

Talking with beasts:  
human and animal languages ?



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Talking with beasts:  
human and animal languages ?

'Man invented language to satisfy his deep need  
to complain'

Lily Tomlin





Talking with beasts:  
human and animal languages ?

'Language is very difficult to put into words'

Voltaire



# Symbolic communication

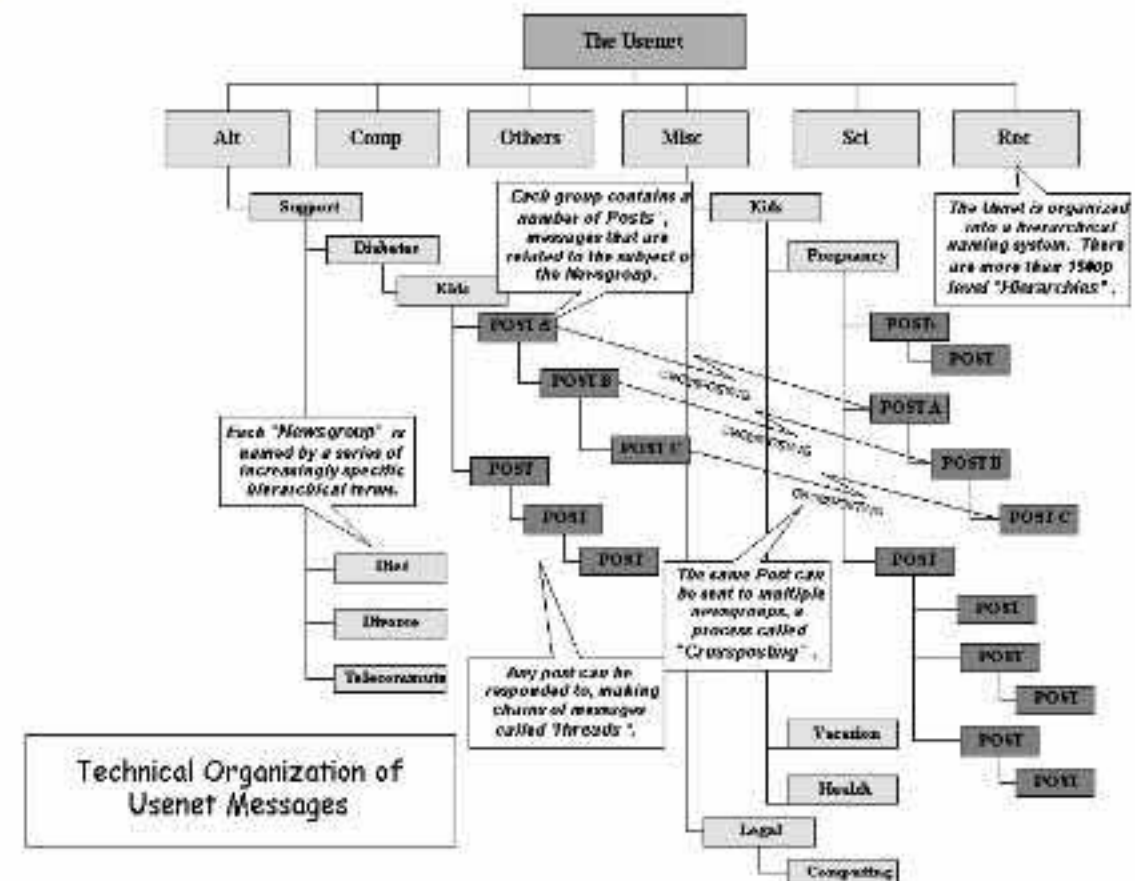
Extensive use of symbolic communication is why humans are the dominant species



- Information exchange and recording
- "Words have a longer life than deeds"  
Pindar (522-443BC) Nemean Odes

- Complex social structures

- Strategic planning expanding our relevant time domain





# Symbolic communication

Symbolic language is unique to humans



Noam Chomsky



Stephen Pinker

# Symbolic communication



"No one is more strongly convinced than I am of the vastness of the gulf between...man and the brutes...for he alone possesses the marvellous endowment of intelligible and rational speech [and]... stands raised upon it as on a mountain top, far above the level of his humble fellows, and transfigured from his grosser nature by reflecting here and there, a ray from the infinite source of truth."

(Thomas Henry Huxley 1900 "Evidence as to Man's Place in Nature and Other Anthropological Essays" p155-6. New York Appleton).

# Symbolic communication

It is not unique to humans !



"That which distinguishes man from the lower animals is not the understanding of articulate sounds, for as everyone knows, dogs understand many words and sentences"

(Charles Darwin "Descent of Man" 1871).



# So how do we and other animals communicate and why?

## Face to face communication

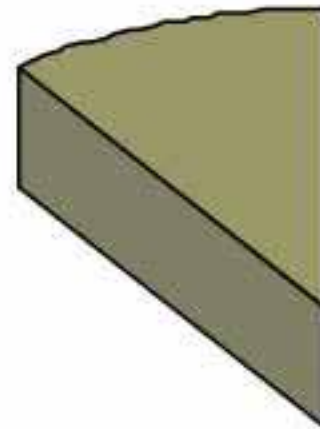


# So how do we and other animals communicate and why?

Face to face communication

non-verbal  
emotional content  
of speech and face  
expressions

25%



spoken  
words 10%

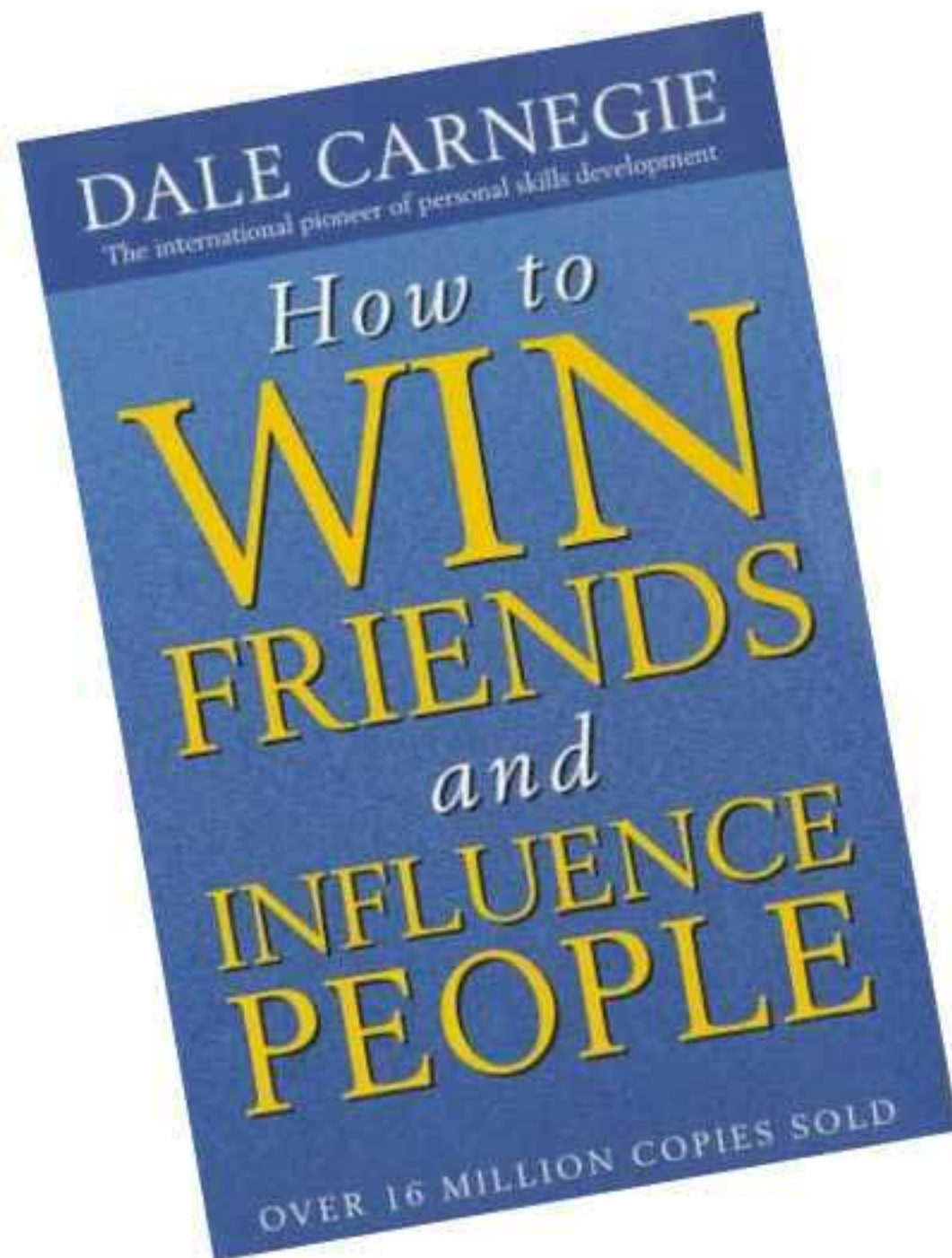
body  
language

65%

Furthermore, 90% of communication is about how we are feeling now!



# Interpersonal skills





# Different ways we can use our bodies to communicate

**Appearance** - All mammalian social encounters involve rapid physical appraisals

Humans - visual scan of body



# Different ways we can use our bodies to communicate

**Appearance** - All mammalian social encounters involve rapid physical appraisals

Humans - visual scan of body

Other animals - dogs or mice doing the circling and anogenital investigation round



# Different ways we can use our bodies to communicate

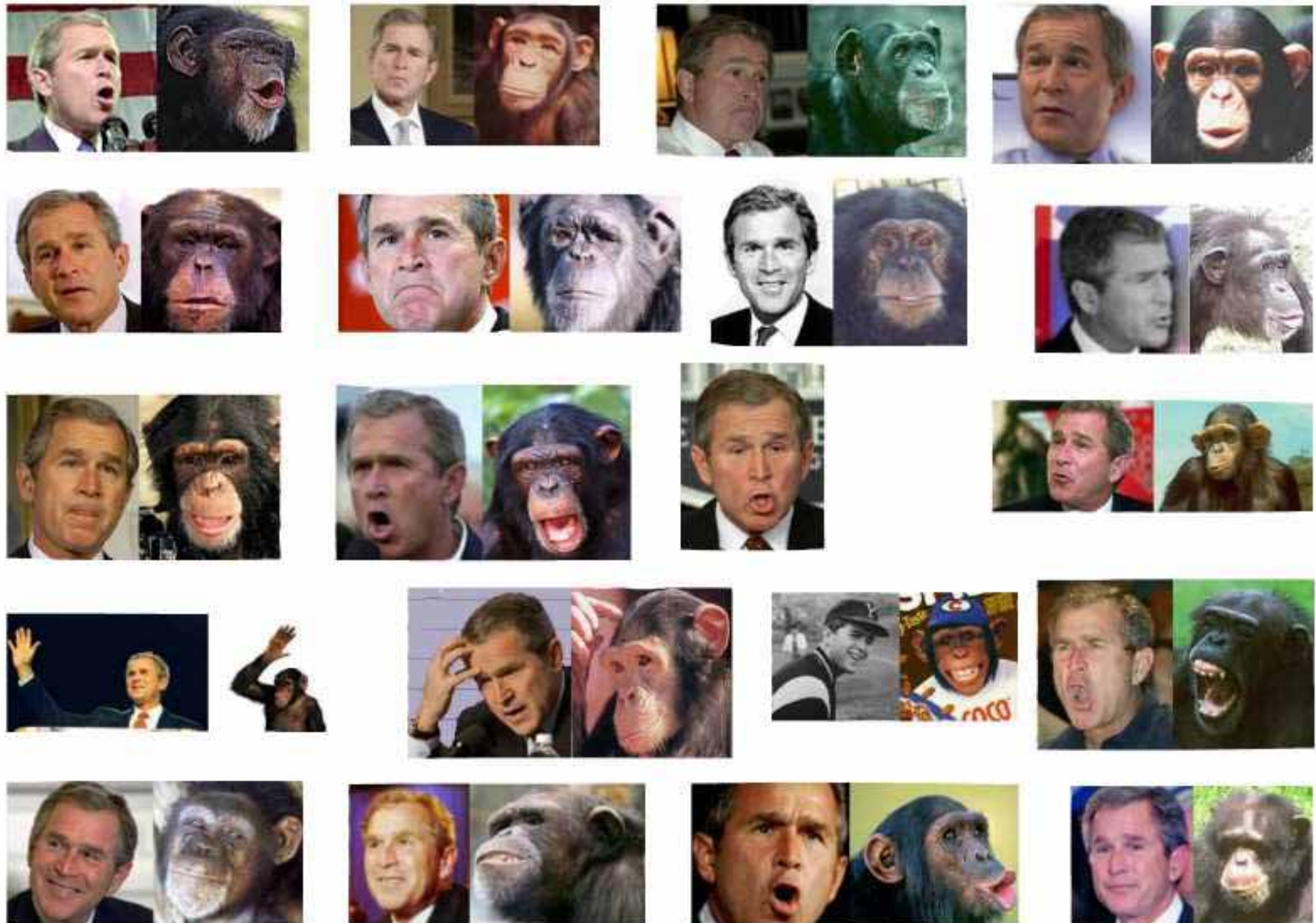
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Facial expressions



