University of St Andrews
School of Psychology and Neuroscience, and Department of Philosophy

What Kind of Mind?

Lesson 4: Teacher Notes

Lesson 4: Chimps	**Learning Intention: To investigate whether chimpanzees communicate similarly to humans** **Activity Instructions**	**Purpose**
1	**Recap Lesson 3** **Resources: Slides 1 and 2 of PP** **Instructions:** Recap the main points of lesson 3 as follows: We thought about our primate family and placed them on a family tree. We thought about different primate hands and how chimps can use tools. We thought about how our hands and brains have evolved and how interacting with our environment has shaped human minds. We then thought about whether human babies and Capuchin monkeys might think about objects in the same way.	To reinforce main ideas from previous lesson.
2	**Chimp Evolution** - Phylogenetic tree; focus on chimps - our closest living relatives. We share an ancestor quite recently (6 million years) **Resources: PP Slides 3 - 7** - images for comparison and discussion **Whole Group Discussion** **PP Slide 3** reminds the children of how chimps and humans are placed on the primate family tree. **PP Slide 4** shows human and chimpanzee hands and feet for comparison. Chimp hands and feet are far hairier than humans. Chimp feet are more like their hands, whereas human feet are elongated and do not have an opposable digit (thumb). **PP Slide 5** asks the children to consider the similarities and differences between human and chimp faces. Their faces are similar in that they have eyes, ears, nose, mouth and brow. They differ in that human eyes have white around their irises, whereas chimps have a darker brown. Chimpanzees do not have foreheads, as humans do, but they do have large ridges in the area above the eye sockets. Humans have formed chins and are the only primates with this feature. **PP Slide 6** This slide draws the attention to the vocal apparatus of the two species. These have evolved differently but still share similarities. This gives rise to the question of whether chimps are talking when they make sounds. Do they have language? **PP Slide 7** This slide poses the question of whether chimps can 'talk' and if they have a shared language with which they can communicate effectively. The children are invited to offer their ideas about this. Just as human and chimp bodies have evolved, so have their minds. Emphasise again that just as their bodies have similarities and differences, so might their minds. So, do chimps 'talk'?	To think about the differences and similarities between chimpanzees and humans in their bodies and minds.
3	**Language** **Resources: PP Slides 8 – 12** **Whole Group Discussion –** **PP Slide 8** - Ask the children which languages they can speak.	To think about what we mean by language; to think about whether non-

	Language is a socially learned tool of communication. We learn the language we speak from others around us. Some researchers, such as Noam Chomsky, argue against that claim and state that we are all born with the facility to learn language and so this is innate. Language may have evolved to help humans communicate with each other, and so survive. Primates, including humans, use a combination of vocalisations, gestures and body language to communicate. **PP Slide 9** - Animals communicate in many ways: some very different to the way humans communicate. Modalities refer to the senses that are used in communication. Signals are sent from one animal to another via different kinds of modalities. The following are examples: Chemical – Ants leave chemical trails that give directions to other ants. Lynx spray urine that contains pheromones to mark their territory, telling other Lynx where they are. Electric – Weakly electric fish like this "Peters' Elephantnose Fish" emit and detect small electrical signals in the water, which they are thought to communicate with, as well as electrolocate (like echolocation as bats do, but with electricity) Acoustic – Human speech is "acoustic" communication, but many other species produce sounds to communicate: birds, frogs, insects, mammals. Here is a Superb Lyre Bird that mimics other sounds in the forest. Tactile – Tactile communication requires touch, like shaking someone's hand. Male kangaroos touch female kangaroos' tails when they are asking to mate. Visual – Many species use visual displays – bright colouring or body ornamentation – often for females to see how fit the males are. Birds of paradise are famous for bright feathers and courtship dances. Here the male displays his tail for the female. ASK CLASS: What modality do they think gestures are in? **PP Slide 10 -** Modalities refer to the senses that are used in communication. Humans use auditory and visual modalities to communicate. Using these types of signals are different from using a spoken language, such as English. This is because a spoken language allows us to combine different signals and incorporates grammar. Linguistic signs are arbitrary and conventional (for example, different languages might use the same sound with different meanings). People use language intentionally, with the purpose of communicating, while at least some baby signals (for example, crying) seem more automatic, like reflexes. **Whole Group or paired Activity – Try Communicating Without Words**	human animals have language

