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I was born in Den Bosch,

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where the painter Hieronymus Bosch named himself after.

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And so I've always been very fond of this painter

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who lived and worked in the 15th century.

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And what is interesting about him in relation to morality

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is that he lived at a time where religion's influence was waning,

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and he was sort of wondering, I think,

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what would happen with society

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if there was no religion or if there was less religion.

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And so he painted this famous painting, "The Garden of Earthly Delights,"

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which some have interpreted

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as being humanity before the Fall,

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or being humanity without any Fall at all.

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And so it makes you wonder,

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what would happen if we hadn't tasted the fruit of knowledge, so to speak,

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and what kind of morality we would have?

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Much later, as a student,

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I went to a very different garden,

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a zoological garden in Arnhem

1:02

where we keep chimpanzees.

1:04

This is me at an early age with a baby chimpanzee.

1:06

(Laughter)

1:09

And I discovered there

1:11
that the chimpanzees are very power hungry and wrote a book about it.
1:14
And at that time the focus in a lot of animal research
1:17
was on aggression and competition.
1:19
I painted a whole picture of the animal kingdom,
1:21
and humanity included,
1:23
was that deep down we are competitors,
1:25
we are aggressive,
1:27
we're all out for our own profit basically.
1:30
This is the launch of my book.
1:32
I'm not sure how well the chimpanzees read it,
1:34
but they surely seemed interested in the book.
1:39
Now in the process
1:41
of doing all this work on power and dominance
1:43
and aggression and so on,
1:45
I discovered that chimpanzees reconcile after fights.
1:48
And so what you see here is two males who have had a fight.
1:51
They ended up in a tree, and one of them holds out a hand to the other.
1:54
And about a second after I took the picture, they came together in the fork of the tree
1:57
and they kissed and embraced each other.
1:59
Now this is very interesting
2:01
because at the time everything was about competition and aggression,
2:04
and so it wouldn't make any sense.
2:06
The only thing that matters is that you win or that you lose.

2:08

But why would you reconcile after a fight?

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That doesn't make any sense.

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This is the way bonobos do it. Bonobos do everything with sex.

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And so they also reconcile with sex.

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But the principle is exactly the same.

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The principle is that you have

2:21

a valuable relationship

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that is damaged by conflict,

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so you need to do something about it.

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So my whole picture of the animal kingdom,

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and including humans also,

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started to change at that time.

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So we have this image

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in political science, economics, the humanities,

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philosophy for that matter,

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that man is a wolf to man.

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And so deep down our nature's actually nasty.

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I think it's a very unfair image for the wolf.

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The wolf is, after all,

2:49

a very cooperative animal.

2:51

And that's why many of you have a dog at home,

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which has all these characteristics also.

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And it's really unfair to humanity,

2:57

because humanity is actually much more cooperative and empathic

3:01

than given credit for.

3:03

So I started getting interested in those issues

3:05

and studying that in other animals.

3:07

So these are the pillars of morality.

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If you ask anyone, "What is morality based on?"

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these are the two factors that always come out.

3:15

One is reciprocity,

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and associated with it is a sense of justice and a sense of fairness.

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And the other one is empathy and compassion.

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And human morality is more than this,

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but if you would remove these two pillars,

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there would be not much remaining I think.

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And so they're absolutely essential.

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So let me give you a few examples here.

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This is a very old video from the Yerkes Primate Center

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where they train chimpanzees to cooperate.

3:38

["1937"] So this is already about a hundred years ago

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that we were doing experiments on cooperation.

3:44

What you have here is two young chimpanzees who have a box,

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and the box is too heavy for one chimp to pull in.

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And of course, there's food on the box.

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Otherwise they wouldn't be pulling so hard.

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And so they're bringing in the box.

3:56

And you can see that they're synchronized.

3:58

You can see that they work together, they pull at the same moment.

4:01

It's already a big advance over many other animals

4:04

who wouldn't be able to do that.

