

Session 6

Chair: Prof. R. Amritavalli

Prof Amritavalli: I invite the speakers to join me, Prof. Jean Aitchison, Dr. Tanmoy Bhattacharya and Prof. Rajendra Singh – three distinguished speakers for this session. May I request Prof Aitchison to start.

Prof Jean Aitchison

How Children Learn Language: Natural Magic or Long, Long Haul?

Well, good morning, I am very pleased to be here. This talk is about the construction of knowledge of language, and whether language learning is natural magic or long-long haul. Well, it's a bit of both. Obviously something must be innate, that is, inborn or even goldfish would learn to talk. But learning is also involved; it takes years before children are proficient. I am talking mainly about first language learning but also a little about second language learning.

First of all, the first section of the handout says language involves innately guided learning. In this type of learning, an animal instinctively knows what it should pay attention to, but has to spend time learning the details. Birds and bees and flowers are a good example.

Flowers are very different from one another and bees are not born knowing about flowers, they have to learn. They instinctively know they have to pay attention to the smell, colour and their shape, in that order. They therefore learn to fly to roses rather than say bus-stops or post-boxes which are also sometimes brightly coloured. Similarly, human infants naturally pay attention to the sounds coming out of people's mouths and they instinctively know how to make sense of them. But it takes them a long time.

Now under section two - Pre-language - we start with crying. Children at first just cry. "A loud noise at one end and no sense of responsibility at the other"- Benjamin Franklin supposedly said. The same types of crying can be identified across all languages; an Indian mother or an English mother would be able to recognize these cries in their own and each other's babies. After that babies coo – something like *gu-gu*, this starts at around six weeks. Then they start to babble, producing repetitive *mumma* types of sequences at around 6 months. Parents sometimes assume that their children are addressing them, though these sounds are just the easiest for them to make when they are experimenting with their lips. Now we come to intonation, which comes in at about 8 months. Children sound as if they are talking, but they are just copying the tunes of the language they hear.

In section three we get two early languages. One word utterances come around 12 months. For example, in English, children often say *do* meaning "juice". Two word utterances come in at around 18 months- for example, *more do* "more juice". Questions such as- *Where Daddy?* And negatives- *No bed.* come in at around two years.

Now we get to the later stages. Under section four, we see that longer sentences are produced at around the age of 3, but careful probing shows that there's a lot the children do not know at this time. By the age of 10, major constructions are normally in place, even quite complex ones. But one aspect of learning continues throughout life and that is - word-learning, acquisition of the lexicon.

So now we come to section five: Vocabulary. Children understand some words from a very young age; my nephew aged around a year could reliably point to a lion or tiger in a picture above his crib, when a parent said "show me the tiger", but to the child it was just a big game. When a parent uttered the word *tiger*, he knew he had to point to an animal with stripes. He probably did not realize that this was the name of the animal he is pointing to. At some stage children discover the power of names, they achieve something called the Naming Insight, the realization that things have names, they get to this stage somewhere in the second year, typically between 15 and 18 months old. After this they name everything. Now we can't obviously chat to toddlers about this, but we do know something about this stage, from the experience of deaf children who mostly reach the naming insight late.

A recent case is of a deaf Mexican called El Dephanso, who discovered the naming insight when he was not

told. He discovered this in stages, discovering numbers first, then nouns, then verbs. Now everybody agrees whether there is a word surge around 18 months. When children appear to just suck up words, by the time they are two, children typically know several hundred words, though they are not old, pronounced in an old type way and by the age of three, over a thousand. Children have an active vocabulary of around 3000 words, the passive vocabulary (what they understand) is likely to be much larger, an estimated 10,000. A word search takes place around the age of 13. I did a survey of vocabulary of British 11 – 14 year olds with a researcher called Ann Koppell. We tested 400 British children, 200 at each of the two schools, and we found that 11 and 12 year olds clustered together, on the one hand, and 13 – 14 year olds, on the other. Most British children had acquired 20,000 words by the age of 13. Remember this number - 20,000. 20,000 words is a critical mass for being able to speak English fluently. I found that foreign learners, some of who I tested (some of them were Indian) who had reached this total could talk efficiently about any subject. And those with less than 20,000 struggled. Average British speaking adults know around 50,000 words. For comparison, the *Concise Oxford Dictionary* claims to contain 75,000 words. So a British adult knows about two-thirds of the *Concise Oxford Dictionary*. But no worry if anyone's behind in all this, word learning continues throughout life.

