Social Cognition

of Us and We

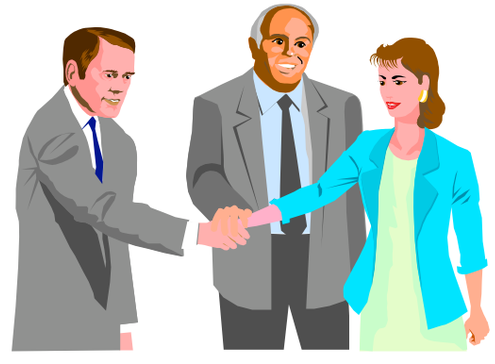


Figure 3. Cloth mother surrogate.

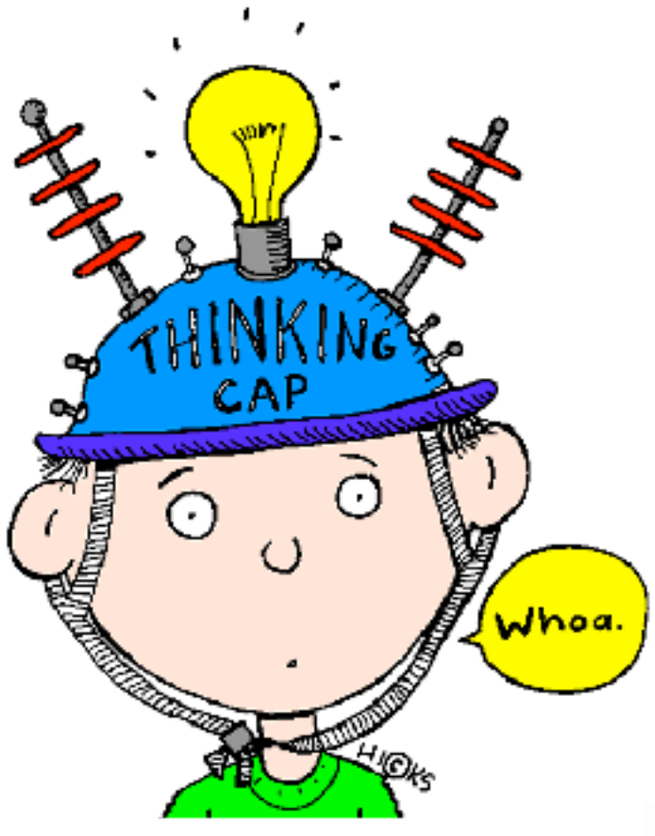
LANGUAGE

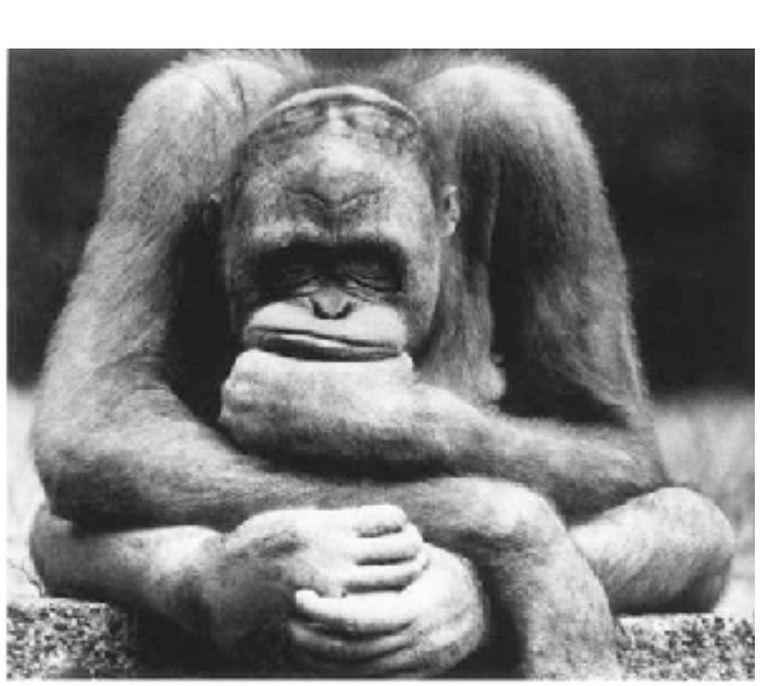
CULTURE

are both inherently and essntially social!

Most of our psychological theories describe the mind of an individual

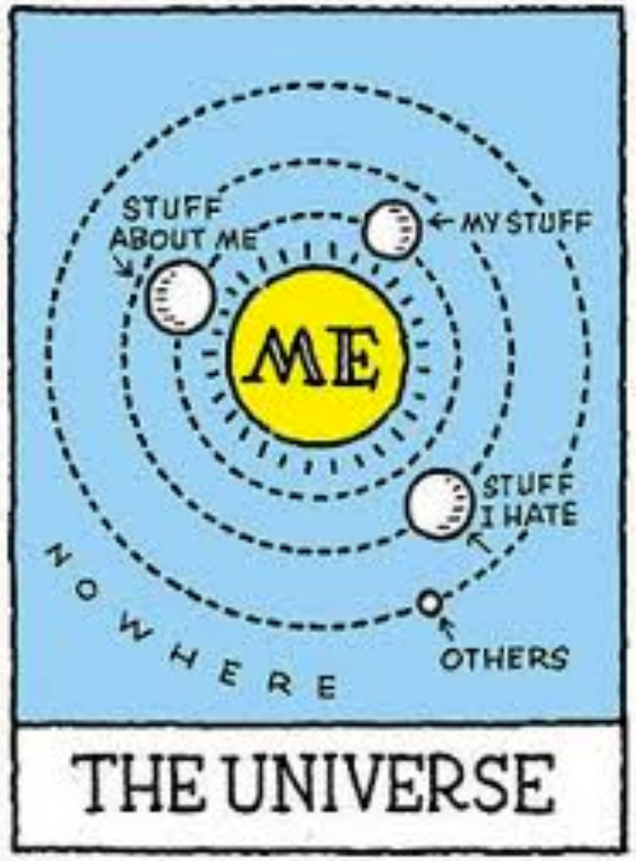

Thinking cat...
...is thinking

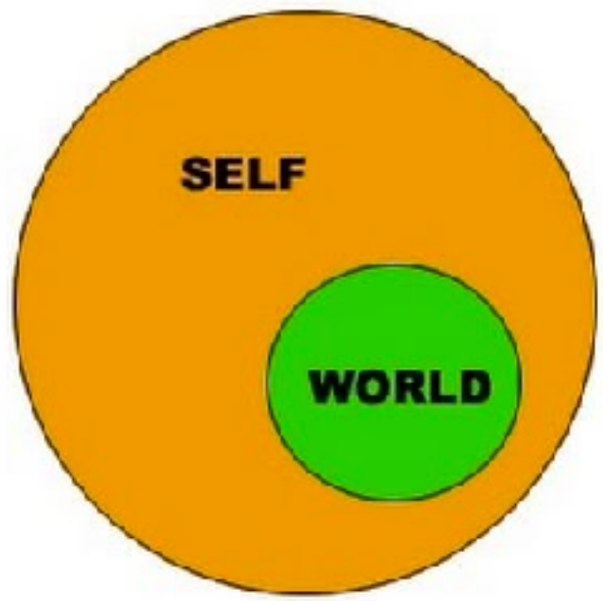

THINKING
CAP
Whoa.



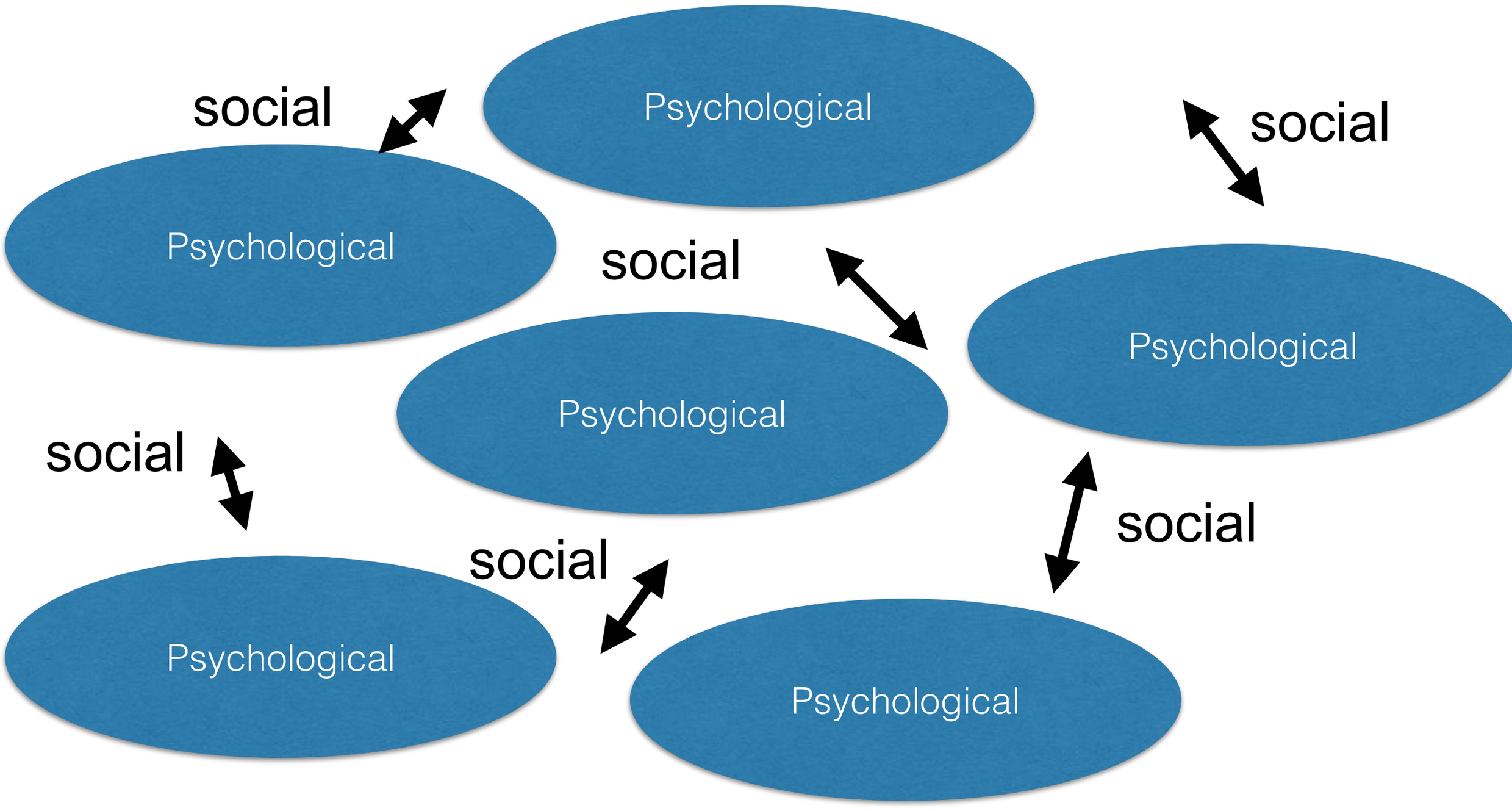
As we come to learn more, perhaps we could learn to understand *mind* as inherently social as well?

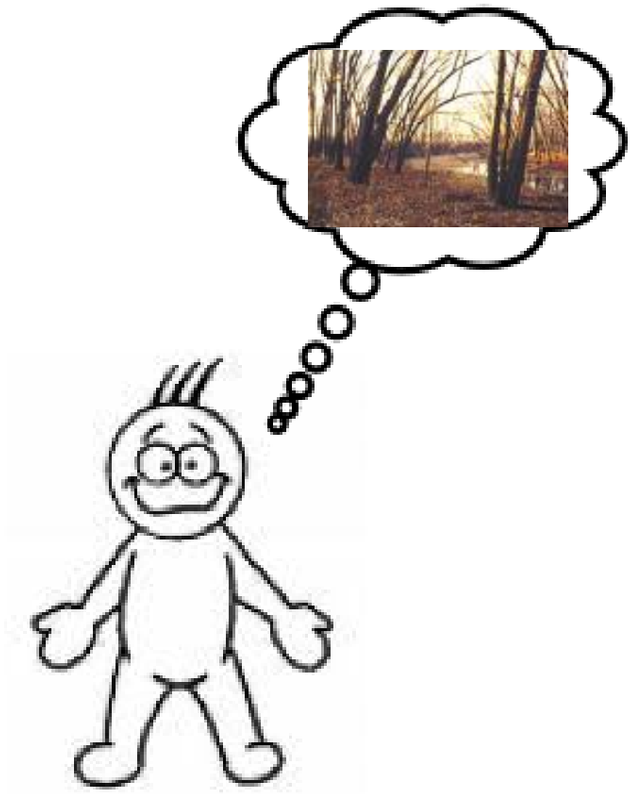
This might help us to avoid the trap of solipsism.

