5.2 Evolution & Cognitive Science (59:42)

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In this discussion we're going to focus on integrating what we know of evolution of human evolution with cognitive science now that may seem of it first of all as with so many other topics in this course this is a huge subject and to try it's impossible to boil it down into one lecture which is what we're going to try and do so really what I'm gonna focus on is a few prominent or relevant examples of themes from the intersection of evolutionary theory and cognitive science

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I should also say that this itself is part of a still larger kind of movement in cognitive science it's in my think that it would be after all cognitive sciences about human thinking as well as computational intelligence and him and you know for many people who study cognitive science there are also forays into animal cognition and animal intelligence you might think that it would be quite inevitable for there to be an early focus on evolutionary theory and how it impacts thought

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and in fact came to cognitive science surprisingly late that is to say many of the examples that we talked about earlier in the course were really from the early days of cognitive science when the focus was on trying to make algorithmic or computational models of high-level human performance problem-solving,

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judgment and decision making things like that. It's only been hanging only but it's it's been maybe in the past 30 years 35 years that there has been a growing attention to looking a cognitive science through the evolutionary lens. Now that doesn't preclude computational models of cognitive science that also include evolutionary thinking for example one could make and we've briefly discussed in fact ideas of how to simulate evolution in computational systems but this is still

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I would say not as mature in cognitive science as the original work on problem-solving and search and so forth and so in another words we're looking at a sort of biological view of cognitive science that still has

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growing but still, occasionally tenuous connections with computational modeling. Overall artificial intelligence tends to be more interested in achieving high-level performance than in mimicking human evolution. But that said there is there is increasing attention on the computational side to evolutionary models as well. In the last I don't know what generation or more there there's

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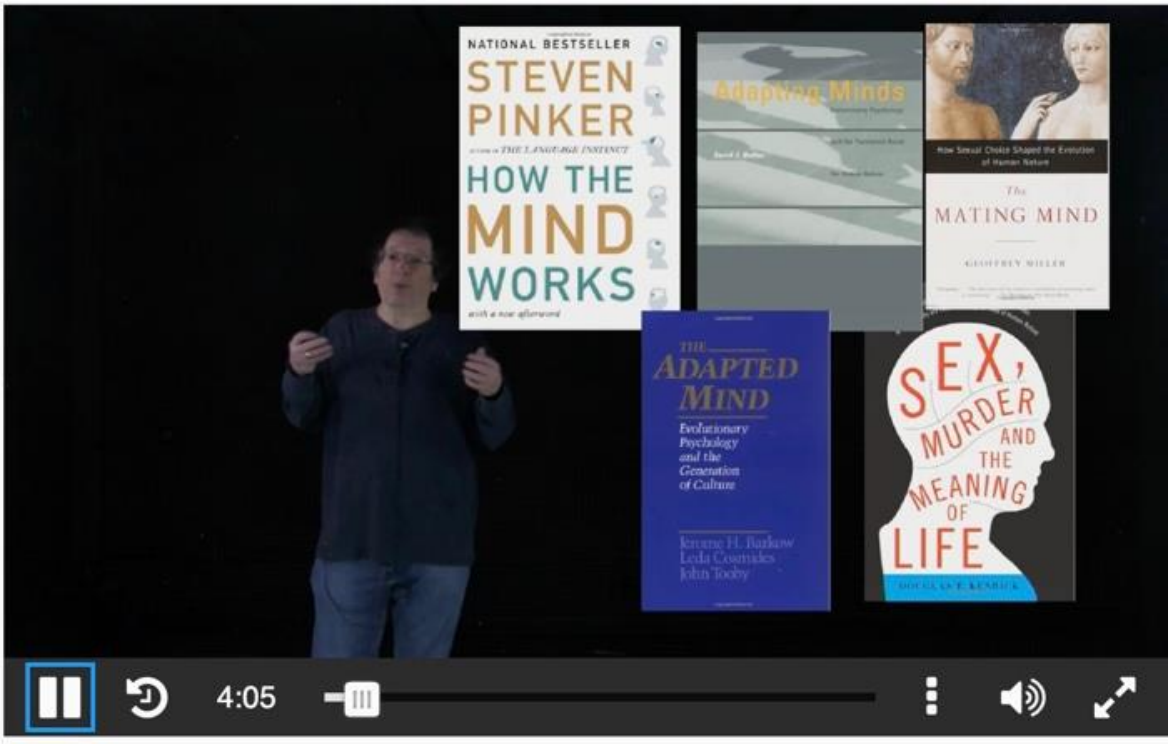
been a burgeoning literature on the evolutionary approach to psychology into cognitive science these are just these are a few books that I like and they represent in fact quite different points of view the written for someone different types of audiences



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but they were there all worthwhile and they're many many more books that the focus on sort of evolution and review of cognitive science and of human thinking the idea is to bring to bear on human intelligence and human cognition

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what we can, ideas or notions or themes that are based in evolutionary theory and in what we know of human evolution I'm going to have a reason a little bit later in this talk to refer back to a couple of these books but they're all worthwhile reading.

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A good sort of I could sort of overall book that you know introduces supposed an evolutionarily and game theoretic notions into human cognition is Steven Pinker's book "How the Mind Works" it's already perhaps about 20 years old but still very worthwhile book and also from perhaps even earlier but a very good compilation early compilation is the edited volume "The Adapted Mind" but again or end of the book on the right by our Douglas Kendrick is

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probably the easiest book it's one of them the most beginner friendly of these books so perhaps if you were interested in this material never read anything about evolutionary theory before anything like that that might be a book to start with. In any event that this group of books is just a signal to kind of give you an indication of how extensive the interest is in evolutionary cognitive science and how you know how rich the literature has become.