I am now going on to section seven on my handout- The Separation of Language and Intelligence. Language – the ability to talk, is surprisingly separate from general intelligence. Normally language and intelligence progress together, but there are a number of bizarre but gifted humans in whom language and intelligence have been separated. The first is a female sometimes called Laura, sometimes Martha. Now Laura used grammatically sophisticated sentences but these sentences often didn't make any sense, for example – "I was 16 last year, and now I am 19 this year"; and this my favourite – "She was thinking it's no regular school, it was just good old, no buses and I don't like him putting paper towels in my mouth." Laura wasn't just repeating pieces of sentences she had learned, because she also made grammatical errors. For example, "These are two glasses I have taken, it was given by a friend, I don't know how I caught it." Another example of someone whose language and intelligence were separate is a man called Christopher, who is severely mentally handicapped. He is unable to look after himself, but has great skill in learning languages. He was 29 when he produced this translation from Swedish – "Mia is sitting crouched down in the kitchen sofa, with her knees bent and her feet tied up in the lovely night shirt, the cat spins in her knee," an accurate translation. Of course, "Mia is crouched up on the kitchen sofa with her knees drawn out and her feet tucked into her stripy nightie, the cat is purring into her knee." The same translation as Christopher's, but Christopher had confused the word *purr* with the Swedish word, for *spin* which is actually like the Swedish word for "purr". And there is another type of child, Children who suffer from Williams Syndrome cannot cope with special tasks for e.g. they are unable to assemble the components of a bicycle into a whole. Yet, their language is sophisticated and elaborate. For example, the following is a description by a 17 year old, describing a brain scan. "There is a huge magnetic machine, it took a picture inside the brain. You could talk but not move your head because that would ruin the whole thing and they would have to start all over again. After its all done, they show you your brain on a computer and they see how large it is."

I now want to describe or discuss the facts that humans are biologically adapted to language, both physically and mentally. Physically, the tongue is muscular and mobile. It's not floppy like the tongues of other animals like dogs. The human tongue is useful; it can not only pick up food from around the mouth but also make a wide variety of sounds. Human teeth are even and although this is not necessarily a very good thing for eating, it does allow one to create a useful barrier in the mouth against which sounds such as [t, s, z, l] can be pronounced. The lungs allow air to breath in quickly during speech and breathe out slowly.

This adaptation is unusual because in most cases breathing can't be attended to. Yet some humans can talk for hours without discomfort; they are more likely to get sore throat than have difficulty breathing. Our vocal chords are thin strips of membrane in the throat, which were originally (and still are today) useful for closing of the lungs to make the rib cage rigid for tasks involving effort, such as lifting heavy weights or once, of course, swinging in the trees.

Notice the difference between the head of a chimp and the head of a human. Humans can shut off the nasal cavity and produce recognizable sounds, particularly the three so-called *anchor vowels*- [i, u, a]. And once we could pronounce these three clear vowels, this was one of the keys for language to take off. I am now talking about 50-75,000 years ago. Now, our human brains have also become specialized for language. Our brains are larger than those of chimps, particularly the front part, but it's quality rather than quantity that counts. The left hemisphere is in most humans used for language. Most humans are right handed and over

90% of these have language in the left hemisphere, or left half of the brain. Of the relatively few people who are left handed, most of them also have language mainly in the left hemisphere. So, these are same figures from a book on neurology showing that over 90% of right-handers have language in the left hemisphere, and also, most left handers. A biologist, Eric Lenneberg wrote a key book in 1967, which was called *The Biological Basis of Language*. He pointed out that language was maturationally controlled behaviour, that is, a kind of behaviour rather like learning to walk or sexual behaviour, in which aspects of the behaviour developed naturally at particular times in an individual's life, provided that there was sufficient stimulation in the surrounding environment. He provided a number of key points for identifying this type of behaviour:

1. Maturationally controlled behaviour emerges before it is required.
2. It is not triggered by any external events. Parents don't suddenly drop children on their heads when they have to talk.
3. Its not the result of a conscious decision.
4. Direct teaching has relatively little effect.
5. And there is a regular sequence of milestones.