	PP Slide 11; Worksheet Activity 1; Instruction commands (on separate sheet, to be cut up and distributed) In this activity, children are being asked to give instructions to a partner without using words. The aim is for one partner to communicate to the other what they would like them to do with the cup, pen and paper. The key element is that they must not talk at all and find other ways to communicate their instructions. Give out the worksheet: the children should record their findings on this. Give a printed instruction to one of the partners in each pair. The instructor will then try to get their partner to do what is printed on the instruction. Children should then complete the worksheet. **PP Slide 12 – Feedback on the Activity** This slide provides the opportunity for the children to report on the activity and think about how difficult or simple it was to communicate their instructions to their partner. Our spoken language contains grammar, which is a set of rules covering how we make up sentences and clauses. It also relates to where the subject, verb and object usually appear in a sentence. Grammar is a crucial element of the above task, as the children would need to communicate what they wanted placed where: that is, which subject doing what on / in / below which object.	
4	**Is chimpanzee communication like language?** **Resources: PP Slides 13 – 14; Slide 13 with film; Worksheet Activity 2; Worksheet Activity 3** **Chimp Communication Film:** **https://www.dropbox.com/sh/ae2l6f4wb6vusbr/AAC0Y4FYJNNc0zBi-efsc45la?dl=0&preview=Chimps.mp4** This slide asks the children to consider whether chimp communication is similar to language. Show the film and ask the children what they notice about the ways chimps communicate in the film. Ask them to think about whether the chimps can communicate what they want effectively. Using the space on the worksheet, **Worksheet Activity 2,** the children should record their thoughts, giving reasons for their ideas. Is chimpanzee communication like language? What is similar? What might be different? **PP Slide 14 -** This slide provides the opportunity to discuss the children's ideas from their worksheets. **Paired Activity – PP Slide 15; Worksheet Activity 3**	To think about whether the ways in which chimpanzees communicate is similar to human language.

	This activity is designed to allow the children to think about how they would communicate as chimps. They are asked to make up their own chimp gestures to convey messages as follows: How would you use your body to signal these messages to other chimps in your group? Which gestures could be used to communicate the following? • I am your friend. • I don't like that food. • I want to play. • I am tired. They should then answer the reflective questions which follow, which are: What is good about using gesture to communicate? What is good about using language to communicate? Which is more effective, do you think?	
5	**Plenary** **Resources: PP Slide 16** **Instructions:** Recap the main points of lesson 4 as follows: Today we thought about how chimpanzees are our closest living primate relatives. We thought about the similarities and difference in human and chimp hands, feet, faces and vocal apparatus. We then thought about what language is and whether chimps have a language in the way that humans understand this. We tried to communicate without using words. We watched a film about chimp communication and saw the gestures which they use and considered whether this was a language. We then made up our own chimp gestures and tried to use these to communicate different messages to each other.	

A Brief Guide to Language

Over the years, linguists, anthropologists, philosophers, and psychologists have debated the origins and nature of language, as well as whether it is a uniquely human trait. We know that other animals can communicate—anyone who has a pet knows that animals have their own ways of indicating certain things to us and each other. But does this count as language? Or is language something that humans have *in addition to* other forms of communication? In this guide, we will explore the research behind the fascinating field of linguistic psychology and strive to answer some rather difficult questions: what is language, and is it the thing which sets humans apart from other members of the animal kingdom?

Before we delve into some theories of language, let's consider the similarities and differences between how humans and other great apes communicate.

When we communicate, we use a mixture of verbal and nonverbal signals. Humans speak, write, gesticulate, and produce different facial expressions to convey a variety of things. Over millions of years, humans have evolved physical traits which allow us to express ourselves in these ways.

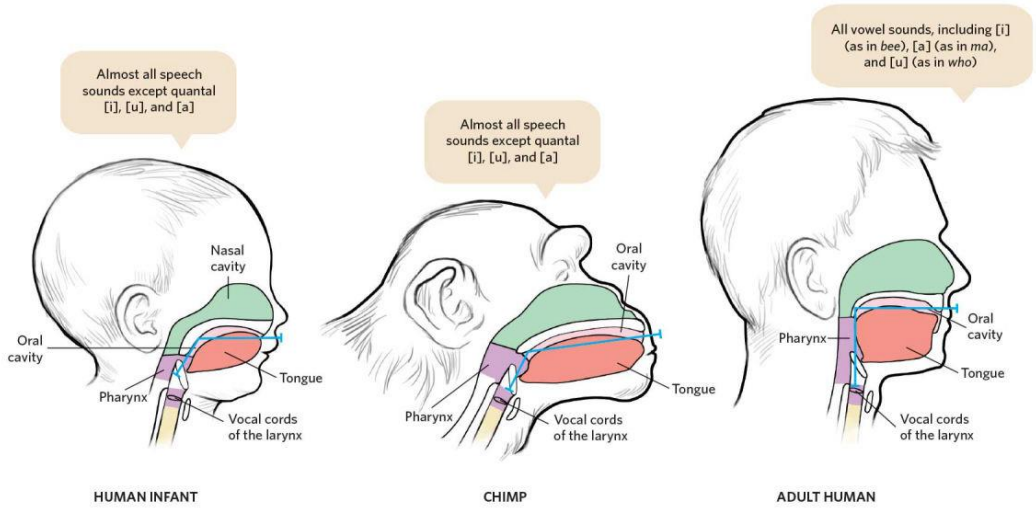


Figure 1: The differences in facial structure between human babies, chimps, and human adults. By adulthood, humans can produce a wide range of vocalisations.