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To start this discussion before we get into anything else I think we just need to say some introductory words again discussing the theory of evolution would itself be the subject of a course we'll take the basic parameters and I am going to take what you know of the basic theory of evolution for granted

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Out of necessity for the course of this type but let's talk a little bit about what we know human evolution again human evolution is you would think despite the fact that it is studying something very old and something for which the evidence is old and is in place,

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despite that the new findings in human evolution our remarkable a spin of a remarkable era for the study of human evolution. Again as a beginning reading I think you couldn't do better than this book by Ian Tattersall called "Masters of the Planet" which is itself now perhaps 10 years old something like that so given the speed at which the research is appearing there are probably things in the book that are a little bit out of date but by and large to very thoughtful

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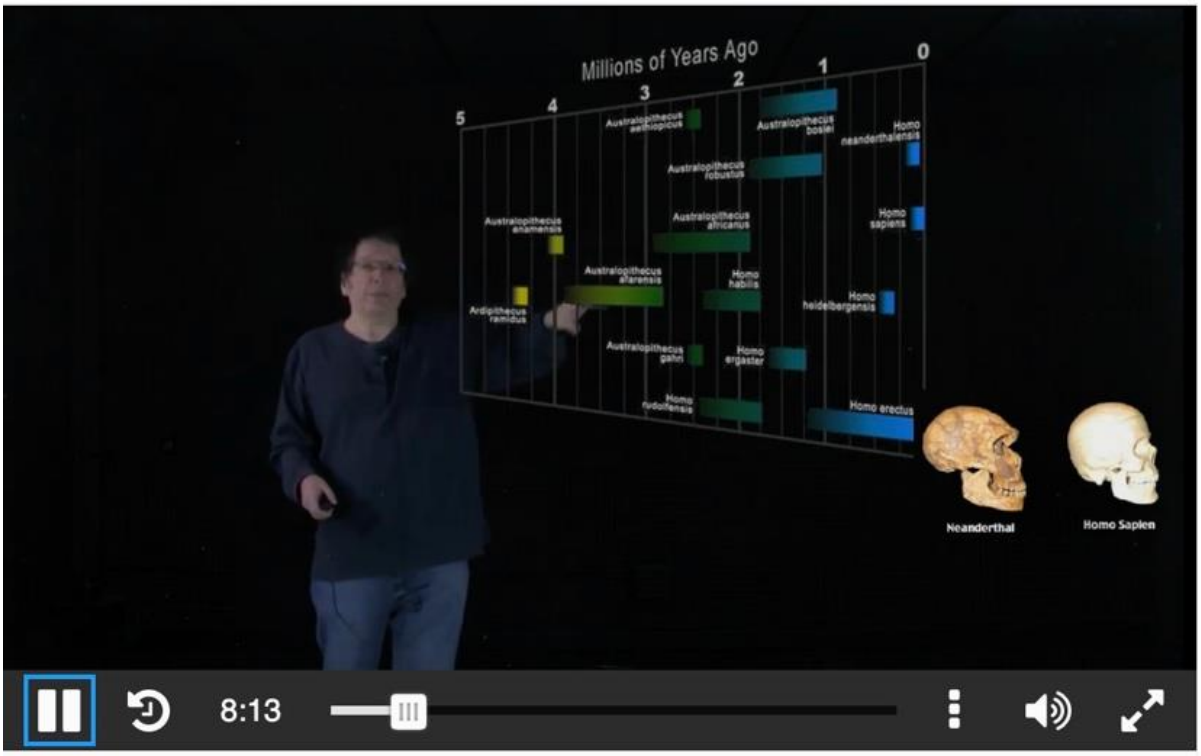
accurate and coherent story of human evolution. The main things for our purposes in discussing you know cognitive science, the main things for our purposes are just getting some rough dates on human evolution and a few major themes here this is a diagram that I got off the web that's

sort of large table and I'm sure it's already out of date so the point is that this is what you're looking at as you can see it's going back 5 million years



and there are a number of Hominem species that are you know labeled on this graph representing what are thought to be different species or sub species in the course of human evolution found in different places.

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There will be no need for you to memorize or you know for our purposes again no need for you to memorize or worry about all the different species and their time relations with each other the main issues here are to first of all to look at this graph and say you know why does it go back 5 million years why not 20 why not 100 well

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a convenient spot for talking about human evolution is to look at the place where apparently humans and chimpanzees and Bonobos shared a common ancestor when did chimpanzees and humans diverge from that common ancestor

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I should really say when did the evolutionary lines that resulted in chimpanzees and human beings diverge from a common ancestor typically these days the estimate is something like 6 million years ago so on the order of 6 million years ago often given new finds these dates are pushed back a little bit but about six 6 million years ago

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there was a an animal that was a common ancestor of both chimpanzees and human beings and starting about 6 million years ago the two lines diverged it became what we now know with modern chimpanzees and modern human beings. This graph then is showing that branch that emerged in the present as modern human beings. There are a number of things to note about this graph and about human evolution in general some things aren't shown on the graph so we see that they were quite a number of sub species

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It was it was not like there was one sort of radical change from the common ancestor to human beings but rather that we're all kinds of intermediate steps that we find along the way and the great bulk of this evolutionary process for human beings took place in central and southern Africa. So we are at root an African animal human beings are an African animal in the course of human evolution

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as Hominins involved there were occasional sometimes I've seen them referred to as an exodus there were occasional of movements of Hominins outside of Africa so for example you see

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early I mean play human remains in Asia you see them in Europe those are not Homo sapiens Sarah for example Heidelberg man and Neanderthal men and Java men so forth those represent animal lines that had emerged from Africa and gone to other places but within Africa the evolution and in the Hominim in line continued and and a Homo sapiens emerged first in Africa.

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When did that happen? Well usually again I mean these these dates are debated but somewhere between one and 200,000 years ago Homo sapiens appeared in Africa once Homo sapiens appeared in Africa at some later time there was an exodus of Homo sapiens from Africa so

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Human beings what we would call you know essentially modern-day human beings then dispersed into Asia and Europe from Africa.

