

>> From WXXI News, it is 1370 Connection. I'm Bob Smith and you are about to meet a man whose professional interests and activities span the gamut from teaching and practice of veterinary medicine to biology to anthropology. His work, he's a writer of books for the entire science curious public. He's not only taken over the best seller lists but to the frontiers of natural history. David Bainbridge of Cambridge University is the author of works including, Teenagers, a Natural History, The X in Sex, and Beyond the Zonules of Zinn: A Fantastic Journey through your brain. He's here in Rochester to speak as part of the Caroline Werner Gannett Visionaries in Motion lecture series at RIT's Webb Auditorium this evening at eight, and he's joining us now in studio. I I wanna welcome you to the program today and I guess what I want to ask first of all is the observation that you've made recently which has gotten a lot of attention including I guess a lot of discussion on our end from parents of teenagers. You've called teenagers, not a scourge, but the pinnacle of human evolution. This is one of the key points that you've made in, Teenagers: A Natural History. Why is the teenager emblematic of the pinnacle of evolution?

>> Well tha- thanks for asking. That really is the key question I've been dealing with. The reason why teenagers are so important, well I mean you just talk to people anecdotally, you don't say to people what are teenagers like and they go oh they're terrible you know? They do all these awful things, they drink and take drugs, and do, smash things up and they're just awful. And then you say what about the teenagers that you know and get them to name a couple and say well what are they like and they go oh yeah they're really nice. So we're kind of, we're we're we're sort of bit sort of split split personality on what we think of teenagers.

>> And of course we don't know what President Obama thinks about his kids, they haven't reached their teenage years yet. They're still on their way. We do know what his predecessor George W. Bush thought when a visitor to his office happened to see a picture of the Bush sisters, the twins, oh his desk, he was greeted by a strange question in which Mr. Bush who I guess was then Governor of the state of Texas just before he ran for the presidency asked, do you love your kids? Visitor said yeah of course. And then he said in response, well mine are a pain in the, and then he used a rather slang word for the posterior which I won't repeat for the sake of propriety on broadcast radio. But you get the idea and that's, that's what he thought of his own kids and I gather a lot of people probably have moments when they think the same thing about theirs especially when they're going through their teenage years. So, why are we wrong about the way we think of our teenagers among us?

>> Well one thing that I have learned while I've been studying teenagers is while Bush may find his, found his daughters pretty irritating, I bet they found him just as irritating. In fact in, in his case probably more irritating than he found them. There is certainly a sort of incompatibility between teenagers and adults and that that's kinda just the way things are. And to a certain extent you have to appreciate that. I I I'm not gonna say that teenagers are there to make adults' life easier 'cause that's just not what they're for, but you look back over all the things humans can do and you look back over human history and pre-history and you gotta ask yourself you know, why do we have teenagers? 'Cause you look at other animals, even closely related animals like chimps and gorillas and there isn't really anything quite like them. It's this extra stage of life which humans have evolved at some point and what I wanted to find out

was, well why did we do this? Why do we have this? I mean it's 10 years of being you know sort of moping around and being grumpy and not getting on with adults. Why did we have this? There must be a very good reason.

>> Well we're going to explore that for a moment because those of us who remember our own teenage years probably think to ourselves from time to time, gee, what was that all about? I think we probably envy some of the higher primates for whom the transition from childhood to physical adulthood and maybe behavioral adulthood looks a lot more like a jump cut in a film whereas we have to do long, slow segues and fades from one stage to the next. We wish for that jump cut, it doesn't happen. It's a laborious process even for those who are experiencing it firsthand, so is there something that maybe we can say is a payoff in evolutionary terms or even in the development of the individual that going through all this is actually good for us?

>> Well it's just because humans can do more things than other animals. Well when we're born we can do virtually nothing. You know baby really can't do anything. Kids get quite good at talking and walking around, but you actu- you look at what humans do nowadays, you see what they do in the modern world but you look at what hunter gatherers do in you know New Guinea or Southern Africa or the Amazon and they just do far more complicated things than other animals do. Chimps walk around and most of the food that chimps eat they just pick up off the ground. Humans aren't like that. They live very complicated lives where they, they they catch things, th- they eat things that are difficult to catch, things that have to be peeled, things that are very difficult to find and humans just, they live a long time because they're very, very clever and they have a very complicated life. They can find resources of lots of different ways and and they have to cooperate to get those so they have an incredibly complicated social life, probably more complicated and subtle than any other animal and, and learning that you just need an enormous brain to do those things. So really what lots of this boils down to is is this huge, uniquely huge human brain and that really is where the teenagers come in.

>> And of course we get this time during which we're physically approaching adulthood in our complexity of structure and our physical strength and our physical capabilities and dexterity, but we're still learning the ropes. I guess the good thing about the teenagers is, we get the time to learn what we need to learn?

>> Yeah the the time is very important. I mean I I I've written about teenagers, I call them teenagers; really it's the second decade of life so it's 10 years. Now if you take a 10 year old and a 20 year old, their brain is pretty much the same size. In fact the 10 year old might have a slightly larger brain. So the brain's not growing, but what's happening is y- you just look at what a 10 year old can do, what a 20 year old can do and you just think what has gone on in those 10 years, all the amazing subtlety and abstraction and dealing with complex ideas, forming your own goals, distant goals and achieving them, and incredibly complex social interactions that that that people do. In fact, I think teenagers have more complex social interactions than adults do in lots of ways.

