**A *Thematic* Approach of Selection Effects and Biases**

**in Cosmology:**

**Fred Hoyle and the Rejection of the Big Bang Idea,**

**Despite the Experimental Observations**

[[1]](#footnote-1) *Abstract*

After a strong dispute between the big bang cosmology and its big rival, the steady-state cosmology, some important experimental observations, such as the determination of helium abundance in the universe and the discovery of the cosmic background radiation in the 1960s, were decisive for the progressive and wide acceptance of big bang cosmology and the inevitable abandonment of steady-state cosmology. But, despite those solid experimental observations favorable to big bang cosmology, Fred Hoyle, one of the proponents of the steady-state cosmology and the main opponent of the big bang idea (which, paradoxically, himself he baptized), never gave up and continued to fight for the idea of ​​a stationary (or quasi-stationary) universe until the end of his life, even after decades of widespread consensus around the big bang cosmology.

We can try to understand this persistent attitude of Hoyle by applying Holton’s *thematic* analysis to cosmology. Gerald Holton recognizes in the scientific activity a dimension that, even unconscious or not assumed, is nevertheless very important in the work of scientists, in implicit articulation with the experimental and the theoretical dimensions of science. This is the *thematic* dimension, constituted by *themata* – concepts, methodologies, and hypotheses with a metaphysical, aesthetic, logical or epistemological nature, associated both to the cultural context and the individual psychology of scientists. In practice, *themata* can be expressed through personal preferences and choices which guide the individual and collective work of scientists.

*Thematic* analysis shows that big bang cosmology is mainly based on a set of *themata* consisting of *evolution*, *finitude*, *life* *cycle* (which has a *beginning*), and *change*; the steady-state cosmology is based on opposite *themata*: *steady state*, *infinity*, *continuous existence*, and *constancy*. The passionate controversy that these cosmological views carried out is part of an old cosmological opposition: the *thematic* opposition between an evolutionary view of the world (associated to Heraclitus) and a stationary view (associated to Parmenides). Personal preferences seem to have been important in this controversy, and Hoyle is a very illustrative example of a life-long personal commitment to some *themata*, in this case to the opposite *themata* of the big bang cosmology. His struggle against the big bang idea was strongly based on philosophical and even religious reasons – which, in a certain sense, is related to *thematic* preferences. In this personal and persistent struggle, Hoyle always refused the way how some experimental observations were considered decisive in favor of the big bang idea, arguing that the success of this idea is based on sociological and cultural prejudices. This Hoyle’s attitude is a typical *thematic* attitude: the acceptance or rejection of a proof or scientific fact may be conditioned by personal *themata*, that is, something which is accepted by some scientists as scientific truth may be considered by another scientists, who defends different or even opposites *themata*, as something that is not sufficiently proven. In this case, that corresponds to the existence of selection effects and biases regarding important cosmological observations, in order to sustain a persistent rejection of the big bang idea.

1. [↑](#footnote-ref-1)