

More from The Economist

My Subscription

Subscribe

Log in or regi



World politics

Business & finance

Economics

Science & technology

Culture

Blogs

Debate

Multimedia

Special report: The brain

Timekeeper reading l

# As others see us

Print

## Dealing with people changes our minds

Dec 19th 2006



Tweet

Advertisement

IN COUNTRIES where physical torture is illegal, the cruellest punishment that can be inflicted on an individual is solitary confinement. The “I” that exists by itself will surely go mad. Indeed, many students of the field think the evolutionary pressure that drove the enlargement of the human brain was not a need to survive in the natural environment but a need to negotiate the social one. The most obvious human attribute is language, and that is meaningless if there is no one to talk to. Less obvious, but just as important, is the ability to think oneself into the mind of another—in other words, to have a theory of mind. It is a combination of language and theory of mind that makes human society possible.

In science, as in other fields of endeavour, it helps to have a good slogan. “The language instinct”, coined by Steven Pinker, of Harvard University, is an excellent way of describing human powers of communication. But although Dr Pinker came up with the label, the idea of such an instinct was originally dreamed up by Noam Chomsky, who referred to it as “deep, universal grammar”. Ambitious claims about language have been made for other species, from parrots to dolphins to chimpanzees. None of these, however, has been shown to engage in the complexity of communication that people do.

Though Dr Pinker and Dr Chomsky disagree about the details—in particular on how the instinct evolved—there is a lot of behavioural evidence that the basic idea is right. The

Broca's area, which governs speech production, and the speech-recognition area discovered a few years later by Carl Wernicke, points powerfully to the idea that a language instinct is hard-wired in by genetics. This is an area where fMRI has built convincingly on the original lesion studies. It has provided evidence that different parts of speech are dealt with by different parts of Broca's and Wernicke's areas. Not only are nouns and verbs processed in separate locations, but different types of noun may have their own areas, rather in the way that Dr Kanwisher's visual categories do. Such specialised locations have been claimed for categories such as animals and tools.

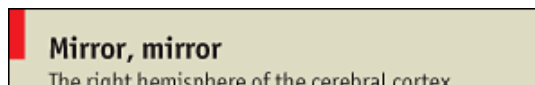
Nor is language processing merely a matter of decrypting and encrypting sound. Deaf people who communicate using sign languages (which have all the grammatical and syntactic features of spoken language) also do their processing in Broca's and Wernicke's areas. If they suffer damage to these areas, it shows up in exactly the same way that it does in those who can hear.

Taking the evidence in total, therefore, it seems likely that the Chomsky/Pinker theory is substantially correct. People have a specialised language instinct. The question is, why?

**The Machiavellian mind**

It is here that theory of mind—the ability not only to hypothesise what other minds are thinking, but to hypothesise what they are thinking about what you are thinking—enters the explanation. The evolutionary value of this is that people can anticipate the actions of others in a way that helps them. But with language, they can not only anticipate the actions of others, they can try to manipulate them. This idea was dubbed “the Machiavellian mind” by two of its originators, Andrew Whiten and Richard Byrne of St Andrews University in Scotland.

One of the most intriguing ideas about theory of mind comes from another sort of



Special report

Who do you think you are?

Captain Kirk's revenge

Brainbox

Dreamweavers

**As others see us**

I think, therefore I am, I think

Sources & acknowledgments

Reprints

---

Follow *The Eco*

---

Latest updates »



University, and Uta Frith, of University

College London, think that autism results when an individual fails to develop a proper theory of mind. (Dr Baron-Cohen believes it is also an extreme manifestation of a general male tendency to be less “empathic” than females are.) All well and good, but modern neuroscience demands a mechanism. If one could be found, it might illuminate the way that theory of mind evolved in the first place.

Vilayanur Ramachandran, a researcher at the University of California, San Diego, thinks he may have found that mechanism: a failure of what are known as mirror neurons. A mirror neuron is one that is active both during the execution of a particular action or the production of a feeling by the individual concerned, and also when that individual observes the same action or feeling in another individual. In other words, it mirrors the actions and thoughts of others.

The first mirror neurons discovered (in the brains of monkeys) were concerned with predicting movement. However, mirrors of emotion have now been found as well, and it is these that interest Dr Ramachandran. He and his group showed, by looking at electrical signals, that the mirror-neuron system does not work properly in autistic children. The absence of relevant mirror neurons, he suggests, means the absence of theory of mind. For example, many autistic people have to learn the meaning of facial expressions by rote so that they can react appropriately.

That work has been followed up by Marco Iacoboni, of the University of California, Los Angeles, using fMRI. Dr Iacoboni discovered that the mirror neurons involved in grasping the intentions of others are in part of the right hemisphere that corresponds to Broca's area in the left hemisphere, and both also correspond with mirror-neuron sites in monkeys. Though no one has yet proved the case, it looks as though the evolution of language and the evolution of theory of mind might not only be two sides of the same coin, but might actually be different specialisations of the same basic structure.

• This article appeared in the Special report section of the print edition



Tweet



THE ECONOMIST



**Getting th**  
Christie's e  
Democracy in



**Jumbo be**  
numbered  
Gulliver | Jan :

More latest updates

## Most commente



- 2** **India's missing m**  
middle class shoul
- 3** **Charlemagne: If f**  
paradise
- 4** **Synthetic biology**
- 5** **Daily chart: Trust**

Advertisement

---

Products and ev

**Test your EQ**

Take our weekly ne  
headlines

**Want more from T**

Visit The Economist  
of carefully selectec  
pleasure, Economis  
more

Advertisement

---

**Classified ads**

Contact us

Help

My account

Subscribe

Print edition

Digital editions

Events

Jobs.Economist.com

Timekeeper saved articles

China

- Asia
- Americas
- Middle East & Africa
- International
- Business & finance
- Economics
- Markets & data
- Science & technology
- Special reports
- Culture
- Multimedia library

**Debate and discussion**

- The Economist debates
- Letters to the editor
- The Economist Quiz

Erasmus

- Free exchange
- Game theory
- Graphic detail
- Gulliver
- Prospero
- The Economist explains

Erasmus

- MB
- The
- The
- Exe
- Rep

**The**

- The
- The
- The
- Ide
- 184
- Roll
- CQ
- Eur
- The
- Edii
- Moc

**Vie**

Contact us Help About us Advertise with us Staff Books Careers Site index

Copyright © The Economist Newspaper Limited 2018. All rights reserved. Modern Slavery Statement Accessibility Privacy policy Cooki