>> This could be because I think if we all think about our own experience and compare who we were at 10 with who we were at 20, well think of yourself at 10, what you were doing then. What was different, drastically different about the life you were living by the time you were 20?

>> Well, the two things I suppose. There's socially, socially everything's much more complicated. You're dealing in an adult, social, human world whereas when you're 10, things are quite simple. You're just very dependent on your parents. You do have friends, you like playing with friends but there's nothing very deep or intense about it, so the social side of things very, very important, very complex and obviously it takes up a lot of teenagers time. And the other thing is just thinking skills. You you can, w- things like that you can study quite easily. You can just see how much thinking or how many things people can hold in their mind at one point, one time, and it just goes up and up and up. And it it's where we learn to be so flexible and do all the amazing things that we do. It's really in those second 10 years, th- these extra 10 years which humans have added on.

>> Yeah I think of my own life and I have to admit, the thought of living the life that I was living at 20 and winding it back to 10 seems absolutely impossible.

>> Yeah. I mean th- that's the thing is you're only a teenager once, you're only a child once and and when you're a when you're a adult, you know I'm 42, and behaving like a 17 year old just seems ridiculous now. But of course when you're 17, behaving like a 42 year old seems ridiculous. They are fundamentally different phases of life and and is it any wonder that that people in those two phases of life sometimes seem a bit incompatible with each other?

>> Yeah and it's even more dramatic than that. By the time you hit 20, you're not even feeling too comfortable about thinking back to what you did at 16.

>> I know, it it changes incredibly quickly. I mean the rate of the change goes down but, yeah between say 13 and 22, the change over the over that state of how you think, it's it's almost like you're a different person. It's, sometimes it's hard to believe that that person is you and you look back to the things you did then and at the time they seemed like such a good idea but, you know now they really ma- they make you cringe some of the things you did.

>> A- and of course we all make mistakes like that even as we gain some experience in adulthood we certainly think why did I do that. Sometimes we think why did I do that about something you did last week but that's another story entirely but, human adolescents then are unique or pretty close to unique in the natural world. Is there any other creature that even remotely approaches that gradual transition from childhood to adulthood that we have as a matter of course?

>> Well that's the thing, I I looked quite hard but there isn't really, no. I mean you you look at other animals that take a long time to grow up and you think of things like chimps and elephants and whales, and they take a long time to grow up but they're pretty grown up by the time they're 10 really. And so even things like that, n- no there isn't. I was very surprised to find out that there wasn't and and so I s- I spent lots of my time tryin' to work out why that was and that's why I came up with this idea that there must be a very good reason why we have teenagers if if, you know, it's a it's 10 years. Time time is time is important when you're an animal. 10, to spend 10 years doing something, it must be pretty important to you.

>> It's, and you can only really do that if you know you're going to have that time, if you have a long enough lifespan that there's a payout.

>> Yeah.

>> That you'll spend your teens in that maturation process knowing that by the time you're out of your teens, you've maybe got 60 more years or even more than that of adult life to make use of what you learned.

>> Yeah I mean humans live an incredibly long time. I mean I've been look, the thing I'm writing about at the moment actually is middle age. I'm doing middle age in natural history at the moment but humans live a very long time and they naturally live a very long time. In the wild, we think you know 20,000 years ago people frequently, if they got to 20 they stood a very good chance of getting to 70 or even 80. So they do live very long, so it's all about investment and y- y- you look at say hunter gatherers and they're not really productive until they're about 25. They're not really producing, they're not really gathering more calories than they can eat until they're 25. You know chimps are pretty good at gathering food by the time they're 12 whereas humans, hum- pe- pe- human ability to acquire resources comes at about 45. So th- there's a lot of investment for the future going on. Also the other thing is of course passing down information to the next generation as well. There's, it takes so much information to to function as a human being, it just takes a very long time. And and and this extra 10 years, that seems to be the the main innovation we have to do that.

>> That's why you start school at age 5 and you're not through for another 16 to 20 years.

>> Yeah I mean I've I've got kids, my my youngest kid is is 8 and you can see they sort of think oh I go to school when I'm 6 or whatever and so I'll be done by the time I'll 11. [laughing] But it doesn't work like that does it?

>> In their dreams.

>> Yeah.

>> In their dreams.

>> And and in our dreams as we're the ones who got to look after them.

>> Exactly. The one thing that's interesting, you mentioned middle age as your next phase of investigation and inquiry. Tell me what you're thinking and learning so far about being in mid life.

>> Yeah well I'm not gonna work through all the stages of life but the the reason that I find the adolescent teenagers and middle age so fascinating is, there's two things about them it's, or three things really is first of all they don't really occur in other animals which is just very, very intriguing. The second thing is is that they're often just viewed as sort of transitional phases between other supposedly more important phases of life. And yet you sp- you know well, it depends how long you define middle as being but perhaps almost half your life being either a teenager or middle aged. And the final thing that's fascinating about them is that we often, we're often very derogatory about them. We're often, we we mi- middle age has very negative connotations, so do the adolescent years, and yet you spend so much of y- your life in these phases. So

why, why do we spend so long doing these phases if they're just negative transitions? I just don't think life can be like that.

