



## Book Reviews

ANDREAS KAPSNER, **Logics and Falsifications: A New Perspective on Constructivist Semantics**, Series *Trends in Logic*, vol. 40, Springer, Cham, 215 pages, ISSN 1572-6126, ISBN 978-3-319-05205-2.

*Logics and Falsifications: A New Perspective on Constructivist Semantics*, by Andreas Kapsner, is an investigation of the effects the introduction of the notion of *falsification* in a semantic theory has on logic. It carefully examines different alternative ways in which constructive semantic theories can be devised so as to include falsifications, and addresses the question of which logics are the best candidates for each of these theories.

The book draws heavily on Michael Dummett's wide-ranging constructivist program, and consists largely in an analysis and extension of some of his views. In particular, it is meant to investigate one strand of Dummett's philosophy that has often been neglected by his commentators: The idea that falsifications have an important role to play in a theory of meaning.

As it is well known, Dummett proposed a verificationistic picture of language, according to which understanding an assertion consists in understanding its verification conditions. This picture induced his famous rejection of the *principle of bivalence* and his corresponding preference for intuitionistic logic over classical logic. However, what is not so well known is that he also envisaged alternative pictures that either have only the notion of falsification, rather than verification, as the basic semantic notion, or that combine both verifications and falsifications in different ways. *Logics and Falsifications* is a thorough pursuit and further extension of these unexplored Dummettian ideas.

The book is divided into three main parts, entitled BACKGROUND, FALSIFICATIONS and LOGICS. Each part contains an introductory sec-

tion that gives a general description of its chapters. Similarly, each chapter has an introductory section that announces the forthcoming content, and a conclusive one that recapitulates and summarizes its main achievements. This makes for easy reading, for it facilitates orientation and helps the reader to keep track of the general path of the work.

Part I contains three chapters, which are supposed to provide the background information necessary for the remaining two parts. Chapter 2 (Chapter 1 is the introduction of the book) settles the basic concepts and terminology that will be employed throughout the book, and describes Dummett's constructive program carefully, focusing mainly on his constructivist theory of language and his revisionary attitude towards classical logic. Chapter 3 is devoted to intuitionistic logic, Dummett's preferred alternative logic. It describes its initial motivations and early developments, and presents two complementary semantics for intuitionistic logic that comply with Dummett's constructivistic strictures: The BHK interpretation and the Kripke-style semantics. Chapter 4 introduces the concepts of *gaps*, *gluts* and *paraconsistency*. Although *dialetheism* (the metaphysical thesis that there exist true contradictions) is presented as one of the main standing motivations for paraconsistent logics, Kapsner stresses that paraconsistency and dialetheism do not necessarily come bundled together. In fact, he mentions *analetheism* (the thesis that some statements lack a truth-value but are nonetheless ascertainable) as an alternative philosophical motivation for paraconsistent logics. The Dummettian distinction between the *assertoric content* and the *ingredient sense* of a statement is also introduced. As it turns out, these notions play a pivotal role in the remainder of the book.

Part II surveys the different semantic theories one gets by allowing the notion of falsification as a basic semantic notion, and examines what Dummett actually said about them and about the semantical role of falsifications generally.

In its first chapter, Chapter 5, Kapsner distinguishes between five stages of falsificationistic involvement a semantic theory can enjoy, which he dubs *pure verificationism* (Stage I), *extended verificationism* (Stage II), *hybrid strategies* (Stage III), *extended falsificationism* (Stage IV) and *pure falsificationism* (Stage V). All these stages are presented in a diagrammatical arrangement that displays two of their characteristic features, namely, the degree of interaction between verifications and falsifications, and whether a theory in a given stage is a form of *verificationism* or *falsificationism*; that is, whether it renders an assertion to be

correct iff it is verifiable, or iff it is unfalsifiable. The diagram also serves to display some duality relations between the stages and to set the path of the third part. This makes the book a fine example of a work whose structure meshes nicely with its content.

Chapter 6 assesses the central idea of falsificationism — an assertion is correct iff it is unfalsifiable or, equivalently, an assertion is incorrect iff it is falsifiable — and considers Dummett's arguments for the thesis that the notion of incorrectness is prior to the notion of correctness when it comes to understanding language. Kapsner argues that falsificationism cannot be maintained for all areas of discourse, though, and goes on to consider instead restricted areas in which it can enjoy some success. He also points out that a constructive account of indicative conditionals and negations seems to call for the introduction of falsifications.

