Vagueness: A Guide

LOGIC, EPISTEMOLOGY, AND THE UNITY OF SCIENCE

VOLUME 19

Logic, Epistemology, and the Unity of Science aims to reconsider the question of the unity of science in light of recent developments in logic. At present, no single logical, semantical or methodological framework dominates the philosophy of science. However, the editors of this series believe that formal techniques like, for example, independence friendly logic, dialogical logics, multimodal logics, game theoretic semantics and linear logics, have the potential to cast new light on basic issues in the discussion of the unity of science.

This series provides a venue where philosophers and logicians can apply specific technical insights to fundamental philosophical problems. While the series is open to a wide variety of perspectives, including the study and analysis of argumentation and the critical discussion of the relationship between logic and the philosophy of science, the aim is to provide an integrated picture of the scientific enterprise in all its diversity.

For further volumes:
http://www.springer.com/series/6936

Giuseppina Ronzitti
Editor

Vagueness: A Guide

Springer

Editor
Dr. Giuseppina Ronzitti
UMR 8163 “Savoirs, Textes, Langage” (STL)
Université de Lille 3 – Bât.B4
Rue du Barreau – BP 60149
59653 Villeneuve d’Ascq Cedex
France
ronzitti@gmail.com

ISBN 978-94-007-0374-2 e-ISBN 978-94-007-0375-9
DOI 10.1007/978-94-007-0375-9
Springer Dordrecht Heidelberg London New York

Library of Congress Control Number: 2011922157

Printed on acid-free paper

Springer is part of Springer Science+Business Media (www.springer.com)

Introduction
Vagueness and. . .

Giuseppina Ronzitti

Some vital clues that vagueness leaves behind are more or less standardly identified in the literature as *sorites susceptibility*, namely the fact that vague terms allow the construction of paradoxical series of the sorites type, *borderline cases*, the fact that when applying a vague term – say a predicate such as "red" or "bald" – to instances in its range of significance we end up in situations in which it is unclear whether the predicate does or does not apply, and finally the connected phenomenon of the *lack of (sharp) boundaries*, the fact that the border between cases of application of a term and cases of application of its complement is not clear-cut.[1] This is not to say that these characteristics exhaustively and satisfactorily identify what is behind vagueness or how it is best described. In fact for each of the proposed characterizations, taken as singularly or (totally or partially) jointly characterizing vagueness, objections can be raised.[2] Furthermore, as the above-mentioned characteristics are not mutually independent there is also the question concerning whether one of them is more fundamental than the others. This being said, there is no denying that almost all discussion on vagueness centers on trying to "solve", in some sense, the puzzle posed by the soritical type of reasoning, elucidating the nature of the real or apparent phenomenon of borderline cases of application of a term, and characterizing what can possibly be an "unsharp" boundary, in case one joins the party of those who claim that vague terms fail to draw cut-off points.[3]

[1] Cf. Rosanna Keefe, *Theories of Vagueness*, Cambridge University Press (2000), p. 6.

[2] The less controversial characterization of vagueness is often indicated as that of vagueness as *sorites susceptibility*. For an argument against such a characterization, see Matti Eklund, "What Vagueness Consists In", *Philosophical Studies* 125, (2005). Stewart Shapiro also expresses some doubts regarding the need of the requisite of soriticality for vagueness. See his *Vagueness in Context*, Oxford University Press, (2006), p. 4.

[3] To be sure, other characterizations have been proposed, and are widely discussed in the literature, as central features of the phenomenon of vagueness, most notably Crispin Wright's notion of *tolerance*. See his "On the Coherence of Vague Predicates", *Synthese* 30, (1975), pp. 325–363.

As it turns out, as a consequence of the obvious pervasiveness of the phenomenon of linguistic vagueness,[4] we meet the sort of problems posed by the soritical type of reasoning and connected phenomena in nearly all contexts. Besides, in many cases, the phenomenon of vagueness does not just occur, but occurs in a way so as to challenge, at least apparently, the fundamentals of a discipline.

This is immediately clear for terms like, for example, the predicate "moral". The possibility of the sorites type of reasoning in these cases can make it difficult to decide where to draw the line between moral and immoral behavior. To repeat an example from Dorothy Edgington,[5] think of the corruption technique consisting in running a soritical series starting with an innocuous present and moving in very small steps to a clear case of bribery. A politician might accept a small box of chocolates offered to him. Also, the small box of chocolates would probably not be counted in any court of law as evidence for corruption. But, the willingness to accept the chocolates may be taken (by the corrupter) as an indication of a possible willingness to accept some other similar, even if slightly more important, gifts and eventually something which clearly will count as corruption. This technique rests on the fact that if a person accepts the first gift considering this as not being immoral, he or she will postpone the decision of refusing the next gift as the acceptance of a slightly more important gift cannot make a qualitative difference, leading to the shift to an immoral behavior.[6]