>> Well we certainly hope not 'cause we're in that middle age. . .

>> Yeah, exactly.

>> stage right now and. . .

>> Yeah.

>> I'm, I have a feeling a large majority of the listening audience of this program is in that same phase right now but, in any event, as we talk about the ages of humankind with David Bainbridge of Cambridge University who is here this evening to speak at RIT's Carlson Auditorium as part of the Caroline Werner Gannett Visionaries in Motion series, and he's here with us now on 1370 Connection for WXXI. You can join in the conversation as well. Our number's 263-WXXI, that's 263-9994, area code 505 in case you're outside the immediate Rochester area, or write into us. Our in-studio e-mail address asktalk@wxxi.org. As we're looking though at the transition from young adulthood to midlife, which I don't know it can come in your 30's, maybe some people'd say it's in your 40's, but you know by the time you hit your 40's you've you've hit there, you're in there.

>> Well people actually argue about when it starts. This is something that's very intriguing and apparently when you think middle age is, seems to depend a lot on who you are. If if you're very worried about middle age, then you seem to think it starts earlier and also what sort of job you have. If you have sort of a hi- higher income, or a higher socioeconomic status as sort of the thing that sociologists like studying, you seem to think middle age starts later, whereas if you if you have lower income, then you seem to think it starts earlier. So I suppose you know if if you're very happy with yourself and doing well, some people thinks it starts at 50 in surveys whereas other people think it starts at 30.

>> Of course, we all know when it ends, when you get the gold watch when you retire at some time in your 60's right?

>> Yeah well, and exactly. It's it's very difficult to pick out an exact definition for when it happens, but I think what it is is I think that actually the teenager years and the middle age years are linked to each other 'cause of course, most teenagers, not all teenagers but many teenagers have parents who are middle aged so I think the two are linked. And so actually my favorite definition of the middle aged years is if it's the last child that a couple can have before they become infertile, it's the time, amount of time it takes for that child to grow up. So that makes it about, I don't know, 43 to 60 or something like that and I I think there's a very good reason. I I think the two coincide. I I think they're complementary. I think middle age and adolescence are complementary, that's why they're these two new life stages, they go together and middle aged people are there to look after teenagers.

>> So bef- so middle age ends when your youngest kid. . .

>> Yeah.

>> turns 18 and gets registered to vote?

>> Yeah, that's pretty much the end of middle a- tha- th- that's my favorite definition of it.

>> 263-WXXI, 263-9994, we have Kiva [assumed spelling] in Rochester on the line and hi, you're on the air. Welcome.

>> Hi, thanks for taking my call. Just wanted to ask it seems that adolescence would be defined by the adults of that species as they look upon the offspring of that age, and so how would you know that elephants don't have an adolescence or chimps don't have an adolescence?

>> Well there's a couple of very distinctive features of human adolescence which you don't really see in other animals and, and one is actually the way that humans grow. Y-you look at other animals and you find that they're, when they're first born they grow incredibly quickly and then that just slows down and slows down and then by the time they reach adulthood, it stops. So you have a very sort of smooth growth curve that starts off very fast and then slows down and then stops. And humans don't have that. They have a, they they start off like that and when we're children we're like that, we grow very, very quickly when we're first born, then it slows down, we speed up a little bit when we're eight, and I'm not gonna talk about that 'cause I'm not talking about children I'm talking about middle, I'm talking about teenagers, but then you get this weird thing in the teenage years called the adolescent growth spurt where suddenly kids start growing very quickly for a period of about 12, 18, 24 months and especially boys can be growing incredibly fast during that phase. So y- you look at say the speed that people grow, the rate that people grow at different ages and there's this is new phase that's been tacked on sort of to the human life story that you don't see in other animals. The the other thing, the the other aspect that really makes it stand out from what you see in other animals is the sort of social changes that teenagers go through. Teenagers very much go off on their own. They go off in teenager only social groups for very long periods of time, and voluntarily, not 'cause they've been kicked out of the of the tribe like you know say young monkeys might be, but voluntarily and they actively sort of push themselves away sort of psychologically and sometimes physically from their parents because they want to be with their friends. And so, and these are sta- these are just phenomena you just don't really see in other animals, and of course they fall into those those extra 10 years of growing up that these other animals just don't have. It doesn't take them you know 20 years to grow up like it does with us.

>> Hmm. All right well thank you very much.

>> Hey thanks for checking in at 263-WXXI, 263-9994. Hey it's kind of a netherworld, the teenagers in in other ways too because physically in a lot of ways, most of them can reproduce, can physically have children of their own by the time they're in their early teens and yet, we say bad idea. Please do not use this power to reproduce until you're much older and economically and self-sufficient and most don't.

>> Yeah. This is something very striking about the way adults think. Something that makes adults very uneasy which is that as you say, there's a stage of life when humans can breed and yet they're not yet, they're not grown up, they're not mature yet. And of course that just makes us a bit unhappy in the modern world.