Lenneberg in his 1967 book argued that there was a fixed critical period during which language acquisition was possible. He claimed that it started at around age two and ended at adolescence. After which, so he said, "acquiring language was impossible." But he was wrong about this rigid critical period. He was wrong in two ways. First of all, children acquire a huge amount of language before the age of 2. Serious damage to the left hemisphere before two can cause permanent linguistic damage. Second, lateralization (specialization of language to the left hemisphere) has been detected in very young infants. That is, if language sounds are played to them, they pay attention with the left hemisphere, as quite detailed experiments have shown. And, quite important, newborns also pay more attention to their own language, suggesting that they have become acclimatized to its rhythms while they are still in the womb. And contrary to Lenneberg, there is no sudden cut off point at adolescence. Language acquisition can continue after the age of 13. Some older people are perfect language learners. Secondly, and very importantly, vocabulary continues throughout life. People go on building up their vocabulary (until they can) until there are about a 100. And, also quite important, word formation peaks at around age 13. So, instead of a critical period, these days researchers talk about a sensitive period, a time which children need, in which children need to be exposed to language, but it starts earlier and goes on later than what Lenneberg thought initially. So, essentially people assume the window of opportunity is open for longer and fades away more gradually. And, for example, families which have migrated to Canada have found that all their children learn French which is what French Canadians speak. The younger the children were when they moved, the more easily these children acquired French. As we now know, this sensitive period seems to be a time of changing sensitivities. Very young children are particularly good at learning the sound structure of their language. Older children pay attention to grammatical structures. Teenagers concentrate on vocabulary. Older children are not really geared to acquiring language. There is no doubt that the people who look after children can help or can hinder. At one time, the term *motherese* was used for speech to children. But we don't use this term very much any more, because its not only mothers who look after youngsters. It is also fathers, relatives and friends. So the currently fashionable term is *caregiver*, someone who gives care. And, so we talk about caregivers and about *child directed speech*, sometimes shortened to CDS. Now it's been found that what people say about first language caregivers and CDS is also true to a large extent for second language learners. Now, first of all it's very important to talk directly to the child. There is no point in just parking the child in front of the television and hoping that he will learn English, he will not. There was a very interesting case of a child called Vincent, whose parents were deaf. So they wanted Vincent to learn not only their own language, which was sign language, but also English. So they used to sit him in front of the television, but Vincent did not learn any English. So, essentially, yes, you must talk to children, but in the correct way. First of all, it's not good to correct children (or any type of learner) overtly or covertly in a critical way. That is, you must never say "No, that's wrong". Correction of that type can hinder a child specially if the caregiver puts on a criticizing voice. Children notice this more than what is actually said. And they just realize that they are being disapproved of. And the same is true of older children acquiring a second language. So correction may well hinder especially if it's done in a critical way. Then children very often don't pay attention to actually what's being corrected. They simply know that nobody likes them or nobody really approves of them and they may not notice or pay

attention to it. And also, parents are inconsistent in what they correct. And they tend to correct the truth, more often than the language mistakes.

So when the child said “Teddy sock on” (When teddy was wearing a sock), a parent is likely to say “Good! That’s right. Teddy’s got a sock on”. But if the child said the grammatically correct - “Teddy’s got his sock on” when the teddy wasn’t wearing a sock then the parent would probably say - “No, you are wrong. Teddy is not wearing a sock.” In short, as Roger Brown once said, “If correction worked in the way parents sometimes think, you would expect children to grow up speaking the truth ungrammatically”.

In fact, the opposite seems to be the case. Now a lot of people have done more recent work on correction and shown that it can sometimes work, if the child happens to be working on that aspect of the language at that time and if it’s done in a friendly way. Children pay selective attention to a particular aspect of language at any one time and the same appears to be true of people learning a second language. For example, here is an example of Alex:

Alex was particularly aware of past tense at one time. He said, “The crocodile bitted the giraffe’s feet”. The father said, “He bit his feet.” And Alex said “Yes, and he bite me too.” Showing that the child had paid attention to the past tense. But what we do know is, the parents and teachers need to provide a good basis for a learner’s update. They need to provide slow, well-articulated, exaggerated intonation and short well-formed utterances. It must be repetitions but not a direct repeat and there must be grammatical variety. So, for example, you might say to a child, “It’s breakfast time. Shall we make some toast? You must be hungry. What do you want to drink? Some orange?” Essentially also, it’s not just the speech which is important but making the children or learners feel involved that they’re engaged in joint enterprises with the adult.