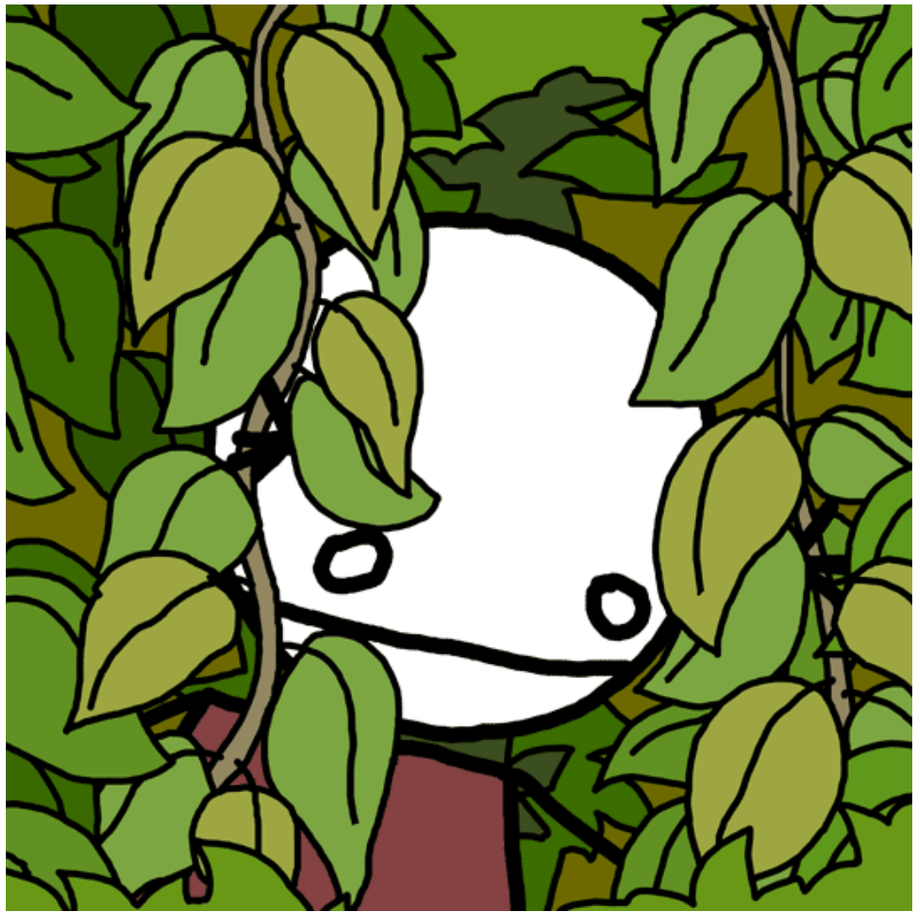




It is unclear whether we are justified in treating these two domains as if they were distinct.







The [external] world is its own best representation

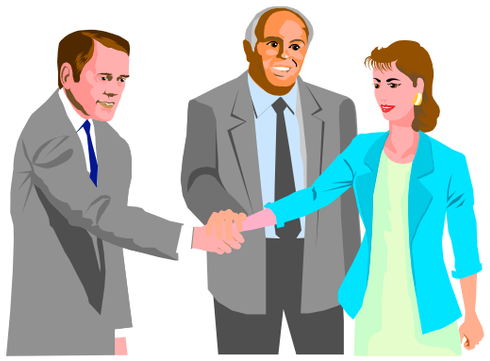
--Rodney Brooks

What is your environment?

Surfaces designed for humans

Which elements here present the greatest challenge for you?

Interdisciplinary interest

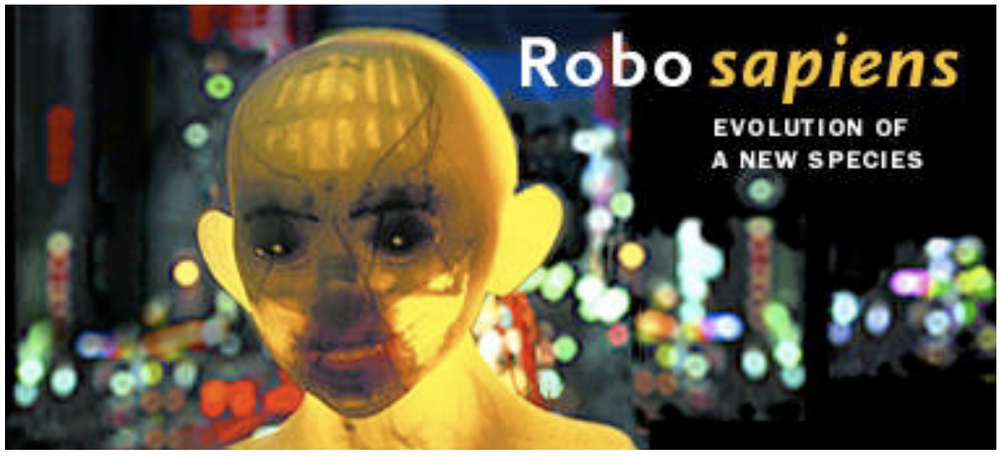


Social psychology

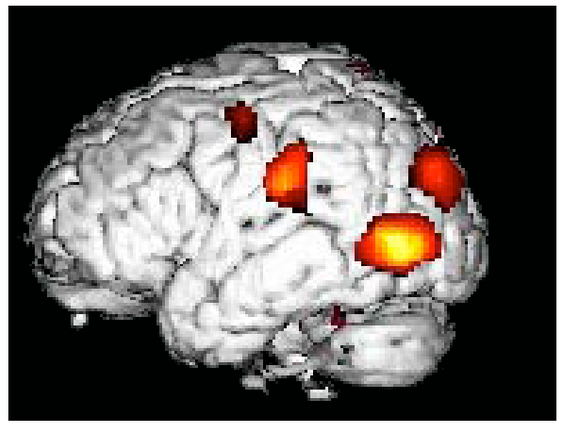
Comparative psychology

Developmental psychology

Social Cognition



Computer science and artificial intelligence



Cognitive neuroscience

A little revision

Introduction to Cognitive Science, COMP 20090

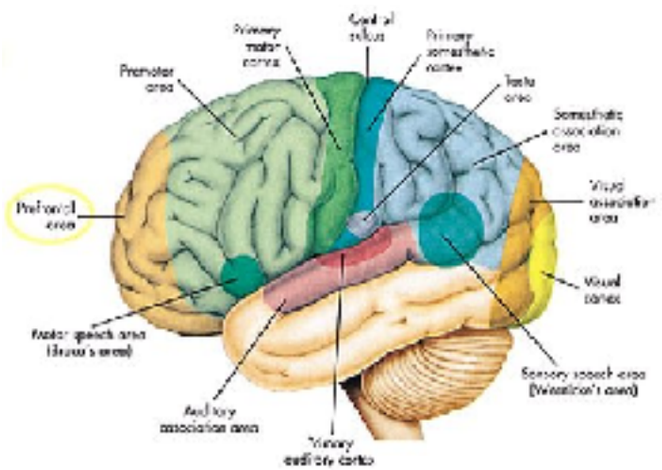
The Altricial - Precocial Spectrum

Altricial

- Helpless at birth
- Underdeveloped

Precocial

- Able to cope at birth
- Relatively developed

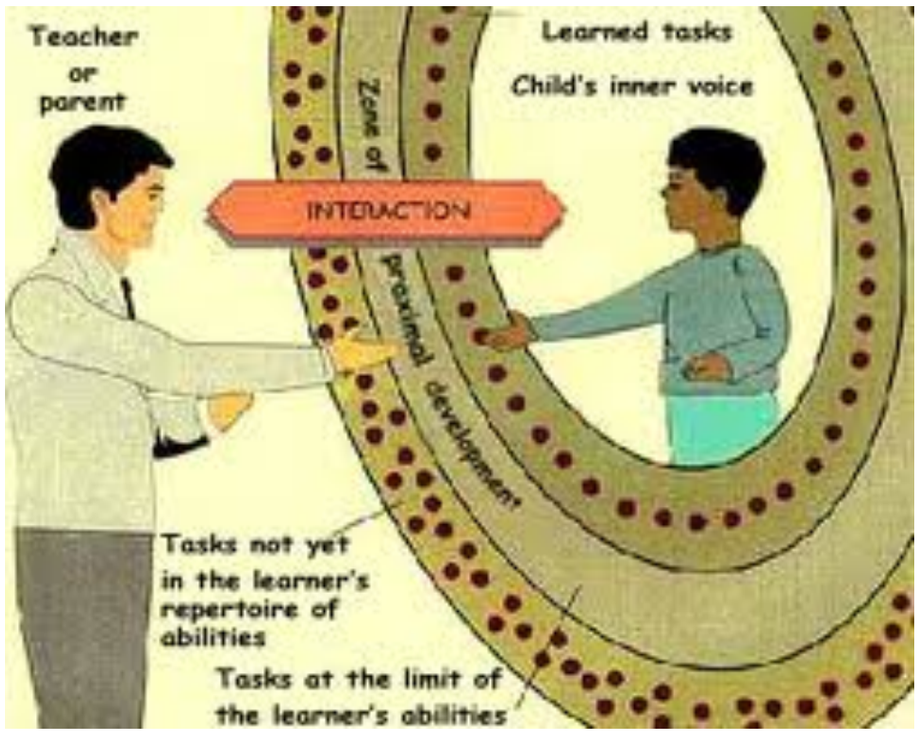


>20 years of development *after birth*

Lev Vygotsky

Learning is done in a social context.

Cognitive functions develop first between people, and only later become internalized



Zone of Proximal Development

Meaning and significance come from the web of social relations we live within.

We first encounter meaning in an inter-personal context, and later appropriate this for our selves: *internalization*

The Cooperative Eye Hypothesis

Michael Tomasello, 2006

Introduction to Cognitive Science, COMP 20090

Of all the apes, only humans have a clear contrast between the white of the eye (sclera) and the iris.

What might the effect of this contrast be?

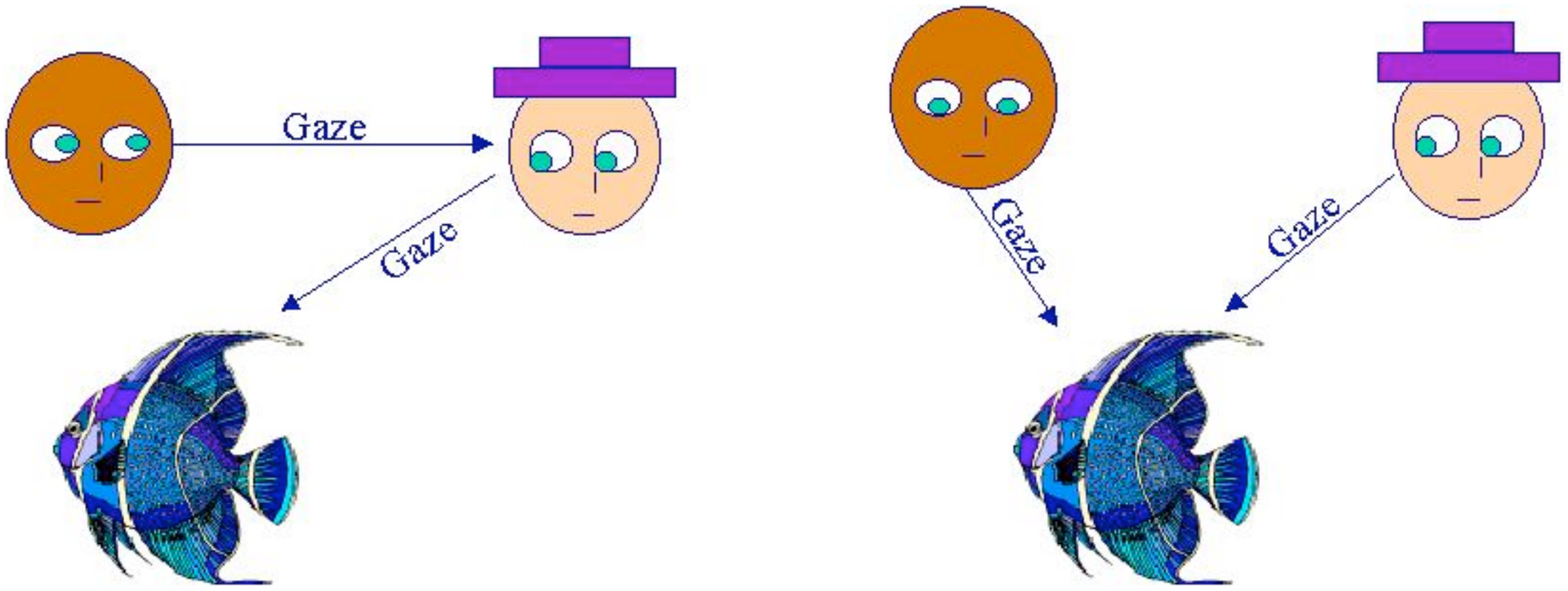
Patterns of eye contact in autistic individuals are radically different

Human

Ape

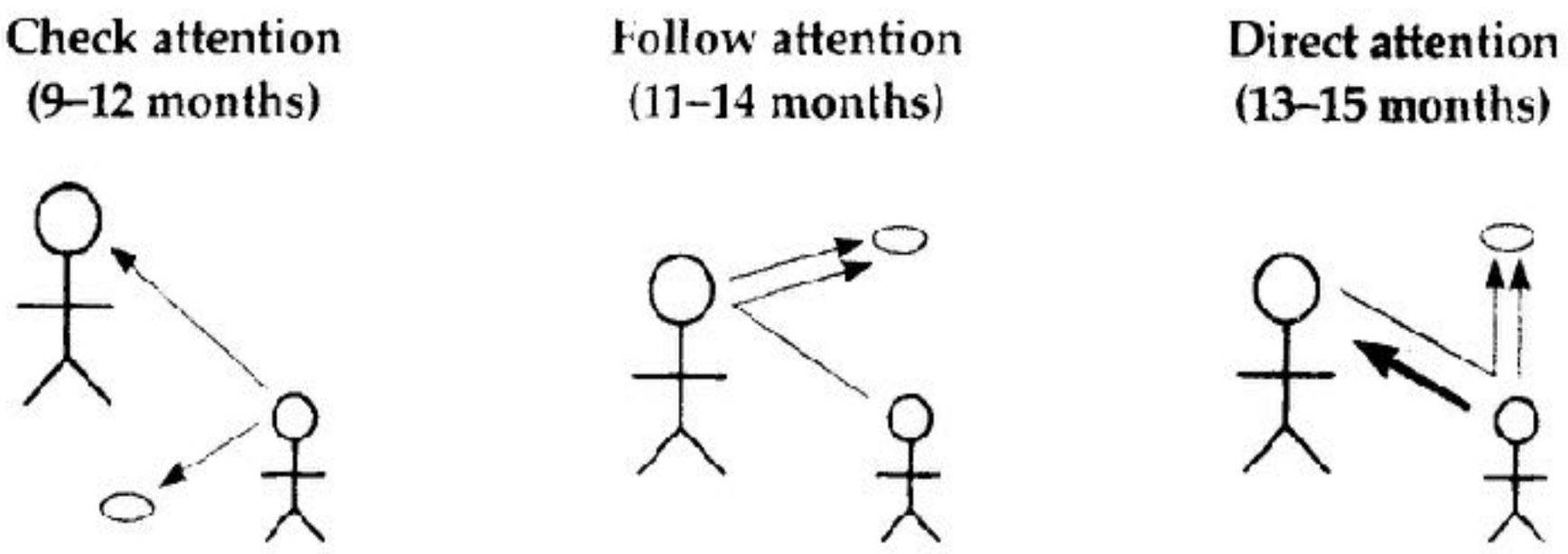
Ape in Planet of the Apes

Joint Attention



Introduction to Cognitive Science, COMP 20090

- Joint attention serves to share an experience
  - IJA: *Initiating* joint attention via eye contact or gestures
  - RJA: *Responding* to the direction of gaze or pointing of another individual
  - CJA: *Coordinating* initiations and responses with another individual



Joint Attention
and language evolution

- Michael Tomasello:
  man and ape share
  99% of genetic material
- Yet enormous difference
  in cognitive skills (language!)
- Solution: Joint Attention
  enables cultural learning
- Only one biological adaptation needed!