We we just don't like to think of that. We we'd like there to be a childhood and an adulthood and the two don't really mix, and unfortunately, they do. And and and you look back and and you can kinda see what's happened is people were under some, although people took a long time to grow up, there was still some time pressure. And you know what's important in evolution is having as many successful offspring as you can, and part of that was having a good sort of childhood and growing up and becoming very sensible and very clever, but also part of it is is getting going and starting breeding and starting having those offspring. So there's this very dif- there's a sort of tension in human life between taking a long time to grow up and yet starting breeding. And of course, the mid teenage years are where that really kicks in, and it's just, it's where nature has left us. Maybe we wouldn't have designed it that way but of course it does make, it makes adults very uneasy.

>> And of course, you end up in a situation which is quite thoroughly documented on television and programs on MTV like 16 and Pregnant and Teen Mom where in many cases they are breeding at a time when they're clearly not economically or even emotionally ready for it, but nonetheless they do it. The United State is sadly, probably one of the leading countries in that phenomenon as well as one of the leading countries putting it on television and using it as a source of entertainment. But nonetheless, we have this problem and is that in and of itself a positive adaptation by and large especially when we're finding out, I happened to read in USA Today that children are physically maturing, reaching puberty a lot sooner now than they did 100 or 200 years ago.

>> Yes they certainly are and, but, of course this this isn't necessarily something we want to have happen, however, it's an entirely natural process. It's entirely natural for 15 or 16 year olds to become pregnant because, obviously they can. And so it's not an an abnormal thing, it's just something that culturally we we don't want today. The thing about things growing up early is interesting although the brain matures pretty much at the same rate it always has, there's been a very dramatic hastening especially puberty in humans over the last 100 years and I I worked out, I looked at various sources when I when I was studying this and I found out that for every day, for every year of the last century, puberty has got 12 days earlier. So for every year of the last century, puberty's got 12 days earlier which is a tremendous rate of change and we think it's to do with diet. We think it's to do with having more food basically. Humans will just mature reproductively sooner. But, this is an entirely natural process and humans have obviously evolved to mature earlier if there's more food around.

>> And yet of course, emotionally, intellectually, and certainly professionally, they're not ready for what they're physically capable of doing so there must be a reason for that too in that you are given, or you have imposed on you, a certain amount of time to get used to all of this and figure out how to handle it.

>> Yeah well that's the thing, but there's a payoff is that it it will be wonderful if we had time to become all adult and mature and sensible and f- well educated and then have kids, but it just, you know, 10,000 years ago there probably wasn't quite enough time to do that. If there had been, then we would. I think we'd become fertile at 20, but obviously the- there was just a bit more time pressure than that.

>> And of course, let's face it, even 100 years ago that wasn't as important because our society has changed so much and our economy has grown so much more complex in such a short time that really everybody has to take that time and everybody has to learn so much more to be ready for the world than you did at, maybe in 1900.

>> Yeah. I mean the the sort of culture that we live in has changed a great deal. Education has become much more important and very long periods of education. You know it's only very recently that I mean we talk about, tend to talk about girls 'cause obviously it's the girls who get pregnant, but you know people are getting educated until they're 21, 24, 27 or 30 now and that just wasn't the case for the vast majority of people especially women 100 years ago. But also economically things have changed. I don't know what things are like here, but in Europe, buying somewhere to live is so incredibly expensive that it just takes a very long time to have enough money to buy somewhere to live and then to be able to afford to have children as well.

>> That's the same here in North America.

>> Yeah?

>> No- nothing is much different between. . .

>> No.

>> western Europe and North America, that's for sure.

>> No I do I kinda thought you'd say that, yeah.

>> Yeah and and proba- probably true of the more industrialized areas of Asia as well.

>> Yeah yeah I'm sure it's all the same.

>> And and in some cases the the economic pressure is even harder and higher but, nonetheless, are we getting out of step with our economic and social evolution once more? Is our biology sort of lagging behind the changes that we have to live with, and have we got to basically use our heads to be able to figure that out and adjust accordingly?

>> Well I think we have. I mean it's not so much a question of the biology lagging behind. I mean on a scale of sort of 1 or 200 years, the biology doesn't really change much; evolution, it's quite slow. Over periods of thousands of years it works, but over hundreds of years, it it really doesn't have time to catch up. But the thing you do notice is that, you know, despite there's all this stuff going on, the the story of human evolution and the story of teenagers especially is, while some don't do well a- as as human society changes, most of them adapt incredibly well and many teenagers go on to be you know very successful, happy adults. And I and I do think in lots of this in a way we concentrate on people who don't do well too much. The vast majority of the human population, certainly in the developed world, you know they they they do pretty well in life.

>> Now of course let's face it, isn't that natural for us to go and try to fix problems rather than necessarily pay too much attention to things that are

working right? Don't we govern ourselves on the principle of it ain't broke so don't fix it?

>> I think we do and I mean one of the great things that humans learn, during the teenage years, is self-analysis. The thing teenagers do that kids don't do is they worry about themselves, they think what did I do wrong, how could I do that better? And then of course that becomes one of the great forces which changes mankind for the better 'cause we're always wondering what we could do better. We're very self critical. It's a very teenage skill that we've learned.