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Where in some places for example in Europe Homo sapiens and Neanderthals coexisted for a time - we don't know how peacefully they coexisted there is evidence of cross a little bit of cross breeding so European Homo sapiens if you do it a genomics analysis of European Homo sapiens you find that there's evidence of a little bit of Neanderthal DNA on there so there was some cross breeding there may also have been

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wars or violence or whatever but regardless eventually this we're talking about perhaps 40,000 years ago Neanderthals went extinct leaving humans is the only human the only hominid in Europe and

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Homo sapiens of course it is now spread across the world so basically we're one species with many you know minor or subvariety sense now spread across the world. We are as a species perhaps 100 to 200,000 years old our evolutionary history is rooted in Africa and that makes a difference because as will see him many of the

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evolutionarily ingrained if you want to put it that way many much of the evolutionary equipment that we now have in cognition is based on a fair you know multimillion a long period of evolution

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in Africa in small bands and that evolutionary process still is reflected in the affordances in the limits of our cognition today. A few things to note about thinking in about cognition from an evolutionary standpoint so once you look at cognitive science from the

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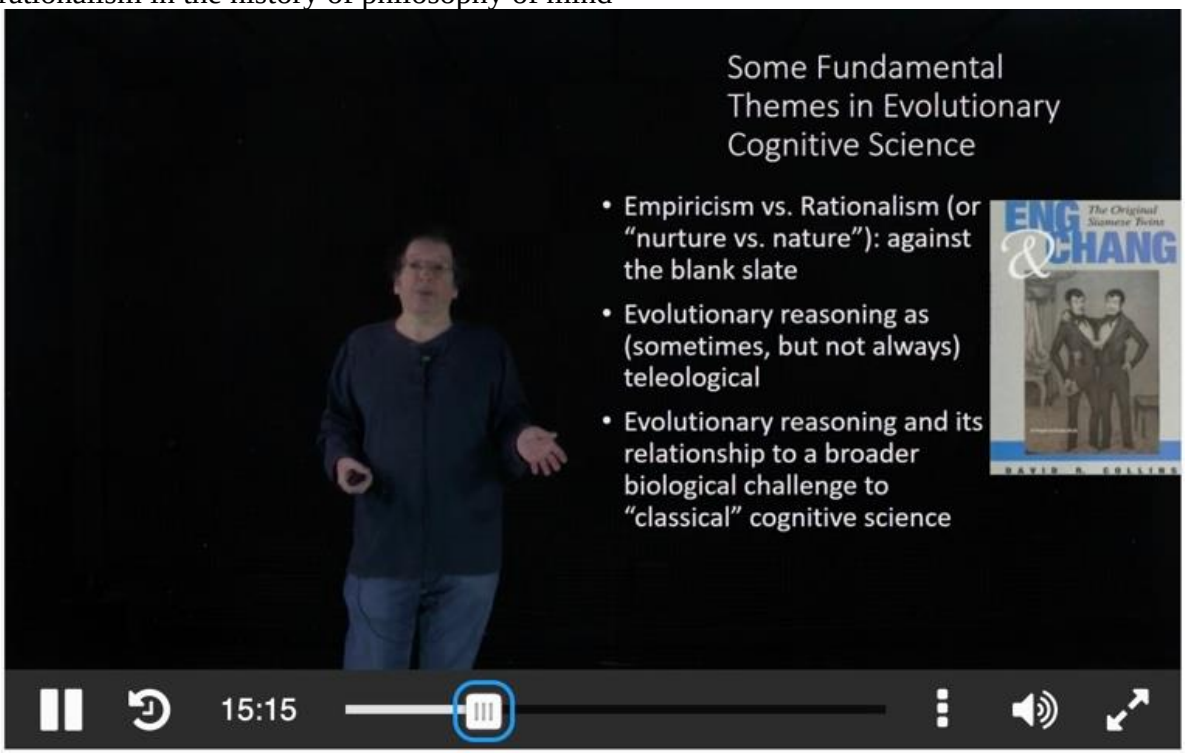
evolutionary standpoint first of all there is a tendency of realistic tendency when focusing on evolution to think about instinct and to think about things that are inborn and human beings this is actually part of a sort of a longer philosophical debate in the theory of mind and the nature of of human beings that in the philosophy of mine sort of goes by the name of empiricism versus rationalism in the history of philosophy of mind



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The rationalists who again differ in their views do not like them they don't all have one identical point of view but people who are generally thought of as rationalists include for example Plato and Descartes. There rationalists sort of focus on or give primary attention to or give greater value to

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The idea of inborn ideas. Ideas that are born into us and they may be born into us as Plato of course didn't have a notion of evolution him and in thinking about inborn ideas he thought of this as part of

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God-given or so you know

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Celestially bestowed, deep philosophical roots in human thinking that he thought he in in a couple places I don't know quite how seriously but in a for example his dialogue Meno Plato alludes to the possibility of past lives so that we bring knowledge into our current life that we learned in the past lives. In any event I don't as I say I'm not

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entirely sure has it seriously she made that suggestion to be but he was addressing the issues that we have these innate ideas for example mathematical ideas innate ideas about logic or geometry or number and they don't seem to be rooted in every day experience we've never actually run into the number three or four we've never actually seen a perfect circle and yet we have these ideas about them so Plato focused and on the notion that we are born with

18:00
collections of ideas that seem to transcend experience. The empiricists who are again there are a number of them but they're often associated with names like Locke and Hume the British empiricists school would focus on experiences as a source of knowledge that we learned about things through experience and at the extreme version of this that we are born as blank slates and to which experience like a tablet or wax tablet until which experience rights