This example was not meant to overly exaggerate the importance of the phenomenon of vagueness, but only to illustrate how vagueness, and reasoning "by vagueness", may occur outside philosophy classes. In fact, given that almost all words are vague and therefore vagueness tinges almost all contexts, it seems to be possible to speak of vagueness in connection with almost any subject. Nevertheless, the philosophical reflection on vagueness has developed more consistently around some specific topics which appear to be highly responsive (for different reasons) to the threats posed by vagueness. This is the case, in a very straightforward sense, when it comes to philosophical reflections on logic and language. The responsiveness of language is perhaps the more obvious, language being the *cradle* of the debate on vagueness.[7] The responsiveness of logic to the challenges posed by vagueness is also very straightforwardly explained if we consider how the basic notion of "borderline case" is standardly defined, namely as a case which resists the application of the law of excluded middle. The responsiveness of (classical) logic to the

[4]Bertrand Russell, in his well-known seminal paper on the topic, remarks that "all language is vague". See Bertrand Russell, "Vagueness", *Australasian Journal of Philosophy and Psychology* 1, (1923), pp. 84–92. Cf. also Timothy Williamson, *Vagueness*, London: Routledge, (1994), p. 2.

[5]"The Philosophical Problem of Vagueness", *Legal Theory*, (2001), pp. 371–378.

[6]Certainly the soritical series for the predicate "innocuous gift" has more dimensions than more standard examples of a soritical series. In the case of the corruption technique it may be argued that already the first gift (a box of chocolates) is indeed a bribe.

[7]We do not mean to imply that vagueness originates in language rather than in the world.

threats posed by vagueness is therefore connected with its being, in a way, under assault.[8]

Beside logic and language, among the fields of inquiry that have become *loci classici* of the debate concerning vagueness we find metaphysics, philosophy of law, linguistics and the philosophical debate on perceptual experience. This volume centers on the mutual relations between *vagueness and* each of the mentioned subjects. This explains the form of the titles of the chapters "Vagueness and . . ." We do not mean, though, that these exhaust all the possibilities. The list of chapters might have been longer; due to the pervasiveness of the phenomenon of vagueness it might have been possible to add more topics. We have chosen to limit ourselves to subjects in which the debate on vagueness is well developed. Among the possible topics which are not included the only noteworthy absence is perhaps mathematics, so the reader will not find here a chapter titled "Vagueness and mathematics". Why not? There are essentially two reasons why we did not include a chapter on vagueness and mathematics. First, in a sense there is no chapter to be written on this topic, as the great majority of philosophers maintain that there is no vagueness in mathematics:

> One objection to the view that sorites paradox [. . .] [provides] evidence that mathematical induction should be rejected is the familiar point of view that mathematics is free of vagueness [. . .][9]
>
> Mathematics is *the* area of precision. We are not troubled by borderline cases of mathematical concepts.[10]
>
> [. . .] there is no vagueness in mathematics (or so it seems).[11]

These are just a few examples, but many more are easily found. The fact is that mathematics, it is maintained, *is* the realm of precision. A little less dogmatically one may point out that mathematical terms occurring in the elementary mathematics which is considered in connection with vagueness are explicitly quantitative. Unlike such predicates as "heap", "fat", "bald" whose meaning implicitly involves the idea of a type of measure without any particular measure being specified, mathematical terms like, say, "90 degrees" explicitly indicate a quantity. The possibility of generating a sorites series is blocked, in these types of mathematical cases, because explicitly quantitative terms (unlike implicitly quantitative terms) discriminate adjacent elements of a series of objects in the range of significance of the predicate.

But then, if there is no vagueness in mathematics, why should the fact that we have not included a chapter on vagueness and mathematics be noticed? This has to do with the second reason, namely that mathematics is employed as a tool in the philosophical analysis of the phenomenon of vagueness. And in fact, in this

---

[8] One should remark, though, that on a different understanding of the nature of the phenomenon of borderlineness, such as the epistemicist account, there is no open conflict with classical logic.

[9] Roy Sorensen, *Blindspot*, Oxford: Clarendon Press, (1988), p. 294.

[10] Dorothy Edgington, "The Philosophical Problem of Vagueness", (2002), *Legal Theory*.