>> In other words, teenagers really are an advantage to our social and cultural and evolution as a species as we're finding out this hour from David Bainbridge of Cambridge University. He's going to be speaking at RIT as part of a Visionaries in Motion Caroline Werner Gannett lecture series speaking with us this hour here on 1370 Connection. I'm Bob Smith, we're back in just a moment.

[ Music ] 1370 Connection continues on WXXI, I'm Bob Smith. We are talking with David Bainbridge of Cambridge University, the author of works including Teenagers: A Natural History, The X in Sex, and more and he's at work on middle age, a natural history which is forthcoming. He's going to be talking this evening here in Rochester as part of the Caroline Werner Gannett Visionaries in Motion series at the RIT Carlson Auditorium at eight. He's here with us now in studio, and so is John in the city calling in at 263-WXXI. Hi John, you're on the air, welcome.

>> Hey Bob, hey David. David you took a George Bush I noticed in one of your comments which is which is okay. George Bush, not that I know him personally, but he's a practical joker so he's, he's a, he kids all the time, he's got a good sense of humor and, that's that's that's, in fact I read about, I read his latest book and he was quite a practical joker, so he's got a good sense of humor.

>> Yeah.

>> Anyway, to get on. . .

>> I I I'm sure he did find his his teenagers irritating. I I think it's quite normal to find your teenagers irritating.

>> Right, right. Anyway, well yeah for for for good reason. [laughing]

>> And Vice Versa of course.

>> Yeah, yeah.

>> Yeah they they tried to talk him out of running for president in 1999, failed of course, but they did according to the New York Times anyway if we if we believe that account.

>> Well thank God he didn't listen to his children.

>> [laughing] Oh no I'm not gonna make a comment on that.

>> Well I I know people have differing opinions on that story but of course the [inaudible]. . .

>> Bob you know [Inaudible] . .

>> It is, it is what it is.

>> I know. You got a good sense of humor David. Thi- now this is way off, this is on subject but I did read through some reading about a species of owl. . .

>> Um hum.

>> Whose, whose young kill for the thrill of it.

>> Yeah.

>> And how di-, did that, I would think that would be sort of an adolescence for that species. What are your thoughts on that?

>> Well, I mean th- th- the thing, I suppose what that is really is play and it is a striking things that mammals do. Most y-, most young mammals play, very few young animals play which is I think why people notice it when things like owls or parrots play because so few birds play, reptiles don't play. The difference between mammals and the, and and most other animals if they come, they don't come very hard-wired. They have a they have a big brain but it doesn't have that much behavior built into it and they need to learn a lot from their parents and they need to practice and and and a big part of practicing is playing and primates have taken that sort of one stage further, and humans have taken it to this completely extreme version where really we can we can do nothing when we're born and you know if we were cut off with other members of our species when we were kids we just couldn't function normally later on at all. We come with great hardware. I always think of it like a computer. We we have a great computer, great hardware and yet we come with almost no software pre-installed. We have to install it ourselves by learning and copying and and playing. And so, and and play is sort of very characteristically a thing that that that infants do. I mean you can sort of see it, if you give people of different ages computers, kids up to about 10 they play games, which is of course what kids like to do. You give a teenager a computer and they spend all their time communicating with their friends on it which is of course what teenagers do. So this, I I I think play really it it it's not really a typical feature of teenage life, that's more what children do. So I think in that case, the the owls, they're really, they're really being more like human children than human teenagers.

>> Okay thanks doc. Thanks doctor.

>> Interesting [inaudible] thanks John for sharing it. I guess, I guess you know you've really passed your adolescence when your computer starts looking to you like a library.

>> Yeah it's, it is very striking how teenagers deal very differently with, with modern technology. It's how they deal with modern things in general; modern culture and modern technologies, modern social change. I mean in the case of social change and cultural change very often they're driving the change, but technology they just naturally seem be able to hook into these new things and it obviously it's something which adults find very intimidating 'cause as an adult,

you get past about 20 and it it just does just take longer to learn how to use you know the latest phone or or or whatever it is.

>> Well you eventually get the hang of it of course but. . .

>> It it's never quite as instinctive as it is for for for teena- teenagers and children as well. They just try things, trial and error. Theyr'e not scared of breaking things so they just try th- and then it just becomes like second nature to them. But as adults we're just, we're just a bit too cautious.

>> Maybe because we have to pay for it if we bust it huh? 263-WXXI, 263-9994. We have Pete in Canandaigua. Hi Pete, we're on the air. Go ahead. Well we're not hearing you yet. We'll we'll try to get that caller in a little bit later on but, in the meantime, I guess one thing that, that I that I guess we have to look at before we do anything else on this is the transition that we do through the rest of life. Are we eventually going to take a look at what it's like to be past middle age and into the retirement years and and what function that has, other than just winding down and taking it easy and relaxing after a life well spent, one hopes?

>> Well yes, although I'm not actually gonna write about old age, I decided I was only gonna do teenagers and middle age. Old age, I mean to me because I was interested in middle age is mainly interesting and striking in how how much, how different it is from being middle aged. When you're middle aged, you're incredibly un- surprisingly unlikely to get ill when you're middle aged. It's, they're very healthy years. It's, and other weird things about humans. We stop breeding and yet we're healthy for another 20 years. That, to any other animal that would just be ridiculous.