End of revision

Anthropology: Four Field Disciplines

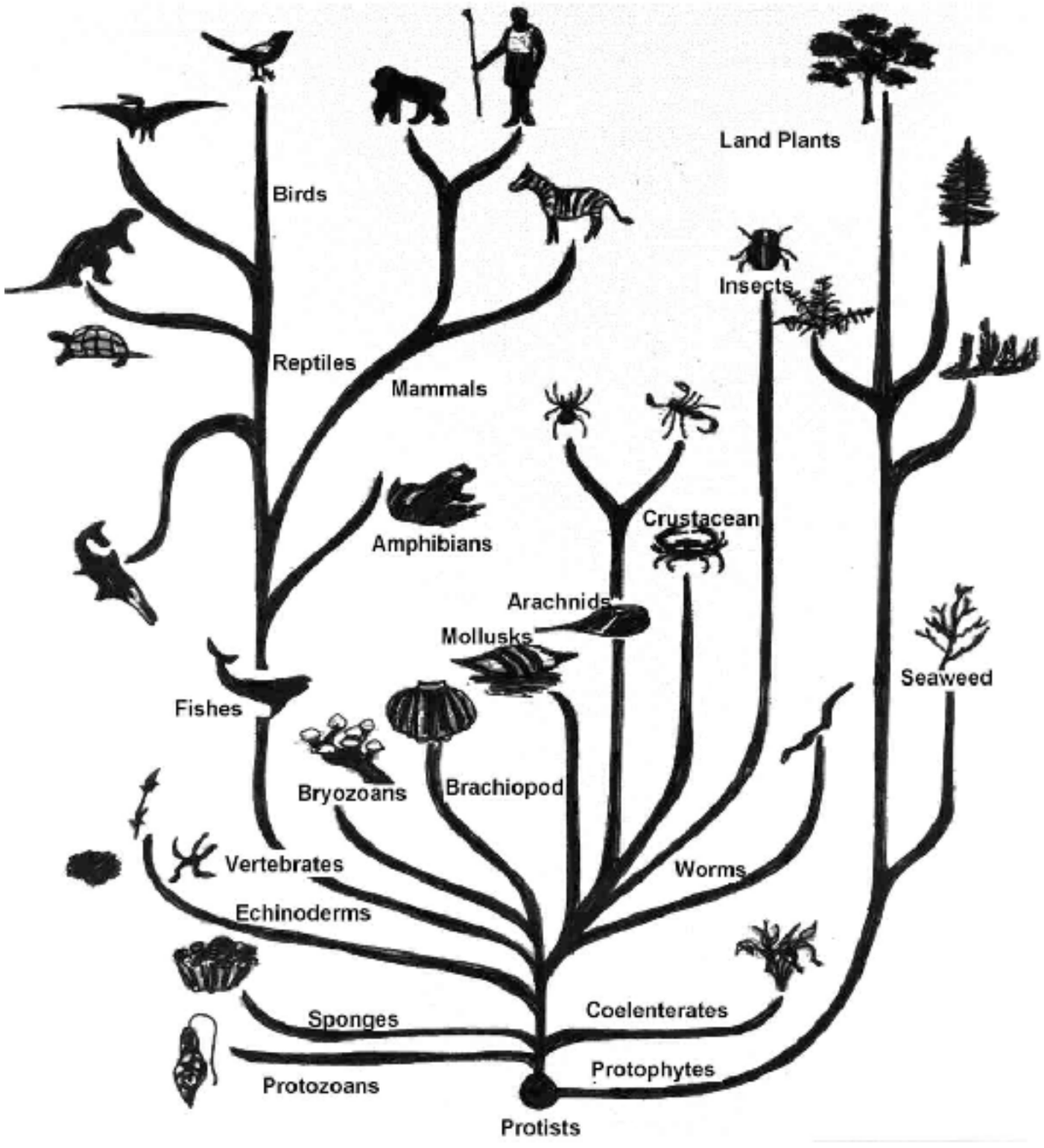
- Anthropology includes:
  - Research on human cultures and languages worldwide and through time.
  - Paleoanthropologists analyze ancient fossil humans and their ancestors.
  - Primatologists study the behaviors of our closest animal relatives and other primates.
  - Others investigate the genetic basis for variations among human populations.

Did you ever try to point something out to a dog?

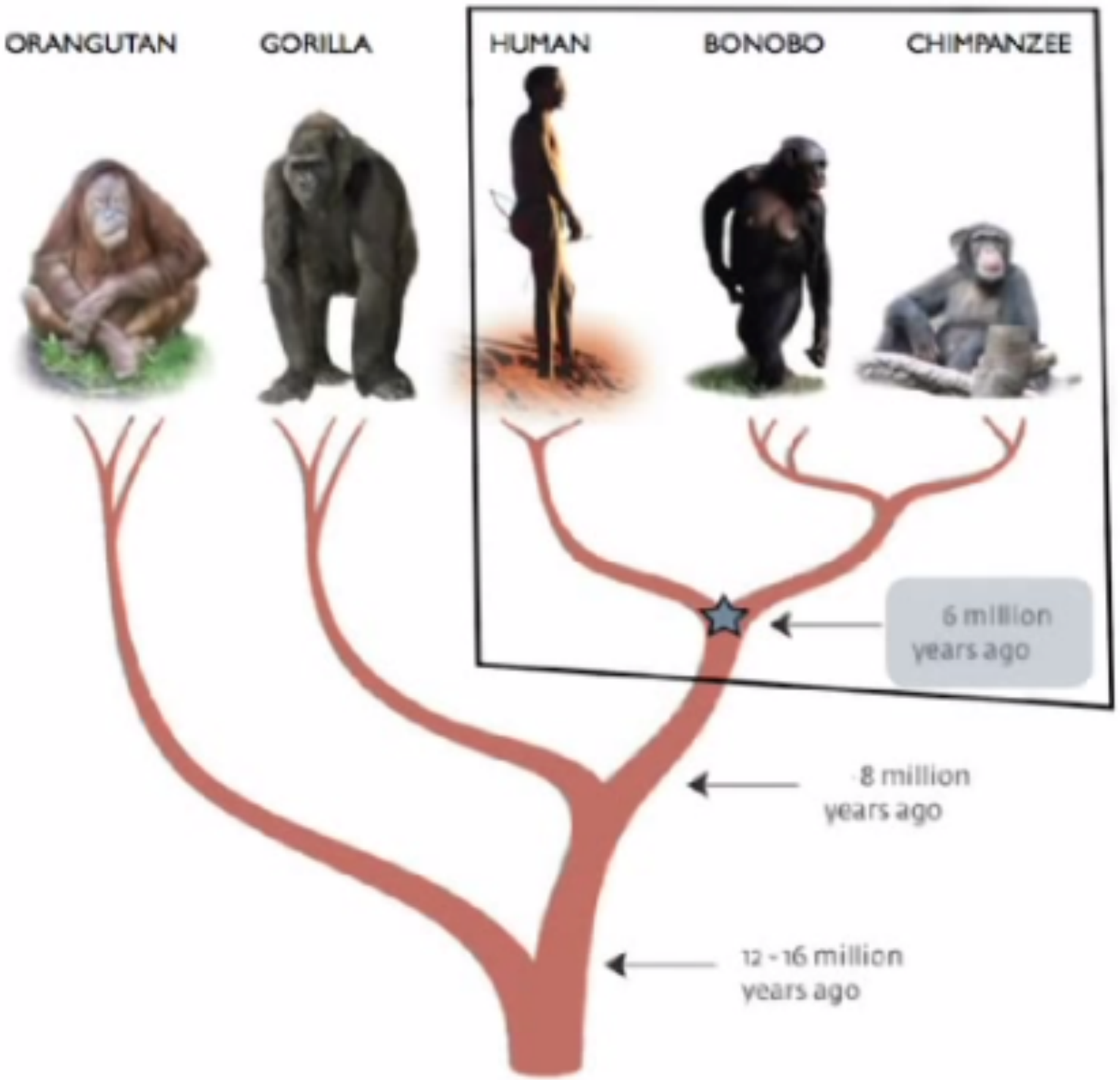
Not all animals exhibit joint attention.

Chimps may (somewhat)

Chimps will look in the direction that the head of another chimp (or human) points. We follow the eyes…..



Last common ancestor of chimp and human: ca 5 - 15 million years ago


ORANGUTAN
GORILLA
HUMAN
BONOBO
CHIMPANZEE
6 million years ago
8 million years ago
12 - 16 million years ago

Humans and Other Primates

- The human species is one kind of primate, a subgroup of mammals that includes lemurs, lorises, tarsiers, monkeys, and apes.
- Humans are most closely related to the great apes:
  – chimpanzees, bonobos, gorillas, and orangutangs

★ Please don't confuse monkeys and apes.

What a difference a little time can make!

eusocial animals: social roles are fixed (by and large)

Eusocial Mammals

Naked mole rat (Somalia, Kenya, Ethiopia)

Also the Damaraland mole rat (Namibia)

Naked Mole Rat Video

Primates spend their lives defining, defending, and improving upon their social roles.

Chimpanzee

- Communities with open subgroups
- Males generally move
- Male dominance with mother important in determining rank
- Maintain strong mother-child bond
- Grooming is a common pastime
- Promiscuous sex when female is fertile
- Settle disputes by aggressive behavior
- Dependence upon cultural behavior
- Make and use tools
- Males hunt in groups and share kill

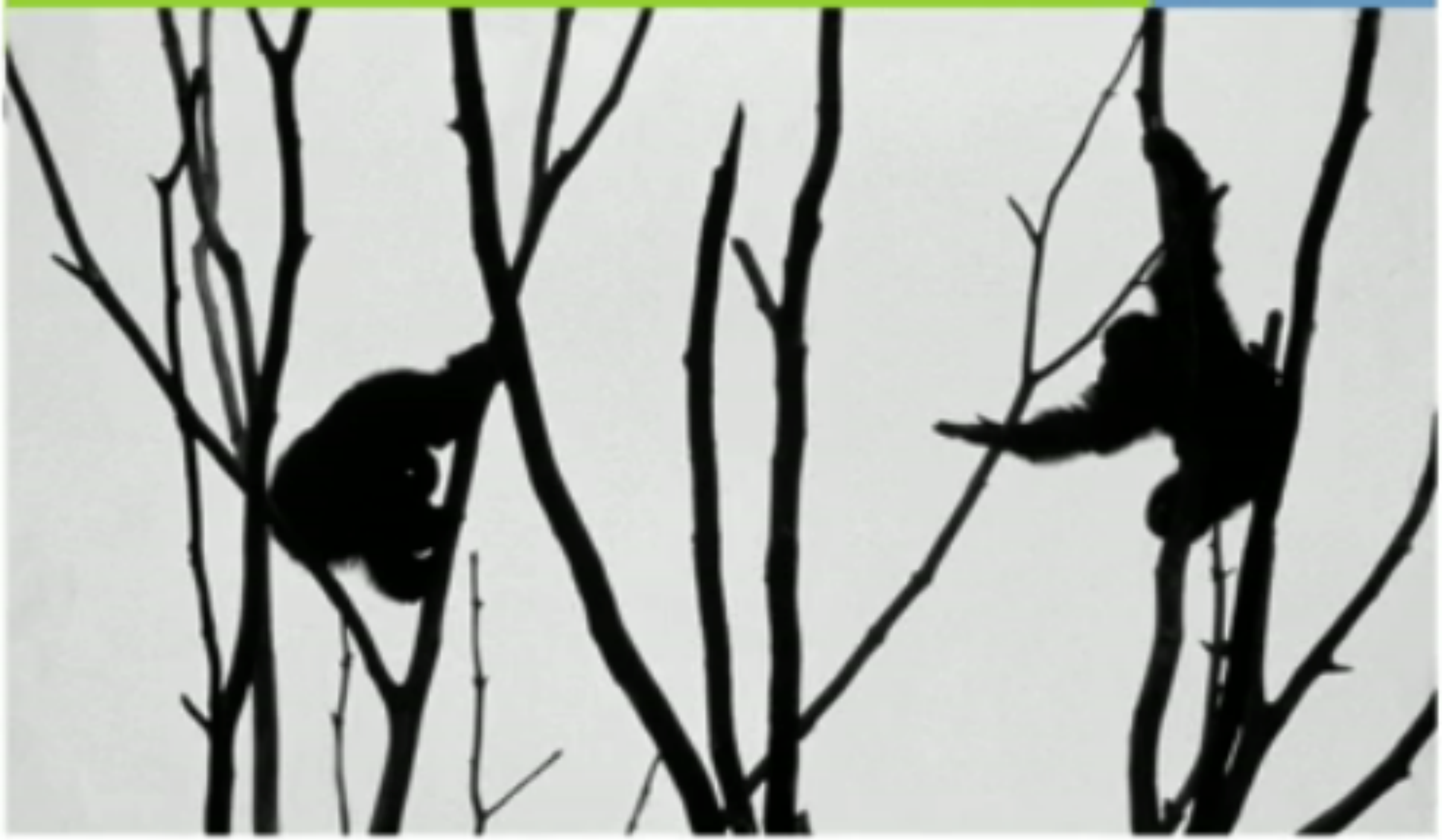
Bonobo

- Communities with open subgroups
- Females generally move
- Female dominance
- Strong mother-child bonds
- Grooming is a common pastime
- Promiscuous sex in all varieties
- Settle disputes through sex
- Dependence upon cultural behavior
- Make trail markers
- Females hunt in groups and share kill

