

The study methods were as follows:

From a unique linked database containing licensing and crash data, we selected all drivers who obtained their NJ intermediate license at 17–20 years old from 2006–2009 (n = 410,230). We determined the exact age at which each driver obtained an intermediate and full license and created distinct, fixed cohorts of drivers based on their age at intermediate licensure. For each cohort, we calculated and graphed observed monthly crash rates over the first 24 months of licensure. Further, we examined crash rates by age at licensure, driving experience (i.e., time since licensure), and license phase[157].

British driving data backs us up further. Youth are more likely to pass the driving test, possibly indicating greater mental fitness compared to more aged participants.

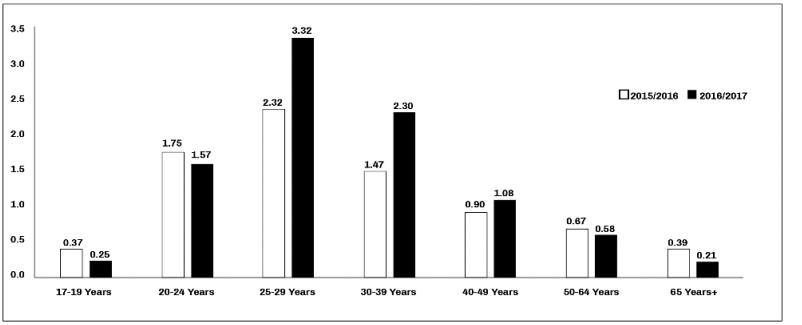
[157] Curry et al. 2015



Source: BBC[158]

Also of interest are British drunk-driving figures. One major justification for raising the drinking age to 21 all across the United States was to destroy "blood barriers," areas on state borders where youth would, allegedly, frequently drive drunk due to having to drive to another state to go to a bar, as some states had 21 as the drinking age and others had it at 18. This begs the question though, why not, in keeping with the spirit of the 26th amendment, require a uniform drinking age of 18 instead of 21? The common answer was that, supposedly, 18-20 year olds are immature and therefore more likely to drive drunk even if they have legal, local access to alcohol. Britain allows us to test this idea, since anyone over 18 can drink alcohol and have a driver's license.

[158] *Is the driving test getting more difficult?* (2018). https://www.bbc.com/news/uk-46374981

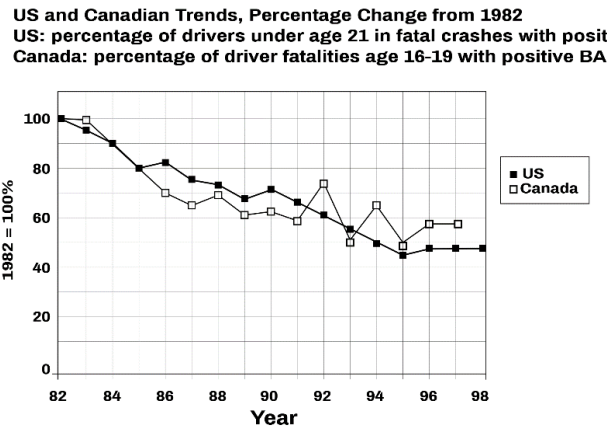


The Data shows that drunk driving convictions for the two youngest and the oldest age brackets declined between 2016 and 2017, thought it increased in the middling years.

Source: Analysis of more than 7 million insurance quotes by comparison by MoneySuperMarket[159]

It appears that 25-29 year olds are the most likely age group to drive drunk in the UK. Relevant to this is data involving a comparison between American and Canadian drunk driving deaths that indicate that raising the drinking age to 21 didn't actually decrease drunk driving.

[159] *Can you guess the UK's drink driving capital? We reveal the ten hotspots and the occupations most likely to be caught.* (2017). https://www.thisismoney.co.uk/money/cars/article-5136981/UKs-drink-driving-capital-2017-revealed.html



Source: US Department of Transportation[160]

The drinking age has been 18 or 19, depending on the province, in Canada since the 1970s, yet Canadian drunk driving deaths have experienced more or less the same decline as American drunk driving deaths since the 1980s. This means that raising the American drinking age likely had no effect on youth drunk driving rates.

There are not many other types of real world outcome data that relate as well to teen judgement ability as the above two. There are, however, certain psychometrics which purport to measure judgement ability. One study reports that

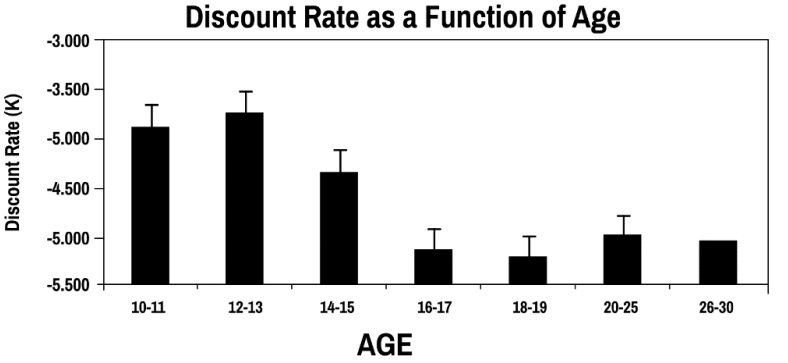
> The evidence suggests that by the age of 15 years many adolescents show a reliable level of competence in metacognitive understanding of decision-making, creative problem-solving, correctness of choice, and commitment to a course of action. Young adolescents (12-14 years) are less able to create options, identify a wide range of risks and benefits, foresee the consequences of alternatives, and gauge the credibility of information from sources with vested interests[161].

[160] *Determine Why There Are Fewer Young Alcohol-Impaired Drivers* (2000). https://one.nhtsa.gov/people/injury/research/feweryoungdrivers/iv__what_caused.htm

[161] Mann et al. 1989

The timeline here correctly lines up with the one predicted by the hypothesis that maturity is attained by the end of puberty. The APA agreed with that study in 1990, arguing that teenagers should be able to get abortions. And as we have already seen, verbal working memory, fluid intelligence, inhibition control, and selective attention all, according to the relevant evidence, present as mature in by the end of puberty. The data converges; "cold judgment" is more or less mature by the mid-teens.

We now move on to literature mainly focused on "adolescent risk taking." This literature is somewhat well developed and attempts to measure "hot judgment ability." One study[162] in this literature measured the ability of teens and older people to delay a $1000 dollar award by offering them cheaper rewards immediately. A "discount rate" was calculated based on how little money they were willing to go to get the money immediately.



The results show that maturity on this metric is reached by the age of 16, indicating that 16 year olds can handle full financial rights. Interestingly, the experimental data contradicts survey data from the same study, where teens disparaged themselves by rating themselves as more immature than older participants.

The study concludes:

[162] Steinberg et al. 2009

> Younger adolescents consistently demonstrate a weaker orientation to the future than do individuals aged 16 and older, as reflected in their greater willingness to accept a smaller reward delivered sooner than a larger one that is delayed, and in their characterizations of themselves as less concerned about the future and less likely to anticipate the consequences of their decisions. Planning ahead [measured via survey], in contrast, continues to develop into young adulthood. Future studies should distinguish between future orientation and impulse control, which may have different neural underpinnings and follow different developmental timetables[163].

The claim here is that despite the behavioral data contradicting survey data, teens are prone to make bad decisions due to impulsivity and a lack of planning ahead even though they have an experimentally demonstrated mature capacity to make decisions that sacrifice immediate gratification for later, greater reward. The study's behavioral data converges with our other evidence but the survey data is possibly invalid. How does it compare to more direct measurements of teen impulsivity in the risk-taking literature? We have already seen that, in short, on selective attention and go/nogo tasks, teens as young as 15 or 16 receive mature scores. Hence, the behavioral data disagrees with the survey data.

So claims about short-sightedness and impulsivity fall short. Another significant claim in the risk-taking literature is that teens have heightened "sensation seeking," meaning, in part, that teens are more sensitive to possible rewards than children and adults, and are therefore prone to risk more (avoiding harm less) for the same rewards as adults. A major proponent of this claim is Daniel Romer, who wrote in his 2017 paper,

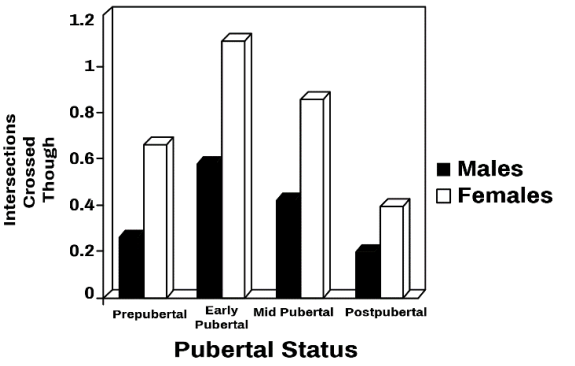
> Recent neuroscience models of adolescent brain development attribute the morbidity and mortality of this period to structural and functional imbalances between more fully developed limbic regions that subserve reward and emotion as opposed to those that enable cognitive control. We challenge this interpretation of adolescent development by distinguishing risk-taking that peaks during adolescence (sensation seeking and impulsive action) from risk taking that declines monotonically from childhood to adulthood (impulsive choice and other decisions under known risk). Sensation seeking is primarily motivated by exploration of the environment under

[163] Steinberg et al. 2009

ambiguous risk contexts, while impulsive action, which is likely to be maladaptive, is more characteristic of a subset of youth with weak control over limbic motivation[164].

Romer is at least partially correct. "Impulsive choice" risk proneness has been shown to reach maturity by 15 or 16 by experimental data. He is also correct to say that impulsive action peaks in the teen years only in those who will struggle with it for the rest of their lives. It is not the norm and it is not a sign of physiological immaturity. That leaves his claim about sensation seeking, which he defines as "heightened attraction to novel and exciting experiences despite their evident risk."

Romer makes his claim based on surveys, but the idea that teens experience increased sensation seeking relative to adults is poorly supported by behavioral data. One study used a driving game where the risk of crashing was ambiguous and drivers were rewarded for driving through lights. While younger teens exhibited riskier driving behavior, the 16-17 year old age group experienced mature levels of risky driving on par with those of adults[165]. Sensation seeking as measured by that task increases during puberty but reaches mature levels once puberty ends.



Number of intersections crossed through in the Stoplight game as a function of pubertal status. Means are adjusted for IQ and socioeconomic status.

[164] Romer et al. 2017
[165] Steinberg et al. 2008

The behavioral data directly contradicts survey data, causing the author of the study to have some conclusion, stating "What does seem clear, however, is that sensation seeking, by either measure, is significantly higher during early adolescence than later"[166]. Romer's survey data, however, leads him to conclude that sensation seeking peaks at 19 and then begins a slow decline[167]. The survey data probably shows a delayed peak due to the acquisition of legal rights; 19 year olds probably do engage in more sensation seeking behavior than 16 year olds due to their different environments. The actual peak, however, appears to be during early puberty, with decline observable from the cessation of puberty into old age. This follows the quadratic pattern of development we have seen elsewhere, and it is most sound, linguistically at least, to state that sensation seeking reaches its mature point during early puberty.

Teens do in fact appear to have higher levels of sensation seeking than older adults; this is not sufficient for the assertion of immaturity. Thirty-somethings, as with gray matter, have more sensation-seeking than forty-somethings. Are thirty-somethings immature? Furthermore we can see that post pubertal females have sensation seeking levels equivalent to those of mid-pubertal boys. As we will see later on, women score similarly to pubescent boys on a number of measures of maturity. Are women said to be immature? No. It follows that males, even some time before the cessation of puberty, achieve scores that indicate adult-level maturity, per current societal standards. Postpubertal youths, then, are certainly mature; typically when a trait declines starting at the end of puberty, it declines slowly enough that the difference between teens and slightly older young adults is statistically insignificant. We see this above with "Discount Rate as a Function of Age."

I will address two popular sources that appear to disagree with what has been shown here but actually expose two common flaws. The first is an fMRI go/nogo task that finds that teens suffer from poorer performance in comparison to children and adults[168]. The problem here

[166] Steinberg et al. 2008
[167] Romer et al. 2017
[168] Somerville et al. 2011

is that "teens" are a group of ages 13-17 with a mean age of 15.9. If, as other data indicates, 13-14 years olds are inferior in performance relative to adults and 16-17 years olds are not, the performance of the group will still be depressed by half the amount it would have been if 16 and 17 year olds were left out. Consequently, the discrete grouping of adolescents in this study obscured the precise age at which adult level scores are reached.

The other source is not data but it is popular[169]. Its flaw is that it makes unsubstantiated claims. Like this book it is full of sources, but unlike this book it does not address the data in any of them. Where I make a claim and back it up with data from a specific source, they make a broad claim and back it up with a few citations. Where I say, "the brain finishes development around puberty. For example, one study found …" they simply say "the brain develops until 25 (source)." and then they take it for granted and move on and pontificate about policy. We will see many more sources like these two in the following chapter.

What we have seen here is a rebuttal of the claim that youth, especially teens have inferior judgement to older people. The data demonstrates that in diverse situations, youth have as much, if not more, ability to avoid harmful decisions as their elders. Impulse control and sensitivity to reward are mature by the cessation of puberty. Cognitive understanding is as well.

3.3: Conclusion

At this point, it should be evident

- that puberty ends around the age of 15 years on the average for boys and 14 for girls
- that the best psychometric and neurometric data reveal that the brain finishes developing by the end of puberty
- that youth norms varied much less extremely from adult norms in the past, even while puberty finished later on average

[169] Johnson et al. 2009

The fact that physiological maturity is reached in the mid-teens suggests a theory of youth contrary to that of contemporary scientific establishment: youth is a time of learning and exploitation, not of brain development and necessary restriction. This was the consensus before the 1990s. What happened? The remainder of this book deals with that question.

What I have argued thus far is publicly rejected by the majority of people who actually collect data in this area of research; some may feel I have not been thorough enough. The next chapter should annul any persuasive shortcomings of the preceding text. In it I systematically go through the actual claims of my opponents piece by piece, showing at each step along the way why they are wrong. I start with the earliest "teen brain" media, working slowly towards the present day. The statements of lead researchers will be heavily scrutinized with many shortcomings revealed. The next chapter of this book is, to my knowledge, the first systematic deconstruction of a faulty "consensus" ever performed. Using a mix of historiographical and scientific methods, I show just how seriously one should take the "experts" and the media.

IV

The Teen Brain Meme

4.1: How it Spread

The "teen brain" meme is the idea that brain science shows that youth have immature brains until the age of 25. As we have seen, examination of the reported data that ostensibly serves as the evidence for this reveals that the brain actually is "developed" by the end of puberty as evolutionary theory predicts. Structures that are supposed to grow until 25 exhibit adult size by 15 in the data. Structures that are supposed to stop growing at 21 or 25 continue to grow until the age of 50 when the researchers don't limit their participants to people under 25. Claims written in the study that the data might help bring insight to youth judgment issues morph, in the news, into enthusiastic announcements of proof showing that youth act childishly because their brain lobes aren't developed yet. Bypassing issues with plasticity and relating ambiguous brain structures to behavior, psychometric data also overwhelmingly reveals cognitive, executive, and judgmental maturity occurring by the end of puberty.

I have already done lengthy analyses on what the truth actually is in regards to youth maturity. Suffice it to say that claims of immaturity are unwarranted to the extreme. The question I am asking here is

twofold: how and why? More specifically, how have they constructed this unscientific narrative? What techniques have they used? In particular, where and when did they misinterpret the data? What are the origins of the narrative and how did it evolve? I seek to document this here, showing where they have clearly misinterpreted data (even in peer reviewed discussion sections), in books and the news. To answer the why I will investigate the who and attempt to draw connections: who researches, who publishes, who funds? What do they have in common as a motivator? The goal of this writing is to lay out a reasonable exposé of the construction, motivations, and people behind this unscientific narrative.

When Googling "teen brain" in 2020, a number of similar websites pop up[170]. The American Academy of Pediatrics refers to teenagers as children multiple times and claims "quite simply, their brains just haven't physically matured yet", a scientifically incorrect statement. There are no citations in their entire article, which quotes a Dr. Andrew Garner saying "The important concept here is that the adolescent brain is still developing and not yet fully mature … some parts of the brain — such as the prefrontal cortex (PFC) that sits right behind the eyes — do not appear fully mature until 24 years old!" We have seen why this is

---

[170] 2020 google propaganda:

A. https://www.aacap.org/AACAP/Families_and_Youth/Facts_for_Families/FFF-Guide/The-Teen-Brain-Behavior-Problem-Solving-and-Decision-Making-095.aspx

b. https://www.healthychildren.org/English/ages-stages/teen/Pages/Whats-Going-On-in-the-Teenage-Brain.aspx

c. https://www.urmc.rochester.edu/encyclopedia/content.aspx?ContentTypeID=1&ContentID=3051

i. https://www.stanfordchildrens.org/en/topic/default?id=understanding-the-teen-brain-1-3051

ii. https://baycare.org/health-library/understanding-the-teen-brain\

iii. https://www.dailyactive.info/2019/03/18/parents-can-attestteenage-brains-are-not-fully-formed/

iv. http://healthlibrary.franciscanhealth.org/YourFamily/Children/HealthyChild/1,3051

v. https://www.acesconnection.com/g/franciscanhealth-laporte/blog/understanding-the-teen-brain

false. One longitudinal found gray matter pruning largely levels off in the PFC around 15, another found all white matter tracts in the brain matured by the end of puberty, and yet another found that myelination has been registered to occur in the PFC until at least the age of 45. Garner states "the PFC is thought to play an important role in regulating mood, attention, impulse control, and the ability to think abstractly" - selective attention, IQ, working memory, risk taking, etc. reach adult levels by the end of puberty. For all studies we have seen that allow us to make the comparison, there is no statistically significant psychometric gap between 15 and 25 year olds. They're trying to "Explain" and immaturity that does not measurably exist.

The other sources that show up on Google have the same modus operandi and say the same thing with no citations whatsoever, making fact checking difficult, but one in particular stands out (previous foot note, c). It seems to have originated either on the Rutgers or Stanford websites and at least five other websites have plagiarized the paste, copying it over with no citation. The article is the same one Rochester hosts, and claims "Good judgment isn't something they can excel in, at least not yet. The rational part of a teen's brain isn't fully developed and won't be until age 25 or so. Adults think with the prefrontal cortex, the brain's rational part. Teens process information with the amygdala." Again, these claims are wrong and anyone who has looked at the data for more than two seconds should know it. My analyses of the data have already shown this. What is of interest here is the history of this falsehood. Sources today exist in a culture where the idea that the brain lobes develop until 25 is common knowledge. As everyone knows, that's why everyone has to pay property taxes so their 17 year olds can sit in high school and do little that benefits themselves or society. While ideas supporting youth exploitation are potentially ancient, the idea that brain scientists have "proven" that youths' brains are immature is a relatively new one that can't be older than the fMRI. Somebody was the first person to go on the news and say their study proves teens "think with the amygdala instead of the frontal lobes." If it can be shown that this person cited a study that didn't actually support what he or she was saying, and then the evolution and dispersion of the narrative can be traced and we will have a useful list of narrative-pushers

and sufficient evidence to show that the meme is a myth and always has been.

Using Google, I was able to find what seems to be one of the first, if not the first, media publication about the "teen" brain. While queries for articles regarding the teen brain from before 1999 return null results, 1999 reveals what seem to be two of the first publications to mention the "teen brain." One is a full piece about it and the other mentions the former in passing, saying "U.S. News just ran a cover story on 'The Teen Brain.' (Why are your teen-agers sullen and irrational? Because the parts of the brain that develop last are those that regulate judgment and emotion. Also because they hate you.)"[171], implying that this was a significant development. The US News story says "until the past decade, neuroscientists believed that the brain was fully developed by the time a child reached puberty"[172]. This makes sense because the fMRI was invented in 1990, and Sarah Jane Blakemore, a well respected scholar of the "teen brain", says on recording "we were taught that … the human brain stops developing in mid-childhood, that's what I was taught during my undergraduate degree, I know that because I kept my textbooks and they say that"[173]. Blakemore was 20 years old in 1994, so she was likely taught this in between 1992 and 1996, possibly just 3 years before the US News cover story. What's more, I know from experience in reading the literature in this field that most of the earliest studies on the "teen brain" were published around 1998 or 1999, when this cover story ran. All of this is to say that this US News cover story is probably the first major media publication concerning the teen brain, featuring teen brain researchers involved in the first round of research on the topic, beginning after the fMRI would have proliferated in the mid-90s and being ready for publication shortly after Blakemore's undergraduate experience. This means that this document is more or less where the unscientific narrative began.

---

[171] https://slate.com/news-and-politics/1999/09/the-american-teen-ager.html

[172]http://sofferpsychdevelopment.weebly.com/uploads/2/5/9/8/25987501/inside_the_teen_brain_us_news_and_world_report.pdf

[173]https://www.youtube.com/watch?v=yQXhFa8dRCI 21:00

The article is attributed to "Shannon Brownlee", and while a deeper look into her will be undertaken after the "how" is fleshed out, suffice it to say that she isn't just an everyday journalist. Her career still goes strong and she has held multiple significant positions across think-tanks and media organizations. At the time Brownlee was a senior writer for US News. In the article, she immediately utilizes the Columbine massacre as a persuasive tool:

> The shooting in Littleton, Colo., focused the nation's attention on aberrant adolescent behavior, but most teens never come close to committing violent acts. Still, even the most easygoing of teenagers often confound their elders with behavior that seems odd by adult standards.

She continues, explaining the nonexistent aberrant behavior, for perhaps the first time ever, with teen brain "science:"

> For most of this century, the assumption has been that teenage sturm und drang, the insolence and the rages, are all directed at parents. Teens turn against authority figures, went the conventional wisdom, in an effort to define who they are and to assert their independence -- a view that spawned the teenage rebel, that quintessential American icon. The alternative explanation was that hormones, those glandular bringers of sexual stirrings and pimples were to blame.
>
> The true source of teenage behavior lies north of the gonads. It's that 3-pound blob of gray and white matter known as the brain.
>
> Yes, teenagers do have brains, but theirs don't yet function like an adult's.

Brownlee says a great deal throughout the article, consisting of offensive anecdotes and uncited pseudoscience, along the lines of "this imbalance may explain why your intelligent 16-year old doesn't think twice about getting into a car driven by a friend who is drunk." Our analysis of the data suffices to show that this is incorrect; 16 year olds exhibit adult level judgment abilities. But still, this particular line must have been chosen for a reason. What is of interest to analyze, then, are the numerous researchers Brownlee quotes throughout the article, especially where they cite studies. This will shed light on the extent to which the narrative is whole-sale fabricated and the extent to which it comes from played-up research. It will show how what they say either

doesn't relate to their studies at all or relies on similar patterns of hyperbole, misinterpretation, and cherry picking.

