



Henrique Antunes<sup>ID</sup> and Damian Szmuc<sup>ID</sup>

## An Introduction to the Special Issue: Logics and Their Interpretations II

The existence of a multiplicity of logics is a *historical fact*, witnessed by the numerous, and often competing, systems logicians have come up with throughout history – especially since the first decades of the 20th century. But it is also a *mathematical fact* that there are countless ways of formally characterizing different logics, regardless of whether they have ever been or will ever be actually formulated and investigated. However, that there exist several different logical systems, either in the historical or mathematical sense of ‘exist’, tells us nothing about their usefulness, intelligibility, and applicability. Rather, it raises the issue of which logics, among such numerous systems, are useful, intelligible, and have fruitful and natural applications.

At least three important problems arise when one considers the plethora of different logical systems that exist (again, either in the historical or mathematical sense of the word). First, there is the internal issue of providing a satisfactory understanding of the motivations for proposing a particular system to model a certain class of phenomena. Second, there is the external issue of whether it even makes sense to have different logics that can be equally justified by the mere fact that they are capable of modelling the phenomena in question. Third, there is the issue, also external, that even after endowing a given logic with an interpretation or recognizing its usefulness (for certain purposes), we may still ask whether it deserves to be legitimately called *logic*, in the sense the Western philosophical tradition has understood the term.

The second issue bears directly on the debate concerning logical pluralism, that is, the debate about whether there is more than one correct logic, while the third issue calls for the formulation of criteria that a

formal system must satisfy in order to deserve the name *logic*. To be sure that a system can be mathematically characterized does not seem to be sufficient for it to be a logic since it would also be necessary to endow it with some conceptual interpretation. Furthermore, perhaps not all conceptual interpretations of a system are admissible, but only those that are framed in terms of certain particularly central concepts, e.g., preservation of *truth*.

The first issue, viz., that of articulating the conceptual motivations for proposing or adopting a certain logic and determining how well it achieves this task, also has its subtleties. For instance, one may begin with a philosophical view about the phenomena in question, and *then* look for a logic that represents their behavior, or alternatively start with a formal system and only after find either a conceptual interpretation or an application for it.

The articles gathered in this volume present and investigate particular logical systems or frameworks that are intended to formally cope with a certain problem or class of phenomena — e.g., the ones by Bruno Ramos Mendonça, and by Newton Peron and Henrique Antunes. Other articles, such as those by Edson Bezerra and Giogrio Venturi, Joaquín Toranzo Calderón and Federico Pailos, and Gemma Robles, Sandra M. López, and José M. Blanco, are mainly (though not exclusively) concerned with mathematical investigations of certain specific logical systems or families thereof. Carlos Monsalvo Benito's paper deals with general issues in the philosophy of logic, such as the notion of interpretation in logic and the debate over the correct account of logical validity.

In “Local Applications of Logics via Model-Theoretic Interpretations”, Carlos Benito-Monsalvo analyzes the notion of interpretation in both an *internal* and an *external* sense. By assuming the criterion of identity between logics provided by the hierarchy of ST-related logics, he argues that a satisfactory understanding of the notion of interpretation favors the model-theoretic characterization of validity over the proof-theoretic one. He also advocates a *localist conception of logic* based on the model-theoretic approach to the notion of interpretation.

In “Game Semantics, Quantifiers and Logical Omniscience”, Bruno Ramos Mendonça proposes an improvement of the *urn semantics* approach to the problem of logical omniscience, that is, the problem of finding principled restrictions on the extent of a rational agent's logical knowledge. He maintains that an agent's competence in using quantifiers is guided by a basic hypothetical logical knowledge, and shows how this

principle can be incorporated within the framework of urn semantics, yielding a framework,  $US^+$ , that is taken to provide an improved solution to the problem of logical omniscience.

In “A Four-Valued Logical Framework for Reasoning About Fiction”, Newton Peron and Henrique Antunes present a family of first-order logics that are intended to model reasoning involving fictional names. Their proposal is based on the idea that any given statement may be either fictionally true (false) or factually so. After analyzing the classical, free, and modal logic approaches to fictional names, the authors put forward and examine a few four-valued logics that differ from one another with respect to how they handle the semantics of mixed statements, i.e., statements in which both fictional and non-fictional names occur.

In “Many-Valued Logics and Bivalent Modalities” Edson Bezerra and Giorgio Venturi investigate the result of extending many-valued logics with modal operators that are supposed to formally express the concepts of logical validity and logical consistency. After characterizing the family  $\mathfrak{L}^{S0.5}$  of modal many-valued logics and investigating the properties of their modal operators, they illustrate the recovery behavior of  $\Box$  and  $\Diamond$  in the modal extension of Łukasiewicz logic  $\mathfrak{L}_3$ .

In “Beyond Mixed Logics”, Joaquín Toranzo Calderón and Federico Pailos explore the extent to which a plethora of consequence relations that have been considered “non-respectable” by the specialized literature can nevertheless receive an appropriate, intelligible, and useful reading. For instance, they call attention to the fact that falsity preservation from premises to conclusions can be seen as an interesting phenomenon and emphasize that the usual property of truth preservation from premises to multiple conclusions not only can be instantiated by the preservation of the truth of the premises to the truth of at least one conclusion but also by the preservation of truth to all conclusions.

In “Relational Semantics for the Paraconsistent and Paracomplete 4-valued Logic  $P\mathfrak{L}4$ ”, Gemma Robles, Sandra M. López and José M. Blanco present and investigate different classes of models for the logic  $P\mathfrak{L}4$ , in addition to its original two-valued Benalp-Dunn semantics. The paper shows how  $P\mathfrak{L}4$  can be endowed with the ternary Routley-Meyer semantics and also with the binary Routley semantics.

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HENRIQUE ANTUNES  
Department of Philosophy  
Federal University of Bahia (UFBA)  
Salvador, Brazil  
`henrique.antunes@ufba.br`

DAMIAN SZMUC  
IFF (CONICET-SADAF) and University of Buenos Aires (UBA)  
Buenos Aires, Argentina  
`szmucdamian@conicet.gov.br`