

# The Emergence of English as a Celestial Language

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## Abstract

*Given the emergence of English as a Global Language, and the probable eventual intensive human exploration and settlement of Space, what forces will likely shape the structural features of English as it expands into the Cosmos?*

*In the exploration and settlement of Space, we will very probably use English as a Celestial Language. Microgravity, artificial intelligence, isolation, confinement, and the silent environment of Space will transform this language's structural features.*

*Microgravity will precipitate lexical change, as vertical expressions become meaningless and are replaced by proximal and topological expressions. Interfacing with artificial intelligence will induce language change. Isolation of space settlements will induce language change, to enable each settlement to maintain a strong identity while preserving intelligibility with others. Confinement will be compensated for by language change. Finally, fundamental differences in empirical reality will affect the very structure of language, which will evolve to reflect the nature of the cosmic environment.*

## 1. Introduction

*"It is the business of the future to be dangerous; and it is among the merits of science that it equips the future for its duties."*

- Alfred North Whitehead [1].

A variety of commentators (see for example Leiper [2]) agree on the emergence of English as a Global Language (EGL), which process I here presume to be a *fait accompli*. Little regard is paid to the use of English in Space, except references by Crystal to the English engraving on the Voyager space probe [3], and to the imaginary Babelfish universal translator [4].

Forces that have contributed to the emergence of EGL have become understood in hindsight, and are

well-documented. Yano [5] identifies important features including the language's hybridity and permeability. According to Crystal [6], critical factors include the nineteenth century expansion of British colonial power, and the emergence of the United States as the leading political world force in the twentieth century. Graddol [7] describes how America has driven modern technology, particularly in movies, broadcasting, and more recently the Internet.

Commentators differ however as to whether English will continue as the sole Global Language. Garg [8] suggests there has been no precedent. Nayar [9] maintains the future development of English is being taken over by its more intensive use as an international language between non-native speakers. In Kachru's three circle model, cited in Yano [10], the boundary between inner circle ENL and outer circle ESL speakers is becoming indistinct, as functionally native ESL speakers become more numerous and powerful. Crystal shows how regional languages are increasing in importance at the expense of the death of many native languages [11]. An oligarchy of Global Languages may in time develop, and in a world where bilingualism is increasingly an asset, Graddol [12] asserts monolingual native English speakers are likely to be at a disadvantage. Crystal [13] suggests that a World Standard Spoken English may evolve, together with a variety of standard Englishes, which, according to Bhatia [14], need not be governed by uniform native standards. Jenkins [15] advocates mutual intelligibility among non-native speakers, rather than the imitation of native speakers.

Graddol, in a personal communication cited in Wallraff [16], suggests unpredictable events may ensure English does not remain a Global Language. Global disasters, including severe environmental degradation, melting of the ice caps, pandemics, and cosmic catastrophes (e.g. asteroid impacts) would be unlikely to disrupt English usage alone. However the eventual emergence of China as a superpower, and resentment of historical British colonialism and of contemporary American foreign policy, may become critical factors (see for example Kazmi's panoptic critique of English as an International Language [17]).

These may result in worsening terrorism targeting Anglo-American interests. Notwithstanding these diverse considerations, I presume English will consolidate its position as a Global Language.

In the absence of global catastrophe, and consequent upon resolving pressing global problems of poverty, environmental degradation, and social inequity, I envisage humanity will in the fullness of time expand into Space. There will be great waves of migration, akin to the prehistoric populating of Polynesia. And the language that will be predominantly used in this exploration and settlement of Space will in all probability be English.

## 2. A Language of Space

A term is required for the use of language in this human exploration and settlement of Space. Possibilities include Space, Universal, Extra-terrestrial, Cosmic and Celestial Language. *Space Language*, ‘a language used in Space’, is unsuitable because of the connotations of ‘spatial language’ used in linguistics, architecture, geometry and the plastic arts. *Universal language*, ‘the language of the Universe’, is grandiose, implying a monopolistic claim that would be overthrown with eventual contact with alien intelligence. *Extra-terrestrial language* is helpful for short-term use, but excludes language used on Earth, and suggests an alien language. *Cosmic Language* as ‘a language used in the Cosmos’ is adequate, but may be misinterpreted as the presumptuous ‘**the** language...’ I therefore prefer ‘*Celestial Language*’, which does not claim to be unique in the universe.

Large-scale space activities will likely be dominated by the United States, with joint participation by Europe, Russia, and Japan, while China and India develop independent space programs. English is the official language of the International Space Station (ISS). English, rather than Russian, Japanese or Chinese, is highly likely to emerge in the near future as the language predominantly used in the human exploration and settlement of Space.