The first researcher quote in the article cites Sandra Witelson, McMaster University brain scanner, saying "the teenage brain is a work in progress." This peculiar line, which would go on to be almost a catch phrase, can be found in the bodies and titles of numerous subsequent publications. Two very relevant ones are a PBS Frontline publication from 2000[174] and a surprisingly serious and well-cited 36 page essay pamphlet funded by the National Campaign to Prevent Teen Pregnancy from 2005[175]. These will be examined later. As for the Witelson quote, she of course refers to no specific data or study and in fact seems to have never published a teen brain study herself: she mainly studied sex differences in the brain, but is also half-famous for publishing a study in 2000 wherein she dissected Albert Einstein's brain. Since she does not appear to study the teen brain herself, it is odd that she would make such a comment. It's not crazy to think, considering the line's potency and subsequent popularity, that perhaps it was a catch phrase thought up by popularizers. In fact, a considerable amount of the language the researchers use is odd and strangely popularized, whereas for other subjects researchers tend to retain some jargon and an academic tone. Regardless, Witelson is wrong. We have demonstrated that gray and white matter reach adult levels by the end of puberty, but that myelination and gray matter decline actually continue into old age, making Witelson's comment wrong by the omissions that the thirty-something brain is a work in progress if the "teen brain" is and that the average teenage brain has measurements in the adult range.

Next Brownlee writes that the frontal lobes are in charge of executive functions, including the brain's

> ability to handle ambiguous information and make decisions … In an adult, … an overhead insult might arouse a murderous rage, until the prefrontal cortex figures

[174] https://www.pbs.org/wgbh/pages/frontline/shows/teenbrain/work/ and https://www.pbs.org/wgbh/frontline/film/inside-the-teenage-brain/
[175] https://mdcune.psych.ucla.edu/ncamp/files-fmri/NCamp_fMRI_AdolescentBrain.pdf

out that the comment was met for somebody else … something very different happens in teenagers, according to Deborah Yurgelun Todd, a neuropsychologist

So not only are teen's brains underdeveloped, but the effect size is so large that, after finding out an insult wasn't met for them, they'll kill you anyway. And supposedly this young person who is killing over insults wouldn't do that at 26. Of course, that isn't true. The evidence they cite is Todd's 1998 study[176] where she showed a group of young people with the average age of 13.8, which she uncritically labeled as "adolescents" and who Brownlee described as people who might feel "elation at a high SAT score [the average SAT taker is 17 or 18, not 13]," pictures of fearful faces and found that the amygdalas of the younger group tended to show more activation than those older participants. Yurgelun Todd is directly quoted as saying about her study that "You have to actually learn how to read emotions, we may think anger is pretty obvious to our kids, but they may not [sic]". This is false, adolescents, even at the age of 13, can recognize anger as well as adults unless expressions are made unnaturally difficult to parse. As was reported in 2009:

> Does it look more angry or fearful? It may be rather difficult to tell: About fifty percent of adults say faces like this are angry and fifty percent say it's fearful. However, for children, the story is different. Researchers have found that small children aren't as good as adults at recognizing emotions in faces. Young children would see this picture as more fearful than angry. However, most research has suggested that kids are just about as good as adults by the time they're five years old.
>
> But neuroscientists have consistently found that the portions of the brain responsible for processing key emotions, particularly anger and fear, continue to develop all the way through adolescence. If our brains are still changing, shouldn't we see some impact in the way kids and teens perceive emotions?
>
> A team led by Laura Thomas felt that earlier studies of children's perception of emotion were flawed because the tests were too easy[177]

Thomas's study found that there was only a performance gap between kids and adults for the most obvious or two of six expression-

[176] Baird et al. 1998

[177] https://scienceblogs.com/cognitivedaily/2009/10/29/are-older-kids-and-adolescents

difficulties (in contrast to her hypothesis), and the effect size of the gap that was found in no way indicates that "we may think anger is pretty obvious, [but to kids it may not be]". The idea that a kid of any age would misunderstand an unambiguously angry parent is not supported by the data. And while I have not been able to find a study comparing teen performance to young adult performance in anger or fear recognition (the adults in Thomas's study were about 40 years old on average), one study found that face recognition ability in general peaks at about 30, and that for teens at ages that indicate they have completed puberty, performance is on the level of middle aged adults by 15, meaning teenagers can be expected to do about as well on these tests as their parents and that the effect sizes of the differences between age groups after puberty are not anywhere near as relevant in the real world as Brownlee wrongly indicates. Finally, it's unclear that scores on facial recognition tests, emotion-loaded or not, are entirely a function of brain development. Thomas's study failed to find significant differences between teen and child performance, although this might conflict with the rest of the literature. Another study failed to find any evidence of pubertal development influencing the development of facial emotion recognition[178], which is not what would be expected if the skill was entirely a function of brain development, considering that gray matter processes are strongly influenced by puberty.

Moreover, Yungelun Todd's study does not report any finding except that the younger group showed more amygdalic activation, yet Brownlee writes that, according to Y. Todd, "many of the teens were unable to correctly identify the expression … adult brains … light up in both the limbic areas and the prefrontal cortex while looking at expressions of fright. In teenagers, however, the prefrontal cortex was almost dark while the limbic system lit up." This means that either Y. Todd or Brownlee reported data that couldn't make it past peer review, although one would expect the mention of a null-result at any rate. In fact, there's no mention of data being collected with regards to facial identification or prefrontal cortex activation at all in her 1998 paper (or

[178] Vetter et al. 2018

her 1999 followup, for that matter). Either the data was made up, or it was never published.

Moving on, Brownlee turns to Jay Giedd, the teen brain researcher that had a highly public role in the early days of the campaign, appearing in many of the first articles about the teen brain and extensively in the first book. With no evidence, Giedd oddly paints "adolescence" as a kind of critical period, where people have one chance to irreparably shape their future character: "Teenagers are choosing what their brains are going to be good at -- learning right from wrong, responsibility or impulsiveness, thinking or video games." Unlike Yungelun Todd's mysterious prefrontal cortex data, Giedd at least got this speculation past peer review, (an institution which isn't exactly perfect) at the exact same time he put it on the news, as both his 1999 paper and the US News Report were published on August 9th, 1999[179]. Contrary to Giedd's speculation, his findings, which showed small declines in gray matter after puberty, merely reflect the beginning of aging since the pattern of gray matter loss persists throughout the lifespan[180]. This lack of aging might explain the small advantage teens have in learning new things over adults[181], or it might explain nothing at all. Regardless, the learning gap between teens and older people is not large enough to claim that "teenagers are choosing what their brains are going to be good at", implying that the period is extra important and that what is learned cannot be unlearned. Furthermore, Giedd's followup 2004 study showed by its scatterplots that, after a dip during puberty, teen gray matter volume in any given brain region, including the frontal lobes, differed so little from young adult gray matter volume (age 22) that it appeared to not differ at all. This is consistent with the idea that the decline in gray matter volume during the teen years is actually a slow aging trend, and that its significance is greatly overstated by researchers who claim that it proves that the teen years are a critical period. This hypothesis is convergent with a study that tries to predict age with brain scans, and which finds a monotonic decline in gray matter volume in all

[179] Giedd et al. 1999
[180] Terribilli et al. 2011
[181] Davidow et al. 2016

regions considered, including the frontal region, from 18 to 90 years old, and which can predict age with a mean average error of 5 to 10 years[182], depending on the structure surveyed. This means that physiologically mature teens and early twenty-somethings are not practically distinguishable by their brain structure. The literal consequence of this finding is that there's not really such a thing as a "teen brain", but rather there is a young adult or a youth brain, a concept that fits well with the larger body of evidence. The idea that physiological immaturity can explain any given behavioral differences between a group of 16 year olds and 21 year olds is unsupported.

Moving on, Giedd is again quoted saying roughly the same thing he said previously. While his interpretations are unfortunate and hasty, they're not quite in the same realm as Yungelin Todd's. Taken alone, his sayings are acceptable hypotheses in a culture that assumes immaturity under arbitrarily decided ages.

Brownlee of course fails to properly contextualize Giedd's speculations, interpolating, for example, that "young teenagers don't yet have all the brain power they need to make good judgments … [because] the prefrontal cortex has [not yet] been pruned". This is in reference to Giedd's 1999 study, which simply found the small effect sizes already discussed and which in no way implies that young teens are literally incapable of making good judgments. In fact, Giedd's paper is in no way related to judgment ability, making this more pure, motivated speculation, presented as scientific fact. The actual data on judgment indicates that "it" reaches mature levels by the end of puberty, with some depression during puberty, but probably not enough to claim that young teenagers categorically cannot make good judgments. They tend to do so less of the time, but it is unclear that that means what Brownlee wants it to mean.

Two other people are quoted in the article, but those quotes are trivial or seem to have been lifted from elsewhere, such as one quote claiming that "Marvin Zuckerman … suspect that thrills -- like sneaking out … stimulate the teenage brain's dopamine system". Apparently people over 19 dislike roller coasters. Still, trivial though the quote may

[182] Jiang et al. 2020

be, the implication fits the hyperbolic pattern, and Brownlee's reality-independent generalizations and anecdotes about teens jumping off of bridges don't help. For example, the following passage precedes the Zuckerman quote:

> "I think all people do stupid things sometimes. It just seems like teenagers do it more often," says Rachael Fisher, an 18 year old senior from Lakewood, Colo. That's an understatement. Driving without a seatbelt, getting tattooed, smoking cigarettes, shoplifting -- the list of foolish things kids do is longer than most parents really want to know.

A pattern has become visible that fits each of these instances and that will likely fit subsequent ones: the journalist fills the article to the brim with unsubstantiated generalizations and anecdotes, and typically features researcher quotes to achieve a more trustworthy ethos. These quotes are either unsubstantiated generalizations or, more usually, they refer to particular evidence. In this case, effect sizes are hyperbolized and speculation that assumes answers to unstudied questions are presented as fact, and sometimes data is even potentially fabricated.

It is time to move onto other sources to further document and analyze the propagation of this misinformation. The phrase "the teen brain is a work in progress" seems to link most if not all of the early teen brain propaganda. It's possible that the phrase originated with Witelson's quotation, but also present in the US News Report is a picture titled "the teen brain -- a work in progress" sourced from the American Medical Association Encyclopedia of Medicine and The Human Body. These books seem to have originated in 1989 and 1990 respectively, although with the latter there are many editions and many books with the same title by different authors. The picture seems to have been made for the US News article, and the citations seem to be for the information presented. It is difficult to confirm, but it is unlikely that this phrase was used in either of the sources. Furthermore, for the sources to have info on the teen brain, they would have had to have been more recent than 1989, so it is unclear why the AMA Encyclopedia was cited. It is probable that the citations are for rhetorical purposes only, considering the unlikeliness of the first citation and the uselessness of the second.

Google reveals that the phrase has been used long after the 1999 US News Report, including by PBS, which put up a webpage that still shows up when Googling for the "teen brain" today (without the work in progress phrase) and which is accompanied by a 50 minute, televised Frontline segment. This television segment is surprisingly analogous to the US News Report despite having come out in 2002, 3 years after the paper publication. It features most of the same researchers, with the addition of Charles Nelson, and uses the same talking points and manipulation techniques[183].

For instance, the program begins with the narrator making unsubstantiated generalizations characterizing teenagers as immature. Then they cut to a live anecdote, a pubescent looking kid groaning about getting out of bed. For some reason they are in his bedroom with television cameras in the early morning. Perhaps the segment was scripted. His parents give an anecdote framed to make it seem like all teenagers are like this kid: "[He procrastinates], we have to remind him, take your books, here's your keys to the house, it's a normal routine"[184].

Then the program shifts to Charles Nelson, a researcher, who generalizes too but with a PhD. None of his sayings refer to data or studies. For example, he claims the behavior of his own son must be normal: "When they first become teenagers, they themselves are surprised about what flies out of their mouths. A personal example is when my son was 12, he one day just blurted something out, and wondered where did that come from"[185]. Then he claims adolescents are developing children: "Parents are thrown for a loop by adolescence but it's just another phase of child development. They just throw temper tantrums, but in 5 ft tall bodies"[186]. Like in the US News article, the quality of thought here is low. The rhetoric is generalized, vague, hyperbolic and obviously exaggerated and devoid of even a fleeting reference to data.

---

[183] https://www.pbs.org/wgbh/frontline/film/inside-the-teenage-brain/
[184] Ibid., 3:00
[185] Ibid., 6:00
[186] Ibid., 8:00

Then the groaning kid is shown go-karting after being compared to a child by a man who primarily researches infants. He also declares his own immaturity: "my parents just don't know what it feels like to be a kid", he says. This, of course, is to represent teens in as much of an infantile way as possible. Like the US News Report, the Frontline program is far from reasonable, evidenced, and objective. There is a particular agenda here.

They also interview a cartoonist, who makes a comic about a 15 year old named Jeremy, which depicts him as incredibly immature and moody. The cartoonist adds no intellectual substance to the program and serves only to advance unsubstantiated generalizations after the researchers' hyperbole. Eventually Giedd is brought on, who repeats his speculation, still marketing it as fact 3 years later: "what a teenager does will consolidate the wiring in his brain, solidifying what he does … Our leading hypothesis is use it or lose it -- if the teen is doing music or academics, those connections will be hardwired. If they're lying on the couch or playing videogames it's those"[187]. To top off his speculation-as-fact technique, he serves up an overstated effect size with a dash of raw speculation: "the prefrontal cortex is still being built during the teenage years … That basic part of the brain that gives us strategies and warns us of consequences isn't fully on board yet"[188]. Again, the idea that teens show abnormally low judgment compared to what would be expected in a model that says they are really young adults is not supported by the overall data regarding this question and it is most certainly not supported by Giedd's gray matter data.

Then Frontline does something dishonest -- Giedd begins to talk about 12-15 year olds, and they cut to footage of a skate park populated by 11 year olds. Then they cut to footage of a rave, showing 16-22 year olds, and footage of Giedd talking about drugs is played. It is quite possible he meant "12-15 year olds" by "they", but Frontline manipulated his interview footage by cutting it to imply he was talking about much older people: "Drugs may not affect their brain for that weekend, but could for the next 80 years of their life -- it's a cruel irony

[187] Ibid., 14:00
[188] Ibid., 15:00

that when the brain is most vulnerable they also want to experiment with drugs"[189]. Regardless, the idea drugs permanently affect the brains of young people and not old people is from studies of 30 day old "adolescent" rats, and it was popular among neo-prohibitionists of the period as evidenced by a publication called "Alcohol Maims Your Brain" that will be shortly analyzed due to the fact that it's one of the first documents to discuss the "teen brain".

Next Yurgelin Todd comes in, speaks of the same never-published data from US News Article and generalizes, all with narrator support interspersed, displaying the same rhetorical tactics found in the older article. What she says is old news, but one interesting thing to note is that Frontline appeared to record the teens they were following being put through the experiment that Yurgelin Todd had already published in 1998 and which she commented on in 1999. In fact, these teens were tested by multiple psychologists that were interviewed throughout the program, indicating that these were not real experiments that Frontline was recording, but rather just show, something that was never stated clearly.

One final moment of interest is a bizarre claim from Giedd: "teens are clumsy in thought because the cerebellum grows into the 20s"[190]. His studies did not include data on cerebellum volume, and a 2008 study quickly debunks his claim; the study tested normal and prematurely born subjects at a mean of 15 years of age and then again at 19. It found a 3% decline, not a growth, in the prematurely born group and "Cerebellar volume did not change significantly in the control group ($P = 0.612$)". Furthermore, the decline of volume in those in which it was measured was not associated with increased cerebellar efficiency as Giedd might rebutt: those who faced more "pruning" reported lower subjective well-being, "We have demonstrated a reduction in cerebellar volume between adolescence and young adulthood in VPT individuals, which is correlated with reduced self-reported wellbeing"[191]. The volume-related findings of this study were replicated a year later by

[189] Ibid., 17:40
[190] Ibid., 31:00
[191] Parker et al. 2008

another longitudinal study that Giedd himself coauthored[192]. A 2019 study cross-sectional shows that myelination of the cerebellum reaches mature levels in early childhood[193]. That Giedd's bizarre statement, which had little rhetorical value to begin with, is so easily debunked is embarrassing and further demonstrates the low epistemological quality of "teen brain" propaganda and the low epistemological hygiene of teen brain "scientists."

Considering two major errors have already been uncovered, how likely is it that the researchers can be trusted to be speaking the truth? The journalists are no better. Constant, unceasing, dishonest, and unsubstantiated anecdotes permeate the spaces in between researchers' lines. These things occur to such an extreme extent that it is clear that media in the teen brain genre seeks not to find the truth, but to perpetuate the unscientific idea that teens are essentially infants.

To further demonstrate this, a few more early teen brain pieces will be analyzed, and then a line of descendants leading up to the present time will be traced. This will help the later analysis of motivations and will also aid the explanation of the techniques used. Furthermore it will show if claims and techniques have changed, how they have done so, which may reflect important changes in motivations.

One source that might shed light on motivations later in the analysis is titled "Underage Drinking is a D.U.M.B. Decision (Drinking Underage Maims the Brain)"[194]. The website linked at the bottom said, as of December 2002 per archives (the link is now defunct)

> To combat alcohol abuse among underage youth and college students and the health risks and societal harms associated with it, the American Medical Association and the Robert Wood Johnson Foundation are working to create solutions through two national programs: Reducing Underage Drinking Through Coalitions and A Matter of Degree: The National Effort to Reduce High-Risk Drinking Among College Students.[195]

---

[192] Tiemeier et al. 2010

[193] Bruckert et al. 2019

[194] https://www.risas.org/images/clientid_147/alcoholsadverseaffectsonthebrainsofteens.pdf

[195] https://web.archive.org/web/20021205110403/http://www.alcoholpolicysolutions.net/

The subtitle of the pamphlet reads "Fact Sheet from an American Medical Association Report on Alcohol's Adverse Effects on the Brains of Children, Adolescents, and College Students". No specific author is mentioned, but altogether AMA and RWJF funding are implicated in the production of this paper, which still shows up as one of the top results on Google when searching for "teen brain" material from the time period. The document is hosted on a modern website for the Rhode Island Student Assistant Services (RISAS), "a statewide school and community based alcohol, tobacco and other drug use prevention/early intervention program operating since 1987, … funded by the Department of Behavioral Health Developmental Disabilities and Hospitals (BHDDH) and Rhode Island school districts"[196]. The document does not seem to have originated with this government organization.

The document claims, "Frontal lobe development and the refinement of pathways and connections continue until age 16, and a high rate of energy is used as the brain matures until age 20," without a citation. In contrast to similar quotes from the time period, and later quotes that would claim that the frontal lobes develop until 24 or 25, this source picks a specific, relatively early age to claim that the frontal lobes stop developing, and adds on a bizarre, false, and vague claim about energy use until 20. Both assertions are nonsensical and without justification, as already demonstrated, and the particular ages picked probably stem from the desire to justify the drinking age, in the case of the latter age, and an unconscious justification of the driving age, in the case of the former. It is likely that the author was parroting the assertions of the US News Report and PBS and other unfound sources, and spontaneously added the ages to add specificity to the uncited claim for rhetorical effect. What better lends itself to analysis is the next sentence, which has a citation: "Damage from alcohol at this time can be long-term and irreversible". Now we can see that the ages were added so that people know that "this time" refers to the ages from 16-20, when the

[196] https://www.risas.org/images/clientid_147/About_our_Program.pdf

author thinks "many believe that underage drinking is an inevitable 'rite of passage' that adolescents can easily recover from."

The citation provided to support the claim that from 16-20, normal alcohol use can cause long term damage is from 2000 and compared the functioning of alcoholics and nonalcoholics three weeks after withdrawal and of course found that alcoholics performed worse[197]. This in no way shows long term and irreversible damage, and the same thing was found in adults as early as 1985 to nobody's surprise. Another study has data that seems to indicate that healthy, moderate drinkers do not significantly differ from non-drinkers in terms of white matter while extreme drinkers do, even in adolescence[198]. 18-25 year old binge drinkers seem to have deficits, even though they are near or beyond the drinking age.[199]

The dishonesty of the pamphlet has been established, then, as it implied that damage from alcohol was unique to young people and that it could occur from light drinking. The next sentence is not much better. It reads: "In addition, short-term or moderate drinking impairs learning and memory far more in youth than adults. Adolescents need only drink half as much to suffer the same negative effects." The citation is nonsensical: a study on 30 day old rats compared to 90 day old rats[200]. Certainly not justification for the claim that moderate drinking acutely impairs the memory of 16 year olds more so than 21 year olds.

At worst, the article's statements have no relation to their sources, and at best this article fits the pattern fleshed out earlier: it features age based generalizations, speculations, and some irrelevant data, and then links the data as if it supports the speculations that were presented as fact. Furthermore, since the claims in the pamphlet are not true, they most likely stemmed from earlier generalizations and speculations, such as those presented in the US News article or a similar early source that interviewed the same researchers.

---

[197] Brown et al. 2000
[198] Bava & Tapert 2010
[199] Sanchez-Roige et al. 2014
[200] Pyapali et al. 1999

The short pamphlet continues to make a number of similar claims based off of rat studies and studies of alcoholics. For example, the next sentence is "Adolescent drinkers scored worse than non-users on vocabulary, general information, memory, memory retrieval and at least three other tests." The citation is given as number five, but is in fact the same as the third citation in the article, Brown et al. 2000. At best the sentence is speculation-as-fact, at worse a malicious lie, because the study cited is about alcoholics, not "drinkers", and furthermore decreased performance due to alcoholism is not unique to people under the drinking age, as previously discussed.

Next they claim "Adolescent drinkers perform worse in school, are more likely to fall behind and have an increased risk of social problems, depression, suicidal thoughts and violence," uncited, and wrong with regards to women and misleading with regards to men as a 2011 study found "that increases in alcohol consumption result in small yet statistically significant reductions in GPA for male students and in statistically non-significant changes for females," indicating per the small effect size overall that light to moderate drinking is unlikely to be significantly associated with reduced performance, even in males (who probably yielded a significant result while the females did not due to more extreme drinking behavior)[201]. This makes the aforementioned quote from the pamphlet a prime example of unjustified generalizations.