>> Well we gotta be around to raise the kids and get them started.

>> Exactly. That's why. That's why we live so long. That's why 40 to 60 are pretty healthy and I mean I looked up some, the sort of data that life insurance companies use and the years when you're least likely to die in the next year, in your 40's and 50's. And you wouldn't necessarily, you're less likely to die in your 40's and 50's than you are when you're 20. I think 'cause people in their 40's and 50's do do less stupidly, dangerous things. But then you get to 60 or 65 and although you have been aging before that age, aging just seems to start to predominate. When you're 40 or 50, some things are allowed to deteriorate but other things don't seem to be. Your brain doesn't really wind down too much whereas obviously, but your skin does for example. You get to 40 your skin loses the elasticity. So it's very, in middle age it's very interesting 'cause you have some body systems that allowed to kinda just fall apart, and then you have other body systems that very clearly aren't. And then you get to, into old age and it it's more of, I'm afraid it's more of a one way, one way street.

>> Ooh, which. . .>> [Inaudible]

>> probably seems to say that evolution is telling us, we're gonna start to shut you down as soon as your kids have got their college degree.

>> Well you do s- evolutionarily I think you do still have a function when you're over 60 or 65 which is why people live to that age and and I say hunter gatherers frequently do live to that age. If if you get to be an adult if you're a hunter gatherer, you often have a very long life expectancy. You do have a

function at that age but what you have at that age of course is you're a huge repository of information and that's that's really your real function at that age. You can care for for for children a bit as well, but your main function is a sort of long-term, long-term information store which is why the brain is is probably the last body system to deteriorate in many people.

>> You're basically the institutional memory of the community.

>> You are, yes. I mean it's something that increases gradually. You are to some extent when you're middle aged, but that really becomes your most important role when you're older because you're not much use for acquiring resources and food when you're that age, but you're very good for storing information.

>> 263-WXXI, we have Pete on the line now and hi Pete, you're on the air.

>> Bob it's Keith, I'm sorry.

>> Okay.

>> Very interesting topic today. I'm 60 years old, I have 6 grandkids. I don't look at myself as anything but still young. You know maybe chronologically I may be middle aged but when I get together with my toddler grandsons I, or grandkids I wrestle with them. I was racin' scooters against my older grandkids on their porch. To me, middle age or even old age is somewhat of a, of a state of mind. Now again, if you're wheelchair bound because of a chronic illness, it may be a little different, but I figure as long as I can maintain my, my health, I don't plan on being old age so.

>> I I, I I think this is very interesting you say it's a state of mind, and quite a lot of people, there's been quite a lot of research done on this about people's attitude to being middle aged, and it do- it has been shown that people who are sort of inherently sort of psychologically positive people actually are physically healthier in middle age. It's it's and it's it's very it just it's almost you know you make your own luck in a way and so i- if you tend to do into life with a positive attitude earlier on you know in your 20's, that is a predictor for being relatively physically healthier and mentally healthier later on. And I and I think this goes a long way to explaining, life can seem very unfair. I mean some people, you know I know some people who are 80 who really you know if you didn't know that you'd think they were about 55 and then there's some and there's some people who are 80 where you know they you know they just look really, really old and kinda worn out. And so old age, old age sometimes seems very unfair. Some people have a pretty good old age and some people, some people just don't. middle age, the discrepancies aren't quite so great but but they are creeping in, but but but what you say about you feel you can do things and you don't feel old, I think that I think is very important and I think it's partly luck that you're still in the position you can do that. But I think that attitude in itself has been shown to correlated very strongly with how people do.

>> In fact you say one other thing, there's a difference between child-like and childish.

>> Um hum.

>> I I think of myself as constantly child-like, in other words, I'll I'll play with my grandkids even if I'm outside with my dog throwin' the ball and the

neighbor could come over, they're gonna wanna play too and we end up like playin' you know hide and go seek and things like this. I just find it very natural to do with the, the other kids that come over and it's not a problem with any of their parents, I don't have a problem with it. I've actually had 'em come up to the door, and this is the honest truth, they came up to the door and [inaudible] from German on a work assignment so it may be something to do with society versus our society and German, they came up to the door, thought my wife was my mother and wanted to know if I could come out and play. [laughing]

>> [laughing] Now. . .>> And so that was [inaudible] and I just [inaudible].

>> Yeah I th- I think I mean one thing I I I do beli- I mean I've been trying to find research on this about whether things people are in- w- what people are interested and what they like to spend their time doing. I think that those actually don't change very much as we grow up. I think they especially don't change very much for men. I think you know if you ask men what they were in- what they were interested in, what they like spending their time doing, very, apart from you know obviously when you're a teenager you develop a gr- additional interest in the opposite sex, but, apart from that people t- men especially tend to be interested in the same sorts of things they were interested in doing when they were younger, whatever it is, whether it, I don't know, cars or sports or or whatever it is. So the intriguing thing is that I I don't think that what we're interested in changes very much as we get older, especially men, and yet we develop, at the same time we're developing all these amazing new sort of brain abilities. But often, you know, if we've got some spare time we may sort of direct them in the same direction. I I I realize this, you know, playing with my kids is you know my my son will say we'll be playing with Lego and then I'll go and play with Lego and then I'll realize well actually I I don't really enjoy playing in leg- with Lego in a fundamentally different way from when I was a kid. It's actually the same things about it. It's it's it hasn't really changed in my mind why I enjoy certain things.