Part III represents the core of the book. It examines which logics are better suited for each semantic theory in the stages I–V. As intuitionistic logic is taken by Dummett to be the appropriate candidate for a Stage I theory, this stage is not considered separately. All the others are dealt with in a separate chapter, where each logic is semantically characterized by a combination of a BHK-style interpretation and a Kripke-style semantics.

The first chapter of Part III, Chapter 7, is devoted to Stage V. It presents and further develops *dual intuitionistic logic*, a paraconsistent logic that was already envisaged by Dummett as a candidate for a pure falsificationistic theory. Chapter 8 concerns Stage II and proposes the paracomplete Nelson logic known as  $N_3$ . Chapter 9 deals with Stage IV. In this case, Kapsner opts for a paraconsistent (but not paracomplete) variation of  $N_3$ , which he dubs  $N_{3f}$ . Chapter 10 examines the different ways a Stage III theory can combine verifications and falsifications. It considers separately the *discourse separation strategy*, the *correctness as verifiability and incorrectness as falsifiability strategy* and the *burden of proof distribution strategy*. The latter is taken to be the most promising one and is further elaborated by the author.

One of the main virtues of Kapsner's study is that it gives a fresh new philosophical motivation for paraconsistent logics, besides the metaphysical doctrines of dialetheism and analetheism. As Kapsner's investigations indicate, it is very likely that any falsificationistic logic will be paraconsistent. However, the phenomenon of paraconsistency one finds here is not due to the existence of truth value gluts, as the dialetheist would have it, but rather to the existence of gaps between the seman-

tic values in the semantics; gaps that arise from the very constructive character of these values—for one cannot constructively assume that every statement or its negation is falsifiable, or that every statement is either verifiable or falsifiable. This position is closer to analetheism than to dialetheism, but it might be kept apart from it by dropping the metaphysical loaded notions of truth and falsity from the semantics, and sticking instead with the more down-to-earth notions of correctness and incorrectness—as Kapsner strongly advises a constructivist should do.

Although a substantial part of the book is concerned with the relationship between the phenomena of paracompleteness and paraconsistency, Kapsner does not mention the work on paraconsistent logics that has been developed in Brazil during the last 15 years, and which concerns an alternative logical approach to paraconsistency that internalizes the notion of consistency in the object language by means of a new logical operator. In fact, such logics, so-called “logics of formal inconsistency”, are inherently analetheist and seemingly appropriate to formalize a falsificationistic logic. In addition, he does not seem to consider the investigations on duality between intuitionism and paraconsistency carried out by A. Brunner, W. Carnielli, R. Goré, N. Kamide, G. S. Queiroz, J. Marcos, Y. Shramko and I. Urbas, among others.

In the final section of the book, entitled *What is constructivity?*, Kapsner poses a very stimulating question that arises naturally from his work. He asks for the distinctive character in virtue of which a logic might be properly called “constructive”. Kapsner rightly observes that the answer to this question is not to be found in the inferences a logic validates or fails to validate, for some of the logics he discusses in the course of the book validate exactly the same inferences as classical logic does, and still seem to deserve the label. Rather, the answer is to be found in the appropriate semantics for each logic and, more specifically, in the nature of the chosen semantic values. If these values are taken to be epistemically accessible, then the logic in question is to be called “constructive”. He adds that “even if such an explicit explication of the notion of constructivity in terms of semantical values is not assumed, I believe that without a semantical account, the question whether a logic is constructive seems quite pointless” (200). I believe that Kapsner is absolutely right in maintaining that the semantics of a logic is what is prior when it comes to deciding about its constructivity (and if fact when it comes to deciding about many other features). However, he could have strengthened his position considerably by proposing a sharper (but per-

haps more restricted) criterion which was at his full disposal, namely, by proposing that a logic is to be considered constructive if it can be furnished with a suitable combination of a BHK-style interpretation for the connectives and a Kripke-style semantics. The reader who went through all the chapters, and in particular the ones in the last part, will readily appreciate this point, for the picture this kind of combination draws for the many logics discussed makes their constructivity very appealing.

*Logics and Falsifications* should be read by anyone interested in the connections between formal logic and the philosophy of language, and it is highly recommended to those looking for well-entrenched philosophical motivations for non-classical logics, especially when it comes to paracompleteness and paraconsistency.

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