

Chapter 1

Introduction

**Theodora Achourioti, Kentaro Fujimoto, Henri Galinon
and José Martínez-Fernández**

1.1 Presentation of the Volume

In 2011, and within only a few months, four international conferences on truth were independently organized in Amsterdam (“Truth be told”, 23–25 March 2011), Barcelona (“BW7: Paradoxes of truth and denotation”, 14–16 June 2011), Paris (“Truth at work”, 20–23 June 2011) and Oxford (“Axiomatic theories of truth”, 19–20 September 2011). This succession of events and the original work presented at them are evidence that the *philosophy of truth* is a lively and very diverse area of study. They saw a great variety of methodologies from philosophers, logicians and linguists, and even within these groups, a variety of problems and approaches to those problems. We think, however, that the interaction between the different research programmes was not as intense as it could have been. By collecting in one volume a wide range of the very latest research on truth, we hope to intensify the dialogue between philosophers and thus make a contribution to even better informed

T. Achourioti

ILLC & AUC, University of Amsterdam, Science Park 113, 1098 XG,
Amsterdam, The Netherlands
e-mail: t.achourioti@uva.nl

K. Fujimoto

Department of Mathematics and Department of Philosophy,
University of Bristol, University Walk, Clifton, Bristol BS8 1TW, UK
e-mail: kentaro.fujimoto@bristol.ac.uk

H. Galinon

PHIER, Université Blaise Pascal, Clermont Ferrand, France
e-mail: henri.galinon@univ-bpclermont.fr

J. Martínez-Fernández

Lògica, Història i Filosofia de la Ciència, Universitat de Barcelona, Montalegre 4,
08001 Barcelona, Barcelona, Spain
e-mail: jose.martinez@ub.edu

research in the future. Hence the title of this volume, *Unifying the philosophy of truth*, which announces our project.

We are very glad that Springer agreed to host this volume within its ‘Logic, Epistemology, and the Unity of Science’ series. Although—as illustrated by the essays in this volume—contemporary research on truth is now mainly pursued in full independence of the early unity of science programme, this is a good place to recall that positivism played an essential role in the birth of contemporary research on truth in the first half of the twentieth century. The spirit of scientific empiricism and logical rigor promoted by positivism was at first at odds with the use of the concept of truth in philosophy and science. In the 1920s the philosophical notion of truth was under threat from various angles. First, it was not clear at that time what the appropriate conceptual analysis of the notion of truth should be. The traditional conception of truth as correspondence between discourse and what discourse is about was perhaps shared by many philosophers, but it was not seen as amenable to analysis in logical and empirical terms as positivists required for meaningful discourse. Thus, the metaphysical notion of truth was rejected. Second, it seemed all too evident to some philosophers¹ that the rehabilitation of the notion of truth would be a threat to the way they had conceived of their physicalist unitarian project. If the traditional notion of truth were accepted among scientific notions, that would pave the way for truth-conditional semantics, which would then threaten verificationist semantics as the scientific basis for the explanation of meaning. However, although it seems relatively clear that a sentence such as the then all too famous “Das Nichts selbst nichtet”² has no verification conditions, it is not equally clear that truth-conditions cannot be used instead to specify its meaning. In other words, the positivist critique of metaphysics would lose its bite if the language of metaphysics could be shown to be meaningful in terms of truth-conditions. Third, even in mathematics, truth-talk was not very fashionable in those days, as Hilbert’s formalist programme was very prominent as a philosophy of mathematics.³ And finally, the concept of truth had notoriously been involved in paradoxes for more than two thousand years. Even if it had not always been clear whether those paradoxes should be taken seriously or not⁴, this could not have helped build trust in the notion of truth as a legitimate one, even less so at the beginning of the twentieth century which was a time—if any were—in which paradoxes were taken seriously. It is in this historical context that Tarski—following up on work within the Polish school⁵—published his celebrated essay on the notion of truth in formalized languages (Tarski 1983), giving birth to

¹ Neurath in particular. See, e.g. Mancosu (2009).

² See, e.g. Carnap (1931).

³ Remember that in this context Gödel himself, despite his realist convictions in mathematics, carefully avoided use of the term ‘truth’ in his incompleteness paper. See Feferman (1989).