18:41
the ideas that we were than able to appropriate and use. Both of these are extreme points of view and I don't really know of anybody who holds to extreme versions of either of them they're experimentally kind of untenable both of them but people still find that they focus on one side or another of this and there long discussions to be had about this but in the when discussing evolutionary cognition

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there's a natural tendency to stress the rational side of this debate what are the elements of cognition that we are born with as animals what are the things that we take the equipment that we have vision for hearing for learning language for dealing with physical objects for dealing with

other animals what are the things that we don't we seem to have even in the absence of much experience or alternatively

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tendencies that we have that are triggered by almost universal experience. Just because I like this example I just want to mention this as a way of, I think there are a number of ways of diffusing this debate between empiricism and rationalism but one of my favorite examples is from a discussion by Paul Ehrlich the writer he talks about the original they were called the Siamese twins Eng and Chang

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Eng and Chang lived in I think the late 19 century they were they were they were from Siam at the time I guess Thailand now the I think that's true

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And they were born conjoined unfortunately this is their condition would actually be remediable by surgery today but in that time it was not so they lived their lives together conjoined at the mid body and um

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And this is the reason that Ehrlich mentioned this is because it's an unfortunate but it's a stark sort of social experiment in real life where in fact two men have identical genomes they were identical twins and they had to the best approximation one could ever get identical environments so in this debate between nature and nurture or

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you know what is born in and what is learned through experience here you have two men who have the same genome

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again as best as possible an equivalent nature that is an equivalent original equipment is bestowed by nature and identical nurture they're always in the same place they experience the same things given that you would think that they would be highly identical people in fact

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they weren't they didn't even apparently they didn't care for each other that much they didn't like each other that much and I've heard for example they had rather strong political differences so they weren't identical people they probably had many many similarities of course but they weren't identical people this is a natural experiment in which both biology and environment are kept as constant as you can and yet

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people are still individuals they still go off their own way. In fact their environment wasn't really the same Eng had Chang, and Chang had Eng, and those two were not identical people and so

they're environments were distinct and perhaps even grew more distinct as they got older the point being that um what even in discussions of evolutionary cognitive science

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the focus is on inborn traits or you know are common features as animals human beings common features as animals but that does not negate or eliminate the importance of things like individual experience culture and so forth. The second point is that evolutionary reasoning in this is something that you sort of have to

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take into account in discussing evolution and a kind of reason that we haven't used much in talking about cognition today it is teleological, meaning it reasons from purposes when one says

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You know memory has structure like this in human beings or human beings tend to make these kinds of judgments often we take it sort of take that in a descriptive sets were interested in what human beings do do they have these kinds of tendencies and judgments they always follow mathematical reasoning if they don't how is it that they do you know in what ways to human judgments differ from mathematical reasoning the evolutionary approach asks what would be the purpose of these

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These properties what would be the purpose of these phenomena in what ways might they lead to greater evolutionary fitness if we have limitations in judgment could we attribute to a positive effect of those limitations or at least the necessary effect maybe the argument would be that we have limitations and judgment but trying to overcome those limitations would be evolutionarily costly so our limitation judgment may be in fact be limitations but they were limitations that are there constraints that are dictated in fact by evolutionary necessity rather than

25:37
a chance or something like that looking at human cognition from the teleological standpoint means that when we discuss certain properties in human beings we say what purpose like those things have served during evolution or during the period and million period that we were evolving in Africa or even before or currently what purpose might those things serve.

26:05
And finally talking about evolution and cognitive science is really part of this broader biological movement in cognitive science we begsn with discuss we began this course with discussions of things like problem-solving and working on puzzles and him and judgment and decision making and so forth we began the course with discussions like that most of those discussions were rooted in early work where people were trying to make computational models of human thinking and compare the two a great deal of progress has been made that way

26:46

Over time and even a little bit later we discussed for example a teeny bit we discussed cognitive neuroscience in the context of vision for example and we talked about the brain as sort of the vehicle the central organ for cognition which it is

27:09
On the other hand a broader biological view includes not only things like evolution as it affects human thinking but comparisons of human thinking with animal cognition for example looking at the effects of bodily movement and kinesthetic

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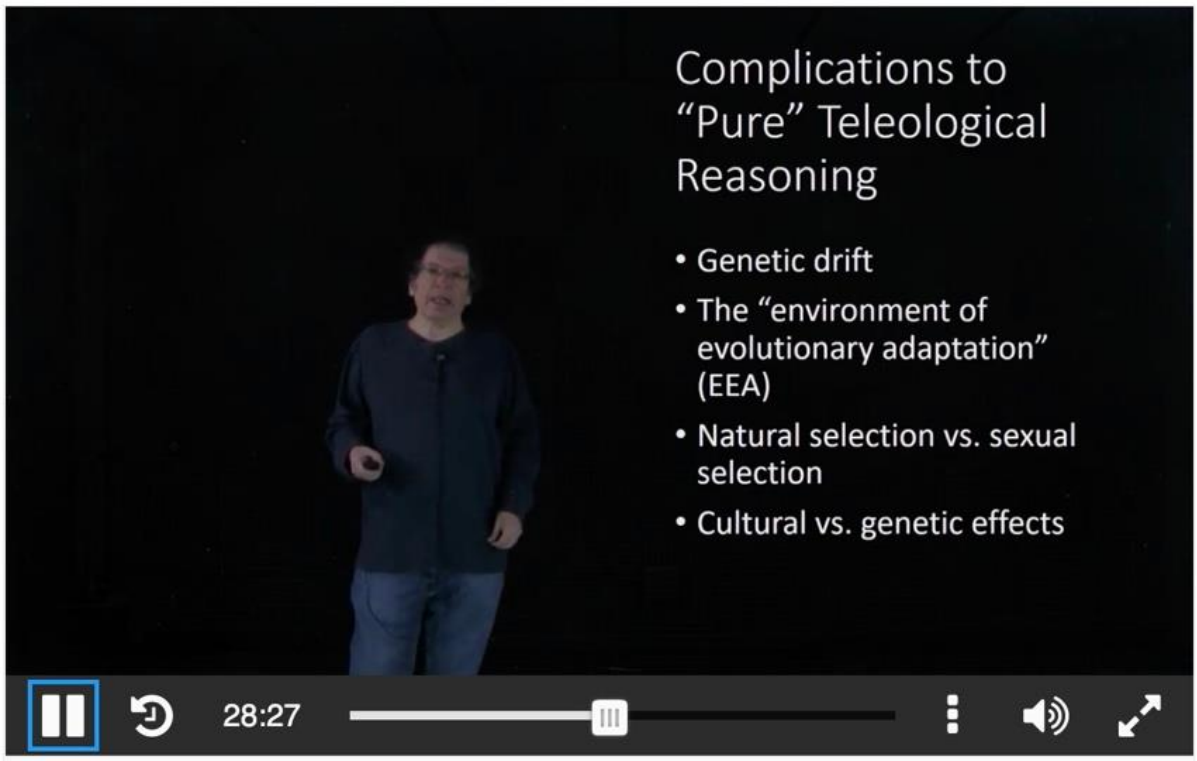
behavior looking at the facts of our bodies and cognition, looking at children's cognition and developmental cognition and so those are biological elements for bringing biological views into cognitive science in a way that wasn't done in the first 25 years or so of cognitive science and now I think it's much more excepted that cognitive science is really a sort of broad biological enterprise with strong elements of evolution and physiology human development animal cognition