I therefore propose:

### ***English as a Celestial Language (ECL).***

This term also has the advantage of including (the) English(es) spoken on Earth as a subset. In reality, English is already spoken in the Cosmos, and is emerging as the most widely used Celestial Language in this miniscule pocket of a remote star cluster, in an insignificant galaxy, of a nondescript galactic cluster...

## 3. English as a Celestial Language

What forces will shape the structural features of Celestial English as it expands into Space? Five factors illustrate the potential language change consequent upon human exploration and settlement of Space: the influence of microgravity; the requirements for communication with artificial intelligence; the effects of isolation and of confinement; and the human response to the silent environment of Space.

### 3.1. The influence of microgravity

The development of language is intimately bound up with human experience. Until recently, this has almost exclusively been under the pervasive influence of gravity, within a significant unidirectional gravitational field. Up until microgravity flights and space missions, the only experiences we have enjoyed that are at all comparable with microgravity have been floating in the womb and in water.

Only recently have astronauts experienced true weightlessness, and a mass audience been able to vicariously live that experience through television. This has led to a restructuring of the cognitive processes of researchers to integrate the realization that ‘*in Space, there is no Up*’. For this writer, it inspired the development of an architecture suitable for conditions of microgravity. This resulted in proposals for a tensile architecture for Space Habitation that responds to microgravity, is appropriately constructed from minimal materials, provides ample habitable space in Space, and embodies appropriate cosmological schema for life in Space [18]. Presuming permanent adjustment to microgravity will eventually be achieved, I elsewhere suggest [19] that the primary shift in architectural conception is from a two-dimensional decentralized horizontal plane and singular vertical axis to a three-dimensional centralized polyaxial space. In a separate work [20], I also describe how symmetries are constrained to Platonic polyhedral symmetries, with vertical axes and horizontal differentiation replaced by local foci, radial axes, and concentric spherical shells.

Hall [21] shows how in microgravity, words such as ‘*floor*’, ‘*wall*’ and ‘*ceiling*’ lose their meaning. It is a shattering realization that in Space **there is no ‘up’ or ‘down’**. I now suggest spatial lexical items which imply a vertical axis, like ‘*up*’, ‘*down*’, ‘*above*’, ‘*below*’, ‘*high*’, ‘*low*’, ‘*on top of*’, ‘*beneath*’, ‘*over*’, ‘*under*’, ‘*on*’, ‘*underneath*’, ‘*top*’ or ‘*bottom*’, have no objective meaning. They may reference one’s

immediate location and orientation, but are relative and ever changing. Any use of a vertical axis and/or differentiation into horizontal layers/planes is essentially arbitrary. The pervasiveness of gravity-bound conceptions in language, previously taken for granted, suddenly becomes all too evident.

I therefore envisage lexical change may occur in spatial language as follows: 'up' or 'down' will become 'out' or 'in', 'above' or 'below' will become 'without' or 'out there' or 'within' or 'in here'. Vertical relations such as 'on top of', 'under', and 'beneath' will be replaced by expressions of proximity 'attached to', 'adjacent to', 'nearby', 'beyond', together with topological expressions such as 'within' and 'without'. Proximity relations will need more adequate articulation, as the language becomes richer in describing varieties of proximity. 'On' will retain its sense of attachment, but lose that of 'sitting on top of'. 'Side' will become problematic because of an implied horizontality, thus 'alongside', 'outside' and 'sideways' as inappropriate lexical items may suffer obsolescence and be superseded by gravitationally neutral lexemes. Alternatively, '-side-' may atrophy through apocope into '-sid-', and through folk etymology be mistakenly associated with 'sidereal'; or even perhaps be generalized, undergoing grammaticalization.

The influence of gravity is also evident in writing conventions. Books consist of pages stacked one on top of another. English is written in vertical columns of horizontal rows, Chinese in horizontal rows of vertical columns. Compare the linear nature of writing with nonlinear complexes of hyperlinked text, images, audiovisuals, virtual reality panoramas, and Flash™ animations. These may anticipate the needs of a Celestial Language; ECL may even undergo "degraphization", as writing itself becomes redundant. Digital information need not be linear, vertically organized nor concretely set in type; it dematerializes. This does not bode well for the fixed word order of modern English.