⁴ But see Read’s paper in this volume with respect to the Middle Ages.

⁵ On the roots of Tarski’s work in the Polish school, see Wolenski (2009) and Wolenski and Murawski (2008).

the contemporary research on truth.⁶ Part of Tarski's philosophical work and long-standing success in the rehabilitation of the notion of truth is explained by his meeting the positivists' strictures⁷ showing, in effect, how in many circumstances the notion of truth can be rigorously defined in a scientifically acceptable language: a paradox- and metaphysics-free language for science. He did so in a series of writings widely acknowledged as a model of balance between philosophical insight and scientific achievement.

Today, another close connection between truth theorizing and the unity of science programme is found in deflationism. Deflationism is probably the most discussed philosophical approach in contemporary philosophical research on truth and it appears in several places in this volume.⁸ Some versions of deflationism have been motivated by concerns raised by forms of physicalism or radical empiricism with the nature of truth-theoretical explanations.⁹ For it has been argued that physicalism implies that the property of truth is reducible to physical properties or, if not, that it must have no explanatory force. But a full reduction of the property of truth to empirical properties appeared to be hard to achieve¹⁰ and this put some pressure on the physicalist to accept that the notion of truth has no explanatory force. Rather than return to a pre-Tarski state of affairs in which the notion of truth is removed from the language of science, the deflationist's twist is to maintain that the notion of truth is still legitimate in scientific talk, but for logical and not explanatory purposes. This position has in turn stimulated a number of discussions to which philosophy, logic and linguistics have all made contributions, some of which are discussed in detail in this volume.¹¹

It seems safe to say that most philosophers, logicians and linguists do not adhere to the early—or late—positivist unity of science programme. But from that tradition we retain the goal of a scientifically informed philosophy of truth. Contemporary philosophy of truth has lain all along at the crossroads of logical, empirical and

⁶ One has to add that in 1935 the context had already dramatically changed in the philosophy of mathematics after the publication of Gödel's incompleteness theorems in 1931.

⁷ For more on Tarski's relationship with philosophers close to the Vienna Circle, see e.g. Mancosu (2008a, 2008b, 2009).

⁸ This is not to say that most philosophers are deflationists. Indeed, Bourget and Chalmers' recent survey of professional philosophers (Bourget and Chalmers 2014), shows that correspondence theory is still the most widely shared view on truth. Within the sample faculty population (admittedly strongly biased towards North American philosophy departments), the results for the different conceptions of truth are as follows ("accept" and "lean towards" answers are aggregated): correspondence 50.8 %; deflationary 24.8 %; epistemic 6.9 %; other 17.5 %.

⁹ We have in mind the deflationist tradition running from W. V. Quine (1970, 1960) to H. Field (2001), including the work of, e.g. S. Leeds (1978). P. Horwich (1998a, 1998b) could perhaps also be attached to this tradition, even though he seems to conceive of his deflationism as a philosophical elucidation in the tradition of Wittgenstein's philosophy of language.

¹⁰ Thus, according to Field (1972), Tarski's work did not establish the reducibility of truth to empirical properties. Later attempts, such as e.g. Fodor (1989) in the context of a defence of "intentional realism", have also been criticized. See Loewer (1997) for an overview of naturalizing semantics. Field (2001) illustrates clearly Field's route from physicalism to deflationism about truth.

¹¹ See in particular Chaps. 4 and 5 of the present volume.

philosophical research, stimulating ever more interaction between them: applications of logical methods help decide philosophical matters (e.g. on the nature of truth¹²), philosophical reflection informs logic research (e.g. on paradoxes¹³) and so on. We hope that the present volume further encourages this ongoing dialogue between philosophy, logical methods and empirical work.

1.2 Organization of the Volume

Research in the philosophy of truth has expanded in many different directions over recent decades. The present volume could not possibly cover the full range of actively researched truth-related topics; however, it does provide an overview of some of the main themes that run through the work currently undertaken within the area in the analytic tradition. This is done directly, through the broad range of topics that the papers address, as well as indirectly, via the authors' reference to others' work that relates to their own.