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Facial expressions

Occulesics - what can be communicated by the eyes





# Different ways we can use our bodies to communicate

**Appearance** - All mammalian social encounters involve rapid physical appraisals

Facial expressions

Occulesics - what can be communicated by the eyes

Eye gaze and appearance

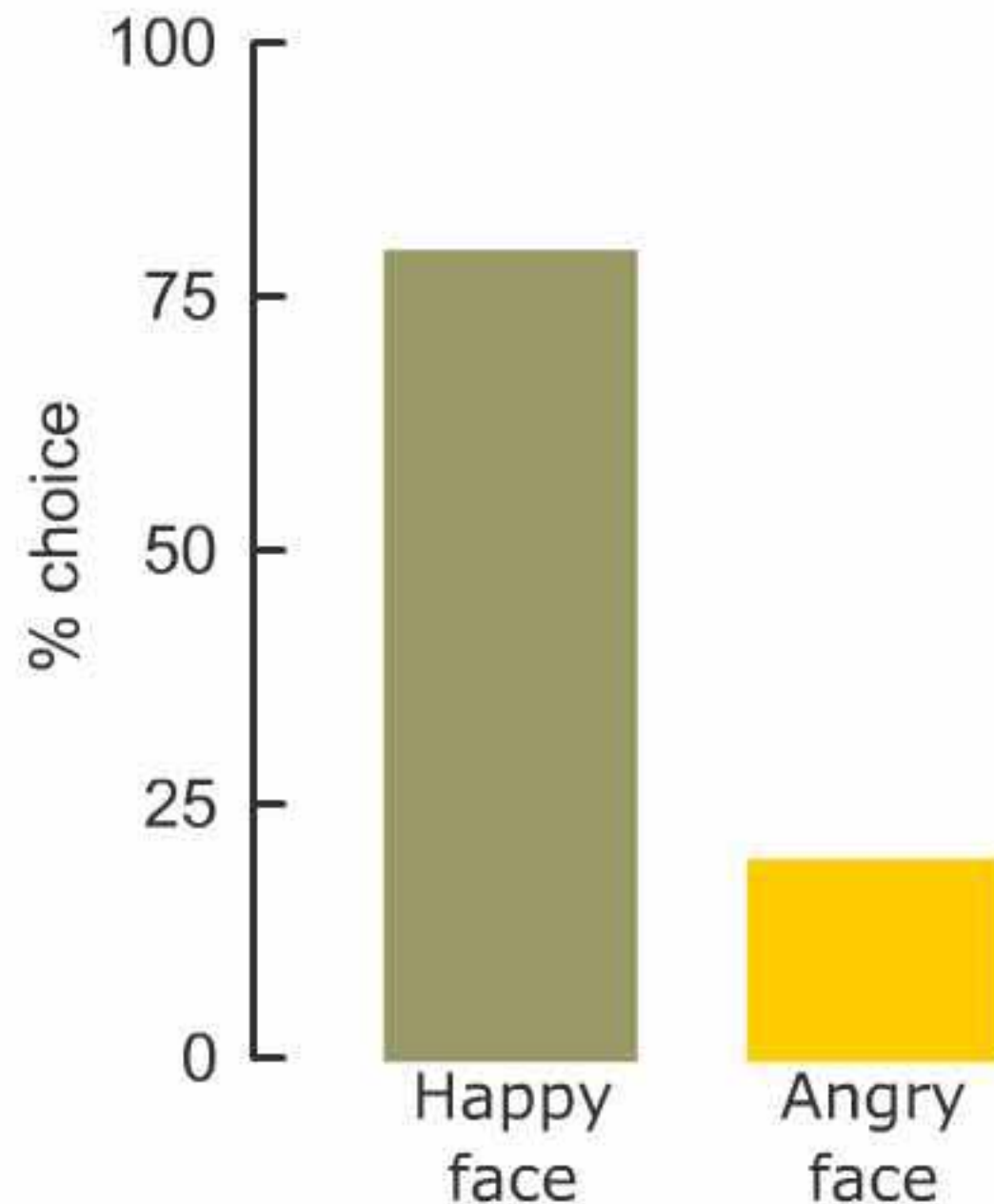
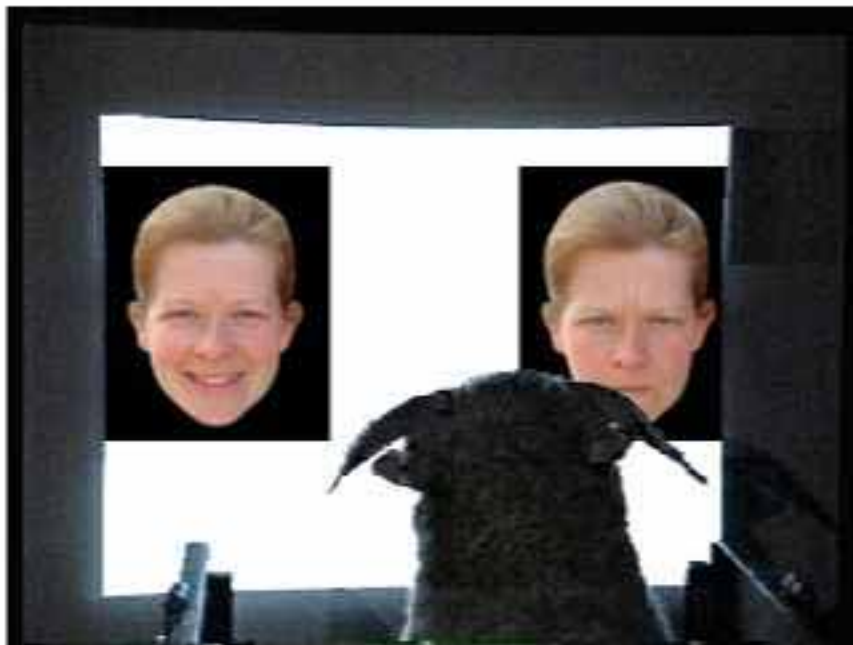




# Different ways we can use our bodies to communicate

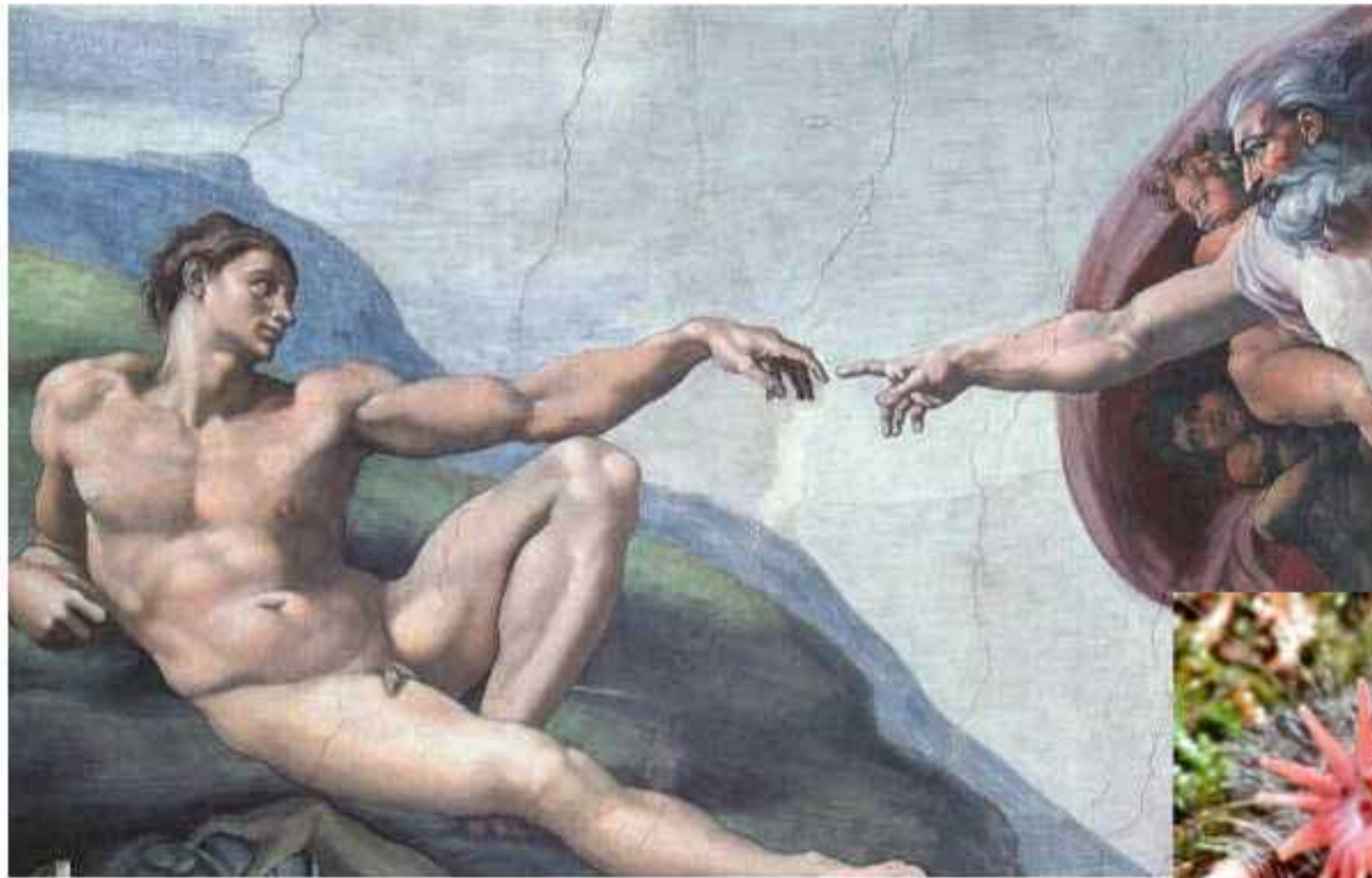
**Appearance** - All mammalian social encounters involve rapid physical appraisals

Can other animals read our facial expressions ?