4:06

And now you're going to get a more interesting picture,

4:08

because now one of the two chimps has been fed.

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So one of the two is not really interested

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in the task anymore.

4:16

(Laughter)

4:23

(Laughter)

4:34

(Laughter)

4:38

[" -- and sometimes appears to convey its wishes and meanings by gestures."]

4:51

Now look at what happens at the very end of this.

4:56

(Laughter)

5:07

He takes basically everything.

5:09

(Laughter)

5:12

So there are two interesting parts about this.

5:14

One is that the chimp on the right

5:16

has a full understanding he needs the partner --

5:18

so a full understanding of the need for cooperation.

5:20

The second one is that the partner is willing to work

5:23

even though he's not interested in the food.

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Why would that be? Well that probably has to do with reciprocity.

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There's actually a lot of evidence in primates and other animals

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that they return favors.

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So he will get a return favor

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at some point in the future.

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And so that's how this all operates.

5:38

We do the same task with elephants.

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Now with elephants, it's very dangerous to work with elephants.

5:43

Another problem with elephants

5:45

is that you cannot make an apparatus

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that is too heavy for a single elephant.

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Now you can probably make it,

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but it's going to be a pretty flimsy apparatus I think.

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And so what we did in that case --

5:55

we do these studies in Thailand for Josh Plotnik --

5:58

is we have an apparatus around which there is a rope, a single rope.

6:01

And if you pull on this side of the rope,

6:03

the rope disappears on the other side.

6:05

So two elephants need to pick it up at exactly the same time and pull.

6:08

Otherwise nothing is going to happen

6:10

and the rope disappears.

6:12

And so the first tape you're going to see

6:14

is two elephants who are released together

6:16

arrive at the apparatus.

6:18

The apparatus is on the left with food on it.

6:21

And so they come together, they arrive together,

6:24

they pick it up together and they pull together.

6:26

So it's actually fairly simple for them.

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There they are.

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And so that's how they bring it in.

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But now we're going to make it more difficult.

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Because the whole purpose of this experiment

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is to see how well they understand cooperation.

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Do they understand that as well as the chimps, for example?

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And so what we do in the next step

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is we release one elephant before the other,

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and that elephant needs to be smart enough

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to stay there and wait and not pull at the rope --

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because if he pulls at the rope, it disappears and the whole test is over.

7:01

Now this elephant does something illegal

7:03

that we did not teach it.

7:05

But it shows the understanding that he has,

7:07

because he puts his big foot on the rope,

7:10

stands on the rope and waits there for the other,

7:12

and then the other is going to do all the work for him.

7:15

So it's what we call freeloading.

7:18

(Laughter)

7:20

But it shows the intelligence that the elephants have.

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They develop several of these alternative techniques

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that we did not approve of necessarily.

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So the other elephant is now coming

7:34

and is going to pull it in.

7:53

Now look at the other. The other doesn't forget to eat, of course.

7:56

(Laughter)

8:00

This was the cooperation, reciprocity part.

8:02

Now something on empathy.

8:04

Empathy is my main topic at the moment of research.

8:06

And empathy has sort of two qualities.

8:08

One is the understanding part of it. This is just a regular definition:

8:11

the ability to understand and share the feelings of another.

8:13

And the emotional part.

8:15

And so empathy has basically two channels.

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One is the body channel.

8:19

If you talk with a sad person,

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you're going to adopt a sad expression and a sad posture,

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and before you know it, you feel sad.

8:26

And that's sort of the body channel of emotional empathy,

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which many animals have.

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Your average dog has that also.

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That's actually why people keep mammals in the home

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and not turtles or snakes or something like that

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who don't have that kind of empathy.

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And then there's a cognitive channel,

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which is more that you can take the perspective of somebody else.

8:43

And that's more limited.

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There's few animals -- I think elephants and apes can do that kind of thing --

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but there are very few animals who can do that.

