EVOLUTION AND THE EVOLUTIONARY PSYCHOLOGY OF EXTRATERRESTRIALS. J. H. Barkow[1]

Overall Goals and Objectives: To show how variations in scenarios that have been presented to explain the evolution of human intelligence can be used to generate potential psychologies for extraterrestrials. Evolutionary psychology and anthropology provide insights into which extraterrestrial psychologies could and could not evolve. The discussion will be limited to high technology extraterrestrials because these are the only ones with whom we are likely to have contact.

A) First, it is necessary to correct common misconceptions (often stemming from science fiction).

1) Science fiction often gives us single-personality ETs, such as the Startrek universe's warrior Klingons and endlessly greedy Ferengi. Such simple psychologies could not evolve because they would not be evolutionarily stable strategies, strategies that could not be bettered. A slightly less greedy Ferengi or less violent Klingon would have a major reproductive advantage over his or her always very greedy or very violent fellows, and in a few generations there would be more than one type of Ferengi or Klingon, or else there would be Ferengis and Klingons whose greed in one case and violence in the other would be more situational than obligate.

2) Ancient civilizations are not necessarily wiser than we are. The analogy that if age often brings wisdom to individuals it must do the same for civilizations is false: old societies collapse, in our own planet's experience. (5)

3) ET species, even if ancient, are as likely to have low average individual intelligence as high. This is because technology depends on the accumulation of knowledge and on extreme cooperation among specialists, not on high average intelligence. An unintelligent but ancient species may have taken a million years to reach our level of technology.

B) *Sine qua non* characteristicsof high-technology ETIs (not exhaustive):

1) ETs will have *culture*, defined as a body of accumulated knowledge that is transmitted and edited both within and across generations. Cultural and biological evolution interact (1, 3, 6, 10) and technology is a subset of cultural knowledge. No single individual of any species could possibly invent all of science and technology alone.

2) ETs will have a distal sense and an ability to manipulate objects, (8) and will be massively cooperative within groups (no advanced technology can be produced without cooperation).

3) ETs will have bureaucracies. Building a modern airliner involves millions of separate parts made in many countries. Apparatus capable of either transmitting or receiving interstellar messages will be of comparable complexity (as will spacecraft). The organization of enterprise on this scale requires not just the psychological trait of cooperativeness but the sociological invention of bureaucracy.

C) ETs are likely to be either ethnocentric, xenophobic, or both.

One of the processes likely to have produced intelligence and cultural capacity in our own species would have involved competition among bands. Competing groups would have culled one another of the uncooperative, the slow to learn, the unsuspicious of the outsider. We are thus (I simplify greatly) ethnocentric – we tend to assume the superiority of our own group, to be hostile to outsiders in large numbers, and to react to outgroup threats by rallying around a

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leader and by increasing ingroup solidarity. (1) There is no evidence that our intelligence and cultural capacity resulted from competition with other species or subspecies. Suppose, however, that we contact extraterrestrials who did compete with and were culled by evolving intelligences of other species. In that case, they would have developed not just ethnocentrism but (arguably) xenophobia, perhaps an obligate hostility to intelligent species other than their own. In the worst case scenario, their SETI programs could be motivated by a search for enemies! (2, 4, 5) (I consider this highly unlikely but not impossible in theory.)

D) We will have difficulty in communicating with extraterrestrials who do not have sexes.

We and many other species on Earth have two sexes. Evolutionary biologists generally explain this phenomenon as a result of competition with tiny predators and parasites (including bacteria and viruses) that have much shorter generational time spans than we do and can therefore evolve much more rapidly. Having two sexes shuffles the genetic cards for us more frequently, permitting the more rapid development of defensive adaptations. But having two sexes also enabled a major factor in the evolution of human psychology, sexual selection (as Darwin explained) (7, 9). Our ancestral males and females chose one another on the basis of adaptive traits that permitted the development of high intelligence and cultural capacity (studies find that both sexes still find intelligence sexually attractive) (7). We were also selected to attempt to eliminate sexual rivals. Sexual selection was a large factor in the evolution of our inherent human competitiveness. All human cultures include competition in terms of standards of excellence, though the domains of competition are strikingly variable. It has been convincingly argued that the functionally unnecessary complexities of craft and the by-definition useless beauty of the fine arts, even the vast lexicons of our languages with their poems and sagas and songs, all reflect the powerful competition for mates that is largely a product of sexual selection.

Extraterrestrials, however, may not have sexes and therefore would not have had sexual selection. After all, on our own planet, bacteria and archae move genetic material horizontally, and extraterrestrials might do the same. Alternatively, they may have evolved very brief generations so as to adapt more quickly to parasites and tiny predators (though this would complicate cultural transmission). Such extraterrestrial intelligences would find our efforts to communicate our art and beauty incomprehensible. If we receive messages that have nothing but function, we should suspect that we are dealing with a sexless species; if their messages include unnecessary complexities then we can hypothesize that these represent art and that our extraterrestrials have two sexes.

The perception of beauty is an adaptation. Landscape "beauty" may signal food, water, or safety (12), while physical attractiveness can signal "good genes" or "ability to provide resources" (11, 13). Since we and the ETIs evolved in different environments and will differ anatomically, our ideas of aesthetics will no doubt also differ.

Additional Information:

(A) "Which Question(s) of the *Alien Mindscape* article is your white paper is relevant to?" This discussion is most relevant to the second part of question 1, "How abundant and diverse is intelligent life in the Universe?"

(B) "How Big Data Analysis can help you advance this project/concept (and which datasets/databases)?" This question does not appear to be relevant, though it may be after further work. For example, a dataset permitting correlation of aspects of environment with cognitive,

behavioral, and social organizational attributes of terrestrial species might aid predictive theory about ETI.

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