# Different ways we can use our bodies to communicate

**Touch (Haptics)** - Deliberate rather than accidental physical contact between individuals





# Different ways we can use our bodies to communicate

**Touch (Haptics)** - Deliberate rather than accidental physical contact between individuals.

The way someone touches you speaks volumes about their intentions

'being touched by someone's words'

Braille



•	•	•	•	•	•	•	•	•	•
A	B	C	D	E	F	G	H	I	J
•	•	•	•	•	•	•	•	•	•
K	L	M	N	O	P	Q	R	S	T
•	•	•	•	•	•	•	•	•	•
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•	•	•	•	•	•	•	•	•	•
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Touch communication between humans and animals



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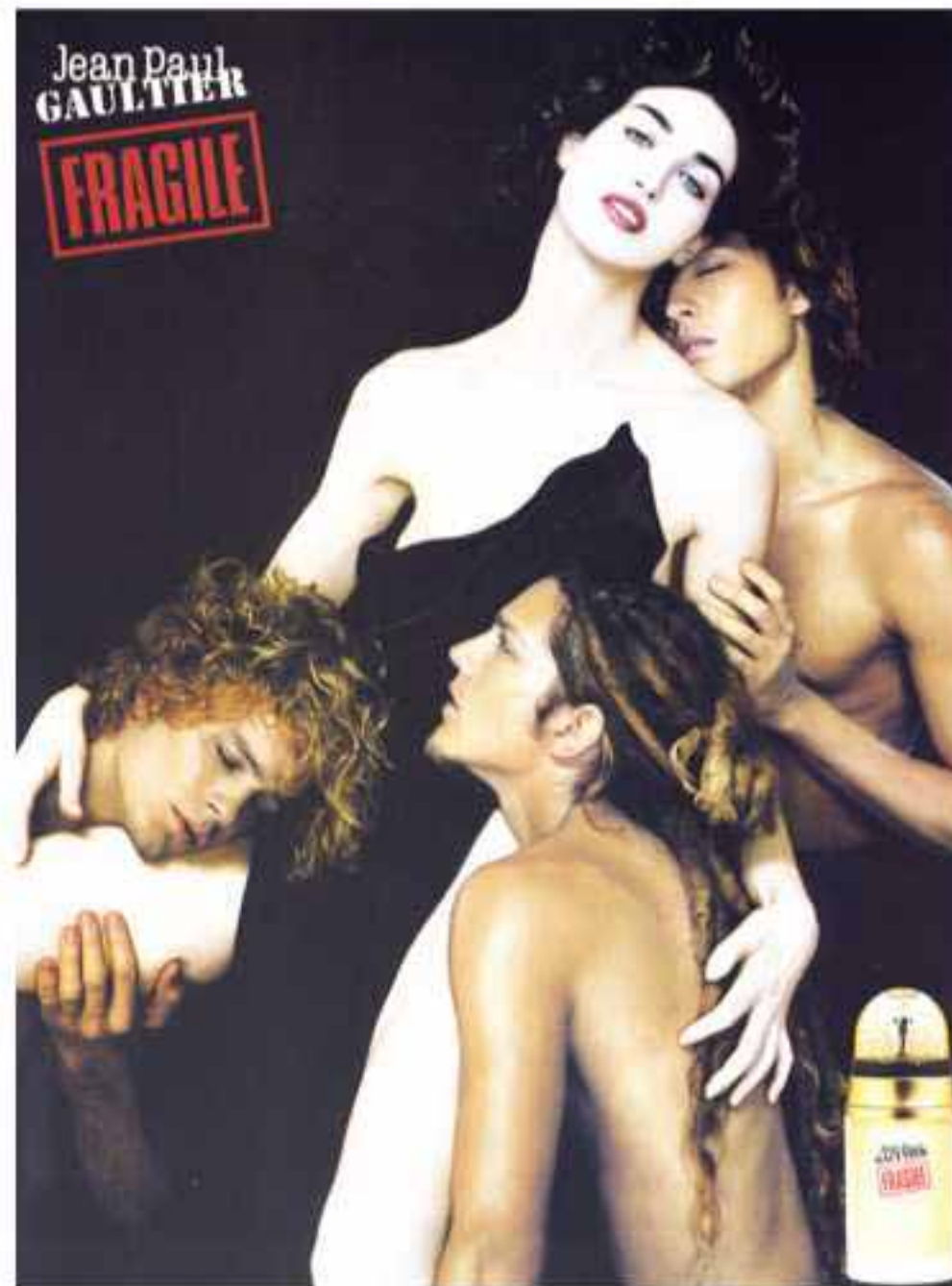
Touch communication between humans and animals





# Different ways we can use our bodies to communicate

## Smell (Olfactics)





# Different ways we can use our bodies to communicate

**Smell (Olfactics)** - other species are up to 1 million times more sensitive to smells than us



# Different ways we can use our bodies to communicate

**Smell (Olfactics)** - other species are up to 1 million times more sensitive to smells than us

Territoriality - this is space that you don't carry around with you

Urine marks - one sign says it all !



- who you are - if you're related - how macho you are
- when you were there last - how often you are there
- how healthy you are - what you've been eating recently



## Different ways we can use our bodies to communicate

Try communicating all that with one word!!





# Different ways we can use our bodies to communicate

**Space** - Spatial relationships or proxemics



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Personal space (E.T. Hall 1963)



Photo courtesy of Kathryn Sorrells, 1998

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The human 'personal bubble'



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**Space** - Spatial relationships or proxemics

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The human 'personal bubble'

1.5 - 4 feet for conversations with good friends



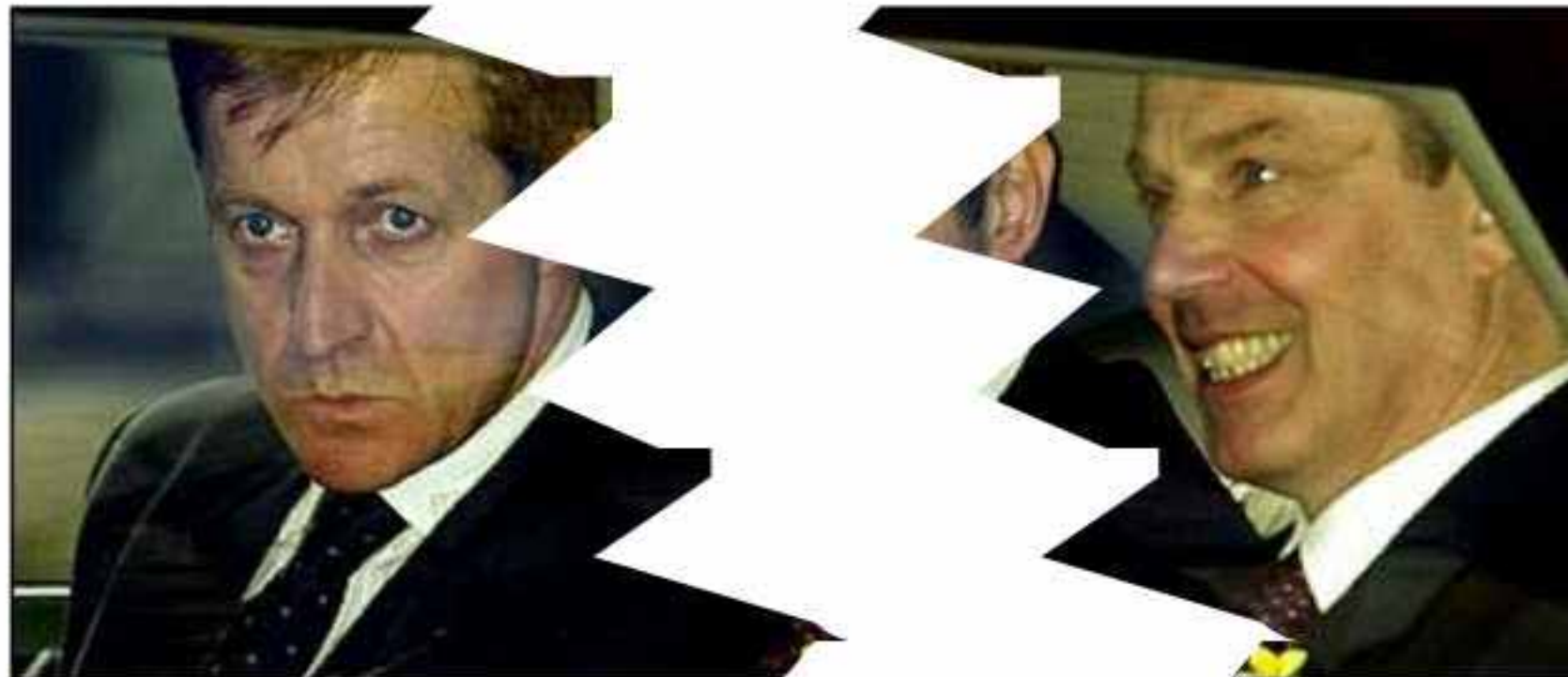
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**Space** - Spatial relationships or proxemics

Personal space (E.T. Hall 1963)

The human 'personal bubble'

4 - 12 feet for acquaintances





# Different ways we can use our bodies to communicate

**Space** - Spatial relationships or proxemics

Personal space (E.T. Hall 1963)

The human 'personal bubble'

Species-specific



# Different ways we can use our bodies to communicate

**Time (Chronemics)** - communicating with others through your use and perception of time





# Different ways we can use our bodies to communicate

**Time (Chronemics)** - communicating with others through your use and perception of time.

Punctuality or being fashionably late



John Cleese in 'Clockwise'



# Different ways we can use our bodies to communicate

**Time (Chronemics)** - communicating with others through your use and perception of time.

Punctuality or being fashionably late

There is a time as well as a place for everything

**BBC NEWS**

You are in: **Health**

News Front Page World UK England N Ireland Scotland Wales Politics Business Entertainment Science/Nature Technology **Health** Medical notes Education

Monday, 20 January, 2003, 22:54 GMT

## 'No sex please, we're too busy'



Modern women have little free time, say researchers

**See also:**

- ▶ 26 Jun 01 | Health  
Sex a turn-off for many UK women
- ▶ 07 Jun 01 | Health  
Cuddles 'more important than sex'
- ▶ 05 Mar 01 | Business  
Long hours harm sex lives

**Internet links:**

- ▶ The Kinsey Institute
- ▶ Relate
- ▶ Archives of Sexual Behavior





# Different ways we can use our bodies to communicate

**Movement (Kinesics)** - communicating through body movements and gestures



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Moving in unison





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# Different ways we can use our bodies to communicate

**Movement (Kinesics)** - communicating through body movements and gestures

Moving in unison - and in different directions !



Use of verbal language here can be disastrous !



# Different ways we can use our bodies to communicate

**Movement (Kinesics)** - communicating through body movements and gestures

Moving in unison - and in different directions !

Gestures used to embellish spoken language

## GESTURE LANGUAGE IN ITALY AND AMERICA



Gestures tell us that before man ever learnt to utter words they communicated with one another by means of gestures and facial expressions. Even to-day the gesture language plays a large part in communication between human beings. In the south of Italy, Sicily, and Turkey, a whole conversation can be carried on in this way, without a single word being spoken, and in these pictures we see some of the gesture language of the people of Naples. It is used a great deal in buying and selling and other bargaining.



# Different ways we can use our bodies to communicate

**Movement (Kinesics)** - communicating through body movements and gestures

Moving in unison - and in different directions !

