

# A predominance to be right-handed is not a uniquely human trait, but one shared by great apes, study finds

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(Phys.org)—Dr Gillian Forrester, a visiting fellow in psychology at the University of Sussex and a senior lecturer in psychology at the University of Westminster, analysed hand actions directed towards either objects or individuals in chimpanzees, gorillas and children, and found that all three species are right-handed for actions to objects, but not for actions directed to individuals.

The results of her three separate studies support a theory that human right-handedness, a feature of 90 per cent of the population, is a trait developed through tool use that was inherited from an ancestor common to both humans and great apes.

The most recent findings, published in *Behavioural Brain Research*, challenge a widely held view that right-handed dominance in humans was a species-unique trait linked to the emergence of language. Scientists have long been aware of the association between the [left hemisphere](#) specialization for language in the [human brain](#) and human right-handedness. For example, 95% of those who are right-handed typically have [language function](#) supported by the left hemisphere.

Dr Forrester says: "Humans have been tool users for 2.5 million years, while the current view is that language only emerged one hundred thousand years ago. Our findings provide the first non-invasive results from naturalistic behaviour, suggesting that language emerged as a consequence of left hemisphere [brain regions](#) that were already evolved to process regular sequences of actions. The structure found in language may have developed from pre-existing [brain processes](#) adapted from experience with tool-use."

Her studies, carried out over the past five years, involved video sampling and coding of activities in individual groups of gorillas, chimpanzees and four-year-old [children](#) within their everyday environments. The simple and non-invasive methodology revealed aspects of [brain function](#) and organization without the need for a laboratory setting with expensive and invasive equipment or testing.

Each observed hand action was coded as being directed towards either an 'inanimate' object, such as sticks for apes and toys for children, or 'animate', such as touching others or self-grooming. Dr Forrester and her team found that in all groups there was a right-handed dominance only in actions towards inanimate objects.

She points out: "Human right-handedness is not species-specific as traditionally thought, but rather is context-dependent – a pattern that has been previously masked by less sensitive experimental measures. Our

findings support the idea that both human and ape brains have this left hemisphere specialisation directing the right side of the body for ordered sequences of behaviours, but that humans have been able to extend upon this neural architecture to develop language."

The study may help to further the understanding of language development in children. Dr Forrester is working with Professor Alina Rodriguez from Mid Sweden University in applying the same methodology to study a large cohort of Swedish children from birth through to five years of age.

"We want to see if the children who are more bilateral with their object manipulation skills have a different pattern of language development than children who demonstrate more typically lateralized hand behaviours," says Dr Forrester. "If that turns out to be the pattern, then it could be a great diagnostic measure for clinicians seeking to identify children at risk of delayed or disrupted [language development](#)."

**More information:** 'Human Handedness: An inherited evolutionary trait', by Gillian S Forrester, Caterina Quaresmini, David A Leavens, Denis Mareschal, Michael S C Thomas, is published in *Behavioural Brain Research*, October 2012.

Provided by University of Sussex

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