

# Ontological intuitions influence the cultural viability of numerical concepts

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Recent evidence from neuropsychology, and from animal and infant studies, indicates that number is more than a cultural invention, and that we share with other animals a specialized domain-specific learning mechanism that deals with number. At present, the relationship between cultural numerical concepts and this evolved number sense has not been fully explored (but see De Cruz, *in press*). Here, I adopt an epidemiological approach, developed by Sperber (1996) to argue that the cultural transmission of numerical concepts can be explained in terms of their fit with the number sense.

Cross-cultural and historical evidence indicate that some cultural numerical concepts are far more widespread than others. Positive integers, for example, are salient, whereas negative numbers have had little cultural success—in Western mathematics the latter became only generally accepted in the course of the nineteenth century. Here, I will explain the success of culturally transmitted concepts as a function of their fit with innate ontological intuitions, especially our innate number sense. In particular, I will show that cognitive scaffolding on multiple intuitive domains, such as number sense, body-part recognition and language, both promotes and facilitates the transmission of positive integers. Negative numbers, in contrast, do not correspond to pre-existing numerical intuitions. They are supported by fewer inductive inferences, and they are therefore harder to understand and to transmit. I will argue that non-intuitive numerical concepts can only be transmitted successfully if they are anchored to external, material symbols. By extending cognitive processes into the material world, the cultural transmission of numerical concepts becomes less vulnerable to the corrosive effects of content-biased cultural transmission.

## REFERENCES

- De Cruz, H. (in press) Why are some numerical concepts more successful than others? An evolutionary perspective on the history of number concepts. *Evolution and Human Behavior*.
- Sperber, D. (1996) *Explaining Culture. A Naturalistic Approach*. Oxford: Blackwell.