Gestures used to embellish spoken language

Usually iconic rather than symbolic



# Different ways we can use our bodies to communicate

**Movement (Kinesics)** - communicating through body movements and gestures

Courtship displays - I'm in the mood





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Courtship displays - I'm in the mood

Look what a physically perfect specimen I am



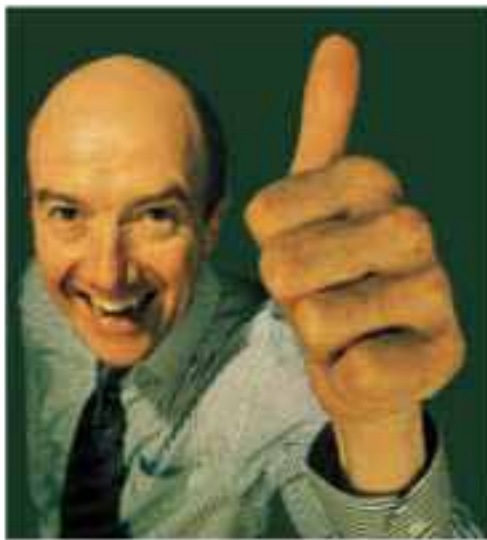
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Use of symbolic gestures





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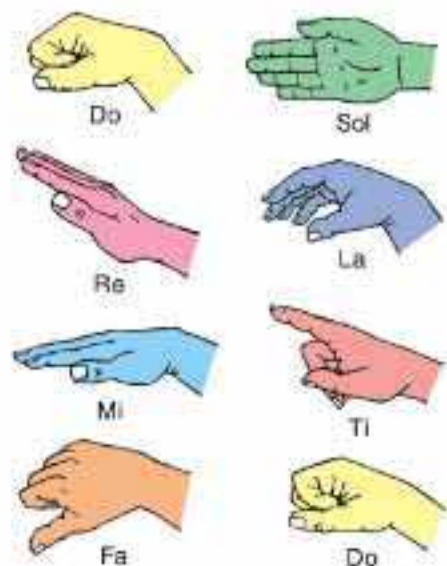
**Movement (Kinesics)** - communicating through body movements and gestures

Courtship displays - I'm in the mood

Look what a physically perfect specimen I am

Use of symbolic gestures

Sign language



# Different ways we can use our bodies to communicate

**Movement (Kinesics)** - communicating through body movements and gestures

Natural use of symbolic gestures in other animals

Busy bees !

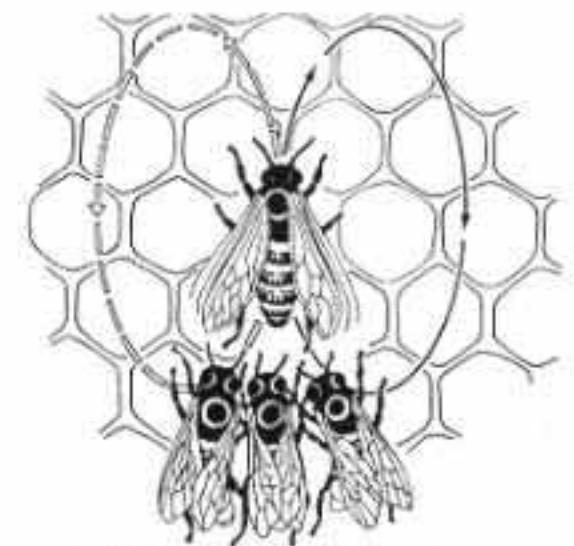
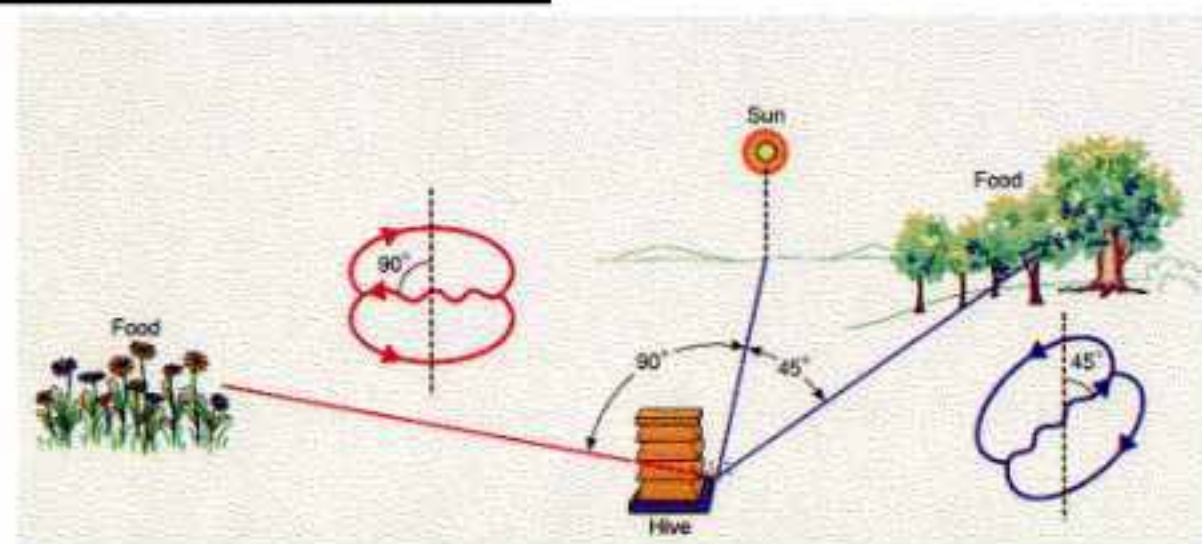


Fig 1. The Waggle Dance





# Different ways we can use our bodies to communicate

**Voice (Vocalics or paralanguage)** - non-verbal cues in a speaker's voice

Tone, pitch, volume, regional and national accents, emphasis, sarcasm, emotion, truthfulness or deceit, confidence etc.

Paralanguage is a major source of 'spin'

**BBC NEWS**

You are in: **UK Politics**

Thursday, 12 April, 2001, 17:43 GMT 18:43 UK

**Spin doctor makes his own headlines**



Mr Campbell: The UK's second most powerful man?  
He has been called 'the real deputy prime minister' and 'the second most powerful person in Britain'.

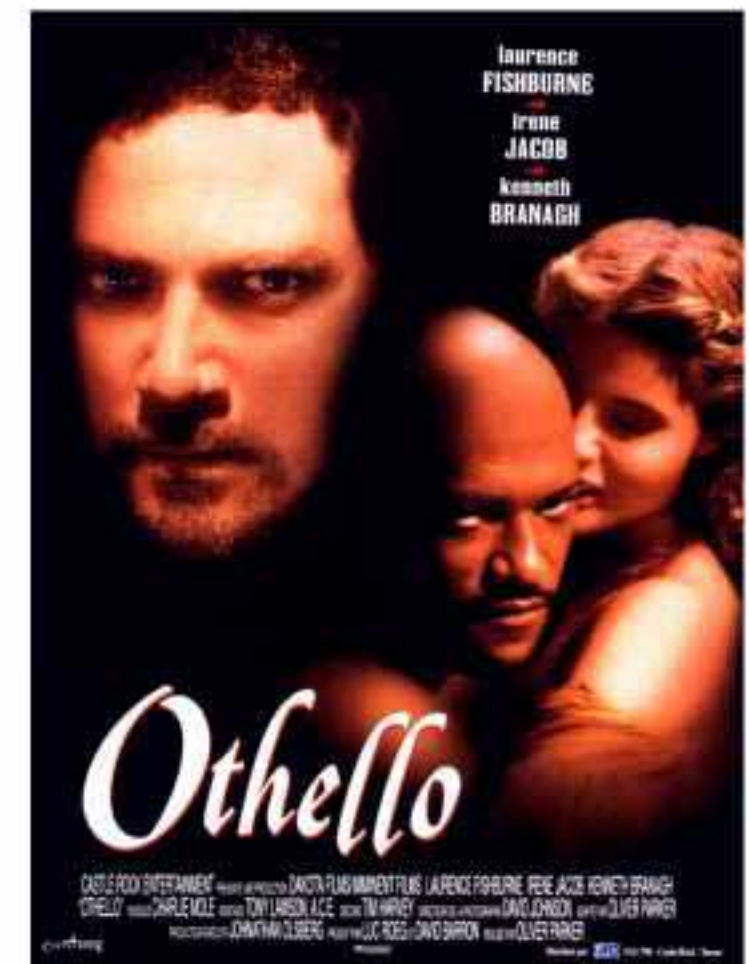
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"I understand a fury in your words, but not the words" **Shakespeare**





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Non-verbal vocalisations - crying, laughing, screaming in pain, yawning and exclamations used to get attention or warn of danger

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**Animal calls** - some mammalian species use up to 20-30 different calls of this kind

In mammals call repertoires are largely innate





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Song birds





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Whale songs



# Why do we and other animals communicate ?

Communicating your feelings, desires, intentions and emotional states to others should be self-motivated





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Some types of communication have clear personal survival advantages:



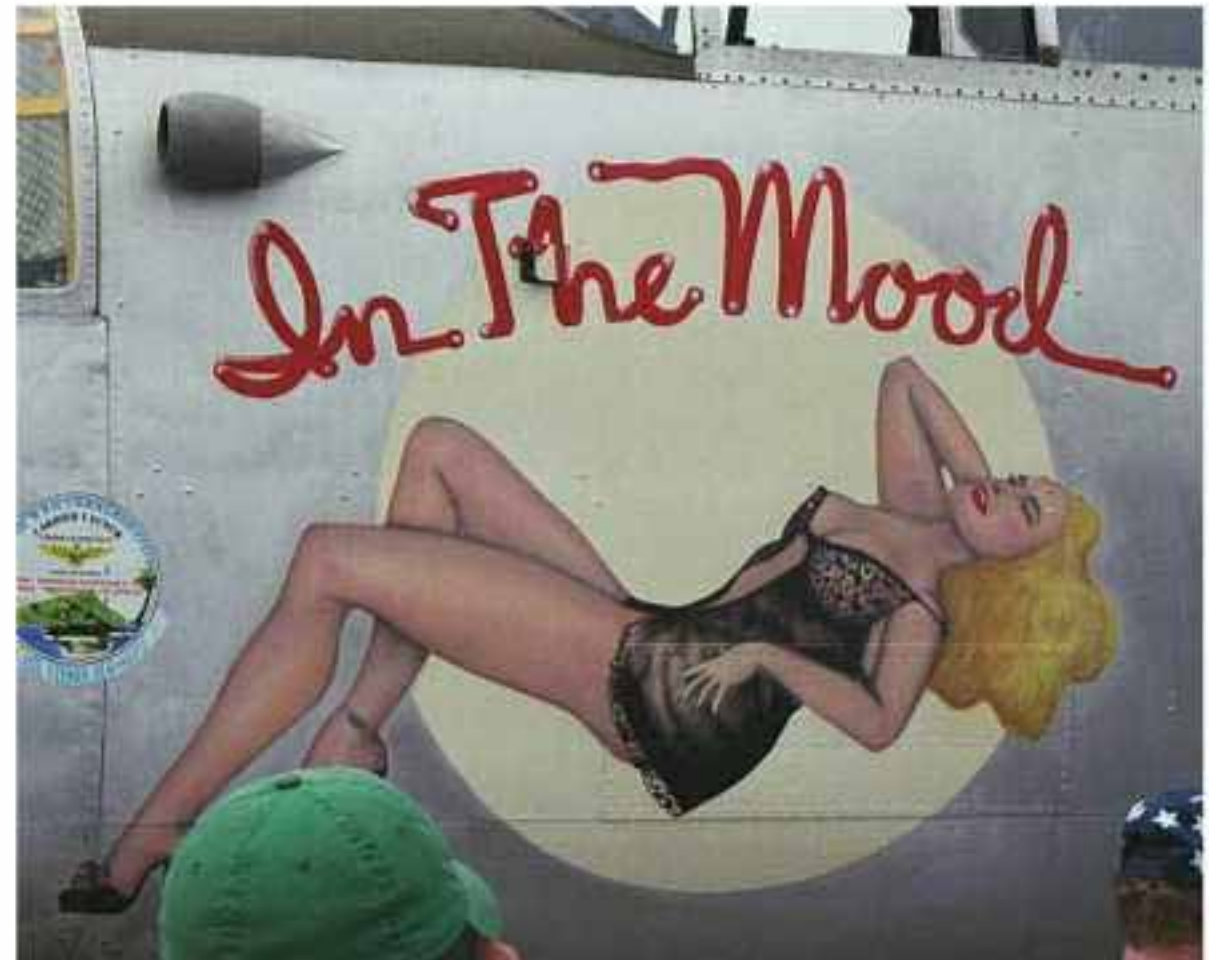
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I'm in the mood for.....