[11] Stewart Shapiro (2006), p. 48.

sense this topic features in this volume, in Shapiro's chapter on vagueness and logic dealing with the model theory which is required by the different theories of vagueness. Models use logical and linguistic notions which are precisely defined within the adopted theory. Otherwise said, models of vagueness are not vague (logical-linguistic) objects. This is also true for the fuzzy approach to sets. Fuzzy sets are not, as the terminology could suggest, examples of vague mathematical objects, but, again, a way of mathematically modeling the concept of "indeterminateness", a way of handling "vaguely specified data".[12]

There are certainly (a few) dissenting voices on this subject, philosophers who have attempted to spell out the occurrence of vagueness in mathematics and who maintain that mathematical language is not exempt from vagueness. Bertil Rolf, for example, has claimed that: "[. . .] it is simply false that all mathematical predicates are purely exact" and mentions the notions of differentiability and continuity which, according to him, "[m]ight have been vague at one stage in the development of calculus".[13]

That said, we think a chapter on vagueness and mathematics in the sense discussed above is possible and remains to be written. However, in this volume we are interested in analyzing and studying how vagueness occurs and matters as a specific problem in the context of theories that are primarily about something else. Apart from the mentioned chapter on *vagueness and logic*, and an introductory chapter on the sorites paradox, we have selected five topics which seem to have most stimulated the efforts of philosophers. A brief description of the chapters, provided by the authors, is as follows:

Chapter 1: Sorites (Dominic Hyde) In a world of change, we see species go from common to rare and yet are unable to point to any moment at which they ceased to be common. We see people grow old and yet cannot nominate any moment at which they ceased to be young. Nonetheless, transitions like these surely must occur at some point, if at all. There must be a change somewhere but no particular point can be singled out as the point of change. Where then are we to draw the line? This puzzling question lies at the heart of the ancient sorites paradox and the more general class of paradoxical arguments that now go by that name. In what follows we look at the various forms the paradox can take and some of the responses that have been pursued.

Chapter 2: Vagueness and metaphysics (Jonathan Lowe) In this chapter, we explore some important questions concerning vagueness that arise in connection with the deployment of certain key metaphysical notions – in particular, the notions of an object, of identity, of constitution, of composition, of persistence, and finally of existence. Various philosophers have argued for or against the view that there can be vague object's, or that the identity and distinctness of objects can be vague, or

[12]Cf. Gilles Gaston Granger, "Sur le Vague en Mathématique", *Dialectica* 44, (1990), pp. 9–22.

[13]In Rolf's view Peano's space-filling curve might, then, have been a borderline case of the predicate "continuous curve". See Bertil Rolf, *Topics on Vagueness*, (1981), Lund, p. 55.

that what an object is constituted by or composed of (that is, what its parts are) may be vague, or that an object's persistence-conditions and thus its temporal duration may be vague, or finally that it may even be vague whether or not an object exists at all. We examine the cogency of some of these arguments. We spend more time on the question of vague identity than on any other topic, partly because it has received more attention in the literature and partly because it is either explicitly or implicitly involved in all of the other topics on our list and so is, in that sense, more fundamental than the others.

Chapter 3: Vagueness and logic (Stewart Shapiro) The plan of this survey is to discuss the sort of model-theory that is suggested (or demanded) by the main, rival accounts of vagueness, and to thereby delineate the logic of each. I will try to indicate, in each case, what the logic would be if the account in question were correct. Since the main logical problem facing vagueness is the sorites paradox, the present survey assesses what each account has to say about typical sorites arguments. Nihilistic and epistemicist accounts do not demand any change in the model theory. Supervaluationist and some contextualist accounts require the introduction of partial interpretations and sharpenings. Subvaluationist and some inconsistency accounts are dual to this, and also make use of partial interpretations and sharpenings. The model theories for some many-valued accounts are also sketched, including a boolean valued account that sanctions classical logic. The resolution of higher-order vagueness is also briefly treated.

Chapter 4: Vagueness and meaning (Roy T. Cook) One natural thought to have about vagueness is that the indeterminacy or imprecision inherent in vague expressions is intimately tied to the meanings of these expressions. If this is right, then important tool for studying vague predicates will be meaning theories. There are three critical issues that must be addressed by any such theory: the incompatibility of vague predicates with the 'governing view' of semantic theorizing, the relation between the meanings of vague expressions and the use we make of them, and the fact that vague predicates are open textured. This chapter explores the prospects for dealing with each of these from the perspective of three approaches: contextualist theories, epistemicist theories, and indeterminist theories. We conclude by looking at a variation of the first problem that applies, not to meaning theories, but to formal logics for vagueness: the problem of inappropriate precision.

Chapter 5: Vagueness and observationality (Diana Raffmann) Vague observational predicates like 'red' and 'loud' are associated with at least two distinctive philosophical problems. First, these words appear to generate the most intractable form of the sorites paradox because they permit the construction of sorites series in which neighboring items are indiscriminable, not just incrementally different, on the relevant dimension. While it is at least non-incredible that incrementally different in a sorites series are category-different, the idea that indiscriminable items could be category-different seems beyond the pale. Second, the nontransitivity of the observational indiscriminability relation threatens the coherence of the notion of determinate observational qualities such as shades of color and loudness levels.