The Bonobo Way

Introduction to Cognitive Science, COMP 20090

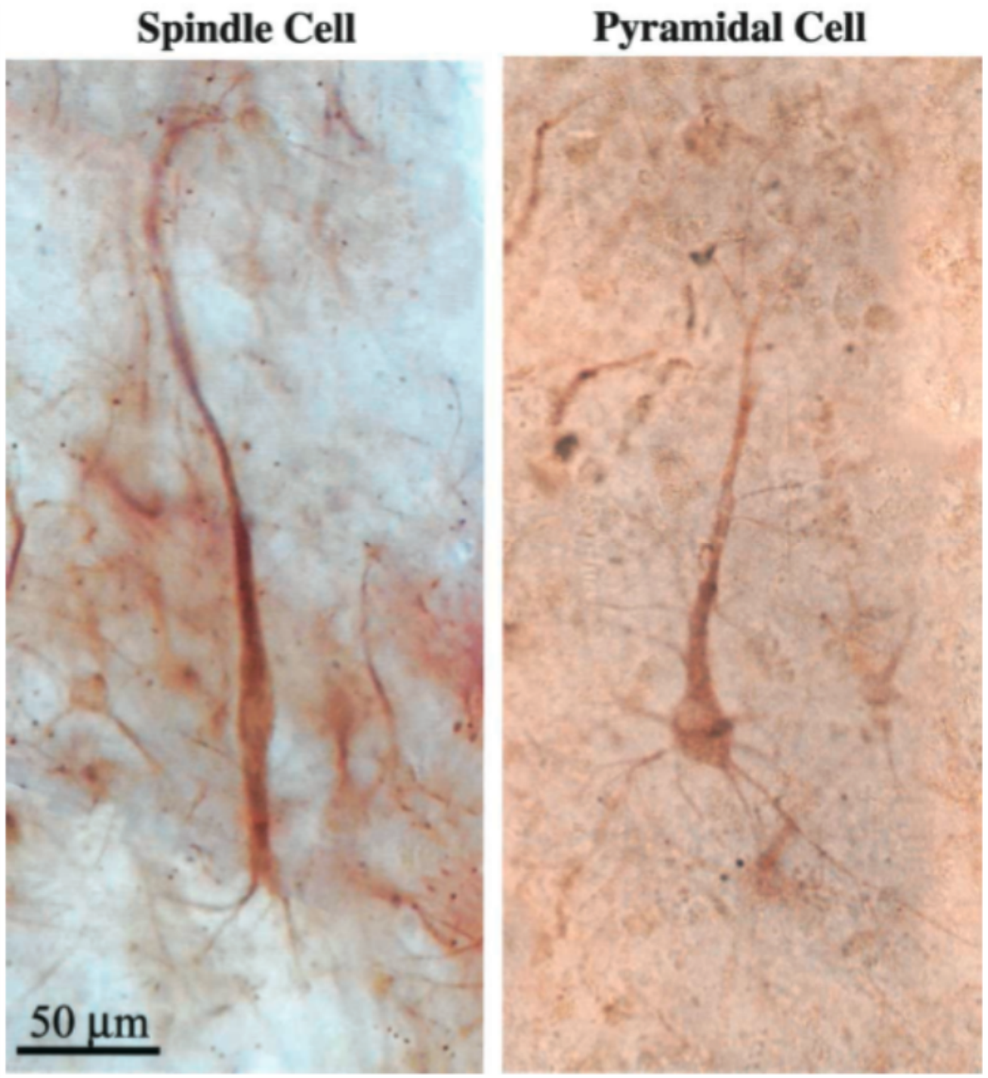
Reconciliation Behavior



Reconciliation and Its Cultural Modification in Primates

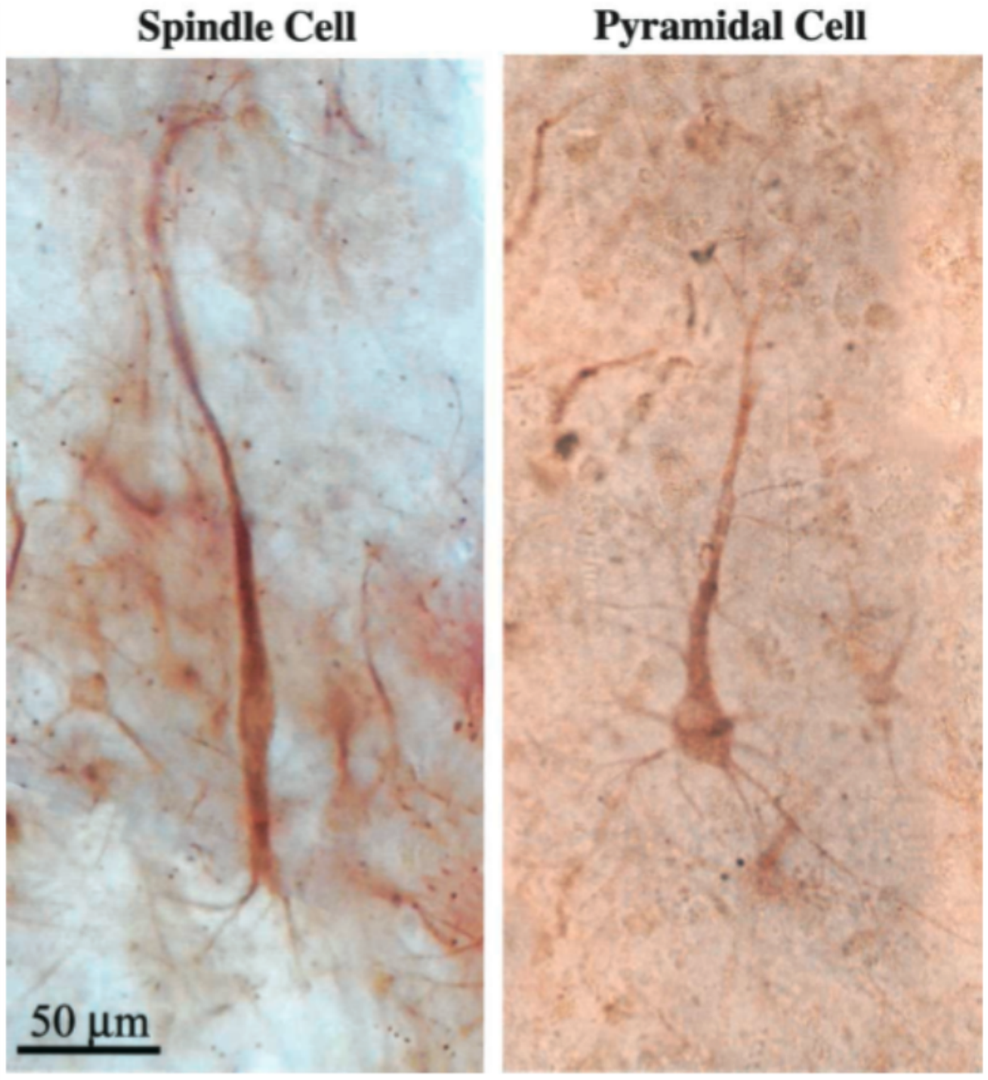
- There is evidence for reconciliation in more than 25 different primate species.
- Reconciliation is common mechanism found whenever relationships need to be maintained despite occasional conflict.
- Chimpanzees are the only animals to use mediators in conflict resolution.
- Reconciliation is a learned social skill subject to what primatologists now increasingly call “culture”.

A curious tale from neuroscience: Spindle Cell Neurons



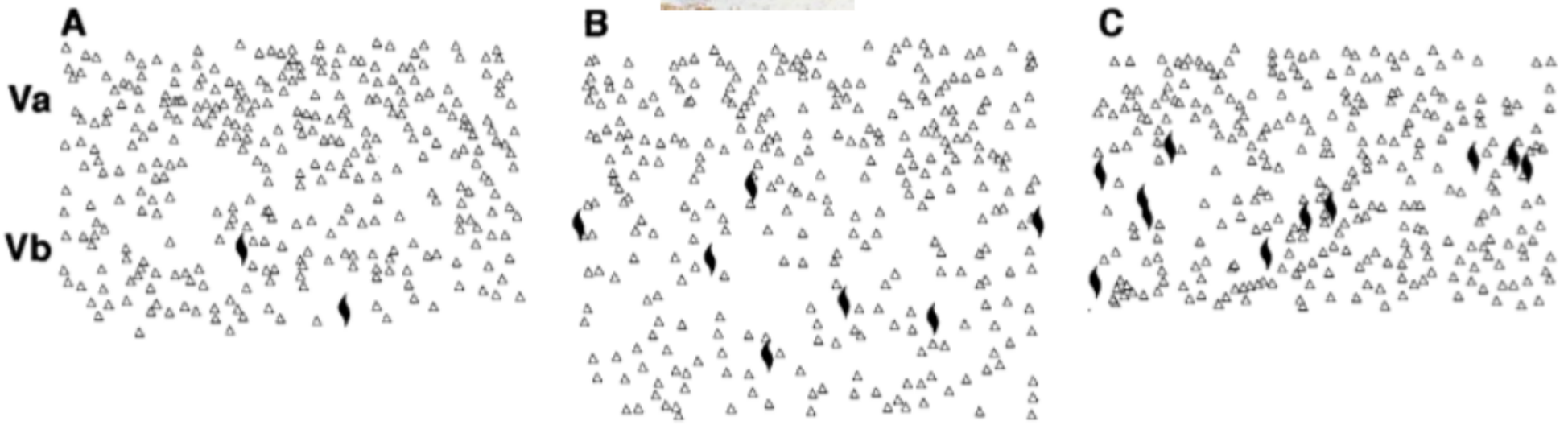
Q: What anatomical differences are there between ape brains and monkey brains?

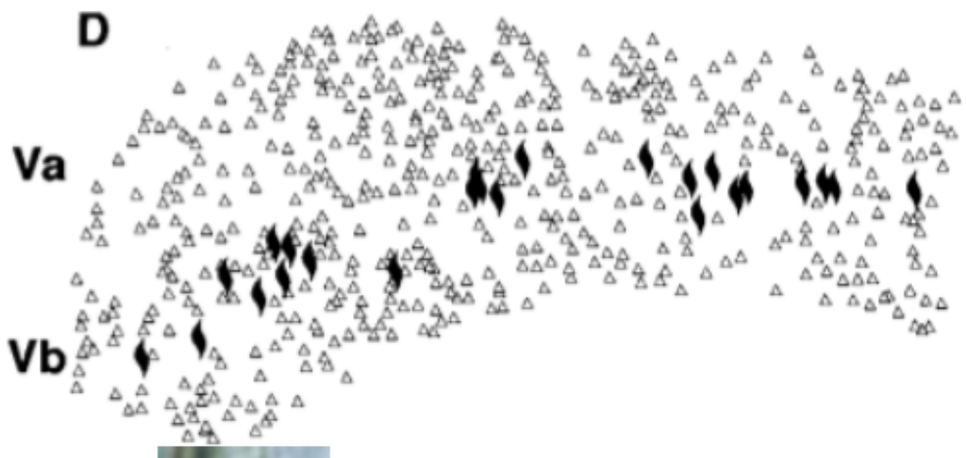
A: Very little. Larger frontal cortex. hemispheric specialization. Spindle cells.

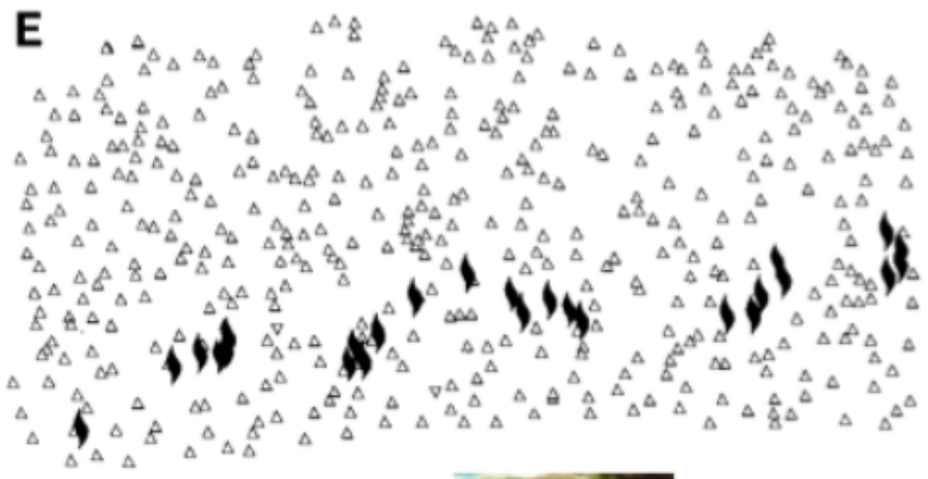


Spindle cells (a.k.a. von Economo neurons) are sparsely distributed in certain cortical areas in apes.

Curiously, their distribution is similar to the degree of social embeddedness of the individual species.







In most apes, they are found only in the Anterior Cingulate Cortex… a part of the brain that responds to social signals and threats.

In humans, they extend out into pre-frontal cortex.

Their function is not known, but evidence suggests that it is related to the social complexity of the lives of each species.

Convergent Evolution: Same problem, Same opportunity, Similar solution

e.g. the eye has evolved several times (with slightly different results, but each taking advantage of visual information).

The recognition of *convergent evolution* tells us that there is an important similarity between the cases. What do they have in common?