28:12
All of those things that sort of contribute to human and potentially machine intelligence. As a first approximation people the teleological reasoning is a natural way of bringing evolutionarily theory to bear we say things like if we have a tendency toward getting enraged at certain phenomena what is the purpose of that tendency if we are



29:01
are better at recognizing faces the net identifying faces which we are at it's much easier for people to say I know that face I've seen that person before and it is for us to say I can identify

that person who that is so these are phenomenon again we tend to say what would be the evolutionary purpose of this but one thing to keep in mind is that not every phenomenon even if it's influenced by evolution, not every phenomenon represents an adaptation in the easy sense that we would like to do but not everything that we do or

29:47
every aspect of the way that we think even if it's influenced by evolution is necessarily adaptive in the sense that it leads to greater fitness or not easily seem to lead to greater fitness here's some examples just sort of widen your thinking about this.

30:08
First as sort of classic notion for population biology notion of genetic drift and we could go into great detail about this but let me give you an example of the kind of thing I'm thinking about imagine that in the course of human history you know ancient human history do you have a human population that's living on you know any certain kind of like a coast

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A coastline of some kind of human populations living here and there is a note of sort of branching off of land from that human coast and some of the original human population go to settle on land very small group maybe a smallish group out of the original population just go to settle in that land and then over geologic time the connection between this outcropping of land and the original coast is covered over by water so there is no longer a land bridge between the original coast and this outcropping the two areas are separate.

31:21
This is kind of development of islands for instance is part of the long-standing study in evolutionarily theory Darwin originally formulated his theory of evolution by studying the different kinds of sub species of finches on different islands in a group called the Galapagos islands off the coast of South America. So now I'm saying imagine that you have in a large human population living on the coastline a few of them move off onto this outcropping and then did the two areas are separated by water over a long period of time.

31:55
Now perhaps it happens that of the few people who moved to this outcropping they had blue eyes the original population had both brown and blue eyes but we just have a small sample that moved to this outcropping and they have blue eyes once the two landmasses are separated if centuries later we go and visit this island we will see that the population has blue eyes.

32:28
They emerged from an original small population of had blue eyes and so that's what they have there would be the temptations for the adaptive reason I would be to say well what's the adaptive advantage of having blue eyes on this island it must be the must be some increase in fitness to having blue eyes if you're living on this island not a bit as we've seen this happen by chance

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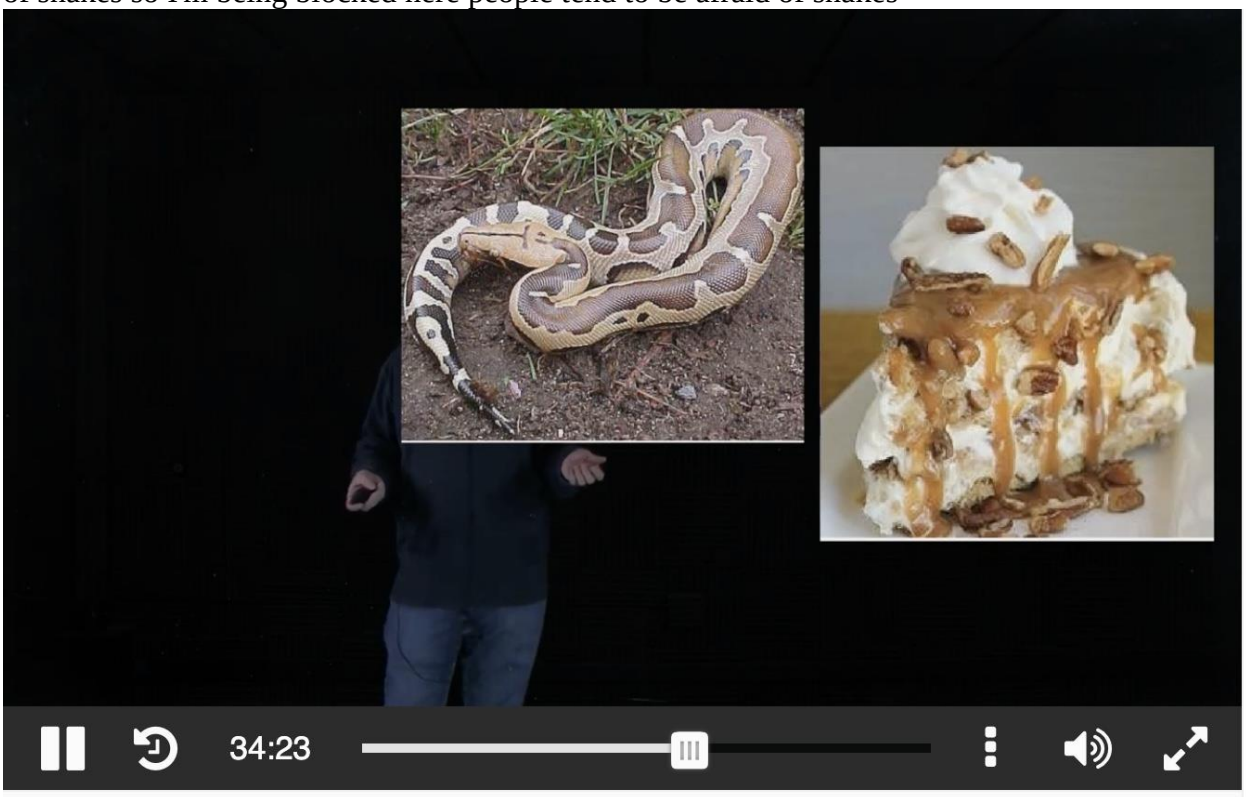
This is a one potential phenomenon that goes under the name of genetic drift just happens that small originating population had a preponderance of one particular gene and that gene is now evident in this get out and in this derived population there's no advantage to blue eyes over brown eyes on this island it's just history OK so that's one example of how you could go wrong through adaptive reasoning.