Next the pamphlet makes two claims in regards to anatomy:

> The hippocampus handles many types of memory and learning and suffers from the worst alcohol-related brain damage in teens. Those who had been drinking more and for longer had significantly smaller hippocampi (10 %). The prefrontal area (behind the forehead) undergoes the most change during adolescence. Researchers found that adolescent drinking could cause severe changes in this area and others, which play an important role in forming adult personality and behavior and is often called the CEO of the brain.

It cites a study on alcoholics in regards to the hippocampus and another rat study in regards to the frontal lobes, again comparing 30 day old rats to 90 day old rats, a comparison that cannot be extrapolated to

[201] Balsa et al. 2011

15-25 year old humans. They mislead and improperly speculate by claiming that this data relates to teens who drink moderate amounts (even the rat study is on alcoholics -- the rats are made dependent on alcohol and forced to withdraw) when it only relates to rats and alcoholics. The findings in regards to the hippocampus, which were from humans, are also not unique to people under the drinking age, as the pamphlet implies[202]. This is a common, speculation related sub-tactic: imply that an effect size technically found in adolescents is unique to that group. That is what they are doing here and it is what they are doing when they claim gray matter reduction is unique to people under 25. It is possibly a conscious lie, but it could also be speculation based on the faulty assumption of the null hypothesis in regards to older groups.

All of their claims are bad, based off of rat studies that are then said or implied to be on humans, alcoholic studies that are then said or implied to be on regular drinkers, or on no data at all, yet an immediate motivation is revealed for this pamphlet when it concludes with a strong call for

> Reducing access to alcohol for children and youth; Reducing sales and provision of alcohol to children and youth; Increasing enforcement of underage drinking laws; Providing more education about the harmful effects of alcohol abuse; Reducing the demand for alcohol and the normalization of alcohol use by children and youth. ... the AMA calls on cable TV and the TV networks to pledge not to run alcohol ads targeted at underage youth. This means no alcohol ads before 10 p.m., none on shows with 15% or more underage viewers and no commercials with cartoons, mascots or other youth-focused images.

15% or more "underage viewers?" Remember, underage in this context includes even 18-21 year olds. That means the "AMA" and this pamphlet are calling for the unjustified crippling of alcohol advertising -- under this recommendation, advertisements on any show or product geared towards young adults, say 21-29, would be banned because such media would inevitably draw 15-20 year olds as well, who can easily, collectively make up a little under 20% of an audience for something

[202] Beresford 2006

geared towards slightly older people. This, in combination with making already draconian alcohol laws that solve no problems more severe, basically reveals this pamphlet to be a neo-prohibitionist all-out economic attack on alcohol businesses. This is not justified based on the data, and much money from previously mentioned foundations has seemingly gone to post-hoc stretching the data to fit an anti-alcohol narrative. The propaganda's flagrant use of the teen brain narrative might reveal that the same people who are behind this neo-prohibitionism are also behind the teen brain phenomenon. This will be explored later, after the chain of events is fully laid out.

Pivoting away from alcohol, another source clearly reveals the rapid spreading power of misinformation which is backed by corporate media[203]. Authorship is attributed not to a person, but to the NIMH Office of Communications and Public Liaison, and the document is dated January 2001. It was probably written by Jay Giedd or one of his helpers, since Giedd was working for the child psychiatry branch of the NIMH in 2001 and the paper cites three of his studies. Indeed, the paper begins with his theoretical speculation, out of character in only one way - it is actually presented as speculation this time:

> New imaging studies are revealing—for the first time—patterns of brain development that extend into the teenage years. Although scientists don't know yet what accounts for the observed changes, they may parallel a pruning process that occurs early in life that appears to follow the principle of "use it-or-lose-it:" neural connections, or synapses, that get exercised are retained, while those that don't are lost.

The first sentence follows the pattern of generalization before misleading citation. But what is most interesting about this document are two details: its title and its claim about a source it cites from Yurgelun-Todd. Both of these are clearly borrowed from the 1999 US News article. The title is that familiar buzz-phrase, "Teenage brain: a work in progress" and what it says about a study by Yurgelin-Todd is most revealing:

> Using functional MRI (fMRI), a team led by Dr. Deborah Yurgelun-Todd at Harvard's McLean Hospital scanned subjects' brain activity while they identified

[203] https://www.psychceu.com/Brain_Basics/teenbrain.pdf

emotions on pictures of faces displayed on a computer screen. Young teens, who characteristically perform poorly on the task, activated the amygdala, a brain center that mediates fear and other "gut" reactions, more than the frontal lobe. As teens grow older, their brain activity during this task tends to shift to the frontal lobe, leading to more reasoned perceptions and improved performance. Similarly, the researchers saw a shift in activation from the temporal lobe to the frontal lobe during a language skills task, as teens got older. These functional changes paralleled structural changes in temporal lobe white matter.

The citation provided, as already discussed, only reports differences in amygdala activation. It does not discuss the frontal lobe or the temporal lobe or white matter. That means that the misinformation almost certainly came from a media piece, probably the US News article, and not the actual study[204]. Falsehoods spread. People, like Giedd and Yurgelun Todd, might repeat the same misinformation again and again, for unclear motives in multiple outlets. Other writers, with more rigor, but not enough to look at the actual data (assuming it is valid), will be inclined to take the words in the media on this topic at face value and report them, possibly even with a citation to the data and not the news article they're actually citing from. And that is a terrible mistake if the truth is their goal, as we have clearly seen.

The aforementioned article makes a few other familiar bad claims using familiar tactics, including:

While this work suggests a wave of brain white matter development that flows from front to back, animal, functional brain imaging and postmortem studies have suggested that gray matter maturation flows in the opposite direction, with the frontal lobes not fully maturing until young adulthood. To confirm this in living humans, the UCLA researchers compared MRI scans of young adults, 23–30, with those of teens, 12–16. … As expected, areas of the frontal lobe showed the largest differences between young adults and teens. This increased myelination in the adult frontal cortex likely relates to the maturation of cognitive processing and other "executive" functions. Parietal and temporal areas mediating spatial, sensory, auditory and language functions appeared largely mature in the teen brain

The study cited has already been discussed, and it compared a group with the average age of 13.8 years to a group with average age of

[204] Baird et al. 1998

about 25 years. Part of what it misses is that gray matter reduction in all parts of the brain continues throughout the lifespan -- it is a sign of aging, and it's why you can estimate somebody's age within 5 years of accuracy from an MRI scan of their brain. The speculation tactic is present here, including the sub-tactic of passing off findings in 13 year olds as representative of "teenagers" as a whole. Furthermore, they also fail to precisely state the effect sizes found between the 13 year olds and the 25 year olds. As we have seen in Chapter 3, mid-pubertal boys perform as well on at least one executive functioning task as adult women, who both underperform adult men. Yet that context is never given and the effect size is between 13 year olds and adults is made to seem gigantic by rhetorical sleight of hand. Still more dishonest is how they use another trick and equate 13 year olds to post-pubertal youth. Do adult youth lack in executive functioning as this paper conjectures, by grouping 15 and 16 year olds with 12 and 13 year olds and then calling them all "teens" in contrast to "young adults?" No, at the end of puberty executive functioning is mature.

A longer document with a similar title, "The Adolescent Brain: A Work in Progress"[205] was published about 4 years later, attributed to Daniel Weinberger, Brita Elvevag, and Jay Giedd, and distributed and commissioned by the National Campaign to Prevent Teen Pregnancy. It is 36 pages long and is more like a short textbook on the topic than a media article. Because it is citation heavy, it can provide much more insight into the validity of the ideas on the topic of the "teen brain" and why and how they spread.

The document begins by explaining the origins of itself and its organization. Having formed around 1995 after Hillary Clinton's husband said,[206] in his State of the Union, "Tonight I call on parents and leaders all across this country to join together in a national campaign

[205] https://mdcune.psych.ucla.edu/ncamp/files-fmri/NCamp_fMRI_AdolescentBrain.pdf

[206] This is remarkable, because as we will see, the PMC is implicated as the source of the myth, and this President was also the one to attempt to cut bankers out of the student loan equation on behalf of the PMC with the Student Loan Reform Act of 1993.

against teen pregnancy to make a difference"[207], the National Campaign founded "the Task Force on Effective Programs and Research. To this day, this Task Force remains a critical part of the National Campaign's work, and it was under its auspices that the paper presented here was developed." This Task Force laments the "inclination to see teen pregnancy only in psychosocial and contextual terms" and explains that

> The paper presented here, … begins to fill this gap by making a very simple point: neurological development is an important dimension of overall adolescent development, and our efforts to understand, guide and help teens should be based in part on a deeper appreciation of adolescent neurobiology

This was inspired by "the field of early child development" which "combines intense attention to biological development … with a continuing focus on such psychological constructs as infant personality and temperament and on the impact of various parenting styles." What is being said, then, is this: moneyed interests set up a research Task Force to serve their campaign which had already decided teen pregnancies are child pregnancies. Its explicit goal is to prevent and "explain teen pregnancy in the United States" as a pathology. It could not be that teen pregnancy occurs for the same reasons as all animal pregnancies and many human pregnancies: having sex without planning, and that this is normal and occurs at normal rates, despite heavy social drawbacks, for teen pregnancy due to the normal human sex drive. The Task Force was tasked with explaining a pathology that does not exist, that is, the "disease" that causes youth to desire heterosexual intercourse, for the purpose of discouraging teen pregnancy. Finding its old list of causes from which "physiological factors [were] virtually absent … striking," it took inspiration from early child development researchers and set out to show that teen pregnancy is justified as a pathology by what simultaneously causes it: the "fact" that "adolescents are not adults."[208]

---

[207] https://www.presidency.ucsb.edu/documents/address-before-joint-session-the-congress-the-state-the-union-11

[208] This is, of course, quite ironic, for as we all know, 1. teens use contraception at higher rates than unmarried twenty-somethings, and have less unplanned pregnancies 2. the sex drive is a key feature that

Under the old paradigm, this was not apparent. Late teen pregnancy was normal when the quicker half of women tended to marry at that age as recently as the 1960s. And as previously discussed, until about 1999 with the publication of the first teen brain papers and media pieces, common knowledge was that teenage youth are physically adults. Historical anthropology reflects this, showing it was typical to enter the working world by about 14 until the proliferation of the universal high school in the early 20th century. The Task Force's task was none other than to help destroy the old ideas about youth, replacing them with a clearly predetermined set of more infantile ideas.

A lucid and telling paragraph indicates that this paper took almost 2 years to finish, considering that much of the media mentioned came out in 2003 and 2004, while the paper was published in 2005:

> When the Campaign first began working with the authors of this paper, the topic of adolescent brain development was still a bit remote—hardly the focus of carpool discussions or office chitchat. But in just a few months, it has made it onto the cover of Time magazine, into many newspapers, and into numerous popular articles and books, such as The Primal Teen: What the New Discoveries About the Teenage Brain Tell Us About Our Kids, by Barbara Strauch, and Why Do They Act That Way: A Survival Guide to the Adolescent Brain for You and Your Teen, by David Walsh; it was also the subject of a PBS Frontline special, and New York University recently convened a conference on this complex topic. In fact, with this paper, the Campaign is actually weighing in a bit late on an engaging topic.

This paragraph is an eye-witness confirmation of the main historical thesis of this section, that the flawed idea of the teen brain is common knowledge because of media exposure that occurred from 1999 onwards via a multitude of important sources, including the Frontline special and the first book on the topic, which were singled out as memorable in the quote above, independently verifying their importance. And another, more abstract and harder to prove idea is evidenced, one that has been developing in the subtext herein: that the media exposure

---

distinguishes children from adults 3. According to Loto et al. 2004 and Makinson 1985, by the age of 15, as expected, there is no adverse effect of age on pregnancy outcomes, including harm to the mother or birth defects. Strictly speaking, signs of "pathology" are not found here.

this topic received was somehow not random, that too much of it happened too quickly, that phrases are too similar, techniques are too similar, and the underlying flawed ideas are too similar. Whether this phenomenon is the result of a conspiracy or the result of some law of human behavior is to be seen, but that it happened is now of little question.

The next paragraph clearly states the thesis of the following well-sourced argument: "adolescents are not adults … [they lack] a stable, solid capacity to make complex judgments, weight closely competing alternatives in a balanced and careful way, control [over] impulses … [because the] prefrontal cortex … is one of the last areas of the brain to fully mature [not doing so] … until the mid 20's." I have already falsified every word in this sentence. Post-pubertal youth have adult judgement abilities, and the frontal lobe begins to lose gray matter by the end of puberty, continuing to do so for the rest of life. It furthermore myelinates from birth until at least the age of 45. There is no sign in its structural changes that the frontal lobe matures in the "mid 20's"; and when we measure its functions, 15 or 16 year olds perform just as well as older youth. To relate this directly to teen pregnancy, which this paper was written in part to provide a propaganda framework for, behavioral data reveals that teens use condoms at somewhat higher rates than older people, have less unplanned pregnancies, and contract overall less STDs. If teens really lacked "control over impulses", it would be no more apparent than in the bedroom, where unmarried couples would frequently "forget" to use protection and end up with infections and unplanned pregnancies at rates far higher than older people, yet the data actually suggests that teens display equal or higher levels of sexual judgment as unmarried twenty-somethings. This is replicated on the road, as there are studies that show, for example, that 20 year olds with equivalent levels of experience to 17 year olds have equivalent crash rates. The violent crime rate is also stable from 15-25, when, according to the Task Force, 18 year olds should be committing far more crime than the much more developed 24 year olds owing to their utter lack of the ability to make "complex judgments" and "control impulses" (the heightened-relative-to-older-people yet stable crime rate of 15-25 year olds is potentially explained by androgen levels).

The preface goes on to note that these so-called findings just happen to be "consistent with the view that adolescents may fare best in environments where there is an appropriate degree of structure", that degree of structure being nothing more or nothing less than the expensive high school and later the university. Apprenticeships are too practical and provide too much freedom -- the teen could hypothetically have choice over what kind of work he does for 40 hours a week! Unacceptable! Instead, firm structure must be provided, his schedule dictated, the choice to intern taken away, the choice to specialize, withheld; and in its place expensive poetry courses.

The last significant piece of the preface is the promise it presents: "Being very careful scientists, the authors do not overstate what is known and they do not move immediately or carelessly into recommendations for policy or practice." This is none other than a guarantee that there will be little to no generalization and speculation-as-fact, that claims will be well sourced and argumentation measured. Sadly, the promise is empty.

While the preface was written by Sarah Brown, the Director of the National Campaign to Prevent Teen Pregnancy, the rest of the document is attributed to Weinberger, Elvevag, and Giedd and begins with a summary that is probably written by Giedd because, forsaking the promise, he repeats his speculation that teens face special "use-it-or-lose-it pruning" after generalization about "great strides" and "remarkable changes," culminating in the statement that "it is now clear that adolescence is a time of profound brain growth and change." Profound! No sources are cited in the summary section, but it continues in that manner for four pages, making a myriad of uncharitable errors. One notable example comes when Giedd repeats Yurgelen Todd's unjustified claim:

> one key MRI study found that when identifying emotions expressed on faces, teens more often activated their amygdala—the brain area that experiences fear, threat and danger— whereas adults more often activated their prefrontal cortex—the area of the brain linked more to reason and judgment—and performed better on the task.

This time the citation, which would show no data regarding the prefrontal cortex, is not even bothered with.

The part with the citations is titled "The Adolescent Brain: A Work in Progress," borrowing from the US News article which preceded it by 6 years and in which the previous ridiculous and debunked claims were first published. It begins immediately with the generalizations that the "careful scientists" were supposed to have left out, leaving this to read more like a news article and less like a steel-man of their position: "Peter Blos [said] adolescence is a crazy time … the teenage years can be difficult … [they] challenge one's judgment about taking risks … there are powerful neurological issues at play."

Generalizations continue throughout the paper that was supposed to be "measured." The quality of the data based claims do not save the paper, the first being the claim that the surface area of the brain increases into the twenties:

> In addition to doubling in size, the brain's surface folds become much more complicated … from birth to young adulthood. … The complexity of the folding patterns becomes increasingly obvious in the parts of the brain … that process cognitive and emotional information … those parts … show the greatest changes in adolescence … the evolving pattern of folds and crevices reaches a peak and levels off by the late teens, after which it remains stable throughout adult life.

The adjacent citation[209] only includes subjects up to the age of *44 weeks* after conception! A 2014 study[210] found that surface area increased up to 12 years of age and after that it *decreased* afterwards until at least the age of 40. That makes the previously quoted paragraph at best an example of misguided speculation. At any rate, the claim that the brain's surface folds become more complicated during the teenage years is false.

Next it is asserted that "Studies of the brains of humans and of nonhuman primates have revealed dramatic evidence that the number of synapses changes during the first two decades of life … [with] stabilization of the maturation process by early adult life." In their

[209] Chi et al. 1977
[210] Schnack et al. 2015

lexicon, "early adult" means the twenties, but the study that was cited for this claim says "Synaptic density was constant throughout adult life (ages 16--72 years),"[211] implying that it plateaus by the end of puberty. It appears that the length of time during which synaptic count develops was overstated, because the study implies that neurological maturity is reached by the age of sixteen.

They continue by stating that "From birth to early adulthood, most of the pruning, or loss, of synapses involves excitatory synapses … Thus, the brain by early adulthood appears to have undergone a reorganization of synaptic balance such that, … there is much greater weight on the inhibitory side and less weight on the excitatory side." This is based off of a study of Rhesus monkeys that found pruning of the neurons in question was finished by 5 years of age, those monkeys being pubescent, like 13 year old humans[212]. Again this writer has overstated the length of time during which the metric in question is in development. The most charitable explanation would be to conclude that the writer believes 13 year olds to be in "early adulthood."

The next claim is that "the branching of neurons in the prefrontal cortex becomes much more complex during adolescence .. . It is as if the cells change their architecture in order to meet the increasingly difficult cognitive and emotional challenges that they are being asked to master." The citation is to a study of Rhesus monkeys that finds neuron-complexity maturity by 2 years of age, which is before puberty[213]. Let there again be charity: evidently the author believes prepubertal humans of about 8-11 years are in "adolescence", which is to say, the author is wrong and has been wrong about every citation so far. The claims here are consistently motivated by something other than data and truth seeking.

Moving on, the same writer next claims that "The cabling of the prefrontal cortex and related regions, however, is not fully myelinated until well into the third decade of life." The citation is from 1964 and does not appear to be online. The writer is only half correct --

[211] Huttenlocher 1979
[212] Lidow et al. 1991
[213] Lambe et al. 2000

myelination increases in the prefrontal cortex until about the age of 45, after which white matter is net lost due to progressive aging[214]. Is the brain therefore not developed until that age? No, and the ascertainment of mature frontal lobe functionality therefore comes down to behavioral measurements, of which much has already been said. The frontal lobes are not myelinated until the fifth decade of life, so the researcher is wrong.

The second to last claim this writer makes cites the Rhesus monkey study that found maturity around 2 years of age, saying "Dopamine inputs to the prefrontal cortex grow dramatically during adolescence, probably representing one of the neuronal mechanisms that increase the capacity for more mature judgment and impulse control." Again, ages are confused and speculation is engaged. This author is clearly motivated to represent teens in as immature a light as possible, having no qualms with essentially lying about what the data in the studies he cites says. Most ordinary citizens could not fact check this in 2005, so they were beholden to what the researchers said about the data in accessible publications like this one. Distortion of the facts has already been shown to be widespread, and the people were helpless to the deception.

The last assertion is not a comeback story for truth: "The hippocampus is critical to the formation of new memories, and studies in human brain and in nonhuman primates indicate that changes in the hippocampus's synaptic organization, dopamine wiring, and myelination also occur during adolescence." The study cited is a qualitative, nonblind assessment of the "Myelination of Cortical-Hippocampal Relays" that includes no subjects in between the age of 11 and 17[215]. A later quantified study that looked at the same structures found evidence of continued myelination in the area until the age of 50 but also evidence that those over 15 were well within the typical myelination range of 25-30 year olds[216]. The quote is therefore revealed to be yet another motivated fact stretching session.

---

[214] Bartzokis et al. 2001
[215] Benes 1989
[216] Benes 1994

The next section seems to be written by another author, most likely Giedd since he quickly repeats his recognizable generalized speculation: "The most striking finding from a recent series of MRI studies of teens is the enormous plasticity, or capacity for change that can be observed in the living brain during this time of life." His first evidenced claim is that "MRI studies show clearly that the level of gray matter in the frontal lobes does not stabilize until well into the third decade of life," citing his own 1999 study that cuts off at 22 years, showing a rather negative slope at the graph's abrupt endpoint. Indeed, his claim is hasty, and wrong, because gray matter declines throughout the entire lifespan[217]. The significant critical point on the gray matter volume graph is in reality at 12 years when volume reaches its maximum. From that point onwards, gray matter declines monotonically and significantly to the extent that a person's age can be predicted within 5 years of certainty at any point in their life from an MRI scan of their brain. Because there is no critical point on the gray matter volume graph from 12 years to death, Giedd's claims that this means the brain is still "under construction … continu[ing] into the early 20's" but not later is baseless speculation that must consult behavioral data to be validated. He does not do this, for if he did he would see that the age range he claims to be immature is not so when behaviorally compared to older young-adults. And while gray matter reduction may contribute to changes in behavior seen in old age, it is an overstatement to claim that young adults are still "a work in progress". Lack of aging is not necessarily immaturity. Yet, like always, Giedd's speculation is presented as fact.

The next page of the document is a circus. Giedd essentially repeats the previous claim about hippocampal myelination, citing a study only involving an 8, 13, 24, 36, and 57 year old[218] that again finds that myelination continues into the sixth decade of life. Furthermore on this same page he repeats Yurgelun Todd's unjustified claim again, citing the study this time, saying wrongly that the study reported that "adults activated the frontal lobes when performing the same task and were

[217] Jiang et al. 2020
[218] Tamminga & Benes 1998

better able to correctly identify the emotions expressed on the faces" while simultaneously failing to report that the "teens" in the study were actually on average 13.8 years old. After these mistakes, Giedd feels it proper to make a pseudo-policy recommendation: "because the basic neuronal circuitry of decision-making is still being formed and shaped, parents and other adults who are in touch with and responsible for growing teens are still needed to help guide the process." Needless to say the claim that teen youth are deficient in decision making compared to older people has not been demonstrated to any degree, much less to such a striking degree that it is warranted to claim that "basic neuronal circuitry" is not yet formed.