In this chapter I examine these two problems and discuss some experimental results that shed new light on them.

Chapter 6: Vagueness and linguistics (Robert van Rooij) This chapter provides a (biased) overview of analyses of vagueness within linguistics. First, the nature of vagueness is discussed, and contrasted with notions such as ambiguity and context-dependence. After that, some reasons are given that could perhaps explain why vagueness is such a pervasive phenomenon in natural language. This is followed with a review of some more or less standard linguistic analyses of gradable adjectives. The chapter is focussed on approaches that take comparison classes into account. Because comparative constructions are ideally formed in terms of gradable adjectives, comparative ordering relations are discussed as well. It is argued that one specific ordering relation is crucial for any analysis of vagueness that wants to capture the notion of 'tolerance': semi-orders. A lot of attention is given to contextuallist' approaches that want to account for the Sorites paradox, because these approaches are most popular within linguistics. In the final main section, the chapter discusses what some people have called 'loose talk'. The main issue here is whether with loose use of language we say something that is strictly speaking false, but true enough in the particular conversational setting, or true, because the conversational setting loosens the requirements for a sentence to be true.

Chapter 7: Vagueness and law (Timothy Endicott) Vagueness in law is typically extravagant, in the sense that it is possible for two competent users of the language, who understand the facts of each case, to take such different views as to the application of a vague law that there is not even any overlap between the cases that each disputant would identify as borderline. Extravagant vagueness is a necessary feature of legal systems. It is a reason to resist the urge to assert bivalence for propositions of law. The challenge – if bivalence is not asserted – is to articulate the principle of the rule of law in a way that is compatible with the possibility of indeterminacy in the application of vague laws.

Contents

Contributors

Roy T. Cook Department of Philosophy, University of Minnesota, Minneapolis, MN, USA, Cookx432@umn.edu

Timothy Endicott Professor of Legal Philosophy, Balliol College, Oxford University, Oxford, UK, timothy.endicott@law.ox.ac.uk

Dominic Hyde University of Queensland, Brisbane, QLD, Australia, d.hyde@uq.edu.au

E.J. Lowe Department of Philosophy, Durham University, 50 Old Elvet, Durham DH1 3HN, UK, e.j.lowe@durham.ac.uk

Diana Raffman Department of Philosophy, University of Toronto, 170 St. George Street, Toronto, Ontario M5R 2M8, Canada, diana.raffman@utoronto.ca

Stewart Shapiro The Ohio State University, Columbus, OH, USA; The University of St. Andrews, St. Andrews, UK, shapiro.4@osu.edu

Robert van Rooij Institute for Logic, Language and Computation, Oude Turfmarkt 141-147, 1012 GC Amsterdam, R.A.M.vanRooij@uva.nl

Notes on the Contributors

Roy T. Cook is an assistant professor at the University of Minnesota, and Associate Fellow of Archée: Philosophical Research Centre for Logic, Language, Metaphysics, and Epistemology, and a Resident Fellow of the Minnesota Center for the Philosophy of Science. He works in the philosophy of mathematics, the philosophy of logic, mathematical logic, and the aesthetics of popular art.

Timothy Endicott is Professor of Legal Philosophy and Dean of the Faculty of Law in the University of Oxford. He has been a Fellow of Balliol College since 1999. He is the author of Vagueness in Law (OUP 2000), and Administrative Law (OUP 2009). After studying Classics and Linguistics at Harvard and Oxford, he studied Law at the University of Toronto and practised as a litigation lawyer in Toronto, before pursuing the DPhil in legal philosophy in Oxford.

Dominic Hyde is a philosopher now working at the University of Queensland, Australia. He graduated from the Australian National University after pursuing doctoral work on the sorites paradox and the associated problem of vagueness under Richard (Routley) Sylvan. He has published a number of articles in the area and recently published a monograph *Vagueness, Logic and Ontology*.

E. Jonathan Lowe, born Dover, England, 1950. Professor of Philosophy, Durham University, UK, since 1995. Educated at Cambridge University (BA History 1971) and Oxford University (Bhil Philosophy 1974, DPhil Philosophy 1975). Research interests: metaphysics, philosophy of mind and language, philosophical logic. Author of 10 books, including *The Possibility of Metaphysics* (1998) and *The Four-Category Ontology* (2006).

Diana Raffman is a professor of philosophy at the University of Toronto. She is the author of a number of articles on consciousness, perception, and linguistic vagueness, several of which draw upon the results of psychological experiments on color perception and categorization using color predicates. She is currently completing a book, *Unruly Words: A Study of Vague Language*, which develops a new theory of vagueness.

Robert van Rooij is a specialist in the formal semantics and pragmatics of natural language. He studied philosophy and linguistics at the universities of Nijmegen (1991) and Tilburg (