33:32
Another example and this is very common in talking about human thinking is that we have made indeed have certain traits cognitive traits that are influenced by evolution they may have been adaptive at one time they may have been adaptive in Africa they may have been adapted to hunter gatherer bands that were living in small groups together.

34:00
But they aren't adaptive now that's a different matter that saying well yes the streets were adaptive they helped in fitness during the n million pure the n million your period that we were evolving but they're not especially helpful now here's classic examples people tend to be afraid of snakes so I'm being blocked here people tend to be afraid of snakes



34:32
So why are people you know if it makes perfect sense to be afraid of snakes if you as a primate primates should be afraid of snakes, snakes are very dangerous to primates of all kinds you know particularly smaller primates him

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Infants or children Smaller in young chimpanzees monkeys and snakes just I don't know they're terrifying. It might sit up there in a tree very still for a long time and a video monkey goes up there into the tree and just think of it as a branch they're walking along there a branch until the branch moves and that's the last thing the monkey ever knows. OK snakes capture you know they strike capture primates unawares it's therefore as speaking ss a primate if you see a snake it's a very good thing to be afraid of it speaking as a modern you know a person living in

35:48
Colorado there are snakes here and believe me if I saw a rattlesnake or something I'd be terrified of it but generally speaking we're not really you know, modern urban especially western populations like not in much danger from snakes, some I guess in America probably every year there's a number of deaths from snakebite but there are many many more fatalities from drunk driving

36:22
and yet we don't have that same sense of dread about drunk driving that we do about a snake, snake fills us with your test fill us with dread we don't want to get near it was drunk driving we might acknowledge is very dangerous but we don't it doesn't scare us and quite the same way this is the idea here is that we involved with a very well-founded and adaptive fear of snakes in our so-called environment of evolutionary adaptation in Africa over millions of years we evolved with to have that fear and it serves as well or served as well during that time.

37:07
It may be somewhat less important or valuable now maybe even more vivid take a look at the photo on the right Yum right sweet dessert cheesecake or something with whip cream. We like fatty foods and it makes sense especially during the evolutionary period. Didn't have cakes like this but it made sense for people to like fatty foods because they were rich sources of nutrients of people didn't get it to eat

37:45
you know sort of rich animal proteins and so forth with fats all that often they got to eat these things and you know when there was a successful hunt or you know a good sort of a good result from a fishing trip or something like that but by and large people went around needing fats to live and they would respond well and they would respond eagerly to you know which foods it was it's in sweet foods like fruit or also valuable to us

38:23
The idea being here of that is when we were evolving in the environment of evolutionary adaptation rich foods are good for us and it made total sense for us to go after them just about every time that we saw that we saw the opportunity. Things are different now we may have too many opportunities to eat rich fatty foods many people see a picture like that on the right and say well I'm tempted but I really shouldn't eat that I'm going to avoid eating that

38:57

would be a highly unusual response from a hominem a couple million years ago or Homo sapiens for that matter 100,000 years ago they saw something like that they eat it with we were in a presence now again in culturally in urban western industrialized societies we're in the situation where there's too much of the stuff in a post of some danger to us now

39:30
So again our love of fatty foods may have been adopted at one time but it's not adaptive now let's go back to the previous slide when we were talking about the peacocks tail before we gave an example of a trait that emerged true sexual selection as opposed to what is called natural selection both natural and sexual selection are in effect versions are they are natural their biological processes so they're both kind of natural selection but the idea of sexual selection in the case of the peacocks tail is that the peacock

40:11
making a trade off it's growing this exorbitant tail as a self handicapping mechanism in order to be more attractive to the peahen therefore when we're talking about adaptivity we have to be careful about what we're talking about is the peacocks tail adaptive for the peacock well yes in many respects pick up with a big blooming multicolored huge fancy tail is probably going to leave more offspring than a peacock with a kind of drab tail absolutely however that peacock with the big blooming tail is going to have to either have to be stronger and faster to get away from predators

41:00
Or it might get eaten so is the tail adaptive or not well it's a complicated equation you can say that these tails would not have evolved had they not lead to a certain kind of fitness defined by sexual selection but on the other hand they're

41:23
They're problems for other measures of fitness like evading predators so again not every phenomenon in this includes things in human sans not every phenomenon is a clear you know winner in terms of fitness winner or loser in terms of fitness sometimes you have to take into account many different factors here and finally you know for human beings much of our lives now have been affected or dictated

42:00
by culture as well as genetics so when we see certain kinds of human behaviors it's not always trivial to say first there might be many cultural behaviors that seem to us not particularly adaptive certain kinds of things that people do culturally that we would think from the evolutionary standpoint or not particularly adaptive.