Like that, Giedd's section is over. One of the other two authors comes in to write the last section, which finally addresses behavior measurements. The section uses a devious rhetorical tactic. It goes over three domains: impulse control, planning ability, and decision making. Each subsection begins by discussing the deficits that frontal-lobe damaged adults display in the domain. For example, after taking damage to his forebrain, "The formerly diligent, responsible foreman became a person who was extremely impulsive, ill-mannered and unable to follow through on his obligations." The idea is that, convinced by the misinformation of the last sections, the reader will assume that teens also display these deficits. They will then think it is scientific fact that teens essentially act like they have frontal lobe damage, even though they don't and the previous claims of structural immaturity were not supported by the data.

The other half of the section does, however, look at behavioral data in the three domains. The first data driven claim is "In healthy children and adolescents, impulse control and the inhibition of irrelevant responses likely develop as part of more complex functions, such as sustained and focused attention, and more complex cognitive processes, such as planning and abstract reasoning. These abilities continue to develop well into adolescence." Two studies are cited. The first is titled "Differential development of attention and executive functions in 3- to 12-year-old Finnish children"[219] and the second is titled "Inhibitory

[219] Klenberg et al. 2001

Control Across the Life Span," and it compares the executive functioning of three groups, one with mean age 10, the second with mean age 20, and the third with mean age 72. The second "young adult" group displays the best performance, with its ages ranging from 17 to 22[220]. My own analysis of the data in this field indicated that executive functioning, which includes impulse control and selective attention, is in fact mature by the end of puberty, which occurs on average at about 15 years old, although this varies with a standard deviation of about a year. Maturity is attained during what these researchers term "mid-adolescence." Although here, similar to before, there is a tactic of slippery vagueness -- the author is avoiding throwing out a particular age that signifies maturity like some of the more unwise are wont to do. Although it is definitely implied, thanks in part to adjacent talk about the "teen brain", that "well into adolescence" is probably supposed to mean, at the least, "until 18-20." The link between puberty and the development of cognitive faculties is essentially unmentioned by these people throughout this article and the others. It is as if puberty does not exist and is unknown to them. This is because serious thought into the matter might lead to a persuasive hypothesis that the point at which physiological adulthood is reached is probably the point at which puberty ends. This is too early to be suitable to the politics that these articles are intended to push so the matter is ignored and instead the vague, socially constructed psycho-cultural conglomeration known as adolescence is put in its place. The author continues, saying "Although the teen brain expends a great deal of effort while performing working memory tasks involving inhibition, it fails to fully engage the neural structures, as reflected in a greater number of errors on the task." The cited study does not concern the "teen brain" at all -- it compares a group with an average age of 10 years to a group with an average age of 22 years[221]. The author made a claim about the "teen brain" based off of this study, yet only children and twenty-somethings are present in it. Furthermore, the study is measuring performance on a go-no-go task, which reflects inhibition control, and a later study that did involve teenagers found mature scores

[220] Christ et al. 2001
[221] Casey et al. 1997

on this task are attained at about 15 years, the end of puberty. The claim that the teen brain "fails to fully engage the neural structures as reflected in a greater number of errors on the task" is 1) not at all evidenced by the data the author cited to support his or her statement and 2) not evidenced by data that actually does test that statement. What kind of measured researchers make mistakes that are this terrible is still a mystery.

The author does it again talking about planning behavior: "For example, a study examining the cognitive components of planning in very young children, teenagers and young adults found a general age-related progression in ability. Importantly, while eight year olds' performance was superior to younger children in their ability to solve complex problems, they had certainly not reached adult performance levels on the difficult planning problems and working memory tasks". The study cited here is accurately titled "The functional emergence of prefrontally-guided working memory systems in four- to eight-year-old children"[222]. The author claimed that teens are included in the study when in fact it only includes children 4-8 years old and a small group of young adults. And again, the author doesn't incidentally happen to be right about teenagers either, since as I have argued elsewhere, the data suggests that postpubertal teens possess executive capabilities that would be expected of young adults, and that are found in older young adults, and teens do not on the contrary have child-like deficits like these researchers consistently claim in the attempt to justify expensive restrictive measures that are politically expedient to them.

Next a claim is made about working memory: "the process of planning requires a temporary mental workspace and it is this very workspace (i.e., working memory) that is not fully formed in adolescence." The study cited actually did find about a 1/4 SD difference in WM measurements between 16 year olds and 24 year olds (d = .22)[223], but "On the basis of schools attended for children, parents' occupational level, and residence, socioeconomic status of the sample was estimated as 35% low income and 65% middle to high income. Ninety percent of

[222] Luciana & Nelson 1998
[223] Swanson 1999

the adult participants were middle- to upper-middle class" (54). It is unclear what the difference in SES is between the groups in terms of standard deviations but considering that WM is highly g loaded and IQ is correlated with SES at high levels, a 1 SD gap between the groups would probably be sufficient to explain the gap between 16 year olds and 24 year olds found in the study. This is probably the cause of these results because most other studies have failed to replicate that performance gap between 16 and 24 year olds. However, some other cross sectionals occasionally find similar effect sizes while longitudinals typically do not. This is because it is rather typical to draw teenagers from public schools and young adults from universities, creating an IQ gap between the groups. Enough studies that escape this problem have consistently found that working memory peaks by 16 (Chapter 3). Therefore the author's claim is incorrect, although this time the data at least appears to support it. Regardless, an effect size of d = .22 does not necessarily justify his claim that "teens [are] vulnerable to problems in the cognitive processes that allow sound planning." To put an effect size of d = .22 in context, the fluid intelligence (IQ) gap between white and black people is consistently shown to be 15 IQ points, or d = 1. The IQ gap between men and women has been estimated to be 3-5 points, which means 0.2 < d < .33. The male-female spatial working memory gap was estimated in a meta-analysis to be about d = 0.16[224].

This author rounds out the paper with bizarre and ineffective rhetoric concerning "adolescent decision making". Multiple studies are cited that concern "acquiring behavioral strategies as teens grow" and utilizing "inappropriate judgment strategies." It is unclear why the author spends so much time discussing "Strategies" instead of examining actual behavioral outcomes. The author even goes on to state that many studies have found that adolescents judge risk like adults. Nevertheless, he or she pivots, stating without a citation that decision making skills are not "fully mature in adolescents" and are "fragile" and might be compromised by "substance abuse."

The paper finishes, stating in the last paragraph that, based off all of the bad citations (I reviewed every relevant citation, the vast

[224] Voyer et al. 2016

majority in the paper), "At a minimum, the data suggest that teens need to be surrounded by adults and institutions that help them learn specific skills and appropriate adult behavior." While I am not inclined to disagree with the denotation of this sentence, given it is hard to see why teens would ever exist in an institution devoid of other generations, the connotation is clearly a defense of the institutions of the status quo and a call for their strengthening. It is further stated that institutions are responsible for "helping them develop the skills of judgment, planning and impulse control." Even under their paradigm it is unclear that this is true -- if the brain is still developing, isn't that a chemical process? Regardless, it is known that judgment, planning, and impulse control reach adult levels by the end of puberty. That, however, is inconvenient when advocating for the strengthening and fortification of the high school system.

This steel-man of the "teen brain" concept has been disappointing -- only one or two of their citations even appeared to relate to their claims, and in those cases a closer look at the data debunked the researchers. From this exercise it has virtually been proven that the "teen brain" is nothing more than a political slogan and has no basis in science. Before the motives behind this phenomenon are analyzed, the chain of events is going to be further expounded. First, the foremost book on the topic will be analyzed and then a line of popular media going from that time into the present will be traced.

The Primal Teen was the first book about the "teen brain", coming out in 2003. It is small, about 200 pages in large print. It was written by Barbara Strauch, an editor for the New York Times. In it the familiar claims are repeated, interspersed with the recognizable generalization technique. It would not be fruitful to analyze all 200 pages, but I have read the whole book and it is my honest judgment that the following analysis is representative of the entire work. What I will show here is that the book repeats claims found in earlier media, at least one major novel claim is baseless, and it features uncharitable generalization to the point that it is reasonable to conclude that the book is just another propaganda piece in the tradition of what has already been exposed.

The book begins with a paragraph that corroborates the current working timeline on propagandization:

> As a science editor, I also knew the official party line about adolescent brains. As far as critical development went, teenage brains were pretty much done, wired up, three pounds of sparkling, charged up brain cells, just hanging there, ready and waiting for all that Chaucer, all that calculus, all that wise parental caution to pour in.

With that being said, the uncharitable generalizations begin immediately:

> Teen. Brain. … The words … go more tongue in cheek than hand in hand. Utter them out loud … and the jokes come popping out, like pimples before a prom. 'What? They have one?' … As the mother of two teenage girls … annoying stuff happens, scary stuff happens … one morning not long ago my oldest daughter, then fifteen, got up (at noon) and … I suggested it wasn't such a great idea to take her new CD player to an amusement park … she mutated. In full pubescent display she stomped upstairs [saying] 'You suck!'

That continues until page 12 when scientific claims finally begin to be made, but it continues to be interspersed constantly on every page. The book's quality does not improve with its scientific claims. It repeats Giedd's speculation, quoting him, Yurgelun Todd's unjustified claim, quoting her, and the misinterpretation of alcohol rat studies and likely more. Charles Nelson from Frontline also comes in with his generalizations: "A lot of teenagers just don't see the consequences of actions. They don't think ahead."[225] There are never any citations in the book, only researcher quotes in the same vein, although sometimes, like Yurgelun Todd, they reference a study but usually refer to data that is not published. A researcher named Benes is featured who published the previously mentioned study only involving an 8, 13, 24, 36, and 57 year old that found that myelination continues into the sixth decade of life. It is mentioned that myelination is occurring during the teens but the fact that it continues long after is left out.[226] All of this is to say there is striking similarity between the contents of this book and the contents of previous pieces.

[225] Pg 32
[226] Pg 53

The most striking novel claim comes from Cauffman and Steinberg, juvenile justice system advocates funded by the MacArthur foundation.[227] They essentially make irrelevant tests that show scores increasing into the 30s and call the measurement "maturity" and then claim that teens cannot handle being put in jail when they commit crimes. Cauffman has lamented the fact that there are 12 year olds in prison for life, not realizing the fact that those 12 year olds are murderers and that such a sentence is not handed to a child lightly. In the book, they state "as a group, adolescents are less mature and have less perspective and less impulse control than adults … the biggest shift toward mature thinking occurred between eighth and tenth grades [age 13-15, puberty]."[228] This is based off of data with a bad measurement method and without construct validity. The measurement method is a survey. Teens consistently view themselves as immature and it shows on survey data, but when laboratory tests and real outcomes are used, things with inherent (or almost) construct validity, teens perform equivalently to young adults (again, this is in regards to safe sex, driving adjusted for experience, risk and judgment simulations in the lab, etc). This means the measurement method would overstate teen immaturity even if what was being measured is maturity, or in other words, related to real behavioral outcomes, or in other words, if the construct was valid. But there is no evidence that the surveys actually estimate anything related to real behavioral outcomes because the researchers made them up. Let them explain: they measure three categories, "(1) responsibility, which encompasses such characteristics as self-reliance, clarity of identity, and independence; (2) perspective, which refers to one's likelihood of considering situations from different viewpoints and placing them in broader social and temporal contexts; and (3) temperance, which refers to tendencies to limit impulsivity and to evaluate situations before acting."[229]. Make no mistake, the researchers are talking about maturity of judgment here and not just some vague social maturity construct, since the paper is titled "(Im)maturity of Judgment in Adolescence: Why

[227] Pg 115
[228] Pg 116
[229] Cauffman & Steinberg 2000

Adolescents May Be Less Culpable Than Adults." In real life, judgment is nothing other than the ability to avoid bad (for simplicity, substitute bad for harmful) decisions. Temperance would concern this if measured appropriately but perspective would not, sounding like a bad sociology major's exercise in denying objective reality, and responsibility would not because it is none other than a function of what age restrictions a person is under, and it was clearly included not because the researchers thought it measured judgment but because they knew that if they claimed it did they would be able to claim that teens lack judgment. The "researchers" here are quick to recommend policy changes, doing so even in their title, but yet failed to look at actual behavioral data that reflects judgment like crime rates and accidental pregnancy rates. Doing so reveals they are wrong though so it's not a mystery why they chose to perform what they performed.

All of this means that the first book on the teen brain is wrought with assuming generalizations, the title itself being an example, and false claims, many of which are exactly the same as the false claims made in other media from the time.

These false claims would continue to be published in the media from 2003 onward. To this very day they are a problem -- in 2018, a book on the teen brain won the Royal Society's Science Book award. And in the last 20 years many more teen brain books have been released. As previously mentioned, Google's top search results contain misinformation that can now be traced back to the earliest publications on the teen brain.

For example, the aforementioned source that has been copied and pasted between at least 6 different websites, including Stanford and Rochester, claims that "The rational part of a teen's brain isn't fully developed and won't be until age 25 or so," echoing Giedd and ignoring the performance of teens on judgment tests and the fact that there isn't a critical point in brain development near 25. It also repeats Yurgelun Todd's unjustified claim:

> Adults think with the prefrontal cortex, the brain's rational part. This is the part of the brain that responds to situations with good judgment and an awareness of

long-term consequences. Teens process information with the amygdala. This is the emotional part.

Wayback Machine archives date this source to at least May 2013, 10 years after the release of The Primal Teen. More than one of the top Google results for a search of the term "teen brain" feature this exact text as of May 2020. Others are extremely similar and repeat already-debunked claims found in older teen brain media. None of the top results cite any sources and all feature the common tactics of teen brain media: uncharitable generalization and speculation-as-fact. Many, like the Rochester source, were probably written by laymen (as far as the teen brain is concerned) who simply repeated claims found in earlier media. Those claims, of course, have been shown here to be fallacious, with many citing data that had little to nothing to do with the hypotheses that were presented as proven fact.

In 2014, another book in the long line of teen brain phantasms was published by Francis Jensen, a researcher employed by the University of Pennsylvania. It is titled *The Teenage Brain: A Neuroscientist's Survival Guide to Raising Adolescents and Young Adults*, and like the others, is filled to the brim with anecdote and generalization. In one instance Jensen told a story about how a teenager almost froze to death, not wanting to call the police because he had been drinking, for fear of getting arrested. Amazingly she used this anecdote to argue that the drinking age should not be lowered! Her data-based claims are as dubious. On page 37 she claims that the teen brain is only 80% mature -- a totally made-up number. Her evidence is gray matter data from Jay Giedd that cuts off at the age of 22 and shows no discernable pruning after puberty (even though more holistic data indicates that the brain loses gray matter throughout life -- Giedd's graphs look flat because the effect size between about 15 and 22 is too small. Remember, based off of gray matter volume and other details, brain age can be predicted but only within 5-10 years of accuracy). In another instance, she claimed prospective memory develops into the twenties,[230] but a 2015 study performed an ANOVA analysis on prospective memory scores for 12.5,

[230] Pg 39

14.5, 16.5, and 18.5 year olds and found no statistically significant differences.[231]

She furthermore claimed that the ability to multitask is still developing through the teen years.[232] Her own evidence, however, found maturity in the 16-17 year old group, where the next youngest grouping was 13-15.[233] Most measurements in the study were found to be developed by 13-15 or to not significantly differ between age groups. The media, however, wrote

> Finally researchers have come up with a reason other than pure laziness for why teenagers can't shower and brush their teeth or unload the dishwasher and wipe down the counter. Blame it on "cognitive limitations." Their brains can't multitask as well as those of the taskmasters. Trust, however, that they'll grow out of it. The part of the brain responsible for multitasking continues to develop until late adolescence, with cells making connections even after some children are old enough to drive, according to a new study[234]

Per the data, this doesn't apply to those 16 or older, but no distinction is made in the news. It's just "teenagers." And further, it's unclear that the measurements in the study correlate with lazy behavior, but the media doesn't care. Finally, assuming the ability to engage in complicated, cognitive multitasking correlates causatively with personal hygiene behavior (where things are done one at a time in my experience), it's unclear that the effect sizes measured are large enough to translate to an explanation for why a 14 year old doesn't want to wipe down the counter. It is possible that other factors could be at play, perhaps social and relational. But the public is not meant to see measured science. It has evidently been predecided by someone that teenage youth are significantly inferior in their behavior due to innate age-based differences and the data and the narrative around it must conform to that whim of will.

---

[231] Bowman et al. 2015
[232] Pg 41
[233] Luciana et al. 2005
[234] https://www.livescience.com/270-teens-lousy-chores.html

Jensen's book and that article both treat the issue the same way: prejudicially. Two more examples: she says "When teen's amygdalae signaled danger, their frontal lobes don't respond … Set limits for your teenager because their over exuberant brains can't do it for themselves. Take away their phones if they don't comply. Insist on knowing their passwords."[235] This is a repetition of Yurgelun-Todd's unjustified claim, and is uncited. Its normative follow up is, of course, not supported by the data, which shows that teenage youth are not significantly more "overexbuerant" than older youth.

Among other claims, Jensen clearly took lines from earlier media. She referenced rat studies to argue for a high drinking age, cited Giedd to claim that the teen brain (but not the thirty-something brain) is a work in progress, and even worked in Yurgelun Todd's unjustified claim eleven years after Primal Teen, and the anecdote-narrative is essentially the same as that found in earlier works.

Four years later this was regrettably still the case. In 2018, Sarah-Jane Blakemore published her somehow-award-winning book *Inventing Ourselves: The Secret Life of the Teenage Brain*. Even though the title seems to reference Giedd's critical period speculation (though identity formation during youth is an old meme), the book is honestly better than its predecessors. It even seems to agree with my analysis on the misuse of the words "mature" and "developing," noting that "White matter volume stops increasing and finally levels off at some point in the thirties or early forties in humans"[236] and that brain development therefore does not end at 25, but in middle age, a point I don't agree with linguistically but which I find respectable. Still, in practice, Blakemore doesn't abide by this hypothesis and instead functionally assumes it is as if brain development ceases in the mid-twenties, even stating just four pages after her admission on white matter that "brain development … occurs throughout childhood and adolescence and into early adulthood [and then becomes adaptation]."[237] Perhaps she states this because she believes, and argues, that adolescent behavior is immature, seemingly

[235] Pg 63, 80
[236] Pg 87
[237] Pg 91

understanding that MRIs alone cannot inform policy. She is mistaken, yet not as unjustified as previous writers, because her method is to actually examine study methodology instead of simply asserting a conclusion with a citation in tow. This seems to reduce her error rate, but nevertheless the book is marked by uncharitable generalizations and bad citations culminating in bad policy recommendations.

For instance, Blakemore begins her book by heavily mirroring The Primal Teen:

> WHEN I TELL PEOPLE I study the adolescent brain, the immediate response is often a joke–something along the lines of: 'What? Teenagers have brains?' Perhaps part of the reason why adolescents are mocked is that they do sometimes behave differently from adults. Some take risks. … They relate to their friends differently

Similarly oriented anecdotes and generalizations are dispersed throughout the book. In regards to her claims, the relevant part of her descriptive thesis is contained in the last line of the quote above in part. To state it more clearly, it seems to be that teenagers take more risks, respond more to peer pressure, and that these things are explained by innate brain development. In response, it can be well-argued that Blakemore overstates differences and hastily misattributes some of their causes.

In regards to risk, I essentially agree with Daniel Romer that adolescents display mature cognitive control in both "hot" and "cold" scenarios. Risk taking is separate from "sensation seeking", which is primarily motivated by exploration of the environment under ambiguous risk contexts" while risk taking "occurs primarily under conditions of known risks." Sensation seeking is an orientation toward reward and novelty, while risking taking is thought to be a function of aversion to punishment under this paradigm. Teenagers are thought to show elevated sensation-seeking, which monotonically declines into old age, but not elevated risk taking. In other words, teens are just as aware and averse to punishment, and have the executive control to enforce that aversion, but will seek bigger rewards with less chance of success than older individuals as long as those bigger rewards are not "risky" in terms

of punishment. Where I differ from Romer is that I believe that laboratory tests show that sensation seeking peaks during puberty, around 14, and not at 19 as Romer has argued from survey data. Furthermore, I believe Romer succumbs to the zeitgiest and overstates differences between postpubertal teens and slightly older young adults.

Blakemore concedes that "in 'cold' tasks, with no emotional context, risk-taking isn't necessarily increased in adolescence."[238] This means, for instance, "there [is] no evidence that young adolescents (aged 12–14) or mid-adolescents (aged 15–18) perceive situations as less risky than adults do. This supports the idea that adolescents understand risk and suggests they do not see themselves as immune to it."[239] However, she believes that for "hot" tasks, it doesn't matter what degree of punishment there is. Teens are more likely to take unnecessary, punishing risk when under fire due impulse control deficiencies.

She cites a number of studies that she believes justifies this claim, alongside generalizations and anecdotes about pubescent animals and humans. One of these studies is from 2010 and uses the Iowa Gambling Task to measure impulsivity and judgment. Blakemore says

> The tendency to play increasingly from the risky deck was strongest in adolescence/early adulthood (14–21 years): this age group preferred and persisted with the risky pack, even though it eventually lost them money. In contrast, children and adults were more likely to learn to avoid this pack over the course of the game. This suggests that the ability to use information about monetary value and the probability of winning or losing to guide decisions in 'hot' contexts, characterized by money, high emotion or arousal, is still developing in adolescence.[240]

However, a look at the data[241] reveals that the first age group of mostly post-pubescents (16-17) had performance that did not significantly differ from any of the three adult groups (18-21, 22-25,26-30). The 14-15 year olds also did not significantly differ from any of the older groups except for the 26-30 olds, and there the effect size was small

[238] Pg 140
[239] Pg 48
[240] Pg 140
[241] Cauffman et al. 2010

(d ~= 0.20). 10-13 year olds, however, showed significantly depressed performance relative to older groups with larger effect sizes (d ~= 0.50). Characterizing 14-21 year olds as riskier than 22-30 year olds is an overstatement at best, based on this data.

Let us again contextualize this difference. On this task, women persistently perform less well than men at around d = 0.5.[242]

Another study she cites comes when she claims "As impulse control gradually improves between childhood and early adulthood, the tendency to choose the immediate reward decreases."[243] It does not demonstrate that impulse control improves beyond the age of 14, because the oldest group included in the study (which was about ADHD) was 14.4 years old on average.[244] In the next sentence, Blakemore cites an fMRI study, claiming

> Brainscanning studies have shown that this reduction in choosing an immediate but smaller reward is associated with a steady increase between late childhood and early adulthood in activity in the ventromedial prefrontal cortex, and a decrease during the same period in activity in the ventral striatum.