- Sex





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- A fight

I'm off for lunch

Watch out we're on the menu!



# Why do we and other animals communicate ?

Some seem to have less obvious personal survival benefits:

Communicating fear, pain, sadness, depression or even happiness





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You are unlikely to receive help from other group members



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Communicating fear, pain, sadness, depression or even happiness

Crying from fear pain or hunger is important for an infant to survive

But why still do this as an adult ?

You are unlikely to receive help from other group members

You may attract predators





# Why do we and other animals communicate ?

Some seem to have less obvious personal survival benefits:

Pre-programmed to help infants and therefore unavoidable as adults ?

Helping you cope with adversity and self-gratification ?

Dealing with the pressure cooker of emotional experience

Can be used voluntarily to communicate emotional states  
- social deception !



# Why do we and other animals communicate ?

Social cohesion - the infectious yawn, smile and laugh !





# Communication of information through language

Is this a unique human trait ?

The unique vs matter of degree debate

UNIQUE



MATTER OF  
DEGREE



# Communication of information through language

Is this a unique human trait ?

The unique vs matter of degree debate

Symbolic - arbitrary symbols used to represent objects, attributes and actions

Syntax - grammatical rules used to combine symbols and influence their meaning

Combinations of these finite elements result in an infinite number of patterns



## ELECTION PROMISES

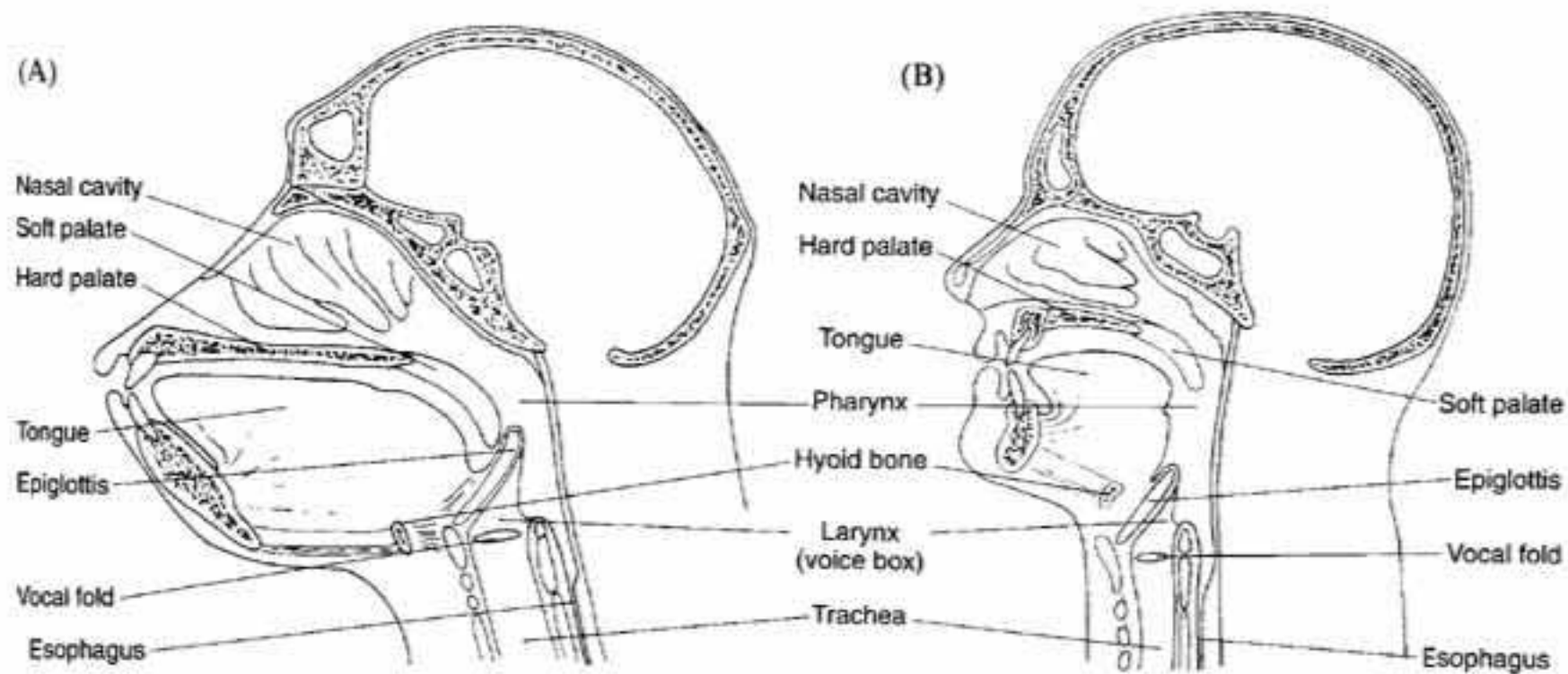
I promise to reduce taxation if elected by the voters

If elected I promise to reduce the voters by taxation

# Communication of information through language

How are language skills developed and used by humans ?

## The voice box





# Communication of information through language

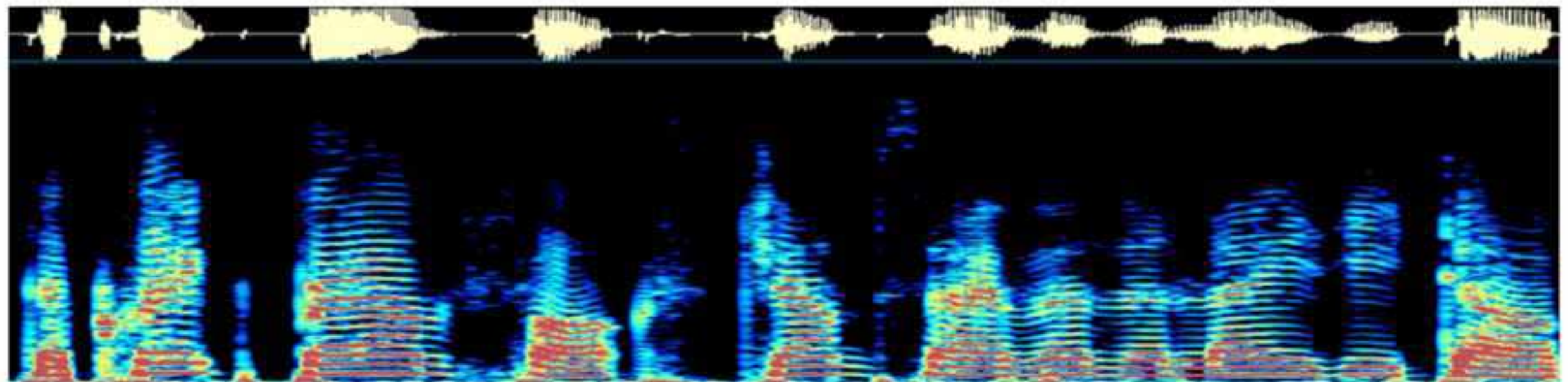
Acquisition by instinct ?



# Communication of information through language

Acquisition by instinct ?

Where do words start and finish ?



the quick brown fox jumps over the lazy dog



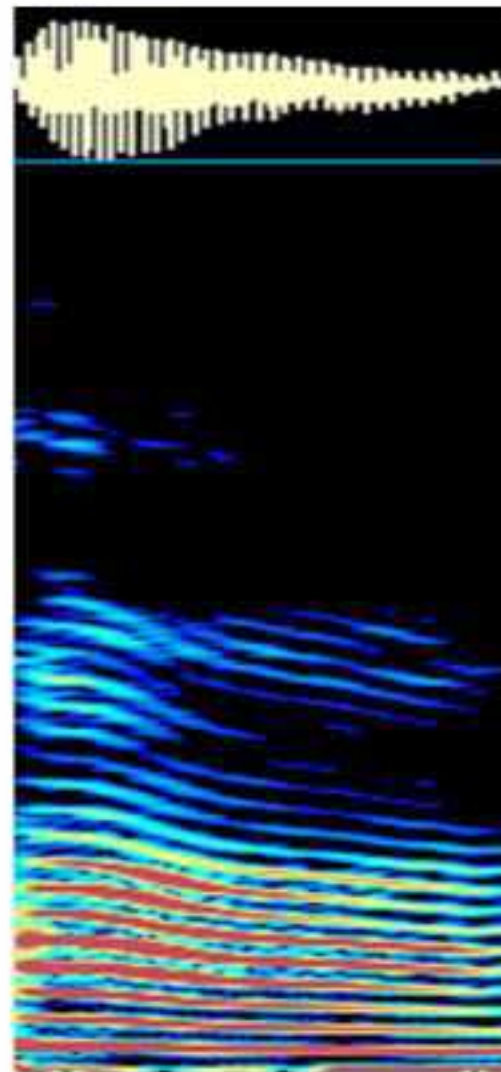
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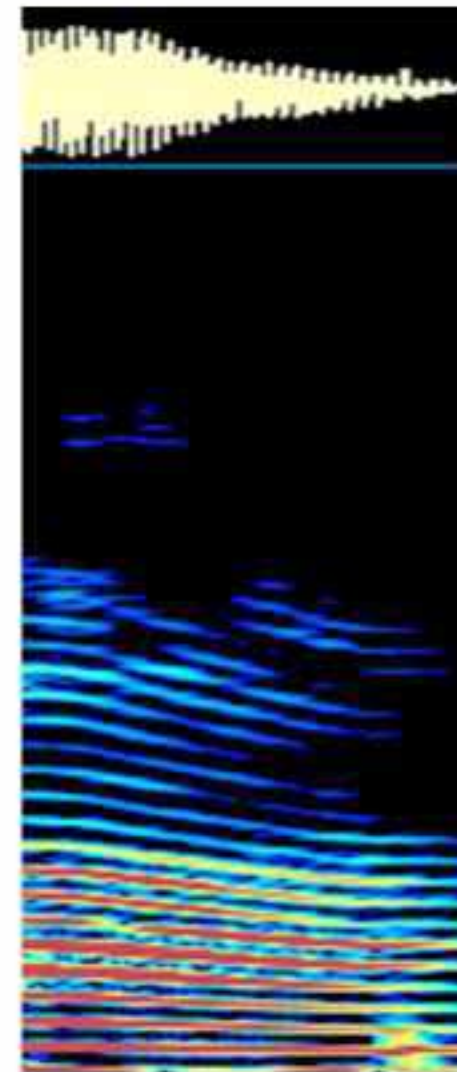
Where do words start and finish ?

Is it a 'p' or a 'b' sound ?