For example, “Shall we go and feed the rabbits now? The rabbits must be getting hungry. They want their dinner, shall we give them some cabbage leaves? They like cabbage leaves. Don’t they?”

Of course, joint enterprises are harder with older children learning a second language but not impossible. It’s still possible, if you get them doing things, such as, for example, drawing a map of England or America and putting London or New York or in India putting Bombay and Delhi in the right place. And this, an important book by Prabhu, on Indian children learning Indian English, and Rama Kant Agnihotri has done a lot of important work as well. (There wasn’t enough space on my reading list to put all these references but they are in my final paper.)

I’m now on section eleven. Children may start out by computers, by beginning with the simpler program than the one they are eventually going to deal with. We in England tend to talk about booting up computers, when we first turn them on. Americans tend to talk about bootstrapping. So, how would bootstrapping work in the child? To start with, the child might form a simple hypothesis, that any sentence begins with a word such as *daddy, mommy*. Then, that is followed by another word such as *car* or *cup* or such as *girl*, such as *daddy car, mummy cup, daddy go*. Then he or she might realize that there were differences in these utterances and to start to think why this might be and how this affected what he or she is saying. And eventually they would realize that sentences express different types of grammatical relationships. In general, we know that when children are working on some aspect of language, they tend to listen, wait, experiment and then listen for confirmation. Say, first of all they listen, they learn a lot about their language before they try to speak it. Then they tentatively experiment. (And of course, sometimes second language learners need to hear more English before they are forced to speak.).

One important aspect of acquiring language is that children and adults are specially tuned in to *co-occurrence* (words and constructions which go next to one another). This was how Sally, a blind child, learnt the difference between *look* and *see* and in her language she was only fractionally behind seeing children. Say for example, “Look, here’s how you wind the clock” and “Come and see the kitty.” And so obviously, she’d paid attention to the words, either side of the ones she was learning. And this is most important that children actually (and second language learners also) learn things in context.

So far, I have talked mainly about how children move forward. But, of course, they also move back from their mistakes. And nobody is quite sure how they do this beyond the fact that you need to keep talking to them slowly and clearly and they move back. I’ve written some of the theories down under section twelve- Retreating- and probably noting discrepancies is the most important. Children notice if their speech is slightly different from that of their parents and then they may change it.

I haven’t said very much about variation, this is section thirteen. Language learning by children is in many

ways similar in general outline. But of course, there is variation between individuals. Some children want to know about words, others about constructions. Second, there is variation between languages and different language types seem to encourage different strategies among learners. Third, numerous children grow up bilingual or even trilingual. This is a great advantage for any child. Their parents sometimes get worried because in households where different languages are spoken, the child is sometimes less advanced at first than in a single language household. But this is only temporary. Essentially, the child acquires both languages, though it sometimes helps if one parent consistently speaks one of the languages. So, if a child knows his mother will speak English and his father Spanish, then that would probably help.

But let me go on to one final point. Owing to lack of time, I've only been talking about language structure. I haven't been talking about general interaction which also needs to be learnt as in the following cartoon sequence:

This is a child who obviously hasn't yet learnt how to cope with telephone. The telephone goes ring-ring. The child picks it up and says, "Hello". The voice at the other end says, "May I speak with your father please." The child says, "Heck! You don't need my permission."

Thank you for listening.

Discussion

Question: First of all, I must congratulate you for a very nice and very informative lecture. It's not a question; it's actually a supplementation. Until now we are talking more on terms of how language can be taught or how language is learnt and the context is usually in the school classroom situation. I would like to supplement it further saying something about the role of infant stimulation or baby stimulation in the early years. Way before the language starts taking shape, a dialoging starts taking place between the baby and the caretaker and the roles of language learning start. Because when the mother looks at the baby and baby looks back and a smile gets passed, that is actually a kind of interaction beginning. And in the present context, how the construction of knowledge takes place and in Asian countries especially, it assumes importance because of the role of early stimulation. We are concentrating on first language and second language, I would say no language. In the place where I am working (in tribal regions), there are times when mother and caretaker and the babies do not get a chance to interact at all. So we should also emphasize on how the baby should be enveloped in a language envelope, how the talking should be there in the very early years because that is the time when all these centres get activated.