>> Hey thanks for checking in Keith, appreciate the call. 263-WXXI, 263-9994. Join us on 1370 Connection. We are talking with David Bainbridge with Cambridge University, author of works including, Teenagers: A Natural History, The X in Sex, and more. I want to talk if I can for a moment about the X in Sex, the X chromosome, something we all have. Every being which reproduces sexually has it in common, only difference is, half of us only have one plus a Y, the other half of us have two X's, so what makes the X chromosome which we all share in common, both men and women, essential and in what way?

>> Well the thing about men being XY and women being XX, we don't know if there's a, there's probably, there may well not be a particularly good reason why it's that way around and certainly you go look at other animals you know like birds appear to be kind of the opposite system. They, we use different letters for them but they're kind of the other way around. So the first thing to say is there may be no particular reason why we're that way around, but now we are that way around, suddenly it has a huge effect on on how we live.

>> Are, I presume all mammals are that way?

>> Almost all mammals are that way.

>> Ah.

>> Yeah the- there's a there's a few weird exceptions. Duckbill Platypus' have a different system.

>> And of course they lay eggs.

>> They lay eggs yes, but in other ways they're you know they they produ- they produce milk for their offspring like other mammals do but there are other things like Mole, Voles, just a few groups of Vole that they've lost the Y chromosome and we don't know how they've got away with it whereas we haven't. But it does mean that there's this complete symmetry between men and women. So men have this little switch, what it is is the Y has a little switch on it that turns an embryo into a boy. And so we have a system where there's an active switch to to make it, make babies into boys. And if you don't have the switch, you become a girl. And that doesn't really mean anything about boys being more important or better or special. We could've done it the other way around, we just happened to do it this way around. But what it does mean is, and that's kind of the end of the story with the Y. The Y's got the trigger to maleness on it, but ma- the X is the one that becomes interesting because men only get one, and women get two. And normally chromosomes aren't like that, everybody gets two of them. And if you get no- an abnormal number of chromosomes, if you don't get two, usually something very weird happens and and not very good and and often you know it's it's rapidly fatal you know long before you get a chance to be born, whereas with the X, so it means about 5% of our of our genetic information, women get two copies and men only get one copy. And for men this means, well 'cause they've only got one copy, if that one copy is damaged, that can cause all sorts of problems. This is what sex-linked diseases are like muscular dystrophy or hemophilia or color blindness.

>> I know women will contend that that makes men really functionally the weaker sex. Is that true?

>> Well in some ways it does. It it means they're more likely to get these diseases, but there's a flip side to this which is because all all mammals basically they have to be able to function with just one X chromosome so the males can survive, the females then have to do something which is very weird which is very early on where, when when a when a girl when a when an embryonic girl, well even when she's only about 100 cells, that's all she is, half of her cells will switch off one X chromosome and half of her cells will switch off another one, and they seem to do it pretty much at random. So because of this, women are actually a mixture of two completely different cells, cell types. One one half use one X and one half use the other. So you you you get women who let's say about 14% of women, half of their cells will carry the the gene for color blindness and the other half won't. And you can actually test this you know? Now, instead of just showing people pictures to test color blindness and actually sort of fire little red and green lasers into people's eyes you find that women's women's, the backs of women's eyes, their retinas are actually stripey and they can be of half of half of the back of their eye will be color blind and the other half won't be. Course their brain sort of fills in the gap so they never realize they're half colorblind. And so women have this strange, they have this sort of double life. They're a mixture of two different cell types. That has all sorts of weird effects on their biology and and men just don't do this 'cause they only have one X so they don't switch any off, so a man is just one sort of cell through and through whereas women, women are kind of slit creatures. They're sort of chimaric creatures.

>> Complicated.

>> They are. Inherently more complicated.

>> 263-WXXI to Eric in the city. Hello Eric, you're on the air.

>> Hi, I I believe I have discovered the, one of the best tests to verify the social programming. I have a collection of probably 60 or 70 little rubber ducks on my piano and when my granddaughter came over some years ago, she would take them down at the age of I think 9 or 10, take them down and arrange them into little circles and little groups on the floor and they would sort of migrate from one group to another. When the grandsons came over at exactly the same age, they immediately took the ducks to the top of the second floor, slid them down the banister to watch them crash.

>> [laughing]

>> No prompting. It was just totally, here are the ducks and here's something to do with them, and boy did they, did they show their social programming.

>> So so they add, so the girls were creating a a conversational circle with the ducks. . .

>> Um hum.

>> And the boys were treating them like they were at Lake Placid going down the 90 meter slide?

>> Yeah.

>> So do do you think that's because of the way the boys and the girls have been brought up differently because they were boys and girls, or do you think they were born that way?

>> I I I'm a I'm a believer in 50/50.

>> Ah, right.