'p'



'b'



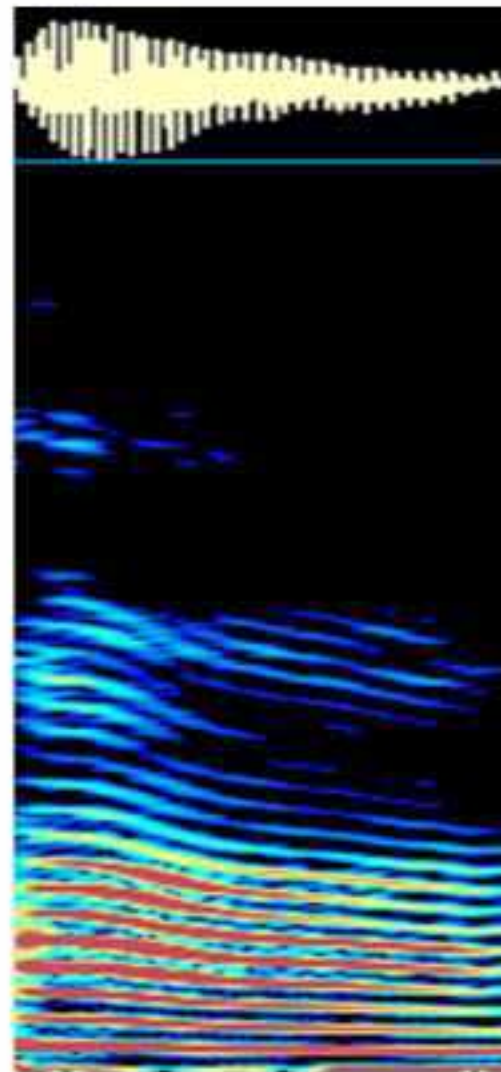
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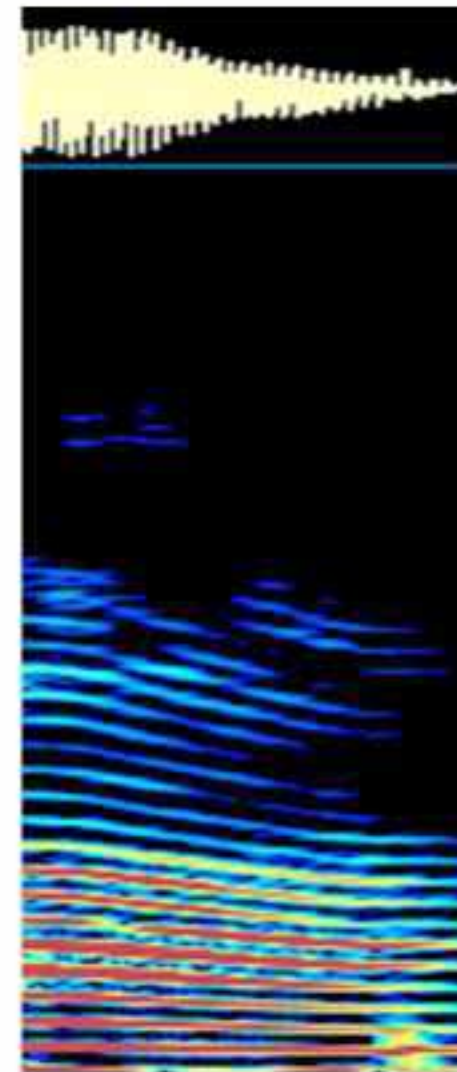
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Acquisition by instinct ?

Where do words start and finish ?

Is it a 'p' or a 'b' sound ?

The 60,000 word encyclopaedia

Engage brain before opening mouth !



# Communication of information through language

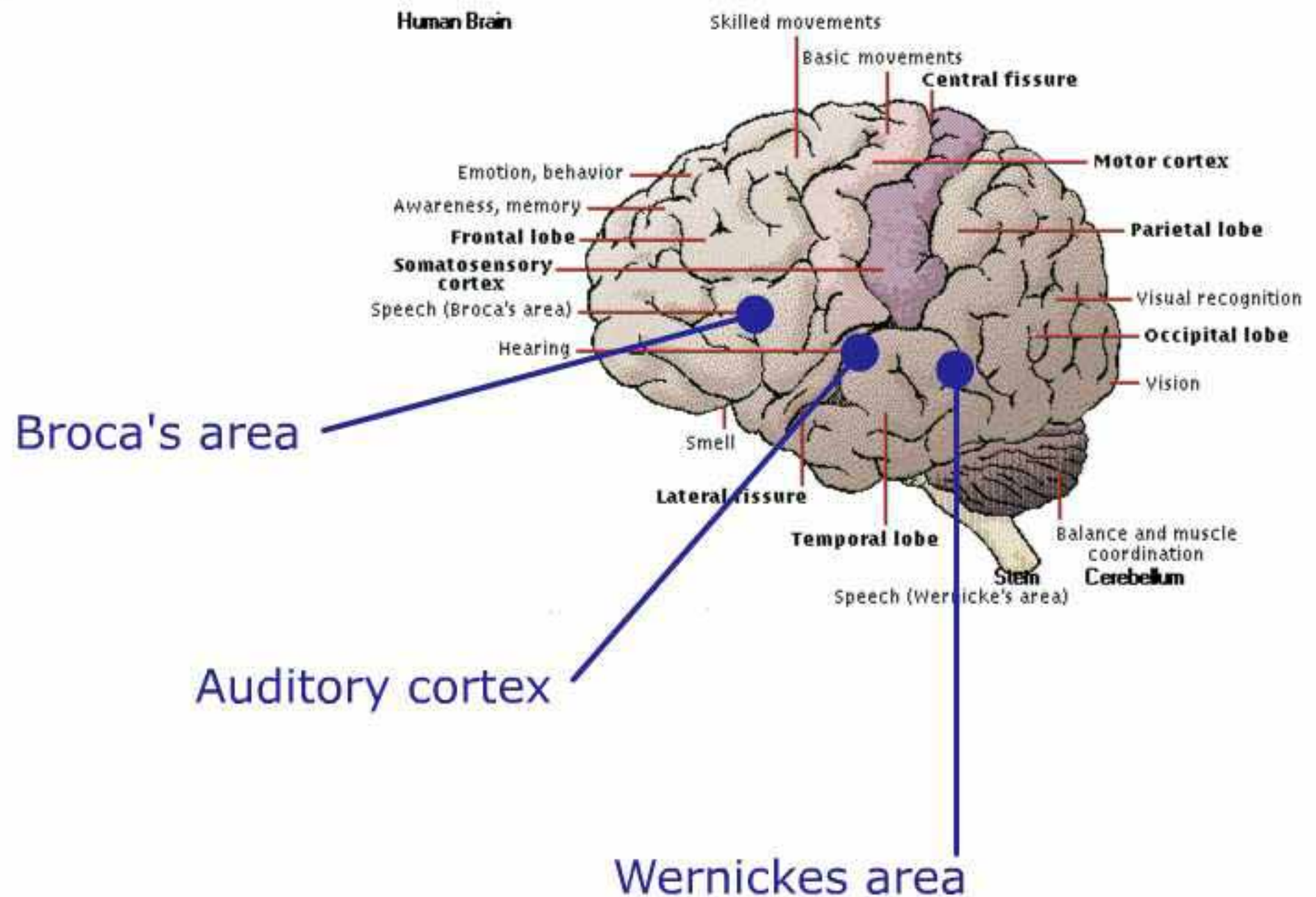
Language evolution - sudden chance mutation or progressive selective adaptation ?

Cognition as the driver of language evolution ?



# Communication of information through language

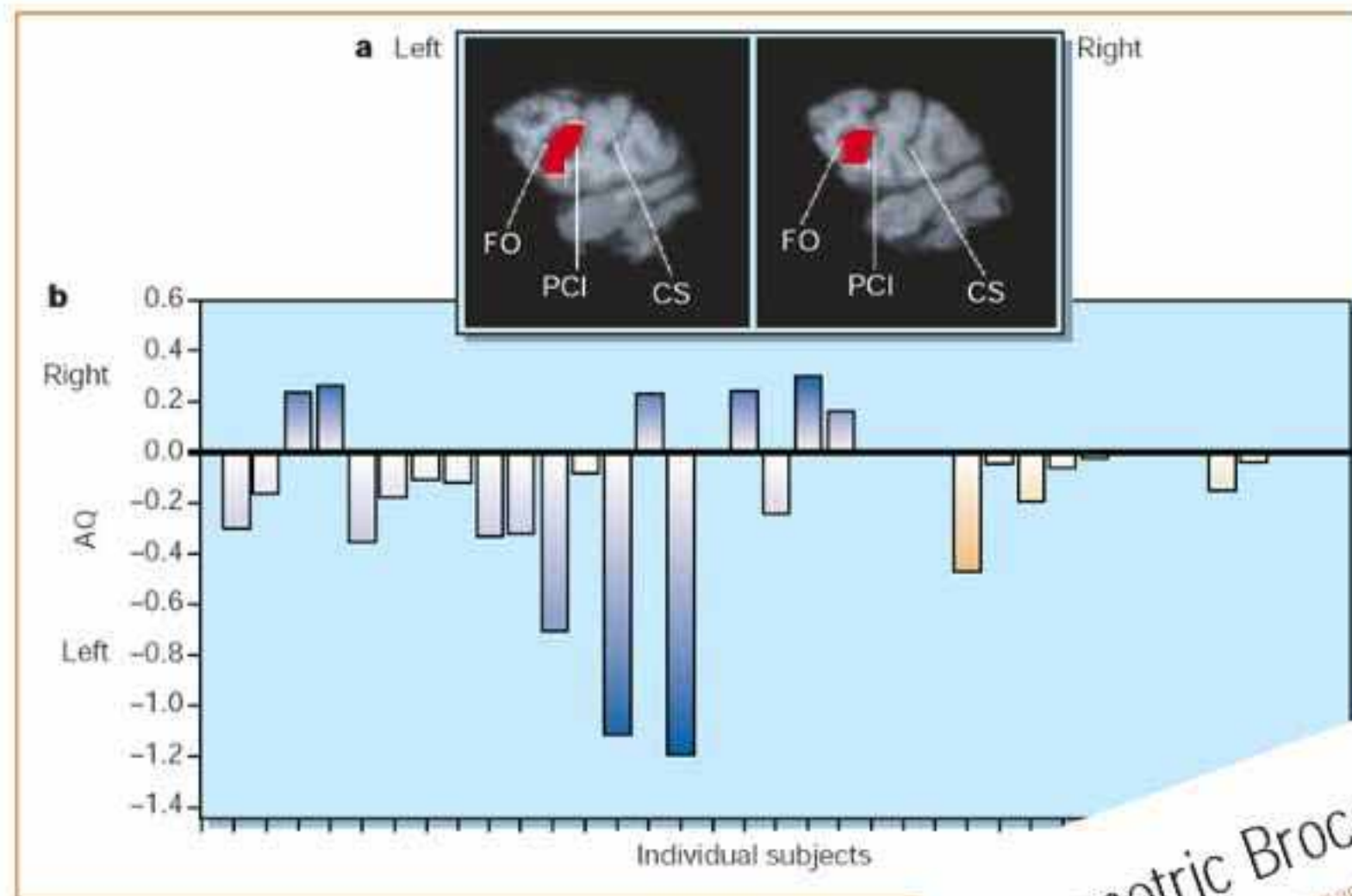
Are there unique areas of the human brain dealing with language ?



# Communication of information through language

Are there unique areas of the human brain dealing with language ?