Our ability to speak, for instance, is deeply rooted in how our heads and throats evolved to accommodate the anatomical features necessary for language. Speaking likely gave our ancestors an evolutionary edge, as it is an extraordinarily rich way of sharing information. Those of our distant ancestors who could not engage in complex speech were likely not as successful as their more linguistically-apt peers. Thus, over time, having the mechanisms for speech became mainstream in our species. Note the differences between human babies, human adults, and chimps in the above diagram. While a chimp's oral cavity is narrow with a short pharynx, the human's oral cavity is tall, and his pharynx is longer. This allows humans to make a wider range of sounds. And, though this short guide will not go into

too much detail about this, our brains have also evolved to interpret the spoken and written word.

But speaking isn't the only way we communicate. Though bodily gestures differ greatly between cultures, they are used by all humans. Let's take a look at some of them:

Figure 2: Waving, using facial expressions, and gesturing with our fingers helps us communicate.

Comparative psychologists have found that chimps also use a multitude of gestures to communicate with one another. This research is discussed in *What Kind of Mind?* Lesson 4. Chimps lift their legs, shake trees, and stomp to make those around them aware of their needs and intentions. Researchers at the University of St Andrews have been involved in decoding the subtle behaviours of great apes, creating a catalogue of chimp gestures called the 'Great Ape Dictionary'.

Figure 3: Though they cannot speak like us, chimps certainly demonstrate complex forms of communication.

But the question still remains: does chimp communication count as language? Some linguists, such as Noam Chomsky, believe that language is an exclusively human phenomenon. He argues that humans possess a neural 'language acquisition device', which allows us to develop grammar, a core facet of language. While comparative psychologists believe that

chimps can combine their gestures to communicate complex messages, human language may be very different. Consider the meaning that even one comma can add to a sentence:

"Let's eat, grandma."

versus

"Let's eat grandma." (yikes!)

If we are considering language, then it is unlikely that other animals demonstrate language at all. From this point of view, it is likely that language is a uniquely human trait – a trait that is shared by all human languages. Even languages which are conveyed through movement of one's body, such as American Sign Language, rely upon the use of grammatical structures as complex as those of verbal languages.

There are other ideas about what features are essential to human languages. Some philosophers have emphasised the fact that human languages involve assigning meanings to sounds, marks, or gestures in an *arbitrary* and *conventional* way. One and the same sound or sequence of letters might mean the same thing in different languages; for example, the German word 'die' is a version of the definite article (English "the"), and the German word pronounced like 'dry' means the same as the English word 'three'. Using English to communicate requires conforming to English conventions -- the arbitrary associations between words and meanings that are typically made by English speakers – and this may require sophisticated knowledge about what other speakers believe and do. It is a good question whether any non-human animals have similar conventions!

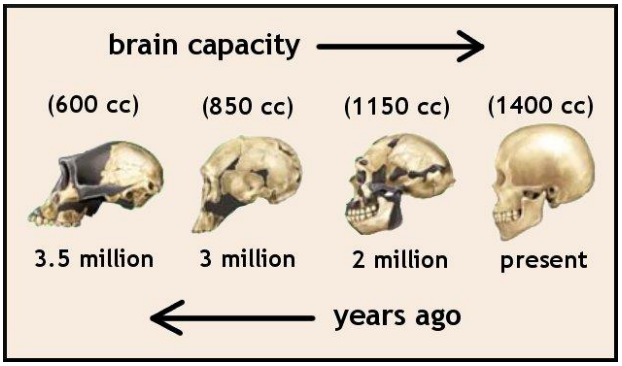
Other philosophers have emphasised the way in which linguistic communication carries meaning. On one influential view, developed by the twentieth-century philosopher Paul Grice, is that genuinely meaningful communication requires acting with certain intentions. For example, Grice thought that it was important that language-users are trying to convey information; in writing this sentence, I am intending that you come to learn something. Whether non-human animals are capable of this sort of intention is a subject of much research and debate.

Thus, researchers continue to strive to answer the question of whether human language is just a particularly complex form of communication, of which we can see simpler forms among animals, or an evolutionary invention that only humans have.

