# Truth, Paradoxes and Inexpressibility

The Buenos Aires - Oxford Research Project: Truth, Open-endedness and Inexpressibility

## Abstracts

Roy Cook (University of Minnesota): *Expressive Completeness and Revenge: Embracing the Technicalities*

The Embracing Revenge account of semantic paradox and the Revenge Problem (Cook 2008, 2009, Schlenker 2010), involves an indefinitely extensible proper class of truth values, and a corresponding series of ever-expanding languages, each of which is able to express a 'Revenge' sentence relative to the previous language. A proper class of truth values, and a proper class of languages, seems a high price to pay for a solution to the paradox. The payoff, according to defenders of the view, is that the view involves absolutely no restrictions on what can be expressed. This paper delivers a crucial ingredient in delivering that payoff, in the form of a very powerful expressive completeness result.

Lucas Rosenblatt (UBA-Conicet) & Damián Szmuc (UBA-CIN) : *Truth is Pathological*

In Kripke's classic paper on truth it is argued that by weakening classical logic it is possible to have a language with its own truth predicate. Usually it is claimed that a substantial problem with this approach is that it lacks the expressive resources to characterize those sentences which are pathological. The goal of this paper is to offer a refinement of Kripke's approach in which this difficulty does not arise. We tackle the characterization problem by introducing a pathologicality operator into the language. We also consider the prospect of generalizing this framework to deal with languages containing vague predicates. In particular, we show that our approach is compatible with some solutions to the Sorites paradox where an unclarity operator is available in the language.

Graham Leigh (University of Oxford): *Reflecting on Truth*

This talk explores the relationship between the global reflection principle ("If A is provable, A is true") and its arithmetic cousins ("If A is provable then A"). I will provide an overview of recent results on the connections in the context of axiomatic theories of truth.

Federico Pailos (UBA-Conicet) : *A Suitable Conditional for a Trivalent Theory of Truth*

I will present a trivalent semantics for a theory of truth with a suitable conditional, according to the criteria fixed by Beall (2009). The conditional will invalidate all forms of Pseudo-Modus Ponens and Contraction (but leave the sub-structural rules untouched). It will also be non-monotonic, and will allow for an unrestricted validation of the T-Schema. The truth conditions from conjunction and disjunction will also be altered. The key feature of the theory is that the truth conditions of these logical constants are partially indeterminate, and so the logic is not compositional. The resulting theory of truth will not also be paracomplete, but paraconsistent.

Volker Halbach (University of Oxford) *Faithful to classical logic*

Truth theories are usually formulated over a base theory in classical logic. Many logicians, however, reject classical logic for the sentences involving the truth predicate. Many logicians and philosophers don't see this as a serious rejection of classical logic; I'll argue that such a rejection is not as harmless as is often thought. In particular, I'll review the recent discussion on axiomatizations of Kripke's theory of truth in classical and partial (or paraconsistent) logic.

Eduardo Barrio (UBA-Conicet) : *Rejecting Transitivity: Some Worries about Revisionary Approach to Logic*

This paper analyzes an approach supported by those who propose rejecting structural transitivity in response to the semantic paradoxes. In its simplest form, transitivity of consequence sets that if $A \vdash B$ and $B \vdash C$, then $A \vdash C$. This property it self is a metainference, a closure property on the set of valid arguments. Failures in the transitivity of deduction has been connected to relevantism [Tennant, 2005], vagueness [Cobreros, Egré, Ripley, and van Rooij, 2012] and tonk [Cook, 2005] [Ripley, 2012]. But Weir [2005] y Ripley [2012] have maintained that non-transitive logic is the escape route that allows transparent truth to mesh with classical logic. In this view, giving up structural cut allows handling truth-theoretic paradoxes. They block the problematic derivation, and they do so in a way that allows them to preserve classical operational rules. The system presented in [Weir, 2005] preserves many, but not all, classical operational rules; the system presented in [Ripley, 2012] preserves them all. As a result, I focus in this work on the latter system. This allows the resulting logical systems to behave quite naturally in a number of ways. Nevertheless, I am going to present several reasons against this approach. Firstly, I present basic ideas about transparent truth and semantic self-sufficiency. Then, I summarize Ripley's logic system ST. In particular, how to resolve semantics paradox rejecting cut. Finally I show that even rejecting partial transitivity in contexts where the truth predicate is applied has bad consequences. In particular, I argue that 1) Transitivity is not the only metainference that is missed in logic without transitivity, 2) Internal and external logic don't coincide. So, we have important limitations in the expressive power, 3) Revenge problems add more limitation, 4) To "ban" cut is not innocuous. We miss technical results and the logic is so complex that it's not clear how to compare it with actual reasoning, and finally 5) In the logic of truth ST, validity cannot be truth-preserving.

