Three-dimensional Messages For Interstellar Communication

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One of the challenges facing independently evolved civilizations separated by interstellar distances is to communicate information unique to one civilization. One commonly proposed solution is to begin with two-dimensional pictorial representations of mathematical concepts and physical objects, in the hope that this will provide a foundation for overcoming linguistic barriers. However, significant aspects of such representations are highly conventional, and may not be readily intelligible to a civilization with different conventions. The process of teaching conventions of representation may be facilitated by the use of three-dimensional representations redundantly encoded in multiple formats (e.g., as both vectors and as rasters). After having illustrated specific conventions for representing mathematical objects in a three-dimensional space, this method can be used to describe a physical environment shared by transmitter and receiver: a three-dimensional space defined by the transmitter–receiver axis, and containing stars within that space. This method can be extended to show three-dimensional representations varying over time. Having clarified conventions for representing objects potentially familiar to both sender and receiver, novel objects can subsequently be depicted. This is illustrated through sequences showing interactions between human beings, which provide information about human behavior and personality. Extensions of this method may allow the communication of such culture-specific features as aesthetic judgments and religious beliefs. Limitations of this approach will be noted, with specific reference to ETI who are not primarily visual.