

WORKSHOP ON NONCLASSICAL LOGICS AND PROBABILITY

Paul Égré (IRL Crossing, CNRS) and Ellie Ripley (Monash University) organized the Workshop on Nonclassical Logics and Probability. This event was organized with the support of Monash University and the PLEXUS network.

The Workshop was held from on August 30, 2025 at Monash University-Caulfield Campus.

9:30-10:30. (joint work with Johannes Stern) Lorenzo Rossi: “Supervaluational truth and quantifiers”

10:45–11:45. Paul Égré and Ellie Ripley: “Vagueness and Probabilistic Consequence”

12:00–13:00. Nicholas Smith: “Nonclassical Probabilism”

14:30–15:30. Alba Cuenca: “A Minimally Rational Epistemic Relevant Logic”

15:45–16:45. Zach Weber: “Counting and Negation”

17:00–18:00. Jan Sprenger: “The material and the suppositional conditional”

Abstracts

(joint work with Johannes Stern) Lorenzo Rossi, “Supervaluational truth and quantifiers”: Quantification has long been both a stumbling block and a testing ground in semantics. Building on Frege, Tarski developed the modern model-theoretic semantics for first-order languages, but many quantifiers (because of the Compactness and Löwenheim-Skolem Theorems) cannot be expressed in FOL. Mostowski and Lindström extended Tarski’s approach to capture quantifiers such as “finitely many” and “most,” leading to Generalized Quantifier Theory (GQT), now a standard tool in formal and natural language semantics. Yet challenges persist, particularly when semantic indeterminacy is involved. We address three forms of indeterminacy: (P) presupposition failure, (V) vagueness, and (L) semantic paradoxes, ill-foundedness, and related phenomena. We propose a general framework for quantifier semantics in the presence of indeterminacy, and develop two formal semantics that (a) satisfy key desiderata for handling P, V, and L, and (b) recover a substantial fragment of GQT.

Paul Égré and Ellie Ripley, “Vagueness and Probabilistic Consequence”: In this paper we are interested in the exploration of probabilistic accounts of the logic of vagueness that would provide empirically motivated counterparts to the strict-tolerant account proposed in Cobreros et al. (2012). In Égré and Ripley (2024), we explored a family of probabilistic consequence relations that we called symmetric consequence: symmetric consequence, like strict-tolerant consequence, says that a sentence follows from a set of premises when for every probability distribution, if the probability of each premise meets a sufficiently high threshold, then the probability of the conclusion meets a dual lower threshold. Symmetric consequence coincides with classical logic at the maximum threshold 1, and only gradually approaches it at lower thresholds. In this talk we deal with symmetric consequence over a language incorporating similarity relations. We define a probabilistic version of the tolerance principle for vague predicates, and we show that the logic

validates the tolerance principle in argument form, and also in conditional form, but not as a universally quantified principle. Like ST, symmetric consequence for vague predicates is nontransitive, and like ST it accounts for the ambivalence felt in borderline cases. However, it differs from ST by invalidating the adjunction rule and so by rejecting borderline contradictions. Despite that, symmetric consequence relation nicely accommodates the observation that our confidence in the tolerance principle itself depends on how closely similar the items of a sorites sequence are.

Nicholas Smith, “Nonclassical Probabilism”: Frege held that the laws of logic are normative for thought (in the sense of judgements and inferences). Although it is not what the term usually means, let’s call this view ‘logicism’. Frege also had views on what the correct laws of logic actually are. One might disagree with Frege on the latter point while agreeing with him on the former, making one a nonclassical logicist: one’s logic is nonclassical but one maintains that its laws are normative for thought.

Probabilism (in the usual sense of the term) is the view that the Kolmogorov laws of probability are normative for thought (in the sense of degrees of belief). I want to view probabilism (in this sense) as a package of two views, analogous to Frege’s position. First there is the view that the laws of probability (whatever they are) are normative for degrees of belief. Although it is not what the term usually means, let’s call this view ‘probabilism’. Second, there is a view on what the correct laws of probability actually are: they are the Kolmogorov laws.

In this talk I advocate a form of nonclassical probabilism, that agrees on the first point (i.e. on probabilism, in the sense just introduced) while disagreeing on the second: the laws of probability are not the Kolmogorov laws but the Dempster-Shafer laws. I argue that this yields an overall package of views that explains why the laws of probability should be normative for degrees of belief—that is, that justifies probabilism. In the case of logic, Frege had a nice justification of logicism (in the sense introduced above): the laws of logic are laws of truth, and we should not reason in a way that leads from truths to falsehoods. In the case of probability, I draw a similarly tight connection between the laws of probability that I advocate and probabilism: the laws of probability are laws of *evidence*, and the degrees of belief of rational agents should respect their evidence.

Alba Cuenca, “A Minimally Rational Epistemic Relevant Logic”: In recent years, there has been increased interest in using relevant and other substructural logics to model epistemic attitudes. Equipped with Routley–Meyer semantics, these logics offer an intuitive way to understand epistemic modalities as accessibility relations between states, while avoiding certain forms of logical omniscience. However, moving to a weaker logic still leaves us with closure under that logic’s consequence relation. In this work, I present a new treatment of epistemic operators in relevant logic that avoids this variant of the logical omniscience problem. Focusing on a knowledge operator, I show that it avoids closure under the weaker logic’s consequence relation by imposing constraints on the atoms within its scope. Roughly speaking, if an agent knows a proposition, their available information must “say something” about each atomic component of that proposition. The result is an epistemic logic in which agents are minimally rational, closed only under weaker principles for knowledge.

Zach Weber, “Counting and Negation”: Counting is central to many important activities. To express that there are distinct quantities requires negation. In this talk we will consider the prospects for counting in a background paraconsistent framework, based on FDE and

extensions. First, we will look at difficulties that arise due to the relative weakness of paraconsistent negation. Then we will look at how these difficulties can be put to positive use, through a worked example in (non-classical) computability theory.

Jan Sprenger, “The material and the suppositional conditional”: The paper explores the scope and limits of the material conditional analysis (MCA) from the perspective of a suppositional analysis, and in particular, trivalent semantics. While both accounts assign different truth conditions and probabilities to conditionals, it is shown that they generate the same theorems and valid deductive inferences in a large fragment of the language with a conditional connective. Therefore, I propose to interpret MCA as a largely successful approximation to valid deductive reasoning with conditionals, inverting Williamson’s claim that suppositional reasoning is a heuristic for valid reasoning with conditionals (on his account, given by MCA).