Ole Hjortland (LMU Munich-MCMP) : *Truth in Substructural Logic*

Paracomplete theories of truth have received renewed attention in recent work by Hartry Field and Leon Horsten. These theories have in common that they weaken classical negation in order to accommodate an unrestricted truth predicate. I argue that, contrary to what the paracompletists themselves think, there are strong connections between the paracomplete theories and an apparently more radical type of nonclassical theory: substructural theories of truth. I provide a (partial) axiomatization of Field's paracomplete theory where both the negation and the conditional are structurally restricted, in particular, contraction-free. Finally, I discuss what I consider the main advantages of the substructural perspective on the paracomplete theories.

Julien Murzi (University of Kent): *Validity and Truth-preservation*

The revisionary approach to semantic paradox is commonly thought to have a somewhat uncomfortable corollary, viz. that, on pain of triviality, we cannot affirm that all valid arguments preserve truth (Beal l2007, Beall 2009, Field 2008, Field 2009). We show that the standard arguments for this conclusion all break down once (i) the structural rule of contraction is restricted and (ii) how the premises can be aggregated---so that they can be said to jointly entail a given conclusion---is appropriately understood.

Diego Tajer (UBA-Conicet): *Logics, Beliefs and Disagreement*

In recent years, some authors (such as Field or McFarlane) focused over the normative role of logic to clarify some disputes about philosophy of logic. Following this line, in this paper I investigate what does it mean for an agent to accept a sentece as a logical truth, or to accept an inference as valid. I use the framework of epistemic logic to make the ideas clear. In my view, which is mainly Tarskian, accepting a sentence as logical means to believe it and all its substitutions of the non-logical vocabulary. In that sense, logical commitments supervene over regular beliefs and should not conflict with them: for example, nobody can accept p ∨ ¬p as a logical truth while at the same time rejecting one of the substitutional instances. I will also elaborate notions of logical rejection and logical disagreement (which will be mainly a disagreement between agents, not between logics), which enable us to make finer distinctions (since, for example, both classical logicians and dialetheists accept the LNC, but the former ones also reject contradictions). Later I describe some alternatives based on different philosophical conceptions of logical consequence. Then I show how my framework can be used to model the interaction between agents with different logical commitments. Finally, I will address the issue of logical pluralism, which becomes puzzling from this normative perspective; it seems that nobody can really accept two different logics at the same time. I sketch a possible solution for this probllem, based on the plurality of intentional attitudes.

Jeffrey Ketland, (Pembroke College, Oxford and MCMP): *Leibniz Equivalence.*

This talk discusses two topics. The first concerns the concept of Leibniz equivalence of spacetime models in the foundations of spacetime theory and. Although usually formulated in terms of a diffeomorphism---a certain structure-preserving map---applied to the points of a single model, it is argued that the notion of a diffeomorphism is something of a red herring. For, given a spacetime model, (M, g, ...), the application of an arbitrary permutation of the base set of the manifold M generates a new somorphic model, and it seems plausible to say then that these isomorphic models represent the same physical possibility. For if one is allowed to shift around the tensor fields, why not shift around (the open sets of) the topology, so long as the overall result is isomorphic? If this is correct, Leibniz equivalence amounts to the claim that isomorphic spacetime models somehow ``represent'' the same possible worlds. The metaphysical subtext of such debates concern three crucial notions: the notions of "abstract structure", "representation" and "possible world". The second topic discussed concerns these metaphysical questions and the proposals are more speculative. Where A is some a model, we make two identifications: the abstract structure of A is the categorical first-order-ramsified second-order propositional function that defines the isomorphism type of A. And a possible world w is the result of applying an abstract structure to some sequence R1, ... of relations. So, a possible world is a categorical proposition expressing, so to speak, a "pattern" of instantiation of relations, usually involving certain concretum relations. As there is no distinguished domain for either an abstract structure or a possible world, a version of anti-haecceitism follows, and Leibniz equivalence is

automatically implemented. The "individuals" in a world or abstract structure are "thin", corresponding only to existentially bound first-order variables. However, constants introduced by skolemization yield parametric names of "quasi-thick" individuals. Pure abstracta---e.g., pure sets, numbers---are, however, thick.