However, fMRI studies in particular have been found to suffer from a plague of false positives: "In theory, we should find 5% false positives (for a significance threshold of 5%), but instead we found that the most common software packages for fMRI analysis (SPM, FSL, AFNI) can result in false-positive rates of up to 70%. These results question the validity of a number of fMRI studies and may have a large impact on the interpretation of weakly significant neuroimaging results."[245] In the study cited by Blakemore,[246] behavioral data differences between groups are small and seem to be functionally insignificant from 15-25. fMRI data yielded weak correlations between age and performance (r=0.30). Whether valid or not, the effect sizes presented in

---

[242] Bolla et al. 2004 ; Singh 2016 ; Reavis & Overman 2001 ; Van den Bos et al. 2013
[243] Pg 141
[244] Scheres et al. 2006
[245] Eklund et al. 2016
[246] Christakou et al. 2011

the study between teens and young adults are on their face small and certainly not justification for the characterization of teenage youth as immature relative to 25 year olds.

Finally, Blakemore cites two studies that she co-authored. The first uses another gambling task. Based on it, Blakemore claims that

> the strength of counterfactual emotions increased between childhood and adolescence: on learning the outcome of each gambling decision, mid-adolescents aged 12–15 years felt a stronger sense of relief (and, to a lesser extent, regret) than did 9–11-year-olds. The late adolescent and adult groups' emotional responses were no higher than those of the mid-adolescent group

Counterfactual emotions are feelings that occur when a person thinks about how things could have gone differently, and they include regret and satisfaction. The finding that these feelings reach mature levels by 12-15 years is consistent with the Iowa Gambling Task data, since that task involves learning from mistakes and successes. Blakemore also does not seem to claim that postpubertal teens are immature based on this data, saying

> The results showed that risk-taking–choosing the gamble with a small chance of winning a lot over the one with a good chance of winning a moderate amount–peaked in mid-adolescence. We calculated the age at which our group of participants made the greatest proportion of risky choices to be 14.38 years

However, Blakemore fails to quantify the effect size of the risk-difference while also failing to report that mean winnings by age do not appear to significantly differ between physically matured teens and young adults ($r = .27$ for mean winnings by age).[247] Since increased "risk taking" peaks at about 14 in this study, consistent with laboratory studies on sensation seeking, and since the "risk" evidently did not lead to punishment, it may be more consistent to consider this a corroboration of the idea that teens have increased reward sensitivity but not decreased punishment aversion or judgment. The data is reported too poorly to lend itself to a calculation of effect size, but it appears to be less than the

[247] Burnett et al. 2010

difference between "risk taking" in men and women. Regardless, since mean winnings do not seem to differ, the characterization of even 14 year olds as reckless "risk takers" is unwarranted. More care should have been put into differentiating between sensation seeking and recklessness, and also into effect sizes and their meanings, before making the policy recommendations that Blakemore goes on to make.

The other study of hers that she cites is used to support the statement that "A 2016 study in my lab revealed that adolescents are less likely to learn to avoid punishment."[248] There are a number of problems with this citation. First, the study is downright Lacanian in its obscurantism to a point that is unacceptable. Poor formatting means most of the paper is spent discussing the simulation of their "computational modelling" methods. If this is what it takes to tease out differences in punishment aversion, the differences are probably negligible to begin with. Second, there are a total of 38 subjects, and data was analyzed based on the averages of two groups: one with a range of 12-16 and an average age of 14.2 years, and another with a range of 18-32 and an average age of 22.3 years[249]. Finally, despite the relative immaturity of the younger group, overall task performance did not significantly differ. This intuitively limits the possibility of practically large effect sizes for punishment aversion, since the younger group was evidently not significantly more punished than the older group.

Overall, then, Blakemore overstates and potentially invents differences in risk taking. She possibly characterizes sensation seeking as maladaptive recklessness. Furthermore, Blakemore inflates the ages at which the differences are most apparent and the effect sizes of gaps even during young ages such as 12-14.

Blakemore argues in parallel that teenagers "relate" to others differently. Particularly, she claims that teenagers are more vulnerable to peer influence, and, more bizarrely, that teenagers lack theory of mind. Both of these hypothesized gaps are further attributed to developmental differences as opposed to environmental ones.

---

[248] Pg 146

[249] Palminteri et al. 2016

One of the first studies she references on this topic is in support of the claim that

> In this study, 306 participants, comprising adolescents (13–16 years), young adults (17–24 years) and adults (25 years and over), carried out the Stoplight Task. When they were on their own, each age group took around the same number of driving risks … When in the presence of their friends, adolescents took almost three times as many risks as when they were alone, and young adults took nearly twice as many risks. In adults, the presence of peers had no impact on risk-taking. … it shows that a critical factor in risk-taking for adolescents, and to a certain extent for young adults, seems to be the presence of peers, whereas this is not the case for adults aged 25 and over.[250]

There are a few problems with these statements. One is that racial differences are ignored. Among the white participants, there are not significant differences between youth scores (mean 19 years), alone or with a group, and adolescent scores (mean 14 years).[251] Furthermore, among white adults, the presence of peers actually led to increased risk taking to a similar degree as in the younger groups. Only in the Black participants is the pattern of increased group pressure at younger ages present. This might indicate that susceptibility to peer pressure is affected by social or environmental factors that might differ between races or age groups.

Even more significant is the fact that effect sizes between racial groups are more significant than between white age groups. For instance, d = .29 between white 14 year olds and white 25+ year olds, while d = .69 between white 14 year olds and Black 14 year olds. While this study has likely, fallaciously, been used to argue for or at least justify driving restrictions upon young white drivers, never would a racist dare to use it to argue that Black people should be forbidden equal driving rights. Such an idea is incompatible with liberal society, except when it comes to youth. Another fact: d = .23 between white and Black youth, while d = .18 between white youth and white adults. White 14 year olds took less risks than Black 19 year olds. Where are the brain scientists arguing to raise the driving age for Black people? They support discrimination not

[250] Pg 37
[251] Gardner & Steinberg 2005

based on some sort of transcendental Science, but rather based on what is advantageous to them.

For whites, the presence of peers does not seem to be a "critical factor" in risk-taking, and Blakemore herself conceded that the risk differences between the age groups was essentially null. Meanwhile, the complex pattern of racial and age-based differences found in the study indicate that there may be significant social factors at play that influence the significance of peer influence on behavior. Indeed, the study had the subjects bring their own friends, inviting this possibility. Blakemore does not investigate why a gap might exist. When there is one, she assumes it is developmental, her priors seemingly being that maturity begins no sooner than 25 and it can be essentially, prejudicially assumed that postpubertal 15-24 year olds are still "developing."

Next, Blakemore builds on her bad claim and says "adolescents are hypersensitive to social exclusion" relative to adults, evidenced by a study that found that 11-16 year olds report a lower mood than adults after being excluded in a lab-based interactive game. The study did, in fact, find a gap in mood after exclusion, with d =~ 0.7.[252] This was explained in the study primarily by increased anxiety after exclusion. Not only were teens more anxious than adults after exclusion, they were more anxious to begin with. In fact, by about 14, exclusion did not heighten anxiety more than in adults, but base anxiety was higher. Could this be brain development, social and environmental factors, or a mix of both? While I know of no quantified justification, it seems intuitive that adults would be less anxious at base in part due to social factors such as cultural expectations, habitual environment, and the social life deriving from those. It is also not impossible that a few more years of adult-level social experience might make a difference. The assertion that the gap is fully explained by brain development naively bio-deterministic and is unsupported by a wealth of other data and simply seems motivated by special interests.

Blakemore herself said

[252] Sebastion et al. 2010

> recent surveys have found marked cultural differences, with adolescents in some cultures, for example in Japan, South Korea and India, spending just as much time with their families as adolescents as they did when children. This emphasizes the importance of taking culture into account when thinking about adolescent development. Different cultures exert different pressures on adolescents. It might be permissible for adolescents to behave a certain way in one culture but not in another.

It could be that adolescents in America are chronically facing a new (to them) social pressure to distance themselves from some of their closest and well developed relations, familial ones, and replace them with the vapidity of other 14 year olds that happen to go to the same public education center. For some reason, Asians do not seem to experience heightened susceptibility to peer influence during and after puberty. The difference could be genetic, but it could also very well be due to top-down pressures, or a mixture of both. Yet excluding the idea of genetically caused differences in brain development (relevant to susceptibility to peer pressure), if brain development were a significant cause of increased susceptibility to peer influence, it would probably show in Asian norms and on the previous risk-taking data. Yet it only seems to appear in regards to social-anxiety in a lab setting, and then in a restricted way. Blakemore, however, is immune to these considerations and titled her anxiety-study "Social brain development."

Peer influence seemingly only needs to be explained for people who are roughly 12-14, however, based on the risk-driving-game data and the anxiety data. Another study Blakemore cites replicates this idea -- it found that "As the chart opposite shows, whereas children (8–11) and adults (19–59) were more influenced by adults' opinions about risk, young adolescents (12–14) were more influenced by the opinions of teenagers. Mid-adolescents (15–18) showed a similar level of influence by adults' and teenagers' opinions about risks."[253] The chart shows that by 15-18, people are as influenced by adults as they will be at 26-59. Children, intuitively, are more influenced by adults than adults and 12-14 year olds are the only group more influenced by the risk-views of teenagers. That the findings only relate to such a young group seems to beg no explanation, but I find it improbable that this gap is fully

[253] Pg 49

explained by differences in brain development. Special norms placed upon 12-14 year olds are not unlikely to play a role.

Moving on from peer influence, Blakemore also claims, based on a cognitively demanding task, that teens have immature "theory of mind," meaning they (14-17.7 year olds) are "Still developing" the ability to understand what others see, literally.[254] They were given a computerized task, where there were 4 rule conditions. Under one, subjects were told to move an object on a bookshelf by an NPC who could only see certain items. Left-right was inverted. Under other conditions, one or both of those rules were removed. In every group, error rates were minimal under no rules, low to moderate under one rule, and skyrocketed under both rules. The IQ gap between the 14-17.7 year olds and the adults was 5 points (even though IQ peaks at 14 or 15), but the correlation between IQ and task performance was not given. Regardless, the task would seem to be g loaded based on the high adult error rates. The effect size of the IQ gap was about d = .33 and d = .4 for task performance. The fact that the correlation between IQ and task performance was not made known indicates that Blakemore was not concerned with issues such as these -- she only wanted to attribute an implausible and ridiculous level of immaturity to teens.

Essentially, Blakemore's claims are not supported by the data she cites. Her modus operandi is to, similar to other writers, hastily slap whatever conclusion is expedient onto data that might lend it a small possibility of being true. In other words, she at best speculates-as-fact like Giedd. More detailed analyses consistently show that her citations reveal maturity, infinitesimal effect sizes, or uncertainties about gap causes with social factors being plausible or even probable. After 20 years, the narrative that teens have immature brains has still not accumulated real evidence. Instead, the data continues to show that the traditional view was much closer to the truth.

In other places in the writing, Blakemore demonstrates continuity with old lines. For example, her title is a reference to Giedd's speculation-as-fact, and she shares in his error, stating that "[gray matter] decline levels off at some point in early adulthood, between the mid-

[254] Dumontheil et al. 2010

twenties and thirties."[255] In reality, of course, it does not level off at 25. She also repeats Yurgelun-Todd's unjustified claim, citing facial recognition fMRI studies comparing 13 year olds to 30 year olds and the "dual systems model", a product of MacArthur foundation grant-receiver and collaborator Laurence Steinburg.[256] This is based off of "the assumption that the brain's reward and emotion systems mature earlier in adolescence than the prefrontal cortex control system." The evidence for this are the bad citations above, and bad gray matter decline data. Small structures lose less volume over time than larger ones (amygdala vs. prefrontal cortex), which they fallaciously claim means the prefrontal cortex is "immature" compared to the amygdala. This sounds evolutionarily implausible. Blakemore also argues that the teen brain is in a "sensitive period" based off of data showing 15-30 year olds can train for IQ tests more easily than kids.

After the aforementioned sloppy work, Blakemore advances the expected policy recommendations: agreeing whole-sale with the MacArthur foundation lackeys, lamenting the fact that "40 per cent of the world's teenagers today do not have access to secondary school", implying the Algebra needs to be taught at even later of an age and in general advancing the idea that teenagers are children until 19-25ish and need daycare, no responsibility, and no criminal liability.[257] Conclusion: in order to push these policies, Blakemore undeniably overstated effect sizes that in many cases, do not exist.

It may seem that this has been written by a lone wolf, howling into the wilderness that the whole establishment is wrong. And while the "consensus" is largely incorrect, as shown, and pushed without rigor, this has not been the only document written contra teen brain. Harvard educated psychologist Robert Epstein was one of the first, writing for Scientific American in 2007 that the teen brain is a "myth."[258] He claims philology shows that there was not even a word for "teenager" or

[255] Pg 87
[256] Pg 126
[257] Pg 176
[258] https://www.scientificamerican.com/article/the-myth-of-the-teen-brain-2007-06/

"adolescent" before the 19th century. History further shows that teens in this day are treated much more like infants than was normal in any other time period. Finally, teens demonstrate maturity in behavioral measures, and anatomical brain scans are not sufficient measurements of maturity.

Dr. Daniel Romer of the University of Pennsylvania wrote in 2017[259] for the Smithsonian magazine, alongside a peer reviewed article he published, that "The Impulsive 'Teen Brain' Isn't Based in Science … adolescent brains crave novelty. But they have the cognitive control to go with it." The gist of this has already been explained previously, but essentially he argues that the data shows that teens are not reckless risk takers like Steinberg, Blakemore & co. claim.

Lastly, I am aware of a less credentialed article published by the Center on Juvenile and Criminal Justice in 2017 that claimed that the teen brain is "non-science."[260] It shows that as of 2015, arrests of 15-19 year olds match those of 30-49 year olds. Crime in California now peaks from 25-29, similar to the pattern in Taiwan. "This invalidation will have an enormous impact on 'teen brain' non-science promulgated in the juvenile justice field.[261] For years, adults have enjoyed demeaning adolescents and young adults as brainlessly crime-driven and 'stupid' to elevate popular and profitable notions of 'adolescent risk taking' as the originator of crime."

Add this book to that list. Flaws in the institution of science have been uncovered here; researchers are not as objective as many are led to believe. Educated researchers have here been documented to routinely cite studies that have little to nothing to do with their claims. Studies only involving children have been referenced in order to make claims about the "teen brain". Studies that find little to no effect sizes have been cited to claim that Science has found the root of teen "laziness." Vectors of change in the brain have been hastily interpreted as development, and

[259] https://www.smithsonianmag.com/science-nature/impulsive-teen-brain-not-based-science-180967027/

[260] http://www.cjcj.org/news/11227

[261] Steinberg and the MacArthur foundation are, for some reason, very interested in this field of policy, as we will see in the next section.

the fact that those vectors continue well into old age has universally been omitted. Writings, even from researchers themselves, have relied on anecdotes and generalizations that prejudicially present teenagers in as immature a light as possible. Researchers have frequently been found to say and write claims that are at best mere speculation, yet these claims have been presented as fact. This has occurred in regards to this subject continuously since 1999, and multiple mistruths and catch phrases have lived on through the lines of propaganda, including Giedd's speculation-as-fact that adolescence is a critical period, Yurgelun-Todd's unjustified claim, and the phrase "the teen brain" and "a work in progress."

Readers can be confident that, where they come across this topic in the future, if teens are presented in an immature light, the source is probably unscientific. But the question still stands: why push this message? Who benefits? Has it come from a broad network of people just trying to make money or is a more specific goal at play, the propaganda pushed by a more specific group? To answer that question, we must take a look at who commissioned and spread the propaganda, their lives, their similarities, their connections, and their possible motivations.

4.2: Who did it?

So far three organizations have been implicated in the spread of the teen-brain myth other than the media. These are the MacArthur Foundation, the American Medical Association, and the Robert Wood Johnson Foundation. All three of these organizations have a remarkably similar politic. Each are incredibly "progressive," with racial and sexual "identity politics" being high on their to-do lists. For example, roughly the majority of faces that can be seen as of late 2020 on the Johnson and MacArthur foundation websites are "people of color." At least half are women. The AMA has apparently taken pride in the fact that the last three of their presidents have been women. As far back as the 70s the AMA rigorously defended gender equality in medicine, and in the 90s they took pride in their first Black president.

Ostensibly, the policy goals with regards to youth of the AMA and the Johnson Foundation are neoprohibitionist, that is, to ban or

support the ban of alcohol consumption for youth, while the policy goals of the MacArthur foundation are to support the juvenile criminal system in a way that discourages the punishment of young criminals.

The history of the two foundations are similar. The Johnson Foundation was founded in 1968 upon the death of Robert Wood Johnson II, the owner of the multinational Johnson & Johnson Corporation. Likewise, the MacArthur foundation was founded in 1978 when John D. MacArthur died, a billionaire businessman who was involved in insurance and real estate. The AMA is a bit different. It was founded in 1847 by Nathan Smith Davis, a physician and teacher of medicine who was a prolific writer.

So who is responsible for the decisions made by these organizations regarding the teen brain? Luckily, the MacArthur foundation publishes their by-laws on their website, alongside listing the members of the body that controls the organization's property, the Board of Directors. Apparently, as the by-laws describe, because the MacArthur foundation is a 501(c)(3) organization, there are no behind-the-scenes owners or shareholders. The organization is self-perpetuating; members of the 15 person Board of Directors serve for four years. After that time has passed, they can be re-elected or replaced by the rest of the board (the MacArthur foundation also has a 3 term term-limit). There is also a President, the "chief executive officer" of the Foundation, who reports to the Board of Directors. This person "shall have the authority to appoint such senior staff members as s/he may deem desirable and to assign duties and responsibilities to such persons." Last but not least, there is a distinct "Chair of the Board," who presides over meetings, and coordinates both "relations of the corporation with the corporations controlled by the corporation" and relations with the President.

The Board of Directors of the MacArthur (and Johnson) Foundation controls billions of dollars, yet none of the directors are billionaires; I estimate the average net worth to be seven figures. These people are at the upper end of the professional managerial class (PMC) and tend to be educational and business executives. The earliest list of directors with full descriptions I have is from 2012, a few years after the MacArthur foundation financed Steinberg, but directors stay on long

enough and the people are similar enough that a quick analysis of the 2012 list should be fruitful.

It contains 5 white men, 4 non-white men, and three white women. The chair of the 2012 board was Robert Denham, corporate lawyer and CEO of Saloman Inc. investment banking. He has a few other business connections and an educational connection: he's a trustee of the New School University.

The next name is John Seely Brown, former "chief scientist" at Xerox and a "visiting scholar and advisor to the Provost at the University of Southern California."

Third comes the President, Robert Gallucci. He "served as Dean of the School of Foreign Service at Georgetown University for 13 years" and has a long history as an American diplomat.

Fourth is the first woman, Jamie Gorelick, is a rather typical case: J.D. from Harvard, on the CFR, was on the 9/11 commission, etc. She apparently has no direct educational connections.

Fifth is woman number two, Mary Graham. She "co-directs the Transparency Policy Project at Harvard's Kennedy School of Government. Her current research focuses on the strengths and weaknesses of transparency systems as means of furthering public priorities." She has written multiple books and a variety articles for different mainstream media publications.

Sixth is the first Black man, Donald R. Hopkins. He is/was a member of the board of the Morehouse College Leadership Center. He was also with the CDC for 20 years and wrote a book on smallpox.

Daniel Huttenlocher, a white man, is number seven. He "is Dean of Computing and Information Science at Cornell University, where he is the John P. and Rilla Neafsey Professor of Computing, Information Science and Business. His research interests include computer vision, social and information networks, collaboration tools, geometric algorithms, financial trading systems, and IT strategy. He holds 24 U.S. patents and has published more than 75 technical papers." He is also a board member of Intelligent Markets and builds advanced trading system for Wall Street.

Eighth is the only Asian man, Joi Ito, "the Director of the Media Lab at the Massachusetts Institute of Technology. He previously served

as CEO of Creative Commons and helped found several Internet ventures in Japan. Mr. Ito was also an early investor in more than 40 companies including Flickr, Kickstarter, and Twitter."

Ninth is the only Mexican man, Mario Molina, "a Professor at the University of California, San Diego." He is a chemist who received a Nobel Prize for showing that CFCs degrade the ozone layer.

Tenth is the last woman, Marjorie M. Scardino, CEO of Pearson, "an international education and media group." She was a lawyer and is married to a Pulitzer Prize winning journalist.

Eleventh is the second Black man, Claude M. Steele, Provost of Columbia University. "He previously served as the Director of the Center of Advanced Study in Behavioral Sciences at Stanford University. His research interests include how people cope with threats to their self-image and how group stereotypes, especially as they affect minorities, can influence intellectual performance."

Last but not least is Jack Fuller, white male, president of Tribune Publishing, winner of the Pulitzer Prize for his editorials in the Chicago Tribune on constitutional issues, and trustee at the University of Chicago.

All but one member of the 2012 MacArthur Foundation Board of Directors have direct ties to higher education. One, Scardino, even has a large financial stake in a textbook company.

There is one more MacArthur Foundation name to investigate: the President during the time when we know Steinberg was funded, Jonathan Fanton. The MacArthur Foundation website says:

> The third decade found the MacArthur Foundation in early adulthood: clear about its values, its mission, and areas of work in which it sought to make a difference. Under Jonathan Fanton's leadership, the Foundation deepened investment in some of the Foundation's most promising areas of work including human rights and international justice, juvenile justice, affordable housing, and community and economic development. He sought out and supported major new ideas, such as the Encyclopedia of Life and the Law and Neuroscience Project, and emphasized fewer grants but for larger amounts and longer periods of time to increase the impact of MacArthur's grantmaking.

Recall that Steinberg was given grants by the MacArther foundation, and consequently pushed, via the teenage brain narrative, the

idea that youth should not be punished for criminal activities. Jonathanfanton.com states:

> Jonathan F. Fanton is President of the American Academy of Arts & Sciences. (More information about Jonathan Fanton's activity as President of the American Academy is available on the website of the American Academy.)
>
> Dr. Fanton served as Interim Director of the Roosevelt House Public Policy Institute at Hunter College from 2009 to 2014. He previously was President of The John D. and Catherine T. MacArthur Foundation from 1999 to 2009 and for 17 years was President of The New School for Social Research. Earlier, he was Vice President of Planning at The University of Chicago. Dr. Fanton holds a Ph.D. in American History from Yale University, where he taught and was Special Assistant to President Kingman Brewster.
>
> He is the author of Foundations and Civil Society, volumes I and II (2008), and The University and Civil Society, volumes I and II (1995, 2002).
>
> As President of the American Academy, Dr. Fanton directs one of the nation's oldest honorary societies and independent policy research centers. Founded in 1780, the Academy convenes leaders from academia, business, and government to address present and future challenges for the nation and the world.