North American kangaroo rat

Australian hopping mouse

North African jerboa

Asian jerboa

North American kangaroo rat

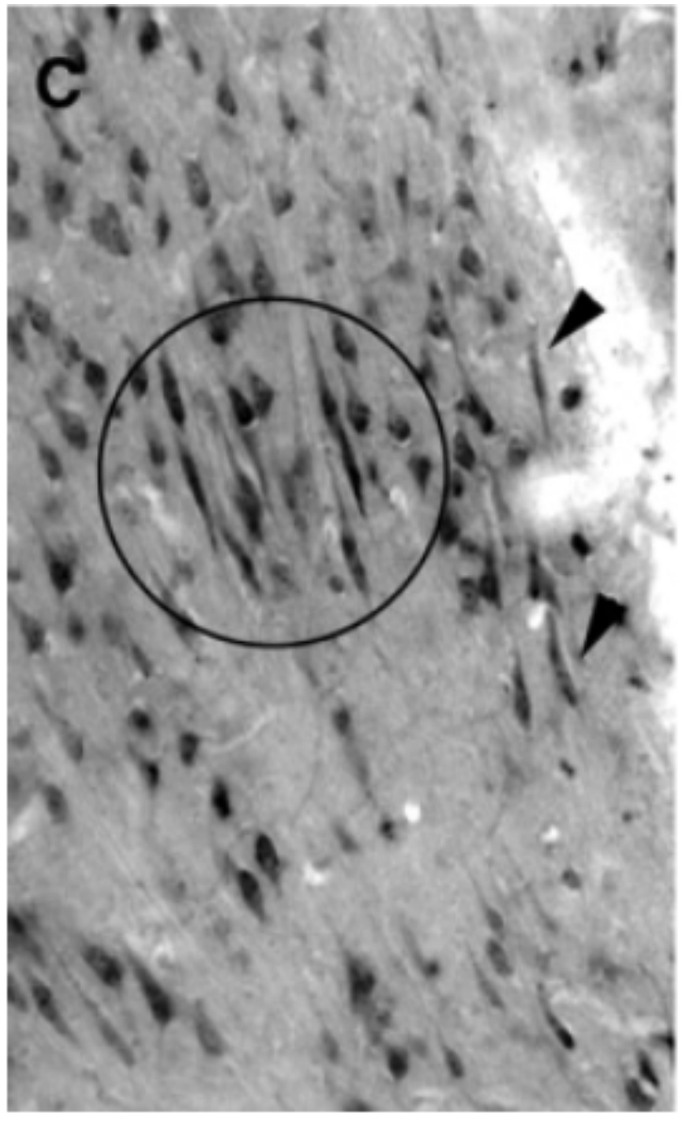
Australian hopping mouse

North African jerboa

Asian jerboa

The North American kangaroo rat, Australian hopping mice, and North African and Asian jerboa have developed convergent adaptations for hot desert environments; these include a small rounded body shape with very large hind legs and long thin tails, a characteristic bipedal hop, and nocturnal, burrowing and seed-eating behaviours. These rodent groups fill similar niches in their respective ecosystems.

Astonishingly, spindle cells have recently been found in the forebrain of a female humpback whale, and in small numbers in a few other cetaceans!



Female humpbacks are richly social, but we know relatively little about their social lives.

Convergent Evolution, but WHY? What is the common (social?) problem that these cells help solve?

Even more recently, spindle cells have also been found in Elephants, another intensely social animal.

Please note: we are avoiding any approach that might claim to know what these cells do. Clearly we can learn from these findings something about our commonalities with these other animals, and something about the role of the nervous system in sustaining our specific forms of social organisation.

Some Sad Stories from Social Psychology

In the studies to be discussed, we need to ask

"What are the anxieties that are widespread within society that give rise to these very problematic studies"

Social psychology seems to respond to the worries of the moment

Case 1: Harry Harlow

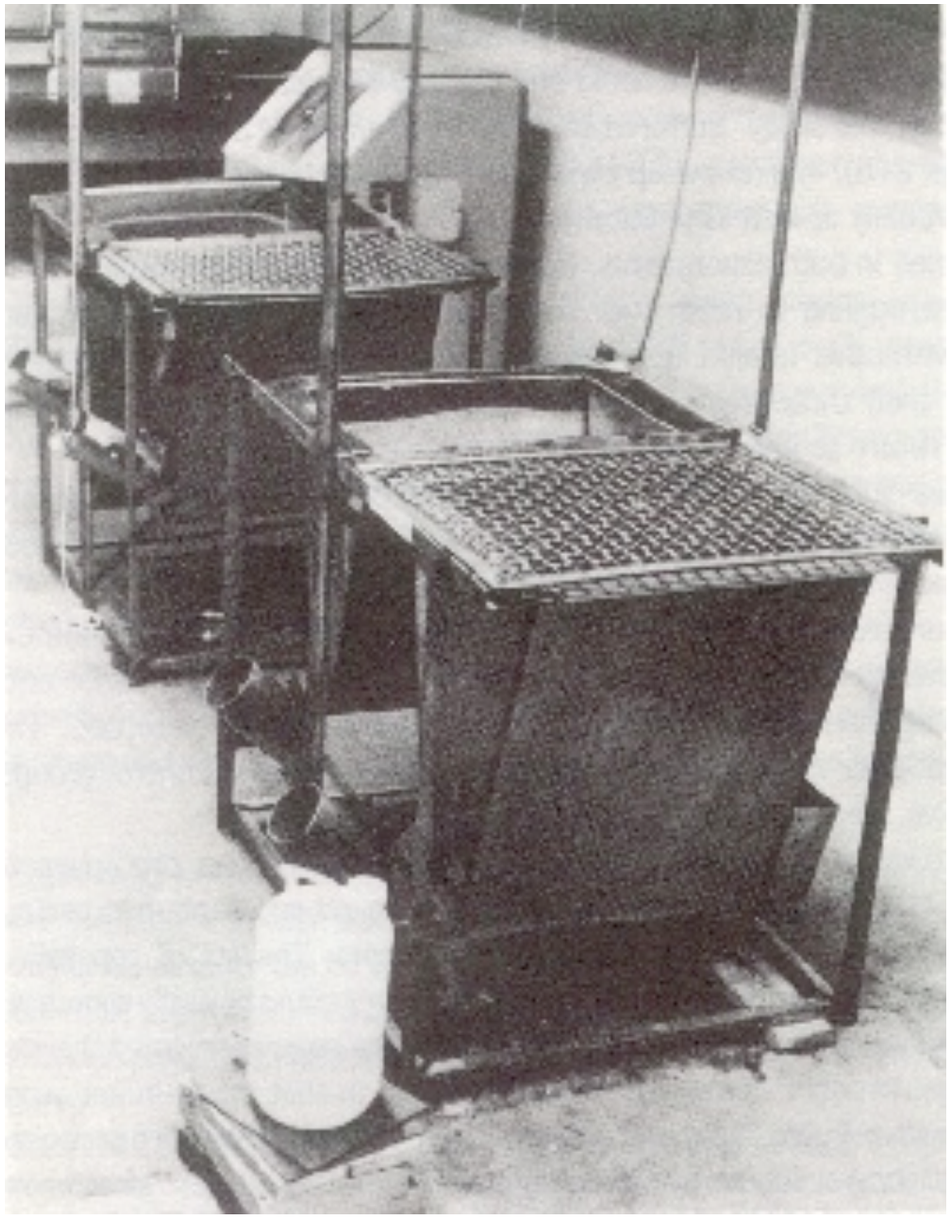
Harry Harlow (1905-1981): Creepy Scientist....

Provided monkey babies with 2 surrogate mothers: 1 wire frame, hard, unlovely, with milk. One soft, attractive, but dry.

Figure 3. Cloth mother surrogate.

This demonstrated that monkeys need social touch and affection (duh).

Used creepy terms like "the pit of despair", "the rape rack", etc in his work.



The pit of despair……

Harlow's experiments on social bonding, maternal separation, isolation, etc. fed a hunger from the public for advice on how best to interact with human infants.

Psychology often seems to play this odd role.

A pop-up robot used to scare small monkeys in Harlow's lab

His experiments may have contributed to the creation of the animal liberation movement in the USA, and to the development of the awareness of ethical issues in research using animals.

Some of his work may also have informed the development of A*ttachment Theory* (mainly John Bowlby and Mary Ainsworth).

This is a useful field that inquires into the consequences of a rupture to the early infant/mother relationship.

What social fears was Harry Harlow's work responding to?

Why did people feel they needed to be told by scientists how to be parents?

We need to understand this research as positioned in the USA after the 2nd World War. This is where the suburbs emerged and attracted millions, drawn there by societal and commercial pressures and the dream of a modern consumerist future.

There was heightened anxiety due to the falling away of the extended family, which had been the norm but which was not supported by suburban living.

Suburban nuclear families made the transmission of parenting skills difficult.

There was an appetite for instruction in matters that had previously been simply passed on in practice.

Case 2: Stanley Milgram

Classics in social ps

(1) The Milgram studies

Note how the recruitment targets subjects who are unfamiliar with, and likely to be intimidated by, the university environment.

Public Announcement

WE WILL PAY YOU $4.00 FOR ONE HOUR OF YOUR TIME

Persons Needed for a Study of Memory

*We will pay five hundred New Haven men to help us complete a scientific study of memory and learning. The study is being done at Yale University.

*Each person who participates will be paid $4.00 (plus 50c carfare) for approximately 1 hour's time. We need you for only one hour: there are no further obligations. You may choose the time you would like to come (evenings, weekdays, or weekends).

***No special training, education, or experience is needed. We want:**

Factory workers	**Businessmen**	**Construction workers**
City employees	**Clerks**	**Salespeople**
Laborers	**Professional people**	**White-collar workers**
Barbers	**Telephone workers**	**Others**

All persons must be between the ages of 20 and 50. High school and college students cannot be used.

*If you meet these qualifications, fill out the coupon below and mail it now to Professor Stanley Milgram, Department of Psychology, Yale University, New Haven. You will be notified later of the specific time and place of the study. We reserve the right to decline any application.

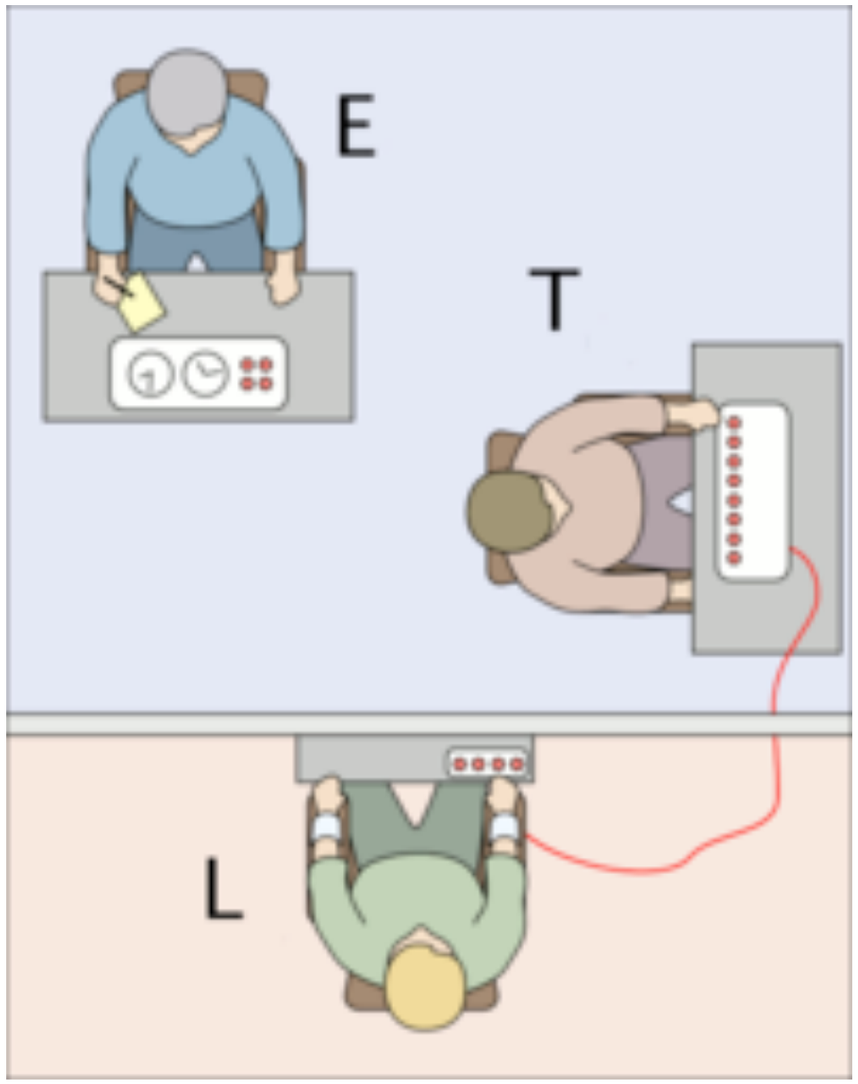
*You will be paid $4.00 (plus 50c carfare) as soon as you arrive at the laboratory.

TO:
PROF. STANLEY MILGRAM, DEPARTMENT OF PSYCHOLOGY, YALE UNIVERSITY, NEW HAVEN, CONN. I want to take part in this study of memory and learning. I am between the ages of 20 and 50. I will be paid $4.00 (plus 50c carfare) if I participate.

NAME (Please Print). . . . . .

The Milgram Studies

Subjects were told they were being assigned randomly to the role of teacher or learner. All were actually given the role of teacher.



