

In contemporary philosophy, the realism-antirealism debate has been introduced very often and in many different contexts. Especially complex situation occurs in the philosophy of science, which latest discoveries are drastically changing our way of looking at the world. At the end of the 20th century John Worrall took it upon himself to put an end to the dispute by introducing the concept of **Structural Realism (SR)**, based on the observation that despite the - often very significant - changes in the successive physical theories, their structural content remains unchanged. This soon led to the development of the belief that the world is a structure to which science gives us access, and it is exactly this structure we should be realistic about. Thus motivated idea honours the intuition imbedded in scientific realism (not committing us to a belief in the scientific description of the „furnishings” of our world), and the antirealist intuition, without entangling us in the problem of accepting the success of the contemporary sciences as “miraculous” (committing us to the assertion that the structure of our theory, separate from its empirical content, correctly describes reality).

Towards the end of the last century, James Ladyman made a general distinction between epistemic and ontic versions of the concept. Nowadays, the most frequently discussed and developed is the **Ontic Structural Realism (OSR)**, whose main thesis states that only the structure *exists*. One of the best-known advocates of OSR is Steven French - a physicist, philosopher, and the brain behind one of the most widely discussed versions of the concept.

The emergence and development of various forms of structuralism eventually gave rise to a discussion on various methods of representing relevant structures that we should be realists about: from typically syntactic ones, such as Ramsey's sentence, to, set- (or group-) theoretical and categorical, semantic interpretations. The most popular version of the semantic approach to structural realism, attempting to define the concept of a „shared structure” between models in terms of relevant functions determined between the analyzed structures, is undoubtedly one that assumes a **structure of sets** as its formal framework. In recent years, however, voices saying that it does not have to be the „only right way” were raised. In response to strong claims, inter alia, from French's side, Canadian mathematician and philosopher, Elaine Landry, has joined the discussion noting that, from a mathematical point of view, there is no rational (devoid of dogmatism) reason to take for granted the claim about the *fundamental* character of set theory. What's more, she formulates an alternative to French's vision of scientific structuralism, whose formal framework (language) is provided not by - highly popular in this context - set theory, but by means of **category theory**.

The aim of this project is a comprehensive critical analysis of the philosophical foundations for applications of different structural frameworks discussed in the context of the ontic version of structural realism, especially the version presented by Steven French, around which the discussion initially broke out, with particular emphasis on set theory and category theory. **The main research task** will be to analyze and criticize the strengths and weaknesses of both concepts, especially in the context of their explanatory value in formulating answers to the relevant questions about the structure of scientific theories, application of mathematics to physical/biological theories and the very complex problem of Structural Realist's appeal to the structural continuity between successive theories and following ontological commitments. These considerations will then be confronted with **my working hypothesis** stating that we should make use of some kind of trade-off between the *comparative* and *relevant* powers of different representational methods, proposing a pluralistic (in opposition to the standard, unificatory) view on the role of structural representation within OSR.

In spite of extensive literature on the current realism vs. antirealism debate and the increasingly popular structural positions present in contemporary philosophy of science, the obvious lack of a comprehensive study of the role and basis of formal solutions applied in them, often presumed and taken for granted, is still an issue. The phenomenon is all the more important since the in-depth analysis of the problem indicates, inter alia, the presence of numerous assumptions - often of an extra-rational nature - behind the choice of an „appropriate” structural framework. I intend to investigate this problem based on an exemplary discussion between **Steven French (set theory)** and **Elaine Landry (category theory)**, which addresses directly the problem of the importance of selecting the appropriate framework for founding a structural position. The comparative analysis of both strengths and weaknesses of those approaches and their ability to answer important aforementioned theoretical and metaphysical questions seems relevant in contexts of both physical and biological theories. The obtained results could then be used in the future to answer the even more general question about the role and influence of assumed formal framework in shaping and then justifying particular philosophical ideas.