Jean Aitchison: Essentially I agree with what you say and I mean one of the interesting things about human language is that they are born to interact. So you find that even very young baby's mothers pretend they've taken their turn in the conversation. So I don't think turn-taking is something that actually has to be taught. Though I do think it's something that one should be aware of. I think very often one tends to talk too much.

Question: It was a wonderful presentation of the, almost a course, in such a short time. You have talked about the vocal tract enlargement and the brain also as the biological defenses. But you didn't mention about language faculty. You didn't mention anything about how language has evolved, in addition to the two broad differences which you have given. Second thing I would like to know is whether separation of language and intelligence can be reconciled to dyslexia, cerebral dominance and so on. Third, we have lots of data about the Indian children acquiring language. I think in the case of the Indian children acquiring language it's a bit faster in comparison to the Western profiles. Nothing intrinsic, but it may be because of the joint family set up which is available, which gives more language input data to the growing child. Fourthly, what about genetic declines, which of course is again a biologically related factor?

Jean Aitchison: Well, those seemed to be comments rather than questions. All I can say is, first of all I'm perfectly well aware of how Hindi children learn language and it's extremely interesting and I've had students who were working on this. But I thought that it would be more interesting to hear about English children. I assumed, I would be talking to people who knew if I talked about Hindi. But I am aware about literature on Hindi children, and not just Hindi. Some of the southern scholars, Laxmi Bai, for example, has done very important work on Telugu and Tamil (and Telugu in particular). So I didn't bring in the Indian ones.

I certainly agree that I could have talked more about how language evolved. We've even written a book on this called *The Seeds of Speech*. You made two other comments but I'm not sure if they were questions or comments.

Question: This is a question specifically on the separation between language and cognition. Most of the studies on William's Syndrome have used a Piagetian framework for testing special cognition and other kinds of cognition. Now it's well known that Piagetian framework is slightly abstract and complicated. I wonder if we use a simpler framework, could you tell me to what extent you think the same results could be replicated.

Jean Aitchison: Well, first of all I'm not a Piagetian. I've certainly read outline works on Piaget, but certainly I'm not tied into a Piagetian framework. I think there are number of people who've worked on relationships between languages, I mean children learning other languages. Slobin, for example, has done some really interesting work in which he's looked at a lot of bilingual children and seen which language develops first and why. And somebody has just said they thought Hindi developed faster. I'm not sure if it does. We usually find in almost all Slobin studies that different aspects of each language developed faster than others and there is no overall benefit from any one language. You just learn certain things faster.

Question: All the examples you gave, of separation between language and intelligence, they are of children who had well-developed language but not developed intelligence. Are there any examples where children had (or anyone had) developed intelligence but no language and if so, what are the implications? That is one. Second is, we often hear that a three year old child is an adult in the linguistic sense. What does this statement mean, and your paper seems to be a witness that this is not so.

Jean Aitchison: The most famous child who didn't have language but had high intelligence is, of course, Genie who was studied by Curtis and I didn't mention Genie because she's been around for so long. I assumed everybody knew her, knew about her. Perhaps I was wrong. There've been other cases, for example, there is a case of a monk who used to have some kind of seizures, and when he had his seizures, he couldn't talk but he could find his way to a hotel. So that I talked about children who were fluent in language but who didn't have general problems because I thought that that would be more interesting with not much time. And I'm not quite sure what your second question was.

Question: The second question was, sometimes we hear a claim that a child by the age of three years is linguistic adult, which means that the child knows all that is to be learnt in his or her home language or first caregiver language etc. and later on he just unfolds the rest of the thing. But it seems that your paper says that child keeps on actually maturing, growing, learning language even after three.

Jean Aitchison: We used to think that children had learnt it all by the age of three. And lots of textbooks do say this but there's been lot of work in the past you know five to ten years. It has shown, no, they don't know as much as everybody thinks. There was a friend of mine, he worked in London, Cory Gummer, who was the one who found out that children aged about eight couldn't understand "The doll is easy to see." so he put a blind fold on a doll and then said to the child, "What does it mean to say that doll is easy to see?" and the child said, "You silly doll, take the blind fold off then you can see." Yes of course, that's not what they were being asked. So, that type of construction.