

**THE CONVERGENCE OF INTELLIGENCES:
LEARNING, SYMBOLS AND EFFICIENT COMMUNICATION**

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Minsky (1985) argued an extraterrestrial intelligence (ETI) might be based on cognitive mechanisms similar to ours despite very different origins. For instance, the ability to solve problems by task decomposition offers evolutionary advantages, and individuals who are part of a technical civilization should have this capacity. Minsky's arguments are extended here in two directions: (1) The last decade has seen the development of a general learning theory which equally applies to humans, animals and machines; this could also apply to an evolved alien intelligence. (2) An ETI would have developed symbol systems (i.e. language) and multi-modal processing (receiving sensory input via several channels simultaneously) to express ideas; ETI communication could include highly sophisticated symbols.

Symbols, or signs (e.g. numbers, icons), provide compact, condensed ways of generating meaning and expressing ideas. When used metaphorically, signs draw on similarities that override conventional category boundaries, bringing together objects/events that normally belong in different domains (e.g. Netscape's Web site "garage"). Since cross-domain communication is so highly efficient, it is possible it could be included in an ETI message. This paper will explore the convergence of cognitive mechanisms such as problem solving and learning, and will focus on the use of metaphor in highly efficient communication.