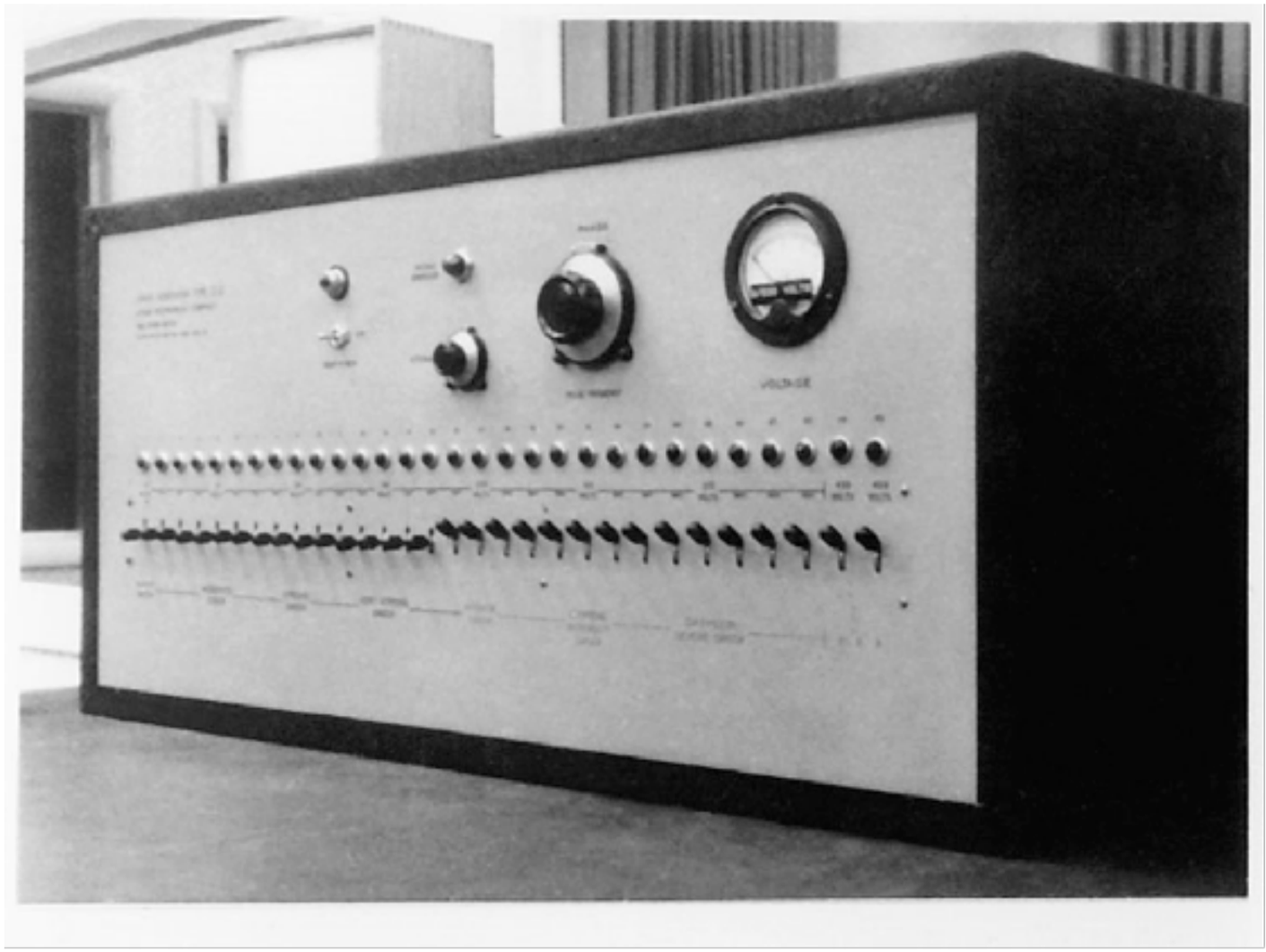
The learner was a stooge who acted the part of a volunteer.

The teacher worked in close proximity to the experimenter, and separated by a one-way mirror from the learner

http://en.wikipedia.org/wiki/Milgram_experiment

The “teacher” administered increasingly strong electric shocks as the “learner” made mistakes in the set task.

No actual shocks were used, but the “teacher” did not know that.

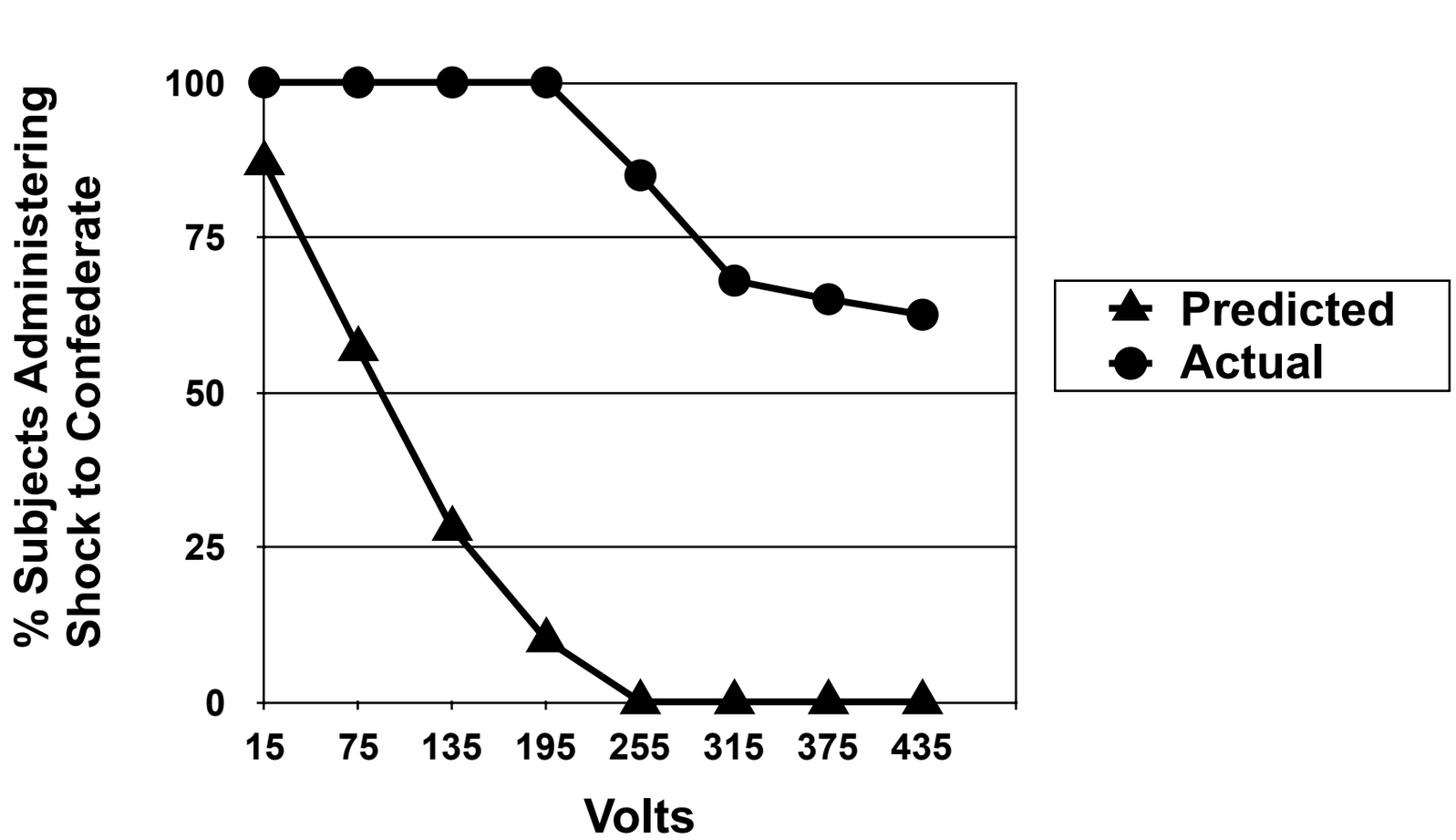


The Milgram Studies

- 15 volts to 450 volts ("XXX")
- At 120 volts learner shouts in pain
- At 150 volts learner asks to stop
- At 300 volts learner pounds on wall
- At 330 volts learner stops responding
- Question: how far will teachers go?

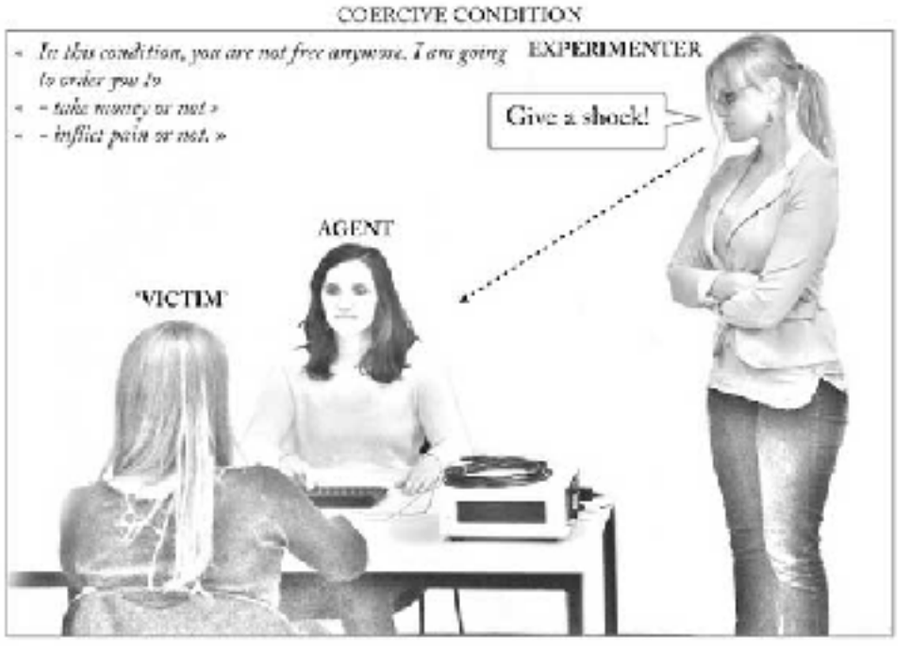
The Milgram Studies

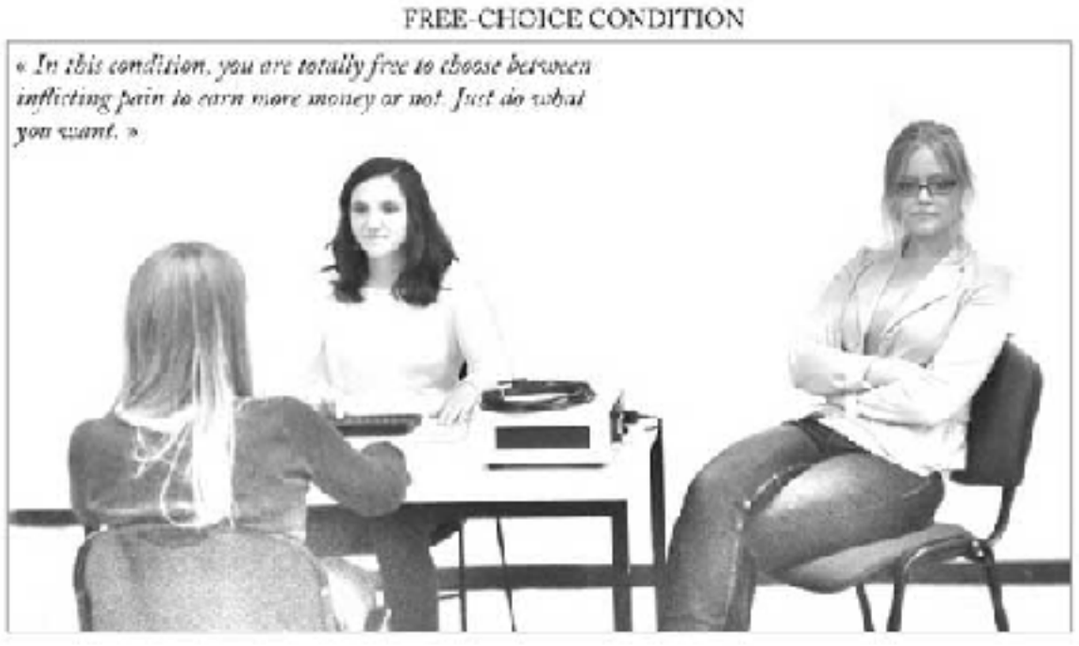
- Psychologists predicted
  - 2% would go to maximum level
- Actual results
  - 65% of teachers went to the maximum level
- Other factors
  - Lab coat
  - Proximity
  - poorly educated
- Ethical issues



Brief clip of a subject taking part.

The required reading for this week includes a recent (non-) replication of the Milgram study.





See what you think. Be careful of drawing very serious conclusions from very little (and complex) evidence! Many aspects of the original study are not used here. (And women suddenly appear in the world of social psychology, which is otherwise inhabited by monkeys and men!!)

What social fears was Milgram's work responding to?

The Nuremberg trials are going to be relevant to this discussion (1945/1946) but also the trial of Adolf Eichmann (1961/1962)

Confronted with the horrors of WW2 and the Nazi state, it was important to ask how the structures of authority interact with individual will or conscience.

Case 3: Philip Zimbardo and the Stanford Prison Experiment

Social Psychology Classics:

Stanford Prison Experiment

- Conducted in 1971 by Philip Zimbardo and others in the basement of the Stanford Psychology Department.

- Volunteers were randomly assigned to play the role of guards and prisoners in a mock prison in the basement.