Consider also print. In **Times**, the most common serif font, letters **m** and **n** rest on feet on an implied horizontal baseline. Ascenders on letters **b**, **d**, **h**, and **k** celebrate the apex of the letter with a serif. Descenders on letters **p** and **q** emphasize the bottom-most point reached. Letters in sans serif fonts such as **Helvetica** also rest on a baseline. Letter heights are delimited within several horizontal layers, depending on whether or not they are capitals, or have ascenders or descenders. For ECL, this vertical/horizontal structuring of print may evolve into something more appropriate.

### 3.2. The requirements for communication with Artificial Intelligence

The need for intelligent conversation with robots and for interfacing with artificial intelligence may induce language change. NASA and Xerox recently demonstrated *Clarissa*, a hands-free fully voice-operated virtual crew assistant that responds to astronauts' voice commands [22], [23]. The NASA Intelligent Systems Division [24] shows how *Clarissa* had problems discriminating commands from conversation.

### 3.3. The effects of Isolation

Crystal [25] describes how linguistics shows social groups, when separated, soon develop differing speech habits. Imagine the separation consequent upon space settlements where most inhabitants are permanently based, and visitors are rare. Modern audiovisual transmissions provide virtual forms of interpersonal communication, but there is the insurmountable problem of communication being limited by the speed of light. Although light from the Sun takes just 8½ minutes to reach planet Earth, because of the time-lag online communication becomes little different from the viewing of recorded material. Even at this close range, interactivity becomes difficult, and likely to be highly formalized, as if being conducted through intermediaries. Code-switching during conversation becomes problematic. But settlements will likely be many light-years away from one another, and from Earth!

Crystal [26] also mentions - in regard to the surge of European population into the American West - the phenomenon of the expanding frontier. The restraints and standards of more settled society were thrown off, and this freedom was reflected in the language. Similar sentiments may pervade early space settlements, with new Englishes developing differently in separate settlements. Applying the dialectic used by Crystal [27], this tendency will likely be strengthened by the need for each settlement to develop and maintain a strong identity, whilst simultaneously needing to preserve intelligibility in communications with other settlements and with Earth.

### 3.4. The effects of Confinement

A major issue for space settlements will likely be the necessity to remain within the colony. Until such distant time as terraforming of uninhabitable planets is achieved, or habitable planets are populated, it will not

be possible to go outside except for excursions in space suits or spacecraft. Interiors will be artificial, although large recreational spaces should if feasible incorporate natural features, plants and animals.

This critical need for hermetic isolation in order to survive will engender a socio-psychological complex of extraordinary significance, and I predict it will be compensated for by language change. I envisage discourse characteristics that provide a virtual liberation from the confines of physical necessity. The essential dialectic of the safe 'in here' and the deadly 'out there' are likely to shape linguistic features.

#### 4. Conclusion: The silent sea of Space

This compensation anticipates the subtlest language changes that I imagine taking place in developing an English as a Celestial Language. We evolve language in relation to our empirical experience of the world we inhabit. In the gravitational field of Earth, everyday objects tend to be placed on and rest on one another. This contact, and implicit static equilibrium, is a direct consequence of gravity. Objects and assemblages also need to resist deformation as a consequence of their own weight and of external gravitational loads.

In microgravity, this is no longer so. Everyday objects have mass, but negligible weight. Rather than resting on one another, they are more likely to collide with one another then continue in their revised trajectories. Contact is either momentary as at the moment of impact, or is secured by restraint. Physical connection is thus transient, unless engineered.

I intuit that the fundamental differences in empirical reality between gravity and microgravity will affect the very structure of language - how parts of speech relate to one another, how they come together, momentarily make contact then separate on their individual trajectories, or are secured for the duration of a discourse, or even perhaps for the life of a language. This may signal a return to the greater word flexibility and expressive word order of Old English as described by Burridge and Mulder [28], and even to constructions like verbal braces and embracing negations, to reinforce the securing of forms.

Finally, the structure of English as a Celestial Language may evolve to reflect the nature of the cosmic environment within which it functions and which it mediates. Within a vast sea of silence, finite complexes of words or phrases may coalesce around focal themes, forming elements of super-clusters, always in rotation, and always expanding one from another, taking light into unimaginable darkness...

## Definitions

### microgravity:

*A condition in space in which only negligible gravitational forces are experienced; virtual absence of gravity; generally, a condition of weightlessness.*

### terraforming:

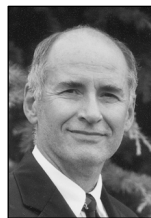
*Transforming the landscape and atmosphere on another planet into one having the characteristics of Earth and suitable to sustain life. Proposals have been advanced for terraforming Mars over millennia.*

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