We have grouped the papers into six chapters (2–7 of this volume). Here we introduce each of the chapters starting with a general presentation of the papers they contain in the order that they occur. This is to give the reader a first idea of what the papers in each chapter are about before we go on to introduce each of them separately. An introduction to each of the papers contained in the chapter then follows.

The topics addressed in different sections of this volume often relate to each other; by no means do we consider our organization of the volume the only possible one. Some of the connections are pointed out by the authors themselves, others we try to highlight in our introduction. A goal that we hope to have achieved by putting the papers side by side the way that we have is to help draw philosophical connections between the papers that go beyond the particular methodologies used. We have, therefore, opted for a divide that cuts across the usual distinctions—distinctions we do not really ascribe to—e.g. between philosophical, logical and linguistic papers. We hope that this, perhaps somewhat unorthodox, organization of the volume will prove helpful in further emphasizing connections between the papers by also drawing the readers' attention to work that they may not at first consider as immediately relevant to their own.

The introduction of the separate papers is not balanced. For each paper we present what we anticipate will be most useful to the non-specialized reader. For example, in cases where we judge that background knowledge of certain issues is required, we have tried to provide part of that background, occasionally at the expense of expanding on the paper's original ideas. In cases where the argumentation of the paper is rather complex, we have opted for a concise presentation of the argumentative structure or an exposition of the preliminary context which then makes it easier to

¹² See Ketland (1999) and Shapiro (1998) on deflationism and conservativity, and Chap. 5 in this volume.

¹³ See, in this volume, Chaps. 6 and 7.

penetrate and appreciate the work. With this selective approach we hope to facilitate a comparative reading much more than could be achieved by a uniform exposition, which in some cases would favour the specialized reader.

Finally, it is often said that truth theorists should clarify their philosophical aims and presuppositions before delving into technical details; but we believe that philosophical deliberation and logical analysis should go hand in hand and complement each other. The interaction between ideas and formal techniques is generally a highly complex and intricate affair. Philosophical thinking may help clarify the ideas behind formalization, while reflection on technical work may lead to progress in philosophical thinking. This volume can be read as an illustration of this interactive process.

1.2.1 Truth and Natural Language

The first two papers in this volume offer a critical reflection on the transition from natural to formal language and to philosophical theories of truth. It is common for philosophers to use examples of sentences in natural language that contain the word 'true'. For example, deflationists often explain the non-substantive character of truth by noting that a sentence of the form 'it is true that A' has the same meaning as 'A' itself (an idea that goes back as far as Frege 1918). In her essay, Moltmann studies the linguistics of truth predication which she regards to be a complex phenomenon of natural language. A linguistic study of truth is of immediate relevance not only to philosophers who want to formalize the ordinary notion of truth but also to those who simply wish to align their theory with the behaviour of truth in natural language.¹⁴ Moltmann's analysis shows that far from supporting a single philosophical theory, some of the ways truth predication manifests itself challenge views of truth that are as prominent as deflationism, or those that consider propositions to be the primary bearers of truth.

In a more foundational approach to the very endeavour of formalizing the notion of truth in natural language, Collins objects to a dilemma that seems to drive some of the contemporary discussions: either a consistent theory of untyped truth has to be developed or natural language is inconsistent because it contains a paradoxical notion of truth. Collins' view is that the paradoxical character of truth is inescapable and yet this does not imply that natural language is inconsistent, because questions of consistency can only meaningfully apply to formal theories, which natural language is not. In the essay following Collins', Sheard claims that it is still possible to identify consistent uses of an inconsistent notion and, furthermore, that such consistent uses are evidenced in the case of truth by the fact that paradoxes do not hinder speakers of ordinary language when communicating with each other when using the word 'true'.

¹⁴ Think of questions concerning whether truth should be formalized as a predicate or an operator, whether it is an iterable notion, etc.

These consistent fragments of the use of the truth predicate in natural language can be analysed as inferential mechanisms wedded to specific communicative tasks. One can then study, in a spirit of truth-theoretic pluralism, which of the available axiomatic theories of truth offer the principles needed for carrying out separate tasks; thereby setting specific standards against which existing theories can be adjudicated (which is desirable nowadays given the number of interesting axiomatic theories of truth available).