- The project was planned to run for 14 days, but was ended prematurely after 6 days, after Zimbardo's girlfriend raised concerns about the well-being of the volunteers

The Stanford Prison Experiment

was NOT a scientific experiment (though it is often mistakenly treated as if it were)

was NOT conducted in a manner that could ever have informed science

did NOT lead to any conclusions we may rely upon

We need to cleanly separate

1. The events that took place in 1971

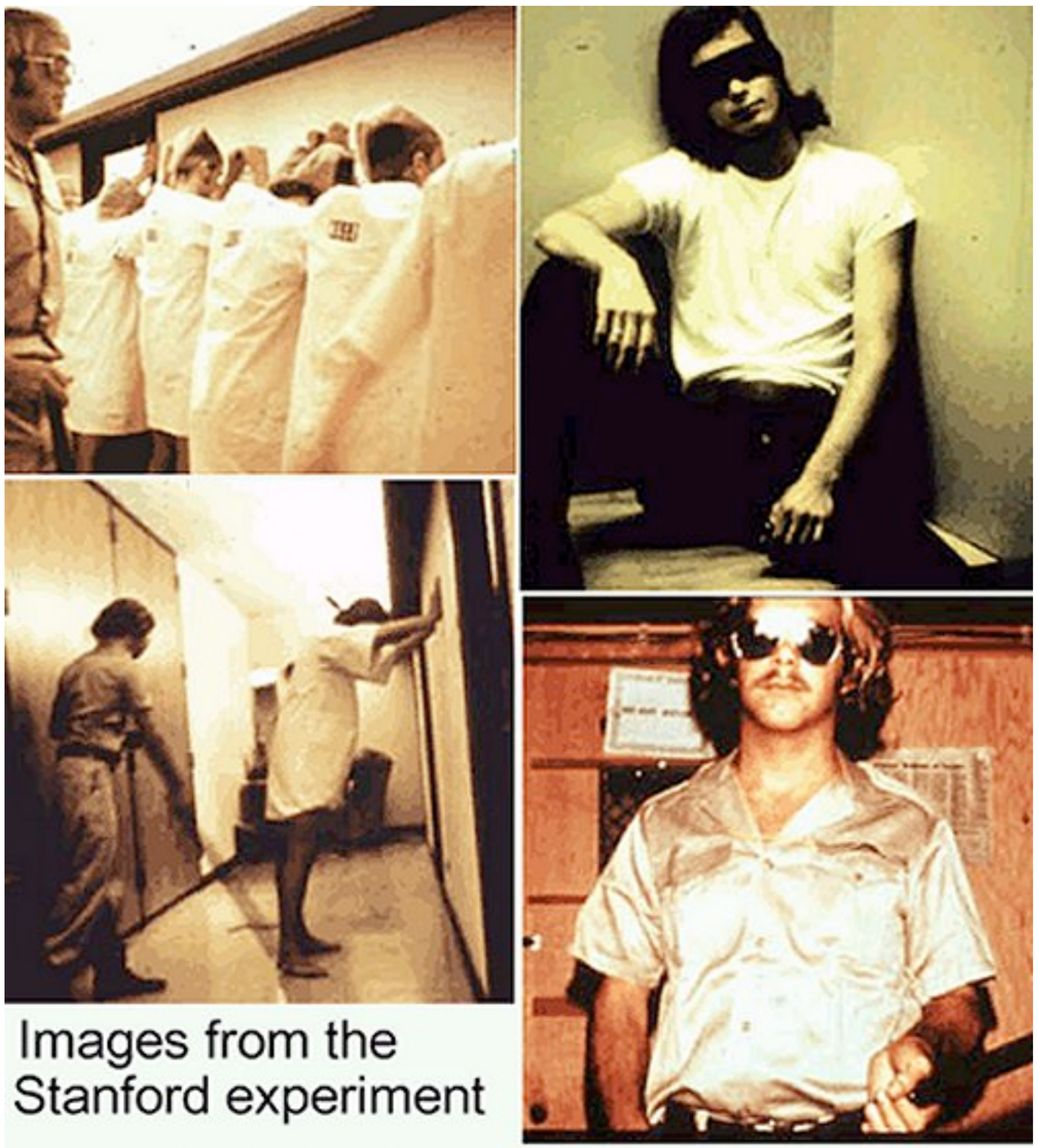
2. The myths and stories around that event, expecially as propagated by Phillip Zimbardo himself, and

3. The social consequences of such myths

1. Events

- Entire basement of Stanford University Psychology Department used to setup a 'mock' prison
- Prisoners were 'arrested' at their residences, made to wear prison issue uniforms ('dresses'), placed in cells, limited freedom to exercise, interact
- Conditions deteriorated. Some guards acted in abusive manners. Some prisoners exhibited signs of anxiety or trauma.
- Zimbardo was on the floor most of the time, egging the volunteers on and manifestly affecting their behaviour
- After 6 days, the project was called off

2. Myths



The main source of documentation we have available is a website that is curated by Zimbardo himself.

This website perpetuates all the known myths about the "experiment"

One of the original guards from SPE did an “I-am-a” on Reddit

https://www.reddit.com/r/IAmA/comments/2y5sbt/iwasa_guard_in_the_1971_stanford_prison

This is essential reading if you want to understand the whole sorry story

- One interpretation, often repeated, asserts that brutality of the ‘guards’ and suffering of the prisoners resulted in the experiment being abandoned after only 6 days”

- With that framing, it has been suggested that guards were depersonalised in the group and their ‘role’ losing their individuality.
- One popular interpretation was that ‘tyranny’ was ‘embedded’ in the psychology of powerful groups – group of people in ‘social roles’ create ‘group norms’ and comply with them. Other interpretations exist. Do not treat this story uncritically!
- Group norms = acceptable beliefs and behaviours in a group

These assertions are not supported by any scientific evidence, and are pushed by Zimbardo himself

SPE has been very heavily criticized:

1. Findings not been reported in scientific publications, can only be evaluated through limited footage and website material. No experimental design, no data, no analysis …

2. Evidence of resistance by the prisoners and some of the majority of the guards did not act tyrannically has largely been ignored

3. Zimbardo was among the participants, egging them on. His role is absolutely not neutral and he greatly influenced all behaviours observed.

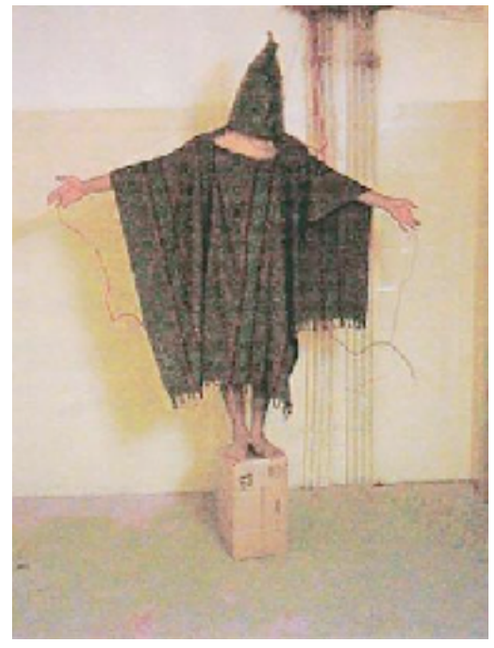
   Example of an inappropriate claim from this sorry affair: "Guard aggression was emitted simply as a consequence of being in the uniform of a guard and asserting the power inherent in that role" (Haney et al., 1973, p. 62)

Consequences:

Claims like these, made with authority, can be expolited politically.

Philip Zimbardo gave evidence on behalf of one of the accused in the Abu Grahib scandal. Why?

It may be convenient for higher persons in the command chain to claim that the "group norms" or the "situational factors" were responsible for the terrible behaviour in Abu Grahib



Some sources report a partial replication in 2006 (The Experiment) did not reproduce the findings.

But there were significant differences between the two.

The "replication" lay in the domain of reality TV, and cannot be taken seriously

The Stanford Prison Experiment was not a scientific experiment, it has been widely misreported, and it has been politically exploited.

What social fears was Zimbardo's work responding to (or exploiting)?

The civil rights movement and civil disorder around 1970 will be relevant here. Between the emergence of a civil rights movement championing the rights of African Americans, and a population bitterly opposed to the Vietnam War, American society was very fragile, marked by violent protest, and media images regularly featured citizens vs figures of authority in uniform.

Against that backdrop, some of the motivation for the study should be clear.

Case 4: Dunbar's number and social networking?

BRITISH SCIENCE FESTIVAL

Falling in love puts friendships at risk

DICK AHLSTROM
Science Editor
in Birmingham

IF YOU fall in love, expect to lose some friends. You can only maintain about five very close friendships, but two will be displaced by your new love interest, according to research into how men and women use social media such as Facebook.

Both genders expect something completely different from social media, according to Prof Robin Dunbar of the University of Oxford. "We only discovered the sex differences by accident," he said yesterday at the British Science Festival in Birmingham.

He and his team have been studying these differences over the past two years and yesterday released some of the findings. They initially looked at social media used by women, but it immediately became apparent that women wanted something completely different from the technology than men.

"Men and women seem to use completely different mechanisms to maintain relationships," Prof Dunbar said.

"For girls it is talking together. For boys it is doing things together. For girls the technology is perfectly designed for what they want to do, networking." This predisposes men and women to use mobiles and social media differently, he added. Use of social networking also has a strong numbers element to it.

Some Facebook users claim to have up to 1,000 "friends" but this was an unrealistic view, according to Prof Dunbar.

Your actual circle of friends was much smaller and could not physically exceed a maximum of 150 due to a limit set by the brain, he said. This figure has become known as "Dunbar's number".

He said, however, that while social networking lets people stay in touch, only direct person-to-person contact cements friendships. "Facebook helps you keep in contact with people, but it doesn't help you maintain relationships," Prof Dunbar said. Friendship tended to disintegrate if you don't maintain direct contact with people.

Yet we maintain only a tiny handful of genuine friendships and these occur in layers, he suggested. There is the core group of about five, those you would see every week and go to if you had problems.

The next layer of 12-15 are good friends you would see at least monthly and whose death you would find upsetting.

"Quite literally we have only just discovered that," Prof Dunbar said.

But with a close-friend limit of five, something has to give if you become romantically attached. "If you go into a romantic relationship you lose two friends," he said. Your new love knocks out one and typically causes a second to fall out of the core group.

"Your attention is so wholly focused on the new partner you don't have time to see the others."

Science Today: page 14

Your actual circle of friends was much smaller and could not physically exceed a maximum of 150 due to a limit set by the brain, he said. This figure has become known as "Dunbar's number".

Irish Times, Sept 16, 2010

That is TERRIBLE JOURNALISM!

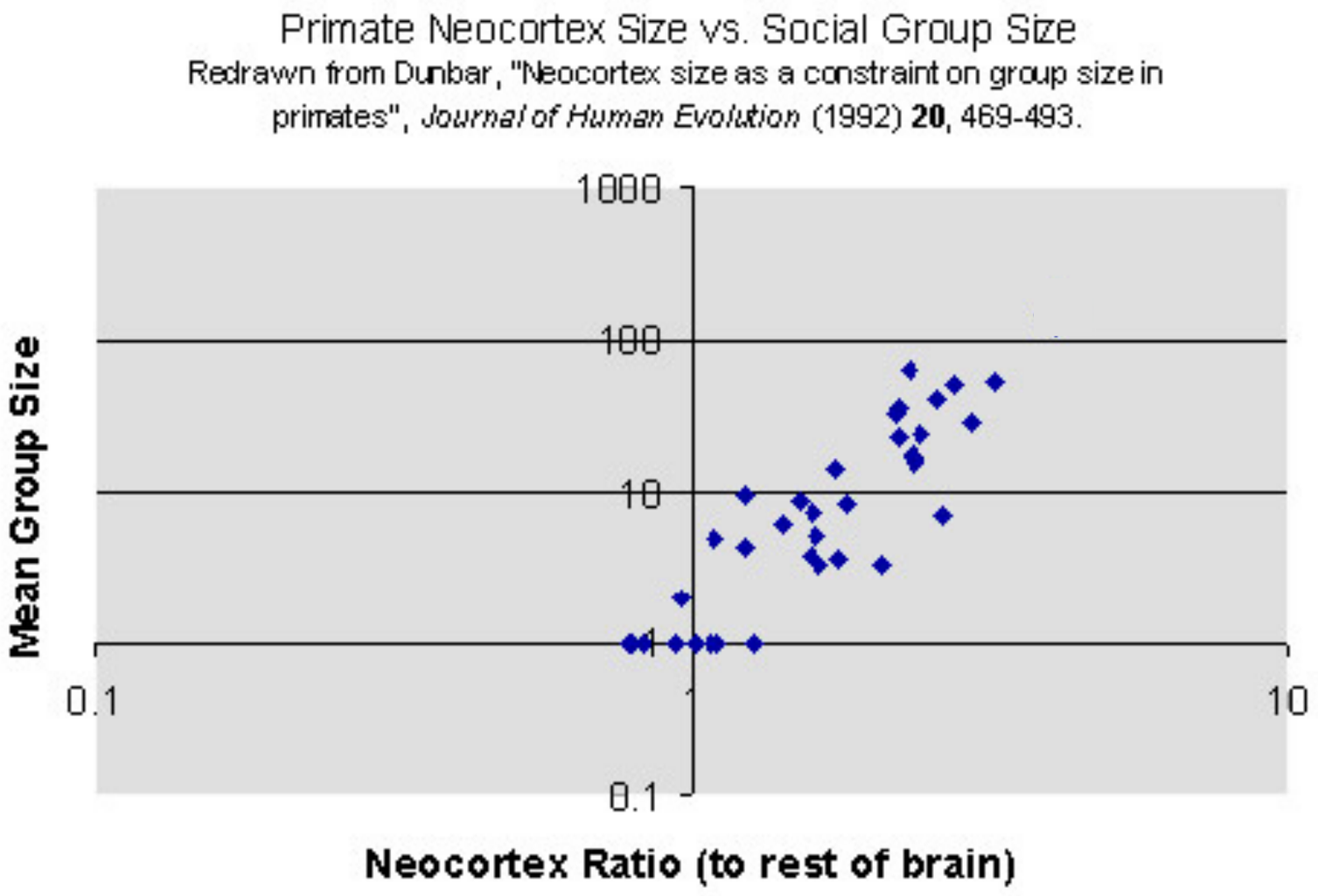
Brains, and Journalists do not mix well.

Critical Thinking Exercise: What is wrong with that report? If you think it is ok, you are not thinking critically.