Eleonora Cresto (UNTREF-Conicet): *Lost in Translation: Unknowable propositions in probabilistic frameworks*

Some propositions are *structurally unknowable* for certain agents. Let me call them 'Moorean propositions'. The structural unknowability of Moorean propositions is normally taken to pave the way towards proving a familiar paradox from epistemic logic – the 'Knowability Paradox', or 'Fitch's Paradox'. The present paper explores how to translate Moorean statements into a probabilistic language. I argue that traditional candidates to play the role of probabilistic Moorean propositions, such as the so-called 'Reflection Principle', will not do. I then offer a suitable schematic form for probabilistic Moorean propositions, as well as a concomitant proof of a probabilistic Knowability Paradox. To do so I rely on a Kripkean framework enriched with evidential probabilities. The framework provides a unified account for both knowledge and probability attributions; we can then think of possible refinements of the basic setting, which may lead to a unified solution for the two versions of the paradox.

James Studd (University of Oxford) *Abstraction Reconceived*

Neologicists have sought to ground mathematical knowledge in abstraction. This account faces two obstinate problems: the bad company problem of incompatible abstractions, and the problem of extending abstraction to branches of mathematics other than arithmetic. This paper argues that these problems are due to the 'static' character of abstraction on the neologicist account and offers a novel 'dynamic' account that provides satisfying solutions to both.

Carlo Nicolai (University of Oxford) : *Axiomatic Truth, Syntax and Metatheoretic Reasoning*

In the talk I will motivate, present and discuss the theory CTD[O], standing for compositional theory of truth with `disentangled' syntax for the object theory O. Unlike the usual setting, the syntax of O is taken to be formalized in a disjoint theory, and not in O itself. Semantic vocabulary is then applied to codes of terms and formulae of the language of O provided in the disjoint syntax. The theory formalizing the syntax of O will be taken to be an axiomatization of hereditarily finite sets. The choice of a theory of finite sets as syntax deserves a special attention: why should we prefer it over first-order arithmetic? Some strengthenings of CTD[O] will also be presented: in particular, we will consider extending the schemata of O, if present, to the entire vocabulary of the language of CTD[O] and to add bridge laws connecting the syntactic and the mathematical domain. Finally, some applications of the theories just presented will be discussed: on the one hand, they appear to offer a formalization of our informal metamathematical practice; on the other, they seem to be relevant for the debate about the so-called conservativeness argument against the deflationary conception of the truth predicate.

Lavinia Picollo (UBA-Conicet): *Reference is Problematic*

Do all semantic paradoxes involve self-reference? Since Yablo's paradox made its first appearance, many philosophers have engaged in a debate about this issue. But at the bottom of the debate there is an unclear notion of reference and, thus, self-reference for formal languages. The whole discussion is therefore misguided. My genera goal is to arrive at a sound notion of reference. I'll first list some features such notion must have to be useful at the debate and then sketch a partial definition of reference that possesses them. Next I'll show some difficulties every useful notion of reference must overcome, including the one introduced here, and suggest a solution. Finally, I'll draw some conclusions.

Michael Glanzberg (Northwestern University) *Complexity and Hierarchy in Truth Predicates*

In this paper, I shall speak in favor of hierarchies. I shall argue that hierarchies are more well-motivated and can provide better and more workable theories than is often assumed. Along the way, I shall sketch the sort of hierarchy I believe is plausible and defensible, which is different in important respects from the orthodox Tarskian one. My defense of hierarchies will assume a particular view of the nature of truth that is fundamentally `inflationary'. My main thesis will be that if one adopts this view of truth, hierarchies arise naturally. The way that the approach to truth I shall advocate makes truth a complex concept, and that in the presence of self-applicative truth and the Liar, truth becomes a very complex concept. As I shall show, this complexity helps motivate hierarchies. Complexity and hierarchy go together, if you adopt the right view of truth.