1.2.1.1 “Truth Predicates in Natural Language” by Friederike Moltmann

Moltmann takes a close look at the appearance of truth in natural language and asks whether the linguistic data support known philosophical views of truth; or weaker than that, whether they are compatible with them. She does not focus her critical study on one particular philosophical theory, nor is there one such theory that is naturally favoured by the linguistic data provided by her study, although some philosophical positions are either excluded or significantly challenged. In fact, this paper is in line with so-called truth-theoretic pluralism: the view that there may be more than one viable notion of truth. Pluralism regarding truth is not a recent view; it has famously been defended, for example, by Lynch (2009). In the present volume, truth-theoretic pluralism is also found to be agreeable by Halbach and Horsten, who take their cue in this from Sheard (1994).

It is an essential assumption underlying Moltmann’s analysis that truth predication be regarded as a phenomenon that extends beyond the occurrence of the word ‘true’. Truth can be predicated by several expressions, here called ‘apparent truth predicates’, of which the standard truth predicate is only one. ‘Apparent truth predicates’ can either ascribe the property of truth (type 1 truth predicates), or express a relation of truth (type 2 truth predicates).

With respect to type 1 predicates, Moltmann argues that the semantics of natural language does not support an operator analysis. Such an analysis for ‘is true’ has been proposed, for example, by Grover et al. (1975), Grover (1992), Brandom (1994) and Mulligan (2010), and recent formal work on truth has again raised the question of whether truth should be formalized as an operator. Moltmann shows that a truth predicate does not exhibit distinctive sentential semantics such as one finds with expressions that are clear cases of operators, e.g. ‘is possible’. She also shows that there is no reason to regard the linguistic form ‘it is true that A’ (that-clause in extraposition) as more representative of the occurrence of truth in natural language than its equivalent ‘that A is true’ (that-clause in subject position); whereas an operator approach does favour the former over the latter. Moreover, it is shown that there is no more reason to study constructions in which truth is predicated of that-clauses than nominal expressions; the latter almost universally neglected by philosophical theories of truth.

Under type 1 truth predicates, Moltmann also places normative predicates that are used to convey truth, such as ‘is correct’ or ‘is right’. This gives rise to two notions of truth: representation-related and normative-related, which are combined in normative

truth-predicates and difficult to separate out. Moltmann's proposal is that studying the semantics of these normative predicates will provide insight into the nature of truth predication itself. She concludes, for example, that truth is predicated over intentional entities (attitudinal objects, see Moltmann 2003, 2013) rather than mind-independent entities, such as propositions (or sentences), which is what deflationists about truth traditionally claim (e.g. Horwich 1998). Note that the view that truth is predicated over intentional objects such as beliefs is already found in Ramsey (see Ramsey 1991, p. 8). It follows that the viability of the deflationist view for such predicates, given their semantics, depends on the possibility of distilling a purely representational role for truth.

1.2.1.2 “Truth and Language, Natural and Formal” by John Collins

Collins' essay is as much about the use of truth in natural language as about the paradoxes. For its starting point, recall that Tarski sees the paradoxes as the outcome of (1) the *T*-biconditionals that characterize the concept of truth, (2) the classical logic that we employ in reasoning about truth and (3) the fact that natural language can speak about everything and in particular it can speak about itself. This diagnosis leads Tarski to what has been called the ‘inconsistency view’ of truth: since the *T*-biconditionals are essential to define truth and classical logic should not be modified, one has to admit that paradoxes are produced because natural languages are universal, i.e. they contain their own truth predicate. This implies that natural languages use truth in an inconsistent way. The solution should therefore come from creating non-universal thoroughly-specified formal languages with rich expressive resources that can consistently incorporate a truth definition that implies all the *T*-biconditionals. And Tarski showed us how to do just that.

The Tarskian analysis of truth has been severely criticized and a new orthodoxy has been developed: the expressiveness of natural language should not be compromised, and the new goal in solving the paradox is to devise powerful formal languages that can speak about themselves to the extent of expressing all paradoxical sentences and still have a consistent truth predicate, even if this implies tinkering with classical logic.