>> Aside from the fact that women have a, a thicker corpus callosum and obviously enjoy conversation more than men, I think that I'm I'm 50/50 on that.

>> I mean I think the social differe- I mean you look at kids who are about sort of 2 1/2 or 3 and the differences are ve- are quite striking. The boys, language in boys is often much poorer at that age and, but then when you actually look at them playing and doing stuff, you realize why it's 'cause they're more interested in just doing stuff and playing with things than telling you about it [laughing] whereas lots of little girls are compulsive communicators.

>> Yeah.

>> So if if it is socially imposed, then it it must be very, very early in life I always think. I I must admit I tend to go more towards the sort of genetic in-built side of things but I mean obviously there's lots of people working on this to find out which it is.

>> Absolutely. Anyway, I thought it was amusing because I didn't provide any input to this particular, these particular events and there they were.

>> Yeah but maybe somebody had, but maybe somebody had taught the little girls to be all social.

>> There you go.

>> Well th- thank you very much for for. . .

>> Yup.

>> calling in, you've just sparked a discussion that I wonder if we're starting to get some insight on through through our research and that is the degrees to which behavioral differences between men and women are innate and hard-wired or soft-wired and learned. Are we beginning to get some insight into those differences that, as a matter of fact, Pete was just talking about.

>> Well I think if you look, I mean you just look at men and women and I mean physically, they're more different than they, they absolutely have to be to you know be two different sexes that can that can make babies. You know, men and women, completely different shapes. They don't have to be. They're much more different than the males and females of any other species. And lots of that happens at puberty, but quite a bit of it happens before puberty as well. So men and women, very very physically different. They just look like they're kinda designed for different, different functions in life. And so it would be quite surprising if their brains were absolutely identical. I d- I and it wouldn't surprise me at all if there were built in social differences b- between, between little boys and little girls.

>> But is that going to fade or become less important with time as we've opened up obviously a lot of previously male dominated endeavors to women and a lot of previously female, female dominated endeavors to men and and we're starting to see people cross those traditional lines and and do things that were maybe in previous generations un- unexpected.

>> I think it will change. I mean it's it's not just the, I mean it, for a while you know maybe 20 years ago it was seen as as women moving into male, male domains and and doing and doing sort of men's jobs. You look back 10,000 years ago, men weren't doing those jobs either. We're all doing completely unnatural jobs that we never would've done you know over the v- over most of our evolution. And so it's it it's more adapting the roles that we do for the different sexes 'cause the different sexes seem to end up doing them. And I I mean I [inaudible] I teach veterinary students. 30 years ago almost all veterinary students were male. Now in Britain at least, I don't know what it's like here, ei- over 80% of them are female. So it's just, it it's becoming a female profession [inaudible].

>> Which is interesting because here in the United States in both veterinary medicine and human medicine, it's tending to go about 50/50.

>> Really?

>> Yeah.

>> Yeah I mean human medicine is about 50/50 in in in Britain but for some reason this huge skew in veterinary medicine, I've never really worked out why it is and so it's just naturally becoming a feminized profession and it will become feminized as it as it was masculinized you know 50 years ago. These things just happen and you know it's change and it's change that's unpredictable to know what effect it will have if you wanted to do anything about it, which you wouldn't necessarily want to. I'm not sure what you could do anyway. I think these these things do just change, but I think it's important to realize lots of the traditionally male professions, you know, they're completely artificial constructions anyway, there's nothing inherently masculine about them.

>> Maybe even including race driving.

>> Well yeah. Yeah you never n- I mean it's, there's there is quite a lot of work going on into the psychological differences between men and women and you know, you know caution and risk taking the things like that, the sort of things that teenagers are learning in fact. And you know, women, it does appear that women under many situations take less risks than men and of course, for some things it's good not to take risks. For other things, it's important to be able to take risks and and profit from them.

>> But in the National Hotrod Association, at the drag strips, women are approaching parity with men.

>> Right. Well. . .

>> Especially in the funny car ranks. So who knows?

>> Yeah.

>> Are we going to get to a situation someday where men and women are pretty much equally represented at almost anything that doesn't require extreme, brute strength?

>> We we could do. It may involve sort of re-alignment of what those, of what those occupations are. But it, wouldn't it be interesting if you still find out there are some occupations where that doesn't happen where they still become skewed? Or as I was saying like veterinary me- veterinary education in Britain, it skews completely opposite to what it used to be. 'Cause then you gotta think about, well why did that happen.

>> Good question. I guess who knows, we may someday have parity and equality in everything except possibly the National Football League. I guess we will know when it happens. My thanks to David Bainbridge of Cambridge University, the author of books including, Teenager: A Natural History, The X in Sex, and more. He's going to be speaking tonight at RIT Carlson Auditorium at 8:00 as part of the Caroline Werner Gannett Visionaries in Motion series. And our thanks to all of you for listening in on this hour of 1370 Connection with WXXI AM and FM HD2 Rochester. For Heather Snyder our technical director, I'm Bob Smith. It's been a pleasure.

[ Music ] David Bainbridge, WXXI 1370 Connection Caroline Werner Gannett Series, Rochester Institute of Technology, RIT, Teenagers: The Pinnacle of Human Evolution?

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