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That can happen I mean not every single behavior that people have necessarily leads to greater fitness the other thing to take into account here is that some of those cultural effects may be local so if you're going to attributes out if you're going to treat a certain kind of behavior to evolution it tends to be helpful to be able to demonstrate that behavior is robust with respect to many many

different cultures and not just western urbanized cultures but to look for hunter gatherer culture is a variety of cultures around the world one for example you know prominent discussion involves preference of men and women for the ages of their mates.

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This is described in a book by David Buss B-U-S-S talked about their there's been many questionnaires and interviews and so forth conducted all over the world and it does seem to be pretty consistent pretty consistent that when men are asked what would be

43:46
What would be the preferred age of a mate they tend to say somebody younger than themselves it may not be vastly younger 3, 4, 5 years younger that number actually varies someone over the over the globe but it's gone it's pretty consistent that men in general say that they would prefer a younger mate women in general prefer an older mate again maybe not vastly older few years older

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This is not, it's not universal individually, there are some you know very happy marriages between younger men and older women for example it happens, happens all the time but it's

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As it is a statistical rule it does seem to be that there is a consistent human preference from men for younger women from women for older men that might have an evolutionary or biological explanation it's certain at least it's possible that it has a biological or evolutionary explanation if only because it seems to be robust with respect to varying kinds of cultures.

45:09
One last example for we finished with this discussion in Steven Pinker 's book “How The Mind Works” he talked an interesting discussion of a subject that usually isn't covered in cognitive science courses mainly emotion and he talks about the evolutionary basis and in fact the sort of logical basis for the rational basis of emotions that they can be analyzed evolutionarily and from the point of view of game theory. I'll just give you a very brief discussion of this these are you know sort of standard stock photos of people who are asked to show different kind of basic emotions and by the way what was relevant to what I was just saying

46:05
These faces are you get again you can take faces a photo of people all over the world and ask them and pose certain situations to them and for a certain core group of emotions like rage surprise happiness disgust fear sadness

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Those, the peoples expressions do not vary with culture the rules about expressing emotions may vary somewhat with culture but if you go you know if you go to many different places in and show them for example these photos even if these photos don't look like the local population and he say one of these people has just one seen a friend that they haven't seen for years OK just seen an old friend for the first time they haven't seen that friend for years which of these people is showing is the person who is seeing that long lost friend how they'll all point to the person who is smiling

47:18
People around the world with you that's all facial expressions and this is something Darwin wrote about to be just talking about expressing he wrote a book on expressions in people and animals facial expressions seem to be evolutionarily derived and constant species wide so we can you know we can recognize somebody who's for example this woman at the top right we can we can recognize somebody who is showing a expression of disgust

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whether they're from our culture from a different culture we know that face but I'm going to focus on for the moment is the face of the upper left here this woman who is angry, enraged. Pinkard discusses what would be again from a teleological standpoint if you were enraged I mean and being enraged seems to be a

48:12
highly irrational state of mind you're libel to do something dangerous bad things happen when people are enraged sometimes people make decisions that are very costly to them thinking from the teleological standpoint what is the advantage is there a fitness advantage to going into a state of rage going into a state of irrationality and moreover

48:43
They're not only going into a state of irrationality but signaling that state of irrationality with facially. Signaling that not only am I getting irrational here but you can see it in my face that I'm getting irrational Pinker go through a thorough and very interesting explanation of a phenomenon like this and he talks about it from the game-theoretic standpoint

49:11
if you're arguing with somebody and you see that they are getting a face like this woman at the upper left here that's a signal to you that maybe the argument is over. In other words you are you're having a rational debate or a rational argument with somebody and you see that their face is getting red and their mouth is getting sad and their eyebrows are clenching and you know maybe they're even starting to tear up a little bit.

49:38
That's a game theoretic move on the other person's part what they're essentially saying is you better not argue with me anymore because I'm losing the ability to argue rationally. It's a strong move in an argument but it's a way of saying you better give them to me because otherwise bad things might happen now it as I say it's a strong and potentially risky move