Cantalupo and Hopkins *Nature* 2001



**brief communications**  
**Asymmetric Broca's area in great apes**  
A region of the ape brain is uncannily similar to one linked with speech in humans.

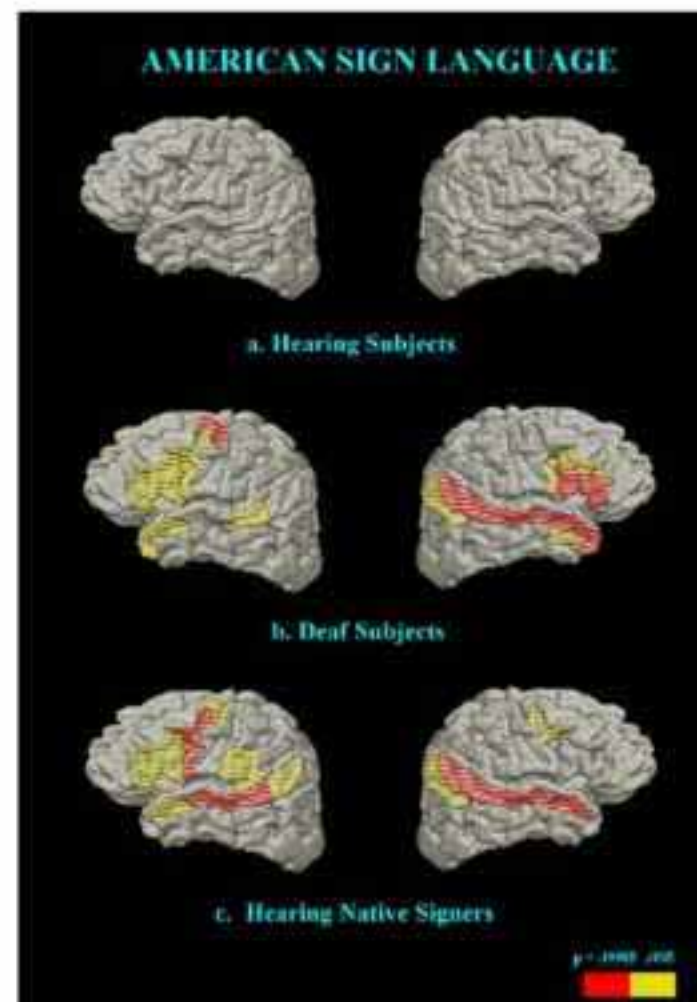
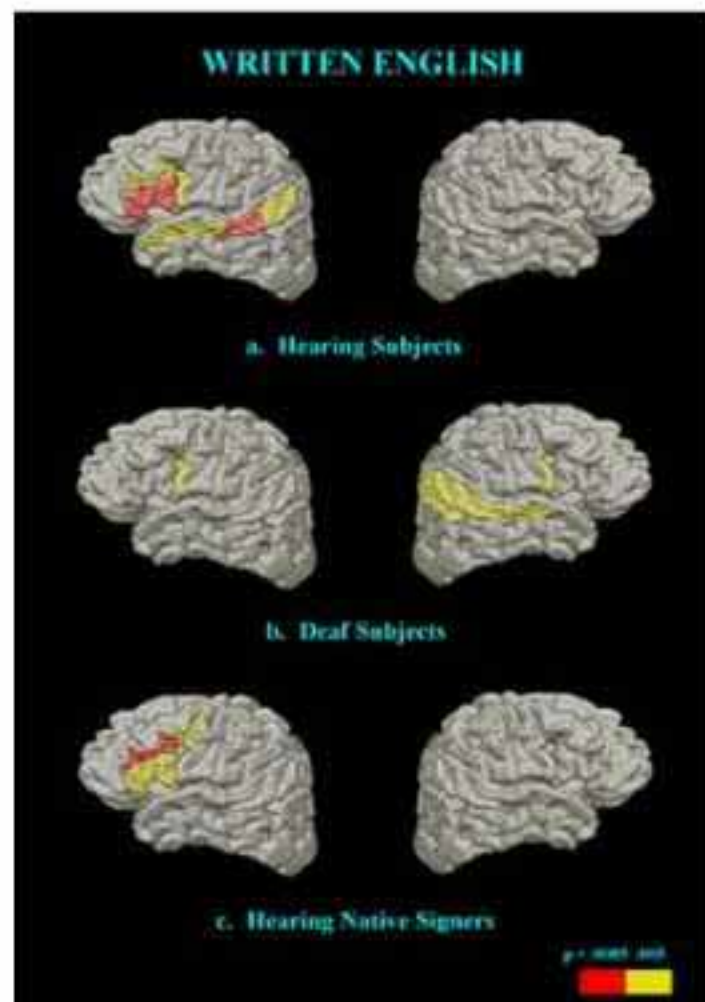


# Communication of information through language

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Cantalupo and Hopkins 2001

Gestures, sign language, musical notes and braille



Brain Development  
Laboratory  
Institute of Neuroscience  
University of Oregon

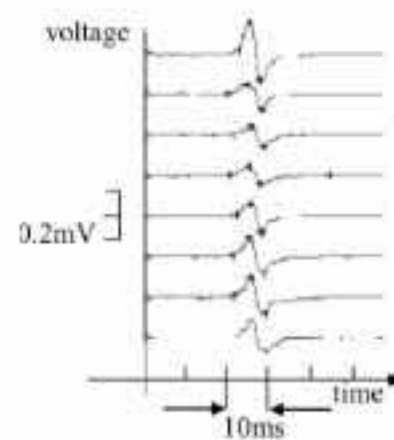
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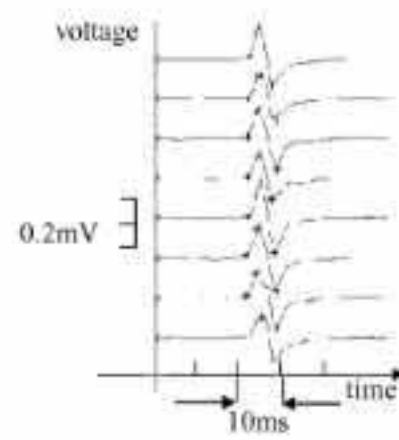
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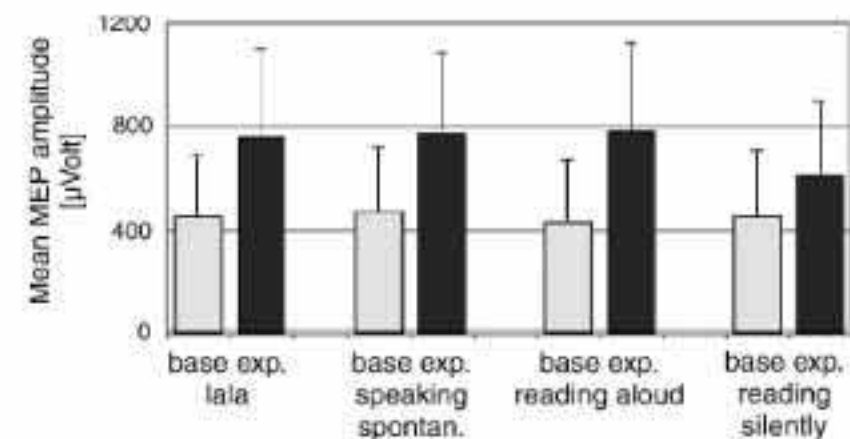
Speaking activates hand movement regions



Baseline  
MEPs



Listening to  
sentences MEPs





# Communication of information through language

Are there unique areas of the human brain dealing with language ?

Cantalupo and Hopkins 2001

Gestures, sign language, musical notes and braille

Speaking activates hand movement regions

No new bits,  
just a re-shuffle ?

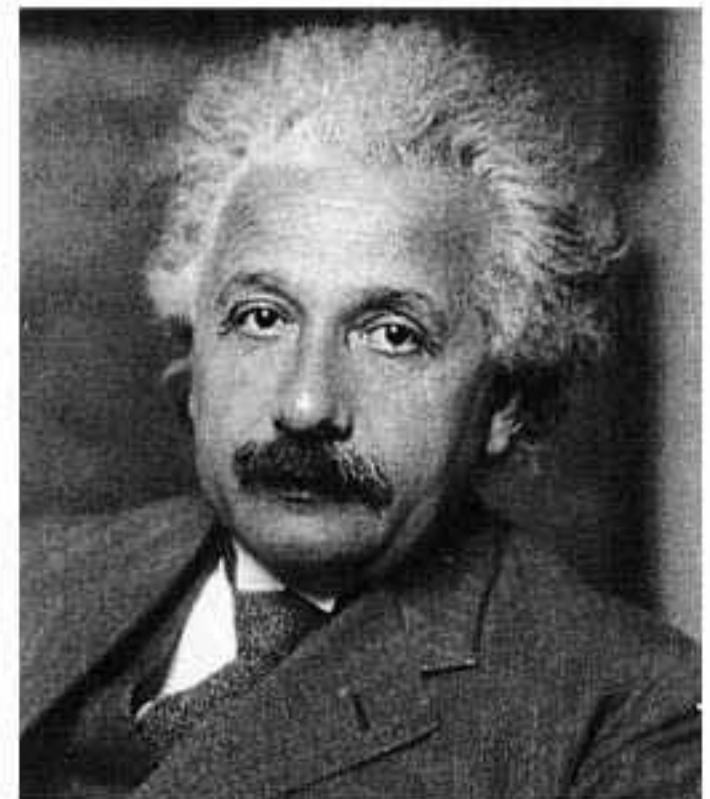
The screenshot shows the BBC News website interface. At the top, there's a navigation bar with links for CATEGORIES, TV, RADIO, COMMUNICATE, WHERE I LIVE, and INDEX, along with a search box. Below this is the 'BBC NEWS' header. The main content area is titled 'You are in: Special Report: 1999: 10/99: Cabinet Reshuffle'. The central headline is 'Blair's dramatic reshuffle', dated 'Tuesday, 12 October, 1999, 08:02 GMT 09:02 UK'. It features a large image of Prime Minister Tony Blair and other cabinet members. To the left is a sidebar menu with links to various news sections like World, UK, England, etc. To the right, under 'Top Cabinet Reshuffle stories now:', there's a list of key events such as 'Blair's dramatic reshuffle', 'Mandelson: No plan B for peace', and 'Mandelson makes his comeback'. At the bottom, there's a section titled 'The changes unveiled by Prime Minister Tony Blair in his reshuffle are the most sweeping since he came to power more than two years ago.'

# Communication of information through language

Is language required for consciousness ?

'The words of language, as they are written or spoken, do not seem to play any role in my mechanism of thought. The physical entities which seem to serve as elements in thought are certain signs and more or less clear images'

Albert Einstein





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'words do not make a mind, although they may show whether the mind you have is worth communicating with'

Keith Kendrick

# Communication of information through language

Do other animals communicate with each other normally using language ?

'If a lion could talk we would not understand him'

Wittgenstein





# Communication of information through language

Do other animals communicate with each other normally using language ?

'If a lion could talk we would not understand him'

Wittgenstein



...and what about great apes ?