In his paper Collins wants to challenge both sides of this discussion: he wants to defend, against most contemporary solutions to the paradox, the notion that Tarski was right in his diagnosis of the inherently paradoxical nature of the notion of truth in natural language; but he also wants to criticize defenders of an inconsistency view of truth for understanding natural language as inconsistent. Collins proposes a different interpretation of Tarski's view, one that respects the basic intuition that paradoxes are insoluble in natural language, while, at the same time, it does not see natural language as inconsistent.

The first part of the paper compares natural and formal languages. Formal languages are characterized by having an explicit stipulation of their syntax and a full transparent semantics. The full transparency of the semantics means that the syntactic conditions express the semantic properties of the language in such a way that

the semantic properties can be read off from the syntax. Formal languages are guaranteed by design to have these features. In contrast, natural languages are not fully transparent. Collins develops this idea by focusing on five linguistic phenomena: (i) ambiguity, which shows that syntactic structure is not always an accurate guide to interpretation; (ii) the presence of words that do not make any contribution to the sentences they appear in; (iii) the absence of words that should be present in a sentence; (iv) the abundance of positions in sentences that do not serve to predict the interpretation of their occupiers; and (v) the fact that there is no decidable notion of being a well-formed formula of natural language because the acceptance and the meaning of sentences depend on the psychological states of speaker-hearers of the language.

In the second part of the paper, after rejecting two objections to his understanding of natural languages, Collins focuses on the concept of truth in natural and formal languages. Collins claims that the concepts of consistency and inconsistency apply only to formal languages and cannot apply to natural languages because a natural language is not a set of fully transparent sentences such that we could have a consistent or inconsistent theory of it. He criticizes the opposing views of two contemporary defenders of the inconsistency view: Eklund and Patterson (Eklund 2001; Patterson 2008, 2009). Collins also criticizes the views of authors who propose formal languages that could model the universal aspect of natural language and still escape (or at least modulate) inconsistency. Against these views, Collins argues that paradoxical arguments are unavoidable in natural language, due to the inherent riskiness of the truth predicate. This riskiness is produced because, as Kripke (1975) pointed out, one can predicate truth of a set of sentences without knowing the content of the sentences themselves.

1.2.1.3 “Truth and Trustworthiness” by Michael Sheard

Sheard starts by observing that, as opposed to the theoretical case, the use of an untyped truth-predicate in real-life communication appears unproblematic: natural language users have no problem understanding each other when they use the word ‘true’, irrespective of their potentially different philosophical ideas concerning truth. Sheard proposes this as evidence of some kind of inferential semantics that operates on the surface level of language use and which is shared by language users. This inferential semantics must be consistent, since paradoxes do not seem to arise (or are somehow avoided) in everyday communication. The alternative to allowing for consistent uses of the truth predicate would be to consider language users as irrational beings, in which case empirical psychological work should explain how they manage to deal with inconsistencies; but, according to Sheard, this is a more general question which would not necessarily shed any light on the question: what is the inferential mechanism that is at work in specific situations when people use the word ‘true’?

Sheard focuses on the use of ‘true’ in its function of conveying information. He constructs a simple scenario consisting of two (idealized) agents, a speaker and a hearer, where the speaker conveys a message with the help of the truth predicate by

means of an assertion, a denial or a generalization. The task of the hearer is to decode the speaker's message and to assimilate the knowledge it contains. Sheard then asks of each of three prominent axiomatic theories of truth, so-called FS, KF and VF¹⁵, whether it provides a mechanism for the hearer to perform this decoding act. He observes that this very much depends on whether the hearer considers the speaker to be a trustworthy source, since if not, the hearer first has to check that the message does not lead to inconsistency before assimilating it. Decoding a message is pretty straightforward for all three systems and message forms in the case of a trustworthy source, with the exception of denial, which one has to formalize $T(\ulcorner \neg A \urcorner)$ instead of $\neg T(\ulcorner A \urcorner)$ (this is because decoding $\neg A$ from $\neg T(\ulcorner A \urcorner)$ requires the inference from A to $T(A)$ which is not generally available). Matters become complicated in the case of an untrustworthy source. Logically, KF and VF are equipped to deal with incoming inconsistencies since they are closed under *reductio ad absurdum*, but note that idealization assumptions become crucial here, i.e. the ability of the hearer to screen all logical consequences of existing knowledge for inconsistency.¹⁶

Decoding messages is discussed by Sheard as a seemingly simple example of a communicative task that allows a comparison between different axiomatic theories of truth. One should not, however, be surprised if a certain theory that fares well in this context does much worse than other theories once one changes the task at hand—Sheard gives another example to this effect. In fact, one should not expect there to be a single axiomatic theory that can account for all communicative uses of truth.