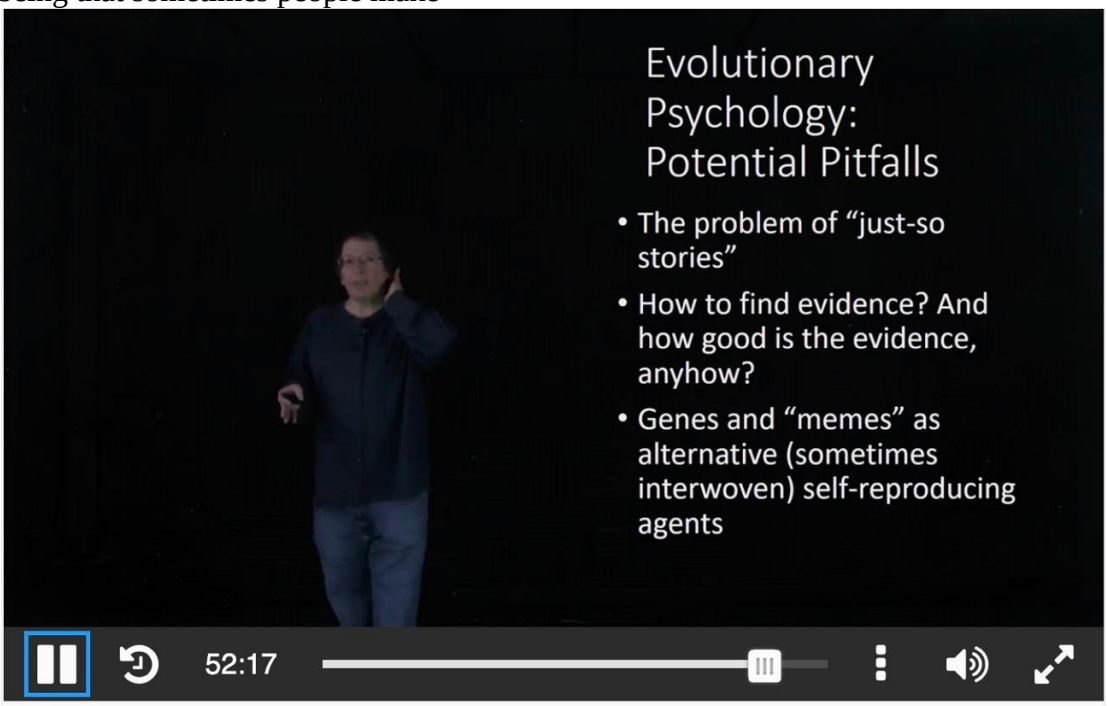
50:08
This may not work out for both parties but it's not necessarily to go irrational is not necessarily an irrational move it's in the course of an argument it's a move to show that I feel very strongly about this issue and things are about to get worse if we argue more about it so you better not argue about it it's and much like the peacocks tail it's a kind of self handicapping mechanism what this woman is saying essentially if you're arguing with her is:

50:48
I'm not thinking clearly anymore. I have turned off the "thinking clearly" part of my mind so you better watch it that's a self-handicapping move that is a signal to you that the argument is entering a new phase. Pinker has a great discussion of these kinds of self handicapping mechanisms in his book

51:16
"How the mind works" so I recommend taking a look at that but this is again one example of looking at certain kinds of human thinking phenomena is especially interesting because emotions are thought of as non- cognitive phenomena but in fact they might have very rational meaningful reasons in the course of a cognitive encounters they may be stances that

51:45
that are all of the universally recognizable hard to fake it's hard to fake being raged some people can do it better than others but they're university recognizable they're hard to fake and they mean something in the course of an argument so this is one way and bringing the bear story revolutionary thinking entered into human affairs in the human psychology finally before we leave the subject of

52:20
Evolutionary psychology, Evolutionary Cognitive Science, just some some notes to make some of the criticisms that have been made of the evolutionary approach the cognitive science one is that there is a temptation some people have called these “just so” stories after the series of stories by Rudyard Kipling about how the elephant got it’s trunk, how the leopard got its spot, the idea being that sometimes people make



52:51
can make up with evolutionary reasons that sound plausible here is why you know whatever you know - here is why we like jewelry here is why people like jewelry him and they give an evolutionary reason why people might like jewelry and it might be a possible reason may in fact be true reason but it's hard to gauge these things I needed we have we don't we don't have a great deal of information or data to go on we have plausible sounding stories in many cases that may make sense but unless they lead to many

53:44
testable predictions of a sort of at least mildly surprising nature it's very hard to test them if for example you give a evolutionary explanation of why people like jewelry then you might want to make predictions of what might happen what would be the case about a culture which does not have jewelry as part of its culture or what kinds of behaviors would you expect people to demonstrate him in the presence of jewelry that we don't already know about or things like that.

54:27
Finding evidence in evolution is of course it's a historical it's a science based on historical evidence we find fossils we analyze them, people go to dig sites and they find places where early humans or hominids lives or where they settled they find the tools

54:54
flints and things like that, ax heads that people had at various times they might at a later time they might find for homo sapiens burials and be able to make judgments of how people lived from the nature of the way they were buried, all kinds of things, it's a very rich science. But there are other things that don't tend to leave much evolutionary evidence

55:30
Language being one there are still many debates about exactly when human beings developed language develop spoken language there are some indirect arguments and I have my own beliefs and so forth but it's based on indirect evidence because language leaves no fossils. Many children's toys leave no fossils unless they're made of stone or something like that.

56:03
So you know we ask what did children play with what did young Hominins play with half a million years ago might be hard to answer that because whatever they played with didn't leave any fossil remains so there are many many questions that we might have about human evolution and we have a limited means of answering them it is true however that means we have of answering these questions is still increasing people dig up fossils now they're able to do a DNA studies of

56:43
of organic remains and waited the people couldn't do 20 years ago and so many questions can be answered now that couldn't be answered before but evolution discussions of the revolutionary origins of behavior still have a great deal of mystery around them and a fair amount of plausible guesswork. Finally there now really interesting comparisons between

57:41
the study of genetics and how traits spread via evolution and genetic replication and the idea of Memes or cultural self-replicators. The word meme was coined by Richard Dawkins in his book "The Selfish Gene" and he referred to Memes as kind you could think of

57:39
them as kind of cultural items that have the same the same kind of should I say talent at self replication the genes do. Memes are things that spread from person to person culturally by a language or could be by physical objects but Memes spread through a culture

58:06
And they and they replicate themselves often not always often because they are a good idea a good idea might be very good at spreading itself through a culture somebody has a better way of

do you know a better mousetrap that might be a meme that spreads through the culture because it's a superior way of doing something on the other hand um there are other Memes that sort of go along for the ride and human thinking even if they may not be entirely beneficial

58:40
Bad tunes I mean you all have this probably all have this experience of hearing that tune that you you can't stand it but it's stuck in your head now maybe that's a meme those that bad tune is going to continue to spread from person to person you may go around whistling it even if you hate it so it's not a particularly helpful meme

59:13
to you the carrier but it's a successful meme on its own terms because it spreads within a large population. We're going to have to sort of end of discussion here although as you can see there's a very rich subject we'll probably touch on it at least indirectly a little bit in our remaining talks which focus on sort of the biological view of cognitive science.