# Communication of information through language

## Dogs and cats



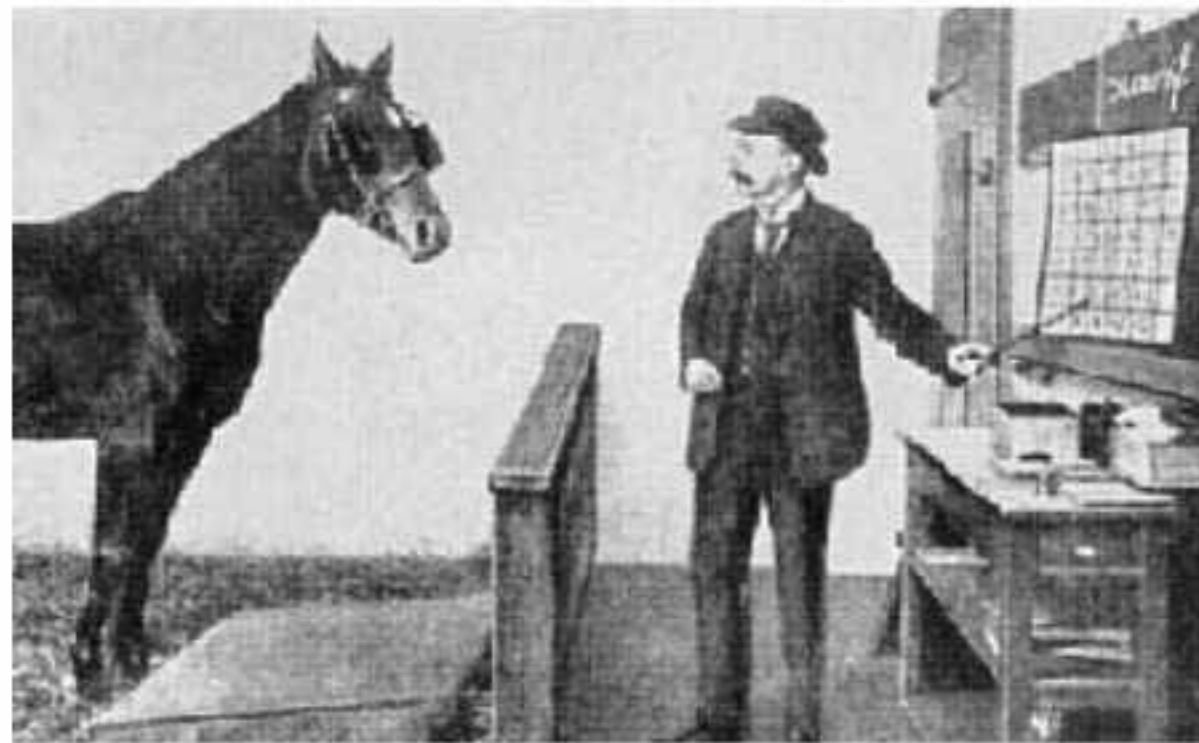


# Communication of information through language



# Communication of information through language

The story of Clever Hans (Von-Osten 1898)





# Communication of information through language

The story of Clever Hans (Von-Osten 1898)

The Jury (6th September 1904):

Psychologist (Carl Stumpf)

A Vet

A Circus Trainer

A Politician

The discoverer:

Oskar Pfungst



Never discount cues from body language !

# Communication of information through language

What about our nearest living relatives, the great apes ?

'a great baboone.....I do believe it already understands much English; and I am of the mind it might be taught to speak or make signs'

Samuel Pepys Diary 24th August 1661





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Ape adoption: An American family affair !



# Ape adoption: An American family affair !

Kellogg and Kellogg (1930s) raised a chimpanzee, Gua (with their son Donald) - did not develop speech





# Ape adoption: An American family affair !

Hayes and Hayes (1952) raised a chimpanzee, Vicki. She learned just four speech sounds (Mama, Papa, cup and up) and did not use them in any language-like way.



'Bedtime for Bonzo'

# Ape adoption: An American family affair !

Gardner and Gardner (1969) raised a chimpanzee, Washoe, and taught her American sign language 150 signs. She used novel descriptive combinations eg 'water + bird' for swan, 'dirty + roger' as expletive

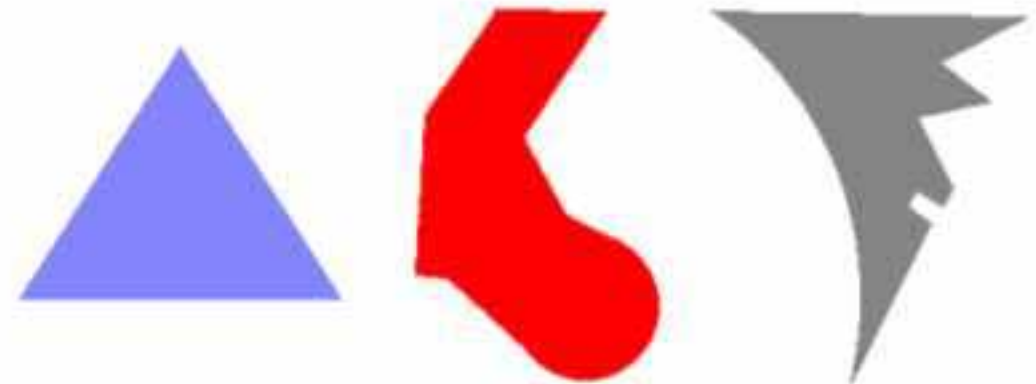




# Ape adoption: An American family affair !

Premack and Premack (1966) raised a chimpanzee, Sarah. She could use 130 signs, making sentences of up to 8 units.

e.g. 'Sarah + to give + apple + Mary'



# Ape adoption: An American family affair !

Rumbaugh (1980) worked with a chimpanzee - Lana, who learned to use the symbols but only as a means of receiving something desired.





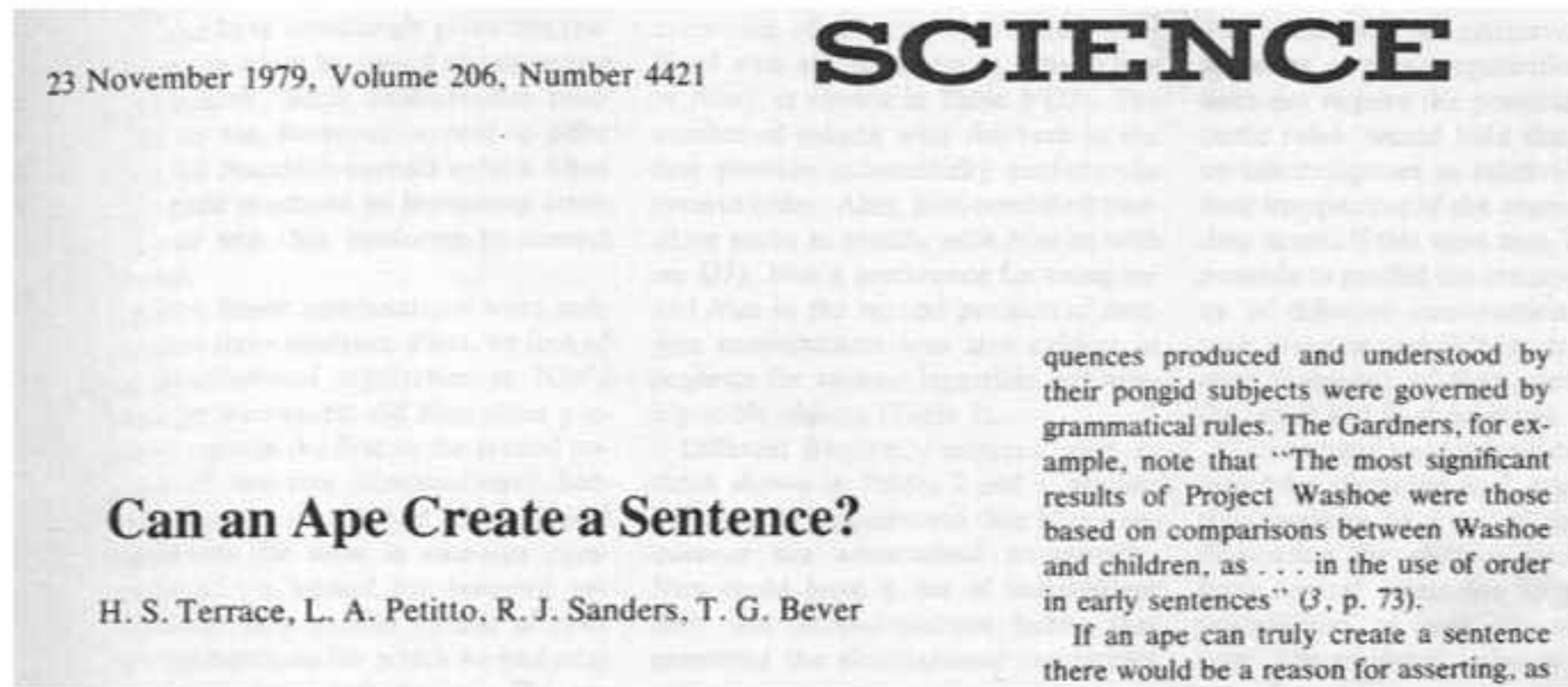
# Ape adoption: An American family affair !

Terrace (1979) raised a chimp named Nim Chimsky, who learned 125 signs, including nouns, verbs and adjectives. However, results indicated another case of Clever Hans !



# Ape adoption: An American family affair !

Terrace *et al* Science 1979





# Light at the end of the tunnel ?

Chantek (taught by Dr Lyn Miles) Knows 500 signs and can use them to lie and conceptualise. Can string together novel combinations of words and understand complex sentences.



# Light at the end of the tunnel ?

Koko (taught by Dr Penny Patterson) Uses a similar repertoire of >500 signs. Can rhyme, make jokes and use metaphors.



bird



ask



apple



stink



want



up



fruit



tiger



because



gorilla



devil



fake



# Light at the end of the tunnel ?

Koko (taught by Dr Penny Patterson) Uses a similar repertoire of >500 signs. Can rhyme, make jokes and use metaphors.



old



good



nose



mother



stamp



rotten



red



love



time



visit



unattention



eat



# Light at the end of the tunnel ?

Koko (taught by Dr Penny Patterson) Uses a similar repertoire of >500 signs. Can rhyme, make jokes and use metaphors.



mother



light



hungry



koko



love



orange



pink/shame



polite/fine



because



gorilla



devil



fake



# Light at the end of the tunnel ?

Koko (taught by Dr Penny Patterson) Uses a similar repertoire of >500 signs. Can rhyme, make jokes and use metaphors.



stupid



tree



toothbrush



bird



tickle



baby



browse



want



drink



dirty



frown



because

## Light at the end of the tunnel ?

Koko (taught by Dr Penny Patterson) Uses a similar repertoire of >500 signs. Can rhyme, make jokes and use metaphors.





# Light at the end of the tunnel ?

Sue Savage Rumbaugh concentrates on language comprehension rather than acquisition.

Words become synonymous with objects rather than just representing them.



Austin and Sherman use symbols to refer to objects and activities. They co-operate to obtain food.

# Light at the end of the tunnel ?

Kanzi is arguably the most accomplished non-human user of symbolic language. She knows >500 symbols, comprehends >2000 spoken words, uses novel sentences and third party instructions.





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# Attempts to teach language skills to other species

Irene Pepperberg works with African Grey Parrots  
Alex can name 50 objects and use concepts such as  
bigger/smaller and same/different



# Attempts to teach language skills to other species

Dolphins at the Marine Mammal Cognition and Behaviour Unit at the University of Southern Mississippi use symbols to communicate with divers





## Some final conclusions

Animals, like us, are body language aficionados

Human language skills probably evolved as a consequence of enhanced cognition

Some other species can be taught to use simple aspects of human language

Like young children they understand much more than they can say

Even their simple use of such language reveals that they have minds

You don't evolve skills to remember 60,000 words and shed-loads of grammar rules for fun!

They can't be taught to use anything more than the basics

Were they to ever need to do so then, in time, they probably could

What we have learned in trying to teach them has also benefited us