Fanton is an author, think-tanker, and academic. Is it possible that these academically-connected types see expanding undergraduate education as something that gives them personal benefit, whether that be more status, more money, or more security? This is plausible; these people all tend to be high up in the academic hierarchy. Their personal nightmare may well be the defunding of extraneous education and the scaling back of the high school-university system, for fear that they may no longer be needed. There may no longer be "Special Assistants to the Yale President" or "Vice President of Planning at the University of Chicago."

What's more is loyalty to capital. Things are complicated, however, when we note that there are no owners behind the MacArthur foundation. If a wrong thinking majority were to trick their way into getting on the Board of Directors, they would then collectively own the foundation. Of course, this happening to begin with is highly implausible; these people often have lifetime track records of commitment to sovereignty when they are picked by exiting Board members. Not to mention that, due to the media environment, there

would always be pressure for the hypothetically subversive Board to drift back to good boy territory.

Those with the most power own the most capital. The upper-PMC tends to function as mere first-order servants of these ultra-capitalists, who are much smaller in number (there are only 650 American billionaires!). Could it be that the teen-brain myth is a signal of proactive obedience, enthusiastic devotion of the upper-PMC court jesters to their corporate kings who donate so much to the private universities, control 95% of the media, and own 55% of the human capital (55% of Americans are employed by 12 corporations)?

Absolutely, if this small class of lords have communicated that expanding higher education is a goal of theirs. And we already know this to be the case, it has been so for 200 years, as Chapter 2 revealed. As such, I find it likely that the teen brain meme is a spontaneously confabulated legitimacy maintenance narrative that emerged among the upper PMC in service of their own personal interests and those of their employers. In other words, the narrative emerged amongst the upper-PMC types featured in the original 1999 US News report as nonsense meant only to enhance the status of those who were speaking it. The narrative being in line with the overall agenda and current status-quo, it was applauded by the rest of the PMC and tolerated by the corporate-kings due to its expedience. From 1999 onwards it has mostly been unoriginally regurgitated as the party-line on youth, due to the benefits of such confabulatory regurgitation. We have seen this where it has been exposed that the non-sensical, data opposed lines of Giedd and Y. Todd have been repeated in various sources ad nauseum in the 20 years since the lines originated in the media.

The ultimate hypothesis here is that the utility of this party-line is primarily with regards to the expansion of the education system. Other age restrictions are just propaganda meant to support the major goal of the expansion of education. The evidence for this is that the decision makers have near-universal ties to the administration of higher-education institutions. Education is also, by far, the most phenomenologically significant and expensive policy that is pushed. True juvenile justice reform is rather limited; in the 90s, alongside a plethora of minorly annoying age restrictions such as the tattoo age, the smoking age, youth

curfews, etc., many states passed laws *degrading* the juvenile justice system, allowing offenders as young as 14 to be charged as adults at the discretion of the courts. This was allowed, faced and faces little back-lash in the media, and is the status-quo to this day despite the teen brain meme and the funding of Steinberg by the MacArthur foundation for the ostensible purpose of juvenile justice reform. What we find is that the decision makers at the MacArthur foundation seem to care little for juvenile justice; instead, they all have serious connections to academia, and as a class, the elite has a track record of paying the most attention to the education system, and even writing or stating that the purpose of the education system is to "civilize" the populace. It stands to reason that a major impetus behind the preference to paint young adults as infantile children is the desire to expand the education system.

If this is true, we should expect the MacArthur foundation to work more towards expanding the age of juvenility in the justice system upwards such that those who are college age are considered children by the courts. Such a focus would be a major sign that the expansion and legitimation of universal higher education is the real goal of such funding. If, on the other hand, juvenile justice is a major concern, then we should expect more of the focus to be on ensuring that younger kids, i.e. 14-16 year olds, are less likely or unable to be charged as adults for crimes, and when convicted face improved imprisonment and rehabilitative treatment conditions relative to now.

Which is the main focus according to a quote by Steinberg featured on the MacArthur foundation website?

> LS: Today, the most important issue in justice system reform concerns the extension of the Supreme Court's decisions in Roper and Miller to individuals who are older than 18. The Network's study of decision-making found that many of the attributes of juveniles that mitigate their culpability are also characteristic of individuals between 18 and 21. These findings, buttressed by brain science showing continued brain maturation into the early 20s, have prompted courts and lawmakers to ask if people in this age group should have the same protections as juveniles under the age of 18. In 2017, a Kentucky state court, drawing on the Network's work, ruled that exposing people under 21 to capital punishment violated the state's constitution. In 2018, a federal district court drew on the Network's work in ruling that the Miller decision applied to 19-year-olds. Currently, courts across the nation are hearing cases involving late adolescent and young

adult offenders, in which defense attorneys are arguing that people between 18 and 21 should also be exempt from capital punishment and mandatory life without parole.

Ah, yes, the main concern is in making sure that 20 year olds are thought of as children. The book can still be thrown at 15 year old drug dealers, but 20 year old murderers can't be allowed to be executed. Interesting.

Moving back to President Fanton, we find some remarks that further support our hypothesis. They are found on his website under "Speech on Undergaduate Education at Miss Porter's School":

These remarks were given at an October 12, 2018 event for the parents, trustees, and STEM Advisory Board of Miss Porter's School in Farmington, CT. …

I want to thank Kate Windsor for inviting me here this evening and for her recognition and active use of a recent report published by the American Academy of Arts and Sciences entitled The Future of Undergraduate Education, The Future of America. And I want to thank my wife, Cynthia Greenleaf, a proud "Ancient" and member of the STEM Advisory Board for ALSO inviting me to be here this evening. …

I greatly admire Miss Porter's for the high-quality education it provides to young women, helping them to develop into future leaders for our country and the world. Your mission to educate your students to become informed, bold, resourceful and ethical global citizens is one that our current national and global situation surely needs. …

Now a few words about the Academy's recent Commission on the Future of Undergraduate Education. The Commission was charged with examining the state of American undergraduate education, projecting the nation's short-term and long-term educational needs, and offering recommendations to strengthen all aspects of undergraduate education. …

Let me provide highlights from the Commission's three major areas of recommendation—completion, affordability, and quality. …

Today almost 90% of all high school graduates in the United States pursue higher education as young adults. They believe that higher education is the path to a brighter future for themselves and their families—and they are right. College graduates report greater job security, higher earnings, more rewarding work experiences, better health, more time with their families. And they are more active as volunteers and voters. These are all desirable outcomes for individuals, families, communities, and the nation. …

The Commission's work offers a series of recommendations to increase completion rates and make student debt more manageable. For example, we recommend that colleges with low completion rates look to places like Florida State University which uses data to identify when individual students start to fail or miss classes and proactively intervenes by providing students with extra academic support and counseling. …

> On the topic of increasing affordability, the report directs its recommendations to the federal and state governments as well as to college and university leaders. One recommendation that especially stands out to me is for the federal government to create one single and simple income-driven repayment plan in which students are automatically enrolled and loan payments are collected through the income tax system. …
>
> The report advances a broad learning agenda for college students:
>
> All college graduates—regardless of their major or the credential they will earn—need their programs of study to impart a forward-looking combination of academic knowledge and practical skills so they are prepared for both economic success and civic engagement. Today, the long-standing debate over the value of a liberal arts education versus a more applied postsecondary program presents a false choice. College educators need to adjust their program curricula and learning expectations accordingly. And students need to see the ability to work and learn with others, and to disagree and debate respectfully, as skills essential for a high quality of life and a future of economic success and effective democratic citizenship.

Under his Presidency, the American Academy of Arts and Sciences did nothing less than push the idea that undergraduate education must be expanded in such a way that everyone completes it. In other words, Fanton promotes universal higher education. Such a thing is obviously easy to implement when people believe that those under 25 are children. What are kids going to do from 18-24, child labor? No, they should obviously continue education because the brain develops until 25…

We see some ostensible explanation for the desire to expand universal education. One is simply monetary. Whether it be from banker's loans or tax dollars, more students means more money and more security for the education institutions. This will obviously appeal to selfish academics. What's more is that it should appeal to billionaire elites, if they view the education system as theirs, i.e. they feel that the education system is a valuable tool by which they influence their subjects, and that expanding it will increase that influence significantly. This is evidently the case. They have said as much for over 100 years through the likes of John Dewey and others. The upper PMC, the most capable and loyal of court-servants, is almost exclusively created and vetted by the education system. The system is, very intimately, the elites'.

The ruling class surely knows that America could easily have a 20 hours work week. Most jobs are "bullshit jobs," so we can easily

afford expanded education. While I'm not sure that this view is true, there may be the belief among the elite that college education makes people more "right-thinking" as well. At the very least, the expansion of the higher education system is a legitimacy-maintaining act. That is, it protects and facilitates the power of those who own the status quo.

One more remark regarding Fanton before we move on to see if the Johnson Foundation and the AMA have similar motivations. His wife, Cynthia Greenleaf, is a senior research scientist for WestEd, according to wested.org. WestEd's catchphrase is "Improving learning, healthy development, and equity in schools and communities." They are apparently an educational research organization devoted to expanding or universalizing education: "Success for every learner is WestEd's main goal and has been for more than 50 years." Greenleaf's research in particular focuses on youth, and not children: "for two decades she has conducted cutting-edge research in adolescent literacy and translated it into powerful teacher professional development. … Her work co-developing the Reading Apprenticeship® Instructional Framework has changed classrooms for hundreds of thousands of secondary and college students and their teachers. Three large-scale randomized controlled studies of Reading Apprenticeship have validated its effectiveness in improving students' subject area engagement, literacy, and achievement."

Private foundations are not, per the IRS, supposed to fund political causes or projects that might personally benefit the leaders of the foundation. Yet here's just another conflict of interest for the President that supervised the funding of Steinberg's teen brain meme.

Moving on to the Johnson Foundation, the relevant website reveals that their special interest is in regards to influencing health care. This may adequately explain why they chose to push the teen-brain myth via neo-prohibitionism. It could be that there's no special interests in alcohol consumption in particular, but that the Johnson Foundation is simply supposed to stay in the line of funding "health" related causes. The true goal might be to strengthen the position of academia, but the Board and leadership are inhibited from giving to educational causes directly. It might also be of slight benefit that cutting the alcohol market hurts Molson-Coors, the main American alcohol company, which happens to be owned by a Republican family somewhat outside the reach

of the main stream of power. The "Influence Watch" website states that the Johnson Foundation supported the Affordable Care Act and that their funds have accounted for 45% of giving in the area of health policy since 1995.

Of past members of the Johnson Foundation Board of Directors (listed under emeriti on the website), the following have worked for higher education institutions:

- Allan S. Bufferd – MIT Treasurer
- Thomas M. Gorrie – Duke University Board Chairman
- Jeffrey Koplan - Vice President for Global Health at Emory University
- Risa Lavizzo-Mourey - distinguished professor and administrator at the University of Pennsylvania.
- Robert E. Campbell - chairman of the Fordham University Board of Trustees from 1992 to 1998
- James Gavin III - Morehouse College School of Medicine President
- Linda Griego – Charles R. Drew University of Medicine and Science Board of Trustees Chair
- Edward Hartnett – Seton Hall University of Law Professor
- Thomas Kean – Drew University President (also on the 9/11 commission).
- Edward E. Matthews – Princeton University Trustee, manager of Princeton University's $17 billion endowment via the Princeton Investment Company
- William L. Roper – UNC Chapel Hill faculty & head of UNC Health Care
- Marla Salmon – University of Washington Professor
- Steven A. Schroeder - Distinguished Professor of Health and Health Care at the University of California, San Francisco
- Richard B. Worley – University of Pennsylvania Healthcare, Investment committee for the Wildlife Fund at Mount Holyoke College.

The following have apparently not worked for higher education institutions:

- George S. Frazza – Johnson & Johnson leader & lawyer
- Gail L. Warden - President Emeritus of Henry Ford Health System in Detroit, Mich

The following I could find no information on:

- Wendy W. Hagen
- Frank J. Hoenemeyer
- William R. Walsh Jr.

Steven A. Schroeder was president up to 2002. There isn't much on him, but in 2012 he published an article in a medical journal titled "Does The Moral Arc of the Universe Really Bend Toward Justice?" It's filled with lines like this:

> One of our two major parties, and about half our population, favor repealing the 2010 Affordable Care Act (ACA) that extends health insurance coverage to 32 million people. These opponents offer no alternative for expanding coverage.

This was in the Journal of General Internal Medicine…

At last we move on to examine who controls the AMA. It would appear it is almost entirely run by physicians, who elect officers to a legislative body, which then votes on participation in initiatives like those regarding the "teen brain." While there is likely to be a skew towards status-oriented people when examining the membership of their legislative body, the participation of the AMA is probably best explained by media exposure. They do not seem to be a driving force behind the teen-brain meme.

As for the media themselves, they certainly have the power to stop the teen brain meme. It would be in line with the current zeitgeist to finally declare "ageism" a social justice problem, and the teen brain narrative an "ageist" myth. Yet they don't. With any consistency they would. What's the issue? Clearly "ageism" is tolerated for some reason. But it doesn't seem to be enthusiastically pushed by the media apparati proper. Rather, educators are the most prominent proponents of the narrative, seeking out all the media exposure they can get. Some of the

most prominent "teen brain" links per Google are the Rochester Paste, each hosted on a university website: Harvard, Stanford, Rutgers, Rochester. A prominent Time article is just a regurgitation of Jensen's book. Likewise, the most popular book on the subject appears to be Jensen's, who of course is a researcher and chair of the neurology department at the University of Pennsylvania medical school. The first to write on the myth, Shannon Brownlee of the US News and World Report, "was formerly a visiting scientist at the Harvard T.H. Chan School of Public Health and is currently a lecturer in the Department of Policy and Management at the George Washington University School of Public Health." She is also a member of the New America think-tank, which receives a large amount of funds from the Rockefeller foundation, and has received 4 million dollars from the MacArthur foundation.

The teenage brain meme thus appears to truly be the pedagogue's myth, pushed by the academic upper PMC and tolerated by the capital-class due to the latter's fondness of the education system. It is possible that the original US News article had a more coordinated origin, but the idea most certainly caught on among the academic upper-PMC after that point. The most consistent and enthusiastic proponents of the myth are down-to-Earth enough wealth-and-status-wise that I find it highly unlikely that they coordinate their posturing via Bilderburg-esque meetings.

4.3: Conclusion

What we have seen here we may ironically call a recapitulation of events from the early 20th century. I say ironically because the events I refer to are the ideas pushed most proximally by a psychologists who believed that individual development recapitulates development of the species. For him, youth had cave-man brains until the age of 25, and therefore needed to be in school. The man I speak of was named G. Stanley Hall, psychologist, president of the APA, pedagogue, and president of Clark University. Savage (2007) describes the ideas that can be found in Hall's magnum opus, *Adolescence:*

The definitive term for the elongated hiatus between childhood and adulthood was coined by a genetic psychologist named G. Stanley Hall. During 1898, he was struggling to complete his huge compendium on the second decade of life. He had been collecting data for at least five years, and at a conference held that summer, he gave his first recorded age-related definition of what he called "adolescence". His breakthrough was to realize that, in American and Western society, the intermediate state that Rousseau had both exalted and warned of was not just biologically determined but socially constructed. "Adolescence is more than puberty," Hall declared, "extending over a period of ten years from twelve to fourteen to twenty-one or twenty-five in girls and boys, respectively, but the culmination is at fifteen or sixteen." Noting the importance of the customs that "savage nations" employed to mark this period, he bemoaned the lack of these rituals within America…

Hall proposed nothing less than the creation of a new, generally recognized stage of life that would increase dependency and delay entry into the world of work: "As civilization advances, education broadens. The school years lengthen inevitably as the community tones up its ideals." Any attempt to restrict the time spent in school or college was "an attempt to return to savage conditions, while the ideals are more highly civilized. The estimate of any educational system must be based upon its success in bringing young people through adolescence with [the] greatest perfection of development."

He endorsed the rapidly expanding high school system. He thought that the school-leaving age should be raised by two years, to sixteen, and that university undergraduates should be exempted from the exigencies of adult life: "The student must have the freedom to be lazy."

Most important, he argued for the socially sanctioned prolongation of adolescence. Noting the trend towards "longer and severer apprenticeship and specialization", he argued for "an ever lengthening probationary period".

With a strong academic impact and crossover sales, *Adolescence* accelerated the demand for the widening of educational opportunities and opened up America's eyes to this omnipresent but ill-defined state.

More than enough evidence has been presented to show that the infantilization of youth in the contemporary West is essentially motivated by the drive to expand and secure the education system. Virtually all of the enthusiastic producers and funders of the teen-brain myth are pedagogues who stand to benefit by spreading the idea that youth are too immature to be anywhere but school. Furthermore, many of the obnoxious little age-restrictions came only after compulsory or near-universal education and labor restrictions. The hypothesis is that these laws serve as propaganda, forcing youth to actually behave as children with the threat of state violence. The true aim is, ostensibly, the education

system. What is certain, at least, is that mass education renders it materially practical to infantilize youth in many instances.

Epstein (2010) gives an age-restriction timeline:

1916 – First federal law restricting labor by young people; struck down by Supreme Court in 1918
1918 – All states have compulsory education laws in place
1933- First federal law explicitly restricting alcohol consumption by young people
1936 and 1938 – First successful federal laws restricting labor by young people, establishing 16 and 18 as minimum ages for work; still in effect
1940 – Most states have laws in place restricting driving by people under 16
1968 – Supreme Court upholds states' right to prohibit sale of obscene materials to minors
1968 – Movie rating system established, prohibiting young people of various ages from attending certain movies
1980s – Many cities and states pass laws restricting teens' access to arcades and other places of amusement; Supreme Court upholds such laws in 1989
1980s – Courts uphold states' rights to prohibit sale of lottery tickets to minors
1984 – First national law effectively raising drinking age to 21; all states in compliance by 1998
1990s – Curfew laws for young people spread widely among cities and states
1992 – Federal law prohibits sale of tobacco products to minors
2000+ - New laws restricting a minor's right to get tattoos, piercings, and to enter tanning salons
2000+ - Tougher driving laws being passed by many states; full driving rights obtained gradually over a period of years
2009 – New federal law making it tougher for anyone under eighteen to get a credit card and limiting credit granted to people between eighteen and twenty-one.

Most recently, in late 2019, the federal government raised the age to buy tobacco to 21, despite the fact that a 2019 study involving people in states that had already done so found that, while such laws made it less likely for 18-20 year olds to smoke, they did not affect the rate at which 21 and 22 year olds smoked.[262]

What has been shown here is that the so-called experts are more often expert pundits. Pedagogues were caught multiple times passing off speculation as fact or referencing data that, if it exists, was never published, while citing no study or a study that only superficially relates

[262] Friedman et al. 2019

to the claims made. A look at the funding behind this activity surprisingly revealed more pedagogues, some of whom which have openly stated that making 18-22 a universal time of education is a priority of theirs. It is therefore safe to conclude that the teen-brain myth is a thoroughly unscientific political narrative in service of the expansion of academia.

V

Applications

I have thus far avoided injecting normative statements into what is intended to be a book of facts. Now that the argument is complete, I would like to take the time to go into more detail on my ethical philosophy and what I have hinted at, that the education system should be scaled back. In addition, there is a quick and elegant argument that this book enables on parenting that I would like to include.

The health of humanity as a whole is of upmost importance to me. Health is ultimately material; the proliferation of spiritual ideas can be very important with regards to health, but at this point in time I don't believe that any religious revelations are literally true. It may be beneficial for some to believe so, but intellectually speaking, morality is about life, and life is a collective phenomenon. Over long periods of time, social species live and die as whole populations. Life as a whole collectively lives or eventually collectively dies. Humans who fail to realize this, and make moral decisions opposed to this ethic of life, are suicidal, and over a long period of time, suicidal groups perish and are outcompeted by less suicidal groups.

Is the education system as it is now more suicidal than a shorter alternative? The facts discussed here indicate that higher education is, for most students, an enormous waste of resources that could otherwise go to improving life in many other areas. As just one suggestion, imagine if, by cutting education, job allocation essentially did not change (because we would simply be making education shorter for those who don't need

much of it), and no STEM professors were fired. Instead, they continue to be paid the same amount and teach less, due to having less students. This would mean countless more collective hours would go towards research, and far less would go towards teaching future office workers chemistry-for-non-majors. Hypothetically, the same amount of money would go into STEM academia, yet it would be much more productive research-wise than it is now. Alternatively or in tandem, the money could go towards public works, reducing the work-week as to give people more time to productively self-actualize, or countless other things which would be beneficial to the nation as a whole. We could have all this for no cost, according to the facts presented in this book. All we have to do is reallocate hundreds of billions of dollars per year of wasteful spending.

To recount why this is the case: we have revealed here that people as young as 14 are "mature" enough to enter the adult labor market; the idea of the teen brain is an unscientific narrative perpetuated by pedagogues bent on expanding their institutions evermore, without any regards for the higher good. Since extra school fails to increase intelligence, people who would go onto perform jobs that require no higher knowledge could begin in their mid-teens. Most people work jobs like I just described; 80% of Americans don't even use Algebra I on the job. And any 14 year old can learn how to use a spreadsheet via an internship/apprenticeship. Furthermore, 73% of college graduates don't work a job related to their major. This means they are simply working white collar jobs that use college to filter for slightly more intelligent or conscientious workers. The important thing to note is that the education did not teach these workers any job-relevant information. It was only, as Caplan (2018) explains in his wonderful book, extremely costly signaling. For the hedonists out there, I should mention that Caplan also cites survey data showing that people report being happier at work than at school. Media manipulation controlled for, cutting back education would actually be extremely popular among those who don't have a stake in the education system.

One potential issue in this hypothetical that some may notice is with regards to job allocation. The solution to this is simple: just use the SAT, ASVAB, or even an IQ test. Already, the SAT correlates more with college GPA than high school GPA does. This renders the signaling

aspect of high school worthless when you realize that 8th graders can simply take the SAT. And if the signaling is unimportant, and if high school is a mix of useless classes and classes that will be partially or totally repeated in college, then high school might as well be gotten rid of.