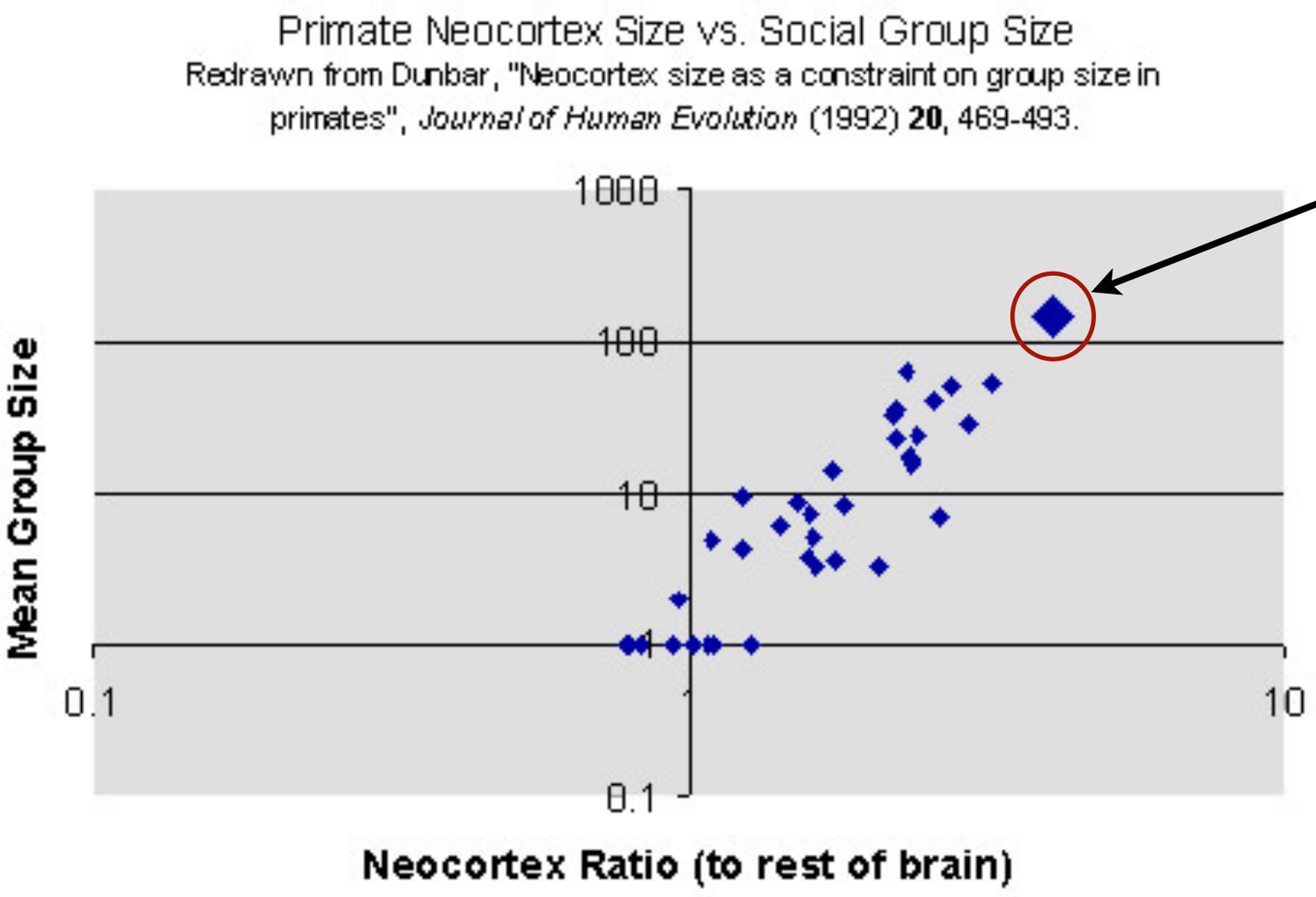
The idea that your brain (a piece of meat) could set a "physical limit" to your number of "friends" is so utterly bananas that it is hard to know where to start. I leave it to you, dear student, to recognise this as complete nonsense.

What is the science behind this rubbish?

In 1992, Robin Dunbar compared a measure of brain volume (ratio of neocortex to the rest of the brain) to the typical size of the groups in which 36 different primates lived. He found a roughly linear relationship (on a log-log plot)



In a follow up study, he took the brain measure for humans, and added it to the plot, to "deduce" an optimal group size for humans.



prediction for humans

Reminder: the scales on this plot are log scales, so that human point is much much further out from the others than it appears.

This is spectacularly bad science.

The x-axis variable is entirely anthropocentric.

The y-axis variable is specious. Group sizes were cherry picked. In retro-fitting his account to humans, Dunbar made liberal use of random selections from the past that suited his hypothesis

The addition of the humans to the plot is absolutely not allowed in any scientific analysis (the correaltion was established over a specific range. Humans lie WAY outside that range. No extrapolation of the relationship beyond that range is justified.

The whole exercise is used to draw *normative* conclusions about how you *should* be. It is finger-wagging by a grumpy old man.

Problems with the X-axis variable

Most species have something slightly odd or individual. Giraffes have long necks, penguins withstand the cold, birds of paradise dance. Humans have big forebrains. This gives us a HUGE ratio of neocortex to the rest of the brain.

Imagine a study where Giraffes started to interpret other animals based on their neck length. Would that make sense?

No they are outliers. They don't fit a regular pattern. So too with us.

Problems with the Y-axis variable

The Y-axis variable is "natural group size", but many primates do not have clear group sizes. Dunbar excluded primate groups living in interaction with humans. This is a very strange view of nature indeed. He omitted species for whom the data did not fit his view.

In making sense of the human group size that he "predicted", he helped himself to a fanciful interpretation of the human past that ignored all of civilization, thus revealing a romantic yearning for some pre-industrial natural state. This is a religious or romantic vision, not a proper framing for a scientific study.

Problems with adding the human data point to the plot

If we gather some data on two variables, and find the relationship to be roughly *linear*, we have established a linear *correlation* (nothing about causal relations, obvs)

If we want to use this insight to make predictions about new cases, those cases *must* lie within the range of our original observations. We can say *nothing* about cases that lie outside that range.

Dunbar's work starts with a corrleation observed in other species, then uses this to make predictions about "group size" in the human case. This extrapolates *far beyond the range allowed.*

Robin Dunbar's conclusions about human group size are

* commonly reproduced in the press
* used to justify normative claims (telling people what they "ought" to do or be)
* This is not exemplary "science"

What social fears is Dunbar's work responding to?

Once more, we find social psychology being used to address widespread anxiety, this time about changing patterns of interaction (among the young!!) and changing relationships to technology.

More here: http://pworldrworld.com/fred/?p=275

Sometimes, interesting findings take control of our imaginations, and lead to wild interpretations

Eager readers like to draw *normative* conclusions

Beware!

Broadening our notion of "mind"

So much for the joys of social psychology

But Cognitive Science is radically interdisciplinary. We are not forced to analyse humans within a single theoretically limiting framework.

Extended Mind and Distributed Cognition

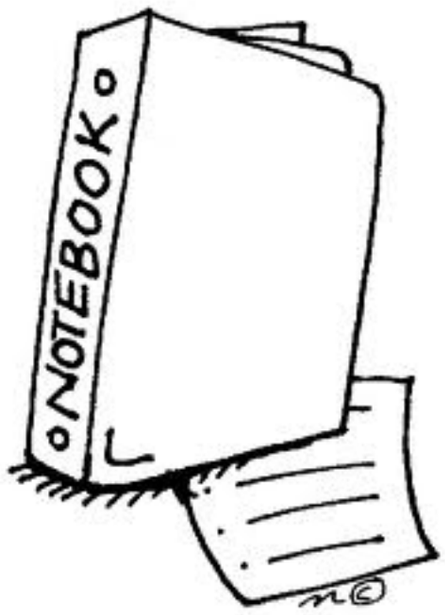
If we consider mental operations to be information processing based on representations, the Extended Mind thesis, and the observation of Distributed Cognition suggest that

. . . minds can not be confined to skulls . . .

. . . or even to individuals

The Extended Mind Hypothesis

As we try to explain *cognition* in terms of functions like *perceiving, remembering, planning, solving*, we find that the machinery we invoke is not all in the brain



The Parity Principle

"If, as we confront some task, a part of the world functions as a process which , *were it done in the head,* we would have no hesitation in recognizing as part of the cognitive process, then that part of the world *is* (so we claim) part of the cognitive process. Cognitive processes ain't (all) in the head!"

Andy Clark and
David Chalmers

Anna plans to go to the Museum. She remembers that it is on 42nd street. She gets the bus there.

Otto has Alzheimers. He keeps salient facts written down in a notebook. He also wants to go to the museum. He consults his notebook and finds that it is on 42nd street. He gets the bus there.

The cognitive process of remembering seems to be the same in both cases. The notebook is thus part of Otto's cognitive system.

But if minds (by some useful definition) are not all in the brain or skull, perhaps cognition is not all in the individual either!

Notice how important it now is to be clear about how you *define* 'mind' and 'cognition'

When deliberating in scrabble, most players will physically rearrange the tiles to better recognise word possibilities.

It might be argued that the re-arrangement of tiles on the tray is not part of action; it is part of *thought*.

If the thesis is accepted, how far should we go?

What about socially extended cognition? Could my mental states be partly constituted by the states of other thinkers?

What, finally, of the self? Does the extended mind imply an extended self?

Distributed Cognition

- "if we ascribe to *individual minds* in isolation the properties of *systems* that are actually composed of individuals manipulating systems of cultural artifacts, then we have attributed to individual minds a process that they do not necessarily have, and we have failed to ask about the processes they actually must have in order to manipulate the artifacts. This sort of attribution is a serious but frequently committed error" (p. 173).

– Hutchins, E. (1995a). Cognition in the wild. Cambridge, Massachusetts: MIT press.

Air traffic control

Ship's control bridge

Most work that uses the Distributed Cognition model focuses on team working environments:

Cockpit

Ship's brig (Navy ship navigation, 7 people)

Air traffic control

It assumes that 'cognition' is a form of information processing, that involves representations, but these representations are not all in heads.

- If the boundaries of cognition do not stop with the individual, then they may

a) involve internal (neural) and external (in the world) structures
b) be socially distributed
c) be temporally distributed
d) be spatially distributed

"The emphasis on finding and describing 'knowledge structures' that are somewhere 'inside' the individual encourages us to overlook the fact that human cognition is always situated in a complex sociocultural world and cannot be unaffected by it" (Hutchins, 1995, p. xiii).

Is scientific knowledge an example of distributed cognition?

Collective Behavior

If we no longer attribute all cognition to individual minds, then we might ask whether we also need an alternative framework for understanding behaviour, especially when more than one person is involved.

Exercise: provide examples of collective behaviour that might benefit from such an approach.

Collective Behaviour

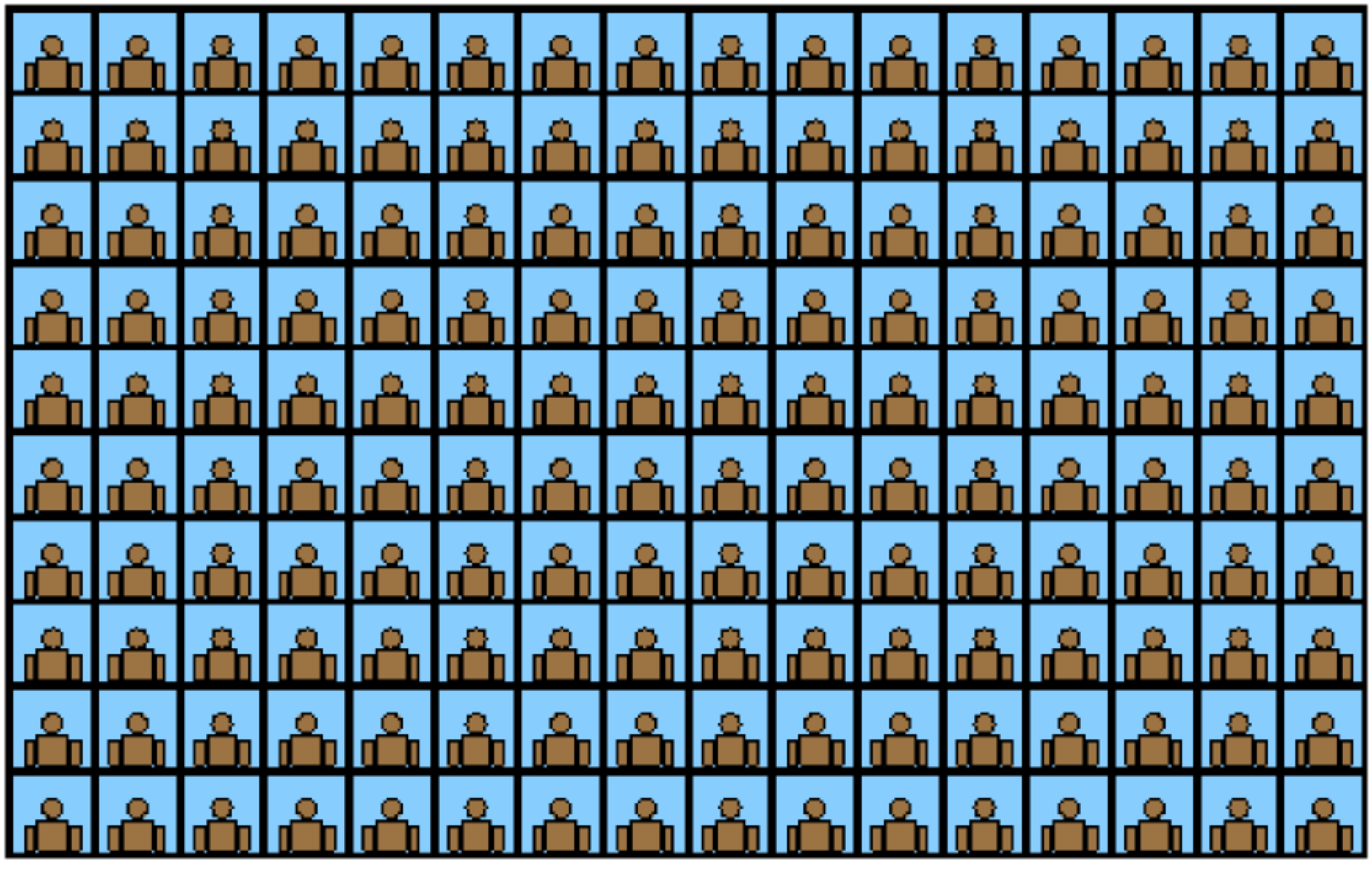
Introduction to Cognitive Science, COMP 20090

Simulated Mexican Wave

Illés Farkas, graduate student
Eötvös University (Budapest, Hungary)

Dirk Helbing, professor
Technische Universität Dresden (Dresden, Germany)

Tamás Vicsek, professor
Eötvös University (Budapest, Hungary)



Mathematical model of the Mexican Wave:

Tamás Vicsek (2002)

Based on a model of electrical propagation in heart tissue

Role of the individual is small: individuals are simple

Interactions among individuals are key!

Modelling collective behaviour requires:

A model of the individual AND

A model of the interactions among individuals AND

A model of the circumstances in which those interactions take place.

There may be no single right approach!
Methodological plurality seems appropriate.