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So synchronization,

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which is part of that whole empathy mechanism

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is a very old one in the animal kingdom.

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And in humans, of course, we can study that

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with yawn contagion.

9:00

Humans yawn when others yawn.

9:02

And it's related to empathy.

9:04

It activates the same areas in the brain.

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Also, we know that people who have a lot of yawn contagion

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are highly empathic.

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People who have problems with empathy, such as autistic children,

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they don't have yawn contagion.

9:14

So it is connected.

9:16

And we study that in our chimpanzees by presenting them with an animated head.

9:19

So that's what you see on the upper-left,

9:21
an animated head that yawns.
9:23
And there's a chimpanzee watching,
9:25
an actual real chimpanzee watching a computer screen
9:28
on which we play these animations.
9:35
(Laughter)
9:37
So yawn contagion
9:39
that you're probably all familiar with --
9:41
and maybe you're going to start yawning soon now --
9:44
is something that we share with other animals.
9:47
And that's related to that whole body channel of synchronization
9:50
that underlies empathy,
9:52
and that is universal in the mammals basically.
9:55
Now we also study more complex expressions. This is consolation.
9:58
This is a male chimpanzee who has lost a fight and he's screaming,
10:01
and a juvenile comes over and puts an arm around him
10:03
and calms him down.
10:05
That's consolation. It's very similar to human consolation.
10:08
And consolation behavior,
10:11
it's empathy driven.
10:13
Actually the way to study empathy in human children
10:16
is to instruct a family member to act distressed,
10:18
and then they see what young children do.
10:20
And so it is related to empathy,

10:22

and that's the kind of expressions we look at.

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We also recently published an experiment you may have heard about.

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It's on altruism and chimpanzees

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where the question is, do chimpanzees care

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about the welfare of somebody else?

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And for decades it had been assumed

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that only humans can do that,

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that only humans worry about the welfare of somebody else.

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Now we did a very simple experiment.

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We do that on chimpanzees that live in Lawrenceville,

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in the field station of Yerkes.

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And so that's how they live.

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And we call them into a room and do experiments with them.

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In this case, we put two chimpanzees side-by-side.

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and one has a bucket full of tokens, and the tokens have different meanings.

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One kind of token feeds only the partner who chooses,

11:02

the other one feeds both of them.

11:04

So this is a study we did with Vicky Horner.

11:08

And here you have the two color tokens.

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So they have a whole bucket full of them.

11:12

And they have to pick one of the two colors.

11:15

You will see how that goes.

11:18

So if this chimp makes the selfish choice,

11:21
which is the red token in this case,
11:24
he needs to give it to us.
11:26
So we pick it up, we put it on a table where there's two food rewards,
11:29
but in this case only the one on the right gets food.
11:32
The one on the left walks away because she knows already
11:34
that this is not a good test for her.
11:37
Then the next one is the pro-social token.
11:39
So the one who makes the choices -- that's the interesting part here --
11:42
for the one who makes the choices,
11:44
it doesn't really matter.
11:46
So she gives us now a pro-social token and both chimps get fed.
11:49
So the one who makes the choices always gets a reward.
11:52
So it doesn't matter whatsoever.
11:54
And she should actually be choosing blindly.
11:56
But what we find
11:58
is that they prefer the pro-social token.
12:00
So this is the 50 percent line that's the random expectation.
12:03
And especially if the partner draws attention to itself, they choose more.
12:06
And if the partner puts pressure on them --
12:09
so if the partner starts spitting water and intimidating them --
12:12
then the choices go down.
12:15
It's as if they're saying,
12:17
"If you're not behaving, I'm not going to be pro-social today."

12:19

And this is what happens without a partner,

12:21

when there's no partner sitting there.

12:23

And so we found that the chimpanzees do care

12:25

about the well-being of somebody else --

12:27

especially, these are other members of their own group.

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So the final experiment that I want to mention to you

12:33

is our fairness study.