The system would be just like that of today, but shorter. 7th and 8th graders would be told that their grades matter and their test scores matter and that they should do their best. Their rankings will largely control whether or not they do something more or less prestigious, just like with 11th and 12th graders today. The top 20% would, ideally, receive scholarships for higher study. They would then go off to university and achieve the relevant qualifications roughly 4 years earlier than do people today. The rest would be encouraged to go into the job market and would be hired according to their aptitudes.

If it sounds like this is too totalistic, think again. This is exactly what goes on today except it takes way too long. I furthermore advocate for a shortening of the work week, meaning anybody who feels like they got screwed would be free to demonstrate at any point in their free time that they're more intelligent than their 8th grade scores showed, and at that point they would be welcomed into higher education with a scholarship. Each person would also get at least 3 attempts in the 8th grade to take whatever test is given; preparation would be encouraged and provided to all, because it loads the test with a conscientiousness factor.

Based on what we know about psychometrics, it would be very rare for a person to feel like they were cheated. According to surveys, almost everyone who does not excel at school despises it. They are happier at work than they are in college. Furthermore, to prevent surprises, I advocate for an SAT-like test to be given every year or two to those in 1st through 7th grade. This way, since aptitude is largely stable, people will know their proclivities early on and will grow comfortable with themselves as they progress through their education. At the same time, intellectuals should not be overpaid as to create jealously among both those who are not predisposed to such posts, and those who would not even enjoy them, but who simply want money. The money-obsessed can try their hand in the business world. This is roughly as it is today; many professors and researchers hardly make more money than

corporate white collar jobs, which would under my system require no formal education beyond 8th grade.

What of other age restrictions? First let me address parenting. Most parents today are hypocrites when it comes to youth-aged offspring. As we have seen, from the cessation of puberty to the onset of significant signs of aging around 25, teens and twenty-somethings score essentially the same on metrics of maturity. It is therefore unacceptable to enforce rules on a physically mature 16 year old that would not be enforced on the same person at 21 under the same material conditions (living in the home), given that relevant experience is controlled for. Relevant experience is generally thought to be controlled for in reality, since people have to learn from their mistakes if they aren't innately opposed to making such mistakes. Consider a curfew, for instance. Based on measures of innate maturity, a 16 year old is no more likely to do something wrong than the same 21 year old, such that the 16 year old should be required to be back at the parent's house by some early time, but not the 21 year old. Some might reject this based on presumed experienced levels, saying the 21 year old should be more experienced with avoiding the dangers of the night, and will therefore exercise better judgment. This is only true if the 21 year old has experienced those dangers first hand in the past. By enforcing a curfew on a 16 year old, experiential maturity is being delayed. When the first experiences with certain dangers come, if they come ever (since some are more or less innately averse to pressures like drug usage), the inexperienced youth, whether he be 16 or 21, will react essentially as maturely at either age. To argue otherwise would be to say that the 16 year old has a less developed brain, which we know to be an untrue myth propagated by pedagogues for material benefit.

This was assuming a hypothetical same person. But there is an even more inflammatory appeal to consistency to be made involving two people who are different in one important way: sex. We have noticed throughout this book that pubescent boys, 12-14, appear to score similarly to grown women on many metrics of maturity. For instance, the impulse-measuring crash avoidance study from Steinberg in Chapter 3 showed that mid-pubescent boys performed as well as post-pubertal women. Multiple studies cited in Chapter 4 showed that 11 or 12 year

old boys show equal judgment to adult women on the Iowa Gambling Task, a test which involves hot decision making and learning from mistakes. There is more. On a measure of selective attention and impulsivity called the Simon task, adult women perform at the same level as 13 or 14 year old boys relative to adult men[263]. Women impulse buy much more than men according to self-report[264], and match the self-reports of 14 year old boys on the same scale[265]. Peer-pressure: While they don't report more dependence on material goods for happiness relative to men, women do report being more invested in vanity than men at d = .3 and in being more impacted by advertisements and friend's consumption expectation at d = .4[266]. Women similarly report being more self conscious at d = .3. Pubescent boys are similarly reported to be elevated in relation to men on scales of self consciousness and influenceability[267]. A meta-analysis found women conform to peer-pressure more than men at d = .3[268]. The data on conformity and age is not as nice as it could be, but in light of what has already been found it essentially replicates by elevated conformity scores of pubertal boys. In one study, 20 year old women conformed as much as 15 year old boys.[269] Another study found elevations in conformity for males around 13-15 and reported that "girls have less behavioral independence from parents than boys."[270] Mental fragility: 70 year old women (the *least likely* age group of women to have PTSD) are as likely to have PTSD as 13 year old boys, the latter being far more likely to be the victim of serious violent crime.[271]

Grown women, then, are about as vulnerable to peer pressure as 13 year old boys, much more susceptible to mental traumatization per violent incident, and display similar levels of judgment ability, especially

---

[263] Stoet 2017 ; Merritt et al. 2005 ; Couperus 2011
[264] Segal & Podoshen 2012
[265] Lin & Chen 2012
[266] Keech et al 2019
[267] Lin & Chen 2012 ; Pechmann et al 2005 ; Chaplin & John 2017
[268] Hyde 1990
[269] Costanzo & Shaw 1966
[270] Berndt 1979
[271] Ditlevsen & Elklit 2010 ; Perkins 1997

with regards to emotionality and impulsivity. It follows, then, that a males can be considered to be minimally mature during puberty. Consider the following thought:

> Based on measures of innate maturity, the average 13 year old male is no more likely to do something wrong than the average 21 year old woman, such that the 13 year old male should be required to be back at the parent's house by some early time, but not the 21 year old woman. Some might reject this based on presumed experienced levels, saying the 21 year old woman should be more experienced with avoiding the dangers of the night, and will therefore exercise better judgment. This is only true if the 21 year old woman has experienced those dangers first hand in the past. By enforcing a curfew on a 13 year old male, experiential maturity is being delayed. When the first experiences with certain dangers come, if they come ever (since some are more or less innately averse to pressures like drug usage), the inexperienced youth, whether he be 13 or she be 21, will react essentially as maturely at either age. To argue otherwise would be to say that the 13 year old male has a less innate maturity, which we know to be an untrue myth propagated by [???] for material benefit.

I will say that this version is a bit more of a stretch, perhaps due to socialization and collective experience or innate maturity of the relevant social groups as they are likely to be constituted at this point in time, particularly in regards to the curfew example. But then it would follow that a parent should vet their 21 year old daughter's friends, like they would their 13 year old's… this is a bizarre and sexist conclusion. The point is that perhaps parents should be more consistent with the data, and that claims of immaturity are misleading, even for those who have another year or two of development. As history shows, very young people, even those who still have a lot of growth ahead of them, can handle many important tasks.

What of age restrictions, then? What rights should parents have of offspring of what ages? I propose something fringe, radical, maniacal, something that is pure lunacy: ultimately I think it is possible to develop an empirically guided family code. Let Parentology be founded as a field of empirical inquiry, where specific outcomes are recorded with regards to what the "law" should be at various ages. The current science on parenting is as of yet so dim and should certainly become brighter as to enrich the families of the world with true knowledge.

I have already implicitly argued that there should be no restrictions on working starting around the age of 14. This means that school should not be compulsory beyond that age either. And for material reasons, the driving age would have to be lowered. Of the other age restriction, most are annoyances that hardly matter either way, save for maybe two: restrictions regarding reproductive behavior and those regarding rights of the parents over their child.

On the former, or restrictions regarding reproductive behavior. There are currently two such types of restrictions extent in the US to my knowledge: laws regulating the age at which someone may be legally married, and laws penalize not youth but the older party in the event that sexual intercourse occurs between two such people, where the youth generally has to be under 16 or 18 years of age. These laws are important in preventing large age and experience gaps in sexual relationships. They serve another function as well: modulating when it is acceptable for youth to marry.

When, then, should youth be allowed and encouraged to marry? It would be materially beneficial as a whole for young people who can easily afford it to marry younger such that they can have more children, increasing the proportion of children not born into poverty, in turn making poverty more rare. On the other hand, it would be more beneficial for them if those who struggle financially were to marry and have children later as to avoid too much stress on their own finances. This results in a natural redistribution of wealth; It was this marriage pattern in Western Europe that led to the explosion of wealth in Britain, after centuries of the upper classes having more children the lower classes. Under the educational system I have proposed, the more highly trained youth would begin to work somewhere between 18-22. It follows that reproductive laws should want to encourage marriage to be in the early-to-mid-twenties. Criminalizing sexual intercourse under the most socially desirable age for having children works to facilitate waiting, minimizing collective harms from unwanted pregnancy.

As for the rights of parents over their children: it would be wonderful if "parentology" could inform us more succinctly here. Rights and duties of parents to their offspring could progressively change. This book suggests that it would probably be beneficial to give a certain

amount of liberty starting around the age of 13 or 14. By 15 or 16 egregious coercions should be a thing of the past; for instance, parents controlling medical decisions of their older sons or daughters comes to mind.

Lastly, it would be most consistent and in line with the Enlightenment to totally repeal all the largely inconsequential annoyance-restrictions, where they are legal for older individuals: smoking, drinking, tattoos, R rated movies, etc. If these things are really so bad, a full prohibition should be considered. Otherwise for children it should be the parents' responsibility to keep those who are too young for these things away from them. The age restriction is a crutch that is used to prevent the addressing of real problems. It is as wasteful as the war on drugs and as hypocritical as a gay Baptist pastor to prosecute someone for selling something to someone who is underage and it is especially ridiculous to lock up people whose only crime is by construction being "immature" – that is, the idea that a 19 year old should be taken to jail and given a permanent record for possessing alcohol is crazy when it's only illegal to possess alcohol for that person because they are construed to be at too immature of an age to handle alcohol. Either prohibit it for everyone, discourage it for everyone, or make it the duty of the parents to keep the immature away from things that supposedly require maturity. Perhaps "parentology" could determine precisely at what ages parents should be forbidding their child alcohol, for instance. Based on the evidence collected here, I predict that the ideal ruleset would be something like the UK alcohol law, but two or three years lower. In the UK, the age to drink beer or wine is 16 with the consent of parents, and 18 otherwise. So the ideal rule would probably be 13 or 14 to drink beer or wine with parental consent, 15 or 16 otherwise. Indeed, the full drinking age in Italy is 16, and even that's rarely enforced, and they suffer no problems from it. This, alongside the developmental data, hints that it's a waste for parents to fight with their 16+ year old over drinking responsible levels of alcohol, and that it is especially wasteful for the government to arrest 16-20 year olds for drinking.

To conclude, I hope you have enjoyed this book. I have worked on this project since the age of 17, but in reality it's been coming together for far longer. From an early age I realized something was wrong with

the education system, and something was wrong with the way older people treat youth in general. If you enjoyed this book, I suspect you have experienced this first-hand as well. Regardless, I want to thank you for keeping an open mind to enough of an extent that you got this far. If you want to give me any feedback, I would be more than happy to read it. You can email me at josephbronski7@protonmail.com .

References

ACF. (2008). National Survey of Child Adolescent and Well-Being. Administration for Children and Families. Retrieved from https://www.acf.hhs.gov/sites/default/files/opre/inhibitory_control.pdf

Abel, J. & Deitz, R. (2013) Do Big Cities Help College Graduates Find Better Jobs? Liberty Street Economics. https://libertystreeteconomics.newyorkfed.org/2013/05/do-big-cities-help-college-graduates-find-better-jobs.html

Amundsen, D. W., & Diers, C. J. (1969). The age of menarche in classical Greece and Rome. Human Biology, 125-132.

Asato, M. R., Terwilliger, R., Woo, J., & Luna, B. S. (2010). White matter development in adolescence: a DTI study. Cerebral cortex, 20(9), 2122-2131. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2923214/

Bailey, D., Duncan, G., Odgers, C. & Yu, W. "Persistence and Fadeout in the Impacts of Child and Adolescent Interventions" HHS Public Access. (2018). February 20, 2020. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5779101/

Baird AA, Gruber SA, Fein DA, et al. (1998). Functional magnetic resonance imaging of facial affect recognition in children and adolescents. Journal of the American Academy of Child and Adolescent Psychiatry, 1999; 38(2): 195-9.

Baird, A. A., Gruber, S. A., Cohen, B. M., Renshaw, P. F., Steingard, R. J., & Yurgelun-Todd, D. A. (1998). Development of Affect Recognition: An fMRI Study. NeuroImage, 7(4), S906.

Baker, D., Eslinger, P., Benavides, M., Peters, E., Dieckmann, N., & Leon, J. "The cognitive impact of the education revolution: A possible cause of the Flynn Effect on population IQ." Intelligence 49 (2015): 144-158. 14 February 2020, https://www.sciencedirect.com/science/article/pii/S0160289615000082.

Balsa, A. I., Giuliano, L. M., & French, M. T. (2011). The effects of alcohol use on academic achievement in high school. Economics of education review, 30(1), 1-15.

Bartels, V. (2000). The History of South Carolina Schools. https://www.carolana.com/SC/Education/History_of_South_Carolina_Schools_Virginia_B_Bartels.pdf

Bartzokis, G., Beckson, M., Lu, P. H., Nuechterlein, K. H., Edwards, N., & Mintz, J. (2001). Age-related changes in frontal and temporal lobe volumes in men: a magnetic resonance imaging study. Archives of general psychiatry, 58(5), 461-465. https://www.ncbi.nlm.nih.gov/pubmed/11343525

Bava, S., & Tapert, S. F. (2010). Adolescent brain development and the risk for alcohol and other drug problems. Neuropsychology review, 20(4), 398-413.

Benes, F. M. (1989). Myelination of cortical-hippocampal relays during late adolescence. Schizophrenia bulletin, 15(4), 585-593.

Benes, F. M. (1994). Myelination of a Key Relay Zone in the Hippocampal Formation Occurs in the Human Brain During Childhood, Adolescence, and Adulthood. Archives of General Psychiatry, 51(6), 477. doi:10.1001/archpsyc.1994.03950060041004

Beresford, T. P., Arciniegas, D. B., Alfers, J., Clapp, L., Martin, B., Du, Y., ... & Davatzikos, C. (2006). Hippocampus volume loss due to chronic heavy drinking. Alcoholism: Clinical and Experimental Research, 30(11), 1866-1870.

Bishara, S. E., Peterson, L. C., & Bishara, E. C. (1984). Changes in facial dimensions and relationships between the ages of 5 and 25 years. American journal of orthodontics, 85(3), 238-252.

Björk, A. (1963). Variations in the growth pattern of the human mandible: longitudinal radiographic study by the implant method. Journal of dental Research, 42(1), 400-411.

Blackstone, W. (1765) Commentaries on the Laws of England.

Blumenfeld, S. (1984) NEA: The Trojan Horse in American Education http://blumenfeld.campconstitution.net/Books/NEA-Trojan%20Horse%20In%20American%20Education.pdf

Bouchard, Thomas J. "The Wilson effect: the increase in heritability of IQ with age." Twin Research and Human Genetics 16.5 (2013): 923-930. https://www.cambridge.org/core/journals/twin-research-and-human-genetics/article/wilson-effect-the-increase-in-heritability-of-iq-with-age/FF406CC4CF286D78AF72C9E7EF9B5E3F

Bowman, C., Cutmore, T., & Shum, D. (2015). The development of prospective memory across adolescence: an event-related potential analysis. Frontiers in human neuroscience, 9, 362.

Brown, S. A., Tapert, S. F., Granholm, E., & Delis, D. C. (2000). Neurocognitive functioning of adolescents: Effects of protracted alcohol use. Alcoholism: clinical and experimental research, 24(2), 164-171.

Bruckert, L., Shpanskaya, K., McKenna, E. S., Borchers, L. R., Yablonski, M., Blecher, T., ... & Yeom, K. W. (2019). Age-dependent white matter characteristics of the cerebellar peduncles from infancy through adolescence. The Cerebellum, 18(3), 372-387.

Burnett, S., Bault, N., Coricelli, G., & Blakemore, S. J. (2010). Adolescents' heightened risk-seeking in a probabilistic gambling task. Cognitive development, 25(2), 183-196.

Caplan. B. (2018). The Case against Education. Princeton.

Casey, B. J., & Caudle, K. (2013). The teenage brain: Self control. Current directions in psychological science, 22(2), 82-87. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4182916/

Casey, B. J., Trainor, R. J., Orendi, J. L., Schubert, A. B., Nystrom, L. E., Giedd, J. N., … Rapoport, J. L. (1997). A Developmental Functional MRI Study of Prefrontal Activation during Performance of a Go-No-Go Task. Journal of Cognitive Neuroscience, 9(6), 835–847. doi:10.1162/jocn.1997.9.6.835

Cauffman, E., & Steinberg, L. (2000). (Im) maturity of judgment in adolescence: Why adolescents may be less culpable than adults. Behavioral sciences & the law, 18(6), 741-760.

Cauffman, E., Shulman, E. P., Steinberg, L., Claus, E., Banich, M. T., Graham, S., & Woolard, J. (2010). Age differences in affective decision making as indexed by performance on the Iowa Gambling Task. Developmental psychology, 46(1), 193.

Chaplin, L. N., & John, D. R. (2007). Growing up in a material world: Age differences in materialism in children and adolescents. Journal of consumer research, 34(4), 480-493.http://assets.csom.umn.edu/assets/93681.pdf

Charles Astor Bristed – A Letter to the Hon. Horace Mann. https://books.google.com/books?id=ry4LBgw61TUC&pg=PA12&lpg=PA12&dq=stephen+girard+horace+mann&source=bl&ots=Nd8hB9pKS-&sig=ACfU3U1I1lrytc32GvZfwnpE5wFlEV5GMA&hl=en&sa=X&ved=2ahUKEwiftY7fjMrjAhUBQ6wKHcvoBCsQ6AEwF3oECAsQAQ#v=onepage&q=unitarian&f=false

Chi, J. G., Dooling, E. C., & Gilles, F. H. (1977). Gyral development of the human brain. Annals of Neurology: Official Journal of the American Neurological Association and the Child Neurology Society, 1(1), 86-93.

Christ, S. E., White, D. A., Mandernach, T., & Keys, B. A. (2001). Inhibitory Control Across the Life Span. Developmental Neuropsychology, 20(3), 653–669. doi:10.1207/s15326942dn2003_7

Christakou, A., Brammer, M., & Rubia, K. (2011). Maturation of limbic corticostriatal activation and connectivity associated with developmental changes in temporal discounting. NeuroImage, 54(2), 1344–1354. doi:10.1016/j.neuroimage.2010.08.067

Cochran, Thomas E. (1921). History of Public School Education in Florida. Retrieved from https://archive.org/details/historyofpublics01coch/page/26

Cockcroft, K. (2015). The role of working memory in childhood education: Five questions and answers. South African Journal of Childhood Education, 5(1), 01-20. http://www.scielo.org.za/pdf/sajce/v5n1/03.pdf

Collinge, A. (2009). The student loan scam: The most oppressive debt in US history, and how we can fight back. Beacon Press.

Couperus, J. (2011, June). Perceptual Load Influences Selective Attention Across Development. Developmental Psychology. Retrieved from https://www.researchgate.net/publication/51234267_Perceptual_Load_Influences_Selective_Attention_Across_Development

Curry, A. E., Pfeiffer, M. R., Durbin, D. R., & Elliott, M. R. (2015). Young driver crash rates by licensing age, driving experience, and license phase. Accident Analysis & Prevention, 80, 243–250. doi:10.1016/j.aap.2015.04.019

Davidow, J. Y., Foerde, K., Galván, A., & Shohamy, D. (2016). An upside to reward sensitivity: the hippocampus supports enhanced reinforcement learning in adolescence. Neuron, 92(1), 93-99.

De Bellis, M. D., Clark, D. B., Beers, S. R., Soloff, P. H., Boring, A. M., Hall, J., ... & Keshavan, M. S. (2000). Hippocampal volume in adolescent-onset alcohol use disorders. American Journal of Psychiatry, 157(5), 737-744.

Deffenbaugh, W. & Keesecker, W. (1935). COMPULSORY SCHOOL ATTENDANCE LAWS AND THEIR ADMINISTRATION https://files.eric.ed.gov/fulltext/ED542358.pdf

Defranco, C., Tarbox, A. R., & McLaughlin, E. J. (1985). Cognitive deficits as a function of years of alcohol abuse. The American journal of drug and alcohol abuse, 11(3-4), 279-293.

DiLorenzo, T. (2000) Origins of American Vote Fraud. https://mises.org/library/origins-american-vote-fraud

Diamond, A. (2013). Executive functions. Annual review of psychology, 64, 135-168. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4084861/

Ditlevsen, D. N., & Elklit, A. (2010). The combined effect of gender and age on post traumatic stress disorder: do men and women show differences in the lifespan distribution of the disorder?. Annals of general psychiatry, 9(1), 32. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2917414/

Dumontheil, I., Apperly, I. A., & Blakemore, S. J. (2010). Online usage of theory of mind continues to develop in late adolescence. Developmental science, 13(2), 331-338.

Eklund, A., Nichols, T. E., & Knutsson, H. (2016). Cluster failure: Why fMRI inferences for spatial extent have inflated false-positive rates. Proceedings of the national academy of sciences, 113(28), 7900-7905.

Elbaum, B. (1989). Why Apprenticeship Persisted in Britain but Not in the United States. The Journal of Economic History, vol 49 no. 2, The Tasks of Economic History. Cambridge University Press.

Epstein, R. (2010). Teen 2.0: Saving our children and families from the torment of adolescence. Linden Publishing.

Fitch, C. & Ruggles, S. (2000). Historical Trends in Marriage Formation, United States 1850 – 1990. Department of History, University of Minnesota.

Forbes, E. E., & Dahl, R. E. (2010). Pubertal development and behavior: hormonal activation of social and motivational tendencies. Brain and cognition, 72(1), 66-72. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3955709/

Friedman, A. S., Buckell, J., & Sindelar, J. L. (2019). Tobacco-21 laws and young adult smoking: quasi-experimental evidence. Addiction. doi:10.1111/add.14653

Gardner, M., & Steinberg, L. (2005). Peer Influence on Risk Taking, Risk Preference, and Risky Decision Making in Adolescence and Adulthood: An Experimental Study. Developmental Psychology, 41(4), 625–635. doi:10.1037/0012-1649.41.4.625

Gates, F. T. (1916). The Country School of To-morrow (No. 1). General education board.