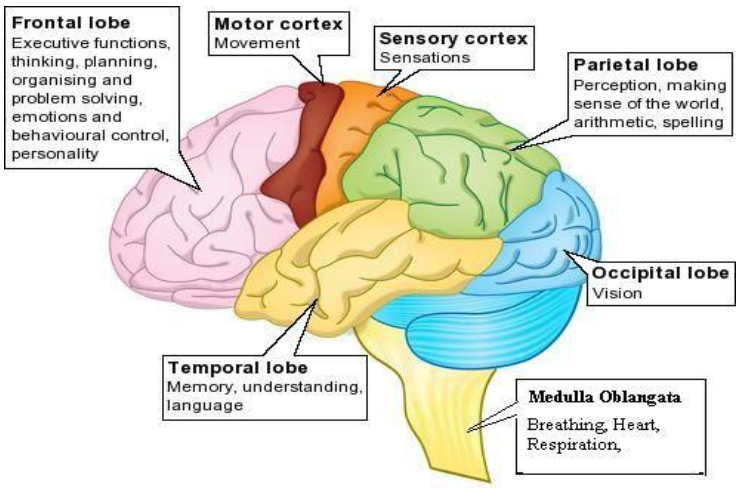
A Brief Guide to Brains

There exists a great deal of information out there relating to the study of the human brain—and sometimes, when you are trying to piece all of this information together, it can be difficult to know where to start. Our hope is that this guide will help you begin to navigate neuroscience: a fascinating field of research that can greatly enhance our understanding of our evolution as a species, our cognitive abilities, and the things which make us human.

One important thing to note is how much our brains have changed over the course of evolutionary history. Take a look at the diagram below:



In just 3.5 million years (a very small amount of time in evolutionary terms; life on Earth is estimated to have begun up to four billion years ago!) the size of the human brain has more than doubled. While brain size does not necessarily correlate with processing power across all species, this has a lot of implications for how humans behave and think. Our incredibly complex brains allow us to perform all kinds of different tasks, such as solve complicated problems, produce language, and commit things we have learned to our memories. We may take these things for granted—after all, the great majority of us can read, write, and speak by the time that we are adults. But these are actually very challenging tasks that recruit many parts of your brain at once, and you have your evolutionary history to thank for your abilities.



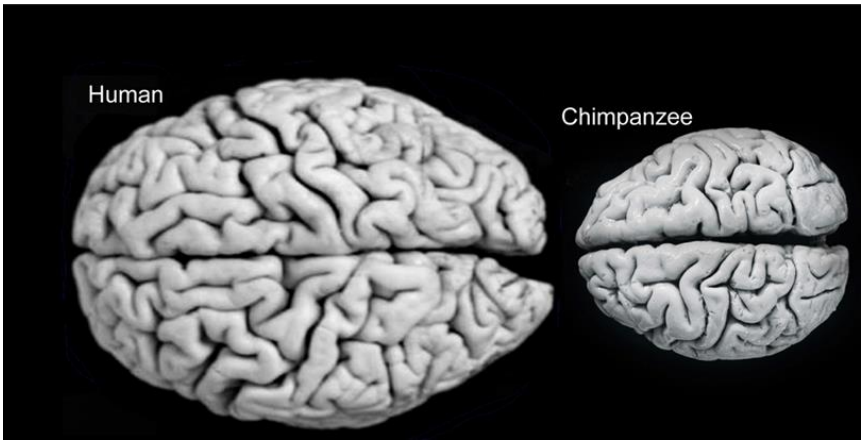
Though neuroscience is a relatively new scientific field, researchers have identified different parts of the brain that are specialised for different cognitive tasks. For instance, the occipital lobe in the back of your brain mainly processes visual information from your eyes. Two bands that go across your brain, the motor and sensory cortices, coordinate your movements and take in information from your sense of touch. However, even though there exist different sections of the human brain, they all work together to produce your conscious and sensory experience.

Animals which are closely related to us evolutionarily, such as chimpanzees and bonobos, have brains which are similar to ours. In fact, we share about 98% of our DNA with these primate cousins! Our brains are larger and more complex than theirs, but we still have much

in common with these animals. Both humans and some species of non-human primates use tools, solve problems, interact with one another in complex social settings, and even develop forms of culture.

Tool use is common among chimpanzees who, for example, use primitive anvils and hammers to extract nuts from hard shells. Likewise, humans use tools for all kinds of things.

Both humans and chimps learn socially, usually from people within our families and older members of our communities. Chimpanzee and human children rely on this type of learning, which prepares them for the challenges of adult life.



Human brains are much larger than chimp brains, but they are organised in a way that is very similar—this is due to our evolutionary relatedness (and chimpanzee brains are still rather big compared to those of other animals, like dogs). Thus, our **minds** likely work in similar ways, and by looking at chimp behaviour, we can gain a bit of insight into our own. In addition, chimp brains can give us information about the brains of the common ancestor we shared with them millions of years ago.