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And so this became a very famous study.

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And there's now many more,

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because after we did this about 10 years ago,

12:42

it became very well known.

12:44

And we did that originally with capuchin monkeys.

12:46

And I'm going to show you the first experiment that we did.

12:49

It has now been done with dogs and with birds

12:52

and with chimpanzees.

12:54

But with Sarah Brosnan we started out with capuchin monkeys.

12:58

So what we did

13:00

is we put two capuchin monkeys side-by-side.

13:02

Again, these animals, they live in a group, they know each other.

13:04

We take them out of the group, put them in a test chamber.

13:07

And there's a very simple task

13:09

that they need to do.

13:11

And if you give both of them cucumber for the task,

13:14
the two monkeys side-by-side,
13:16
they're perfectly willing to do this 25 times in a row.
13:18
So cucumber, even though it's only really water in my opinion,
13:22
but cucumber is perfectly fine for them.
13:25
Now if you give the partner grapes --
13:28
the food preferences of my capuchin monkeys
13:30
correspond exactly with the prices in the supermarket --
13:33
and so if you give them grapes -- it's a far better food --
13:36
then you create inequity between them.
13:39
So that's the experiment we did.
13:41
Recently, we videotaped it with new monkeys who'd never done the task,
13:44
thinking that maybe they would have a stronger reaction,
13:46
and that turned out to be right.
13:48
The one on the left is the monkey who gets cucumber.
13:50
The one on the right is the one who gets grapes.
13:53
The one who gets cucumber,
13:55
note that the first piece of cucumber is perfectly fine.
13:57
The first piece she eats.
14:00
Then she sees the other one getting grape, and you will see what happens.
14:03
So she gives a rock to us. That's the task.
14:06
And we give her a piece of cucumber and she eats it.
14:09
The other one needs to give a rock to us.
14:12
And that's what she does.

14:15

And she gets a grape and she eats it.

14:18

The other one sees that.

14:20

She gives a rock to us now,

14:22

gets, again, cucumber.

14:27

(Laughter)

14:42

She tests a rock now against the wall.

14:45

She needs to give it to us.

14:47

And she gets cucumber again.

14:52

(Laughter)

14:58

So this is basically the Wall Street protest that you see here.

15:02

(Laughter)

15:05

(Applause)

15:08

Let me tell you --

15:10

I still have two minutes left, let me tell you a funny story about this.

15:12

This study became very famous

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and we got a lot of comments,

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especially anthropologists, economists,

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philosophers.

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They didn't like this at all.

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Because they had decided in their minds, I believe,

15:25

that fairness is a very complex issue

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and that animals cannot have it.

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And so one philosopher even wrote us

15:31

that it was impossible that monkeys had a sense of fairness

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because fairness was invented during the French Revolution.

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(Laughter)

15:39

Now another one wrote a whole chapter

15:42

saying that he would believe it had something to do with fairness

15:46

if the one who got grapes would refuse the grapes.

15:48

Now the funny thing is that Sarah Brosnan,

15:50

who's been doing this with chimpanzees,

15:52

had a couple of combinations of chimpanzees

15:54

where, indeed, the one who would get the grape would refuse the grape

15:57

until the other guy also got a grape.

15:59

So we're getting very close to the human sense of fairness.

16:02

And I think philosophers need to rethink their philosophy for a while.

16:06

So let me summarize.

16:08

I believe there's an evolved morality.

16:10

I think morality is much more than what I've been talking about,

16:12

but it would be impossible without these ingredients

16:15

that we find in other primates,

16:17

which are empathy and consolation,

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pro-social tendencies and reciprocity and a sense of fairness.

16:22

And so we work on these particular issues

16:25

to see if we can create a morality from the bottom up, so to speak,

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without necessarily God and religion involved,

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and to see how we can get to an evolved morality.

16:33

And I thank you for your attention.

16:36

(Applause)