Gatto, John T. (2000). The Underground History of American Education. Retrieved from https://cdn.greathomeschoolconventions.com/free/Underground-History-of-America-Education.pdf

Giedd, J. N., Blumenthal, J., Jeffries, N. O., Castellanos, F. X., Liu, H., Zijdenbos, A., ... & Rapoport, J. L. (1999). Brain development during childhood and adolescence: a longitudinal MRI study. Nature neuroscience, 2(10), 861-863.

Giedd, J., Gogtay, N., Lusk, L., Hayashi, K. M., Greenstein, D., Vaituzis, A. C., ... & Rapoport, J. L. (2004). Dynamic mapping of human cortical development during childhood through early adulthood. Proceedings of the National Academy of Sciences, 101(21), 8174-8179.

Gillis, J. (1974) Youth and History: Tradition and Change in European Age Relations 1770-Present. Academic Press.

Goldberg, P. & Riddy, F. (2004) Youth in the Middle Ages. York Medieval Press.

Goodson, S. (2017). A History of Central Banking. Black House Publishing.

Goodwin, D. K. (1991). Lyndon Johnson and the American Dream: The Most Revealing Portrait of a President and Presidential Power Ever Written. Macmillan.

Hacker, A. (2016) The Math Myth.

Hajnal, J. (1965). European Marriage Patterns in Perspective. Population in History, Essays in Historical Demography.

Handel, M. J. (2016). What do people do at work?. Journal for Labour Market Research, 49(2), 177-197. See https://www.theatlantic.com/business/archive/2013/04/heres-how-little-math-americans-actually-use-at-work/275260/

Hare, T. A., Tottenham, N., Galvan, A., Voss, H. U., Glover, G. H., & Casey, B. J. (2008). Biological substrates of emotional reactivity and regulation in adolescence during an emotional go-nogo task. Biological psychiatry, 63(10), 927-934. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2664095/

Hartshorne, J. K., & Germine, L. T. (2015). When does cognitive functioning peak? The asynchronous rise and fall of different cognitive abilities across the life span. Psychological science, 26(4), 433-443. https://d2dg4e62b1gc8m.cloudfront.net/pub_pdfs/HartshorneGermine2015.pdf

Herman-Giddens, M. et al. (2012). Secondary Sexual Characteristics in Boys: Data from the Pediatric Research in Office Settings Network. PEDIATRICS vol 130, num 5.

Hine, T. (1999). The Rise and Fall of the American Teenager. HarperCollins.

Hirsch, M., Lunenfeld, B., Modan, M., Ovadia, J., & Shemesh, J. (1985). Spermarche—the age of onset of sperm emission. Journal of Adolescent Health Care, 6(1), 35-39.

Hopkins, M. K. (1965). The Age of Roman Girls at Marriage. Population Studies, 18(3), 309. doi:10.2307/2173291

Huttenlocher, P. R. (1979). Synaptic density in human frontal cortex-developmental changes and effects of aging. Brain Res, 163(2), 195-205.

Hyde, J. S. (1990). Meta-analysis and the psychology of gender differences. Signs: Journal of women in culture and society, 16(1), 55-73. https://www.jstor.org/stable/3174607?seq=1#page_scan_tab_contents

Jeffrey, J. (1978). Education for children of the poor: A study of the origins and implementation of the Elementary and Secondary Education Act of 1965. Columbus: Ohio State University Press.

Jensen, Arthur Robert. The g factor: The science of mental ability. Vol. 648. Westport, CT: Praeger, 1998.

Jiang, H., Lu, N., Chen, K., Yao, L., Li, K., Zhang, J., & Guo, X. (2020). Predicting brain age of healthy adults based on structural MRI parcellation using convolutional neural networks. Frontiers in neurology, 10, 1346.

Johnson, S. B., Blum, R. W., & Giedd, J. N. (2009). Adolescent maturity and the brain: the promise and pitfalls of neuroscience research in adolescent health policy. Journal of Adolescent Health, 45(3), 216-221. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2892678/

Julienne, M., & Tarter, B. (2019). Establishment of the Public School System in Virginia. https://www.encyclopediavirginia.org/Public_School_System_in_Virginia_Establishment_of_the#start_entry

K.I. Bolla, D.A. Eldreth, J.A. Matochik, J.L. Cadet, Sex-related Differences in a Gambling Task and Its Neurological Correlates, Cerebral Cortex, Volume 14, Issue 11, November 2004, Pages 1226–1232, https://doi.org/10.1093/cercor/bhh083

Kane, H & Thomas D. Oakland (2000) "Secular Declines in Spearman's g: Some Evidence from the United States", The Journal of Genetic Psychology, 161:3, 337-345, DOI: 10.1080/00221320009596716

Katz, M. (1975). A History of Compulsory Education Laws. https://files.eric.ed.gov/fulltext/ED119389.pdf

Keech, J., Papakroni, J., & Podoshen, J. S. (2019). Gender and differences in materialism, power, risk aversion, self-consciousness, and social comparison. Journal of International Consumer Marketing, 1–11. doi:10.1080/08961530.2019.1647125 https://www.tandfonline.com/doi/abs/10.1080/08961530.2019.1647125?journalCode=wicm20

Kelsey, T. W., Li, L. Q., Mitchell, R. T., Whelan, A., Anderson, R. A., & Wallace, W. H. B. (2014). A validated age-related normative model for male total testosterone shows increasing variance but no decline after age 40 years. PloS one, 9(10), e109346.

Kleijwegt, M. (1991) Ancient Youth. J.C. Gieben, Publisher, Amsterdam.

Klenberg, L., Korkman, M., & Lahti-Nuuttila, P. (2001). Differential development of attention and executive functions in 3-to 12-year-old Finnish children. Developmental neuropsychology, 20(1), 407-428.

Kremer, W. (2014). What medieval Europe did with its teenagers. https://www.bbc.com/news/magazine-26289459

Ladouceur, C. D., Peper, J. S., Crone, E. A., & Dahl, R. E. (2012). White matter development in adolescence: the influence of puberty and implications for affective

disorders. Developmental cognitive neuroscience, 2(1), 36-54. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3256931/

Lambe, E. K., Krimer, L. S., & Goldman-Rakic, P. S. (2000). Differential postnatal development of catecholamine and serotonin inputs to identified neurons in prefrontal cortex of rhesus monkey. Journal of Neuroscience, 20(23), 8780-8787.

Lewis, M., Shapland, F., & Watts, R. (2015). On the threshold of adulthood: A new approach for the use of maturation indicators to assess puberty in adolescents from medieval England. American Journal of Human Biology, 28(1), 48–56. doi:10.1002/ajhb.22761

Lidow, M. S., Goldman-Rakic, P. S., & Rakic, P. (1991). Synchronized overproduction of neurotransmitter receptors in diverse regions of the primate cerebral cortex. Proceedings of the National Academy of Sciences, 88(22), 10218-10221.

Lin, Y.-H., & Chen, C.-Y. (2012). Adolescents' Impulse Buying: Susceptibility to Interpersonal Influence and Fear of Negative Evaluation. Social Behavior and Personality: An International Journal, 40(3), 353–358. doi:10.2224/sbp.2012.40.3.353 https://www.ingentaconnect.com/content/sbp/sbp/2012/00000040/00000003/art00001;jsessionid=49dldks9g37e.x-ic-live-03

Loto, O. M., Ezechi, O. C., Kalu, B. K. E., Loto, A. B., Ezechi, L. O., & Ogunniyi, S. O. (2004). Poor obstetric performance of teenagers: is it age-or quality of care-related?. Journal of obstetrics and Gynaecology, 24(4), 395-398.

Lucas, C. J. (2016). American higher education: A history. Springer.

Luciana, M., & Nelson, C. A. (1998). The functional emergence of prefrontally-guided working memory systems in four-to eight-year-old children. Neuropsychologia, 36(3), 273-293.

Luciana, M., Conklin, H. M., Hooper, C. J., & Yarger, R. S. (2005). The development of nonverbal working memory and executive control processes in adolescents. Child development, 76(3), 697-712.

Luna, B., Garver, K. E., Urban, T. A., Lazar, N. A., & Sweeney, J. A. (2004). Maturation of cognitive processes from late childhood to adulthood. Child development, 75(5), 1357-1372. https://www.ncbi.nlm.nih.gov/pubmed/15369519

Makinson, C. (1985). The health consequences of teenage fertility. Family Planning Perspectives, 132-139.

Mann, Horace. (1991) The case for public schools. The Free Library (January, 1), https://www.thefreelibrary.com/The case for public schools.-a016706078

Mann, L., Harmoni, R., & Power, C. (1989). Adolescent decision-making: The development of competence. Journal of adolescence, 12(3), 265-278. https://www.sciencedirect.com/science/article/pii/0140197189900778

Marshall, W. A., & Tanner, J. M. (1969). Variations in pattern of pubertal changes in girls. Archives of disease in childhood, 44(235), 291.

Marshall, W. A., & Tanner, J. M. (1970). Variations in the pattern of pubertal changes in boys. Archives of disease in childhood, 45(239), 13-23.

McKern, T. & Stewart, T. (1957). Skeletal Age Changes in Young American Males. Technical Report EP-45, US Army. https://apps.dtic.mil/dtic/tr/fulltext/u2/147240.pdf

Merritt, P., Hirshman, E., Wharton, W., Devlin, J., Stangl, B., Bennett, S., & Hawkins, L. (2005). Gender differences in selective attention: Evidence from a spatial orienting task. Journal of Vision, 5(8), 1000-1000. https://jov.arvojournals.org/article.aspx?articleid=2131748

Mondale, S. (2001) School: The Story of American Public Education https://archive.org/details/school00sara/page/24

Morell, P. & Quarles, R. (1999). Basic Neurochemistry: Molecular, Cellular and Medical Aspects. 6th edition. https://www.ncbi.nlm.nih.gov/books/NBK27954/

Nasrullah, M., Oraka, E., Chavez, P. R., Johnson, C. H., & DiNenno, E. (2017). Factors associated with condom use among sexually active US adults, national survey of family growth, 2006–2010 and 2011–2013. The journal of sexual medicine, 14(4), 541-550. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5477642/

Natterson-Horowitz, B., & Bowers, K. (2020). Wildhood: The Astounding Connections between Human and Animal Adolescents. Scribner.

Nijenhuis, J. & van der Flier, H. “Is the Flynn effect on g?: A meta-analysis.” Intelligence 41 (2013): 802-807. 14 February 2020, https://www.sciencedirect.com/science/article/pii/S0160289613000226

Noble, R. (1946) On Edward C. Stokes - https://web.archive.org/web/20060312034912/http://www.njstatelib.org/NJ_Information/Digital_Collections/Governors_of_New_Jersey/GSTOK.pdf

Noipayak, Pongsak, et al. "Age at menarche and performance intelligence quotients of adolescents in Bangkok, Thailand: a cross-sectional study." BMC pediatrics 16.1 (2016): 87.https://bmcpediatr.biomedcentral.com/articles/10.1186/s12887-016-0624-8

Nugent, W. (2009) Progressivism: A Very Short Introduction - https://books.google.com/books?id=jP5oAgAAQBAJ&pg=PA68&lpg=PA68&dq=Charles+B.+Aycock+rockefeller&source=bl&ots=uFPJJ3st8u&sig=ACfU3U3YvCz

a8A8nSgOveJOQ2LDpC9UE8A&hl=en&sa=X&ved=2ahUKEwjTkNrQ6YDkAhWBZs0KHQLQBZIQ6AEwEnoECAgQAQ#v=onepage&q=Charles%20B.%20Aycock%20rockefeller&f=false

O'Rourke, M., Gasperini, R., & Young, K. M. (2014). Adult myelination: wrapping up neuronal plasticity. Neural Regeneration Research, 9(13), 1261.

Palminteri, S., Kilford, E. J., Coricelli, G., & Blakemore, S. J. (2016). The computational development of reinforcement learning during adolescence. PLoS computational biology, 12(6), e1004953.

Papadimitriou, A. (2016). The Evolution of the Age at Menarche from Prehistorical to Modern Times. Journal of Pediatric and Adolescent Gynecology, 29(6), 527–530. doi:10.1016/j.jpag.2015.12.002

Parker, J., Mitchell, A., Kalpakidou, A., Walshe, M., Jung, H. Y., Nosarti, C., ... & Allin, M. (2008). Cerebellar growth and behavioural & neuropsychological outcome in preterm adolescents. Brain, 131(5), 1344-1351.

Pechmann, C., Levine, L., Loughlin, S., & Leslie, F. (2005). Impulsive and self-conscious: Adolescents' vulnerability to advertising and promotion. Journal of Public Policy & Marketing, 24(2), 202-221. https://www.jstor.org/stable/30000660?seq=1

Pereira, M. E., & Fairbanks, L. A. (Eds.). (2002). Juvenile primates: life history, development and behavior, with a new foreword. University of Chicago Press.

Perkins, C. A. (1997). Age patterns of victims of serious violent crime. US Department of Justice, Office of Justice Programs, Bureau of Justice Statistics.https://www.bjs.gov/content/pub/pdf/apvsvc.pdf

Plumer, B. (2013). Only 27 percent of college grads have a job related to their major. The Washington Post. https://archive.is/jcVxI

Pyapali, G. K., Turner, D. A., Wilson, W. A., & Swartzwelder, H. S. (1999). Age and dose-dependent effects of ethanol on the induction of hippocampal long-term potentiation. Alcohol, 19(2), 107-111.

Raaum, Oddbjorn, Kjell G. Salvanes, and Erik Ø. Sørensen. "The impact of a primary school reform on educational stratification: A Norwegian study of neighbour and school mate correlations." (2003). http://ftp.iza.org/dp953.pdf

Reavis, R., & Overman, W. H. (2001). Adult sex differences on a decision-making task previously shown to depend on the orbital prefrontal cortex. Behavioral Neuroscience, 115(1), 196–206. doi:10.1037/0735-7044.115.1.196 https://psycnet.apa.org/doiLanding?doi=10.1037%2F0735-7044.115.1.196

Ritchie, S., & Tucker-Drob E. "How Much Does Education Improve Intelligence? A Meta-Analysis" Psychological Science 29 (2018): 1358-1369. Sage Journals. 14 February 2020, https://journals.sagepub.com/doi/full/10.1177/0956797618774253

Romer, D., Reyna, V. F., & Satterthwaite, T. D. (2017). Beyond stereotypes of adolescent risk taking: Placing the adolescent brain in developmental context. Developmental cognitive neuroscience, 27, 19-34. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5626621/

Rothbard, M. & Rickenbacker, W. (1974). The Twelve Year Sentence - Excerpt: https://www.libertarianism.org/publications/essays/twelve-year-sentence-historical-origins-compulsory-schooling

Rundle, A. T., & Sylvester, P. E. (1962). Measurement of Testicular Volume: Its Application to Assessment of Maturation, and its use in Diagnosis of Hypogonadism. Archives of disease in childhood, 37(195), 514.

Ryan, J., Sattler, J., Lopez S. (2000). Age Effects on Wechsler Adult Intelligence Scale-III Subtests. Elsevier. Retrieved from https://www.sciencedirect.com/science/article/pii/S0887617799000190

Sampaio-Baptista, C., & Johansen-Berg, H. (2017). White matter plasticity in the adult brain. Neuron, 96(6), 1239-1251.

Sanchez-Roige, S., Baro, V., Trick, L., Pena-Oliver, Y., Stephens, D. N., & Duka, T. (2014). Exaggerated waiting impulsivity associated with human binge drinking, and high alcohol consumption in mice. Neuropsychopharmacology, 39(13), 2919-2927.

Savage, J. (2007). Teenage: The Creation of Youth 1875-1945.

Scheres, A., Dijkstra, M., Ainslie, E., Balkan, J., Reynolds, B., Sonuga-Barke, E., & Castellanos, F. X. (2006). Temporal and probabilistic discounting of rewards in children and adolescents: Effects of age and ADHD symptoms. Neuropsychologia, 44(11), 2092–2103. doi:10.1016/j.neuropsychologia.2005.10.012

Schnack, H. G., Van Haren, N. E., Brouwer, R. M., Evans, A., Durston, S., Boomsma, D. I., ... & Hulshoff Pol, H. E. (2015). Changes in thickness and surface area of the human cortex and their relationship with intelligence. Cerebral cortex, 25(6), 1608-1617.

Sebastian, C., Viding, E., Williams, K. D., & Blakemore, S. J. (2010). Social brain development and the affective consequences of ostracism in adolescence. Brain and cognition, 72(1), 134-145.

Segal, B., & Podoshen, J. S. (2012). An examination of materialism, conspicuous consumption and gender differences. International Journal of Consumer Studies, 37(2), 189–198. doi:10.1111/j.1470-6431.2012.01099.x https://doi.org/10.1111/j.1470-6431.2012.01099.x

Simons, D., Boot, W., Charness, N., Gathercole, S., Chabris, C., Hambrick, D. & Stine-Morrow, E. (2016) "Do "Brain-Training" Programs Work?" Psychological Science in the Public Interest. 17:3, 103-186, DOI: https://doi.org/10.1177/1529100616661983

Simpson, B. (2004) "Free" Education and Literacy - https://mises.org/library/free-education-and-literacy

Singh, V. (2016). Sex-differences, handedness, and lateralization in the Iowa Gambling Task. Frontiers in psychology, 7, 708. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4885871/

Snaidero, N. & Simons, M. (2014). Myelination at a glance. Journal of Cell Science 2014 127: 2999-3004; doi: 10.1242/jcs.151043. https://jcs.biologists.org/content/127/14/2999

Snyder, T. D. (1993). 120 years of American education: A statistical portrait. US Department of Education, Office of Educational Research and Improvement, National Center for Education Statistics.

Somerville, L. H., Hare, T., & Casey, B. J. (2011). Frontostriatal maturation predicts cognitive control failure to appetitive cues in adolescents. Journal of cognitive neuroscience, 23(9), 2123-2134. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3131482/

Somerville, L. H., Hare, T., & Casey, B. J. (2011). Frontostriatal maturation predicts cognitive control failure to appetitive cues in adolescents. Journal of cognitive neuroscience, 23(9), 2123-2134. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3131482/

Steinberg, L., Albert, D., Cauffman, E., Banich, M., Graham, S., & Woolard, J. (2008). Age differences in sensation seeking and impulsivity as indexed by behavior and self-report: evidence for a dual systems model. Developmental psychology, 44(6), 1764. https://www.ncbi.nlm.nih.gov/pubmed/18999337

Steinberg, L., Graham, S., O'brien, L., Woolard, J., Cauffman, E., & Banich, M. (2009). Age differences in future orientation and delay discounting. Child development, 80(1), 28-44. https://www.ncbi.nlm.nih.gov/pubmed/19236391

Stoet, G. (2017). Sex differences in the Simon task help to interpret sex differences in selective attention. Psychological Research, 81, 571 – 581. https://www.semanticscholar.org/paper/Sex-differences-in-the-Simon-task-help-to-interpret-Stoet/31711e4006429777390d6fe5c79b67f6d6048991

Strenze, T. "Intelligence and socioeconomic success: A meta-analytic review of longitudinal research" Intelligence. (2007). March 25, 2020. https://www.sciencedirect.com/science/article/abs/pii/S0160289606001127

Strohl, D. (2017). Fact Check: Rockefeller didn't pursue Prohibition to ensure ethanol's demise as a fuel. https://www.hemmings.com/blog/2017/04/30/fact-check-rockefeller-didnt-pursue-prohibition-to-ensure-ethanols-demise-as-a-fuel/

Swanson, H. L. (1999). What develops in working memory? A life span perspective. Developmental psychology, 35(4), 986.

Tamminga, C. A., & Benes, F. M. (1998). Brain development, VII: Human brain growth spans decades. American Journal of Psychiatry, 155(11).

Tanner, J. & Marshall, W. (1969). Variations in Pattern of Pubertal Changes in Girls.
https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2020314/pdf/archdisch01552-0003.pdf

Tanner, J. & Marshall, W. (1970). Variations in the Pattern of Pubertal Changes in Boys.
https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2020414/pdf/archdisch01548-0015.pdf

Temin, P. (2013). The Roman Market Economy. Princeton University Press.

Terribilli, D., Schaufelberger, M. S., Duran, F. L., Zanetti, M. V., Curiati, P. K., Menezes, P. R., ... & Busatto, G. F. (2011). Age-related gray matter volume changes in the brain during non-elderly adulthood. Neurobiology of aging, 32(2), 354-368.

Tiemeier, H., Lenroot, R. K., Greenstein, D. K., Tran, L., Pierson, R., & Giedd, J. N. (2010). Cerebellum development during childhood and adolescence: a longitudinal morphometric MRI study. Neuroimage, 49(1), 63-70.

Tockwell, T. (1876). A History of Public Education in Rhode Island.
https://quod.lib.umich.edu/cgi/t/text/text-idx?c=moa&cc=moa&view=text&rgn=main&idno=ABJ2388.0001.001

Tyack, D. (1976). Ways of Seeing: An Essay on the History of Compulsory Schooling. Harvard Educational Review, 46(3), 355–389. Retrieved from https://hepgjournals.org/doi/10.17763/haer.46.3.v73405527200106v

Tyack, David. (1982). Managers of Virtue: Public School Leadership in America, 1820-1980.

Tyack, David. (1986). The Constitutional Moment: Reconstruction and Black Education in the South. Retrieved from https://www.jstor.org/stable/1084950?seq=1#page_scan_tab_contents

Van den Bos, R., Homberg, J., & de Visser, L. (2013). A critical review of sex differences in decision-making tasks: Focus on the Iowa Gambling Task. Behavioural Brain Research, 238, 95–108. doi:10.1016/j.bbr.2012.10.002

https://www.sciencedirect.com/science/article/pii/S0166432812006419?via%3Dihub

Vetter, N. C., Drauschke, M., Thieme, J., & Altgassen, M. (2018). Adolescent basic facial emotion recognition is not influenced by puberty or own-age bias. Frontiers in psychology, 9, 956.

Voyer, D., Voyer, S. D., & Saint-Aubin, J. (2016). Sex differences in visual-spatial working memory: A meta-analysis. Psychonomic Bulletin & Review, 24(2), 307–334. doi:10.3758/s13423-016-1085-7

Walker, P. (1991). The History of Public Education in Georgia. https://archives.columbusstate.edu/gah/1991/01-17.pdf

Wayne, N. L., & Miller, G. A. (2018). Impact of gender, organized athletics, and video gaming on driving skills in novice drivers. PloS one, 13(1), e0190885. https://www.sciencedaily.com/releases/2018/02/180222144348.htm

Weeks, Stephen B. (1917). History of Public School Education in Delaware. Retrieved from https://archive.org/details/historyofpublics00week/page/38