Sheard's approach is, therefore, compatible with both truth-theoretic pluralism and inconsistency theories of truth, since an inconsistent notion may allow for mutually incompatible, yet consistent, uses of it. There are two main reasons for engaging in this exercise of assessing axiomatic truth theories against simple communicative tasks: first, it offers more insight into the philosophical and inferential import of these theories; and second, it provides criteria for adjudicating between the theories. The theme of adjudicating between axiomatic theories of truth is also taken up later in this volume by Halbach and Horsten in chap. 12.

1.2.2 *Uses of Truth*

Emphasis is also placed on the non-paradoxical features of truth by Rouilhan who demonstrates how Davidsonian truth-theoretic meaning explanations could be used

¹⁵ For an exposition of these theories, the reader can consult Halbach (2010).

¹⁶ Sheard notes that FS presents the additional difficulty of not allowing for *reductio* reasoning due to its lack of a general deduction theorem. The best one can do, Sheard explains, is to provisionally accept a message and use the FS inference rules as a test mechanism in order to track potential inconsistencies while resisting the final step of the *reductio* argument, which means that instead of adding the negation of the provisionally accepted message to the database, the hearer simply dismisses the message altogether.

to debunk another paradox. ‘Frege’s paradox’—or rather, a general version of it—arises when meaning explanations for a language intended to be used as the language of science must make use of grammatical categories which clash with the logical structure of that language. Rouilhan’s paper shows that appropriate uses of the notion of truth make it possible to give meaning explanations for a language of science that obey its type-theoretical logical structure, and thus comply with the universalism of founders of modern logic¹⁷, that is, in a way that does not condemn these explanations to being nonsensical.

Kahle’s ‘Sets, Truth, and Recursion’ illustrates how the notion of truth can be applied to foundational topics in mathematics, especially set theory. More specifically, Kahle’s essay presents a set theory based on an axiomatic truth theory, where sets and the membership relations are *defined in terms of a truth predicate*. The set theory is a so-called *Frege structure*, roughly a way to restrict truth-theoretic assumptions and objects of the theory so as to maintain full comprehension. It is then a consequence of these restrictions that Frege structures support a non-classical concept of truth.

Still on the foundational side, Eberhard and Strahm explore the use of truth in ‘unfolding’ the content of arithmetic theories. The *unfolding programme* has famously been developed by Feferman and addresses a query of Kreisel’s about the proof-theoretic commitments that one implicitly makes when accepting a certain theory. Eberhard and Strahm previously worked on theories of truth for feasible arithmetic, that is, arithmetic weaker than PA, which describes feasibly computable functions (usually identified with polynomial time algorithms). Here they consider the use and strength of such theories in carrying out the unfolding programme.

Finally, Bruni explores a fragment of the revision theory of truth, which was famously developed by Herzberger, Gupta and Belnap as a response to the truth-theoretic paradoxes. In particular, Bruni focuses on the finite use of a technique, the revision rule, which was primarily meant as a way to provide a natural semantics for predicates expressing circular concepts, such as the truth predicate. Finite revision falls short of giving a semantics for the truth predicate, yet it finds natural applications in, for example, game theoretic settings, where players base their decisions on what is rational for other players to do. Besides these applications, Bruni also highlights interesting connections between the finite fragment of revision theory and the FS axiomatic theory of truth.

1.2.2.1 “Putting Davidson’s Semantics to Work to Solve Frege’s Paradox on Concept and Object” by Philippe de Rouilhan

In his contribution, Rouilhan introduces the reader to what, in the paper itself, he calls for short *Frege’s paradox* and the *generalized Frege’s paradox*. These paradoxes are not part of the family of Russell’s well-known paradoxes that afflicted Frege’s logical

¹⁷ See e.g. Rouilhan (2012) and references therein for a broader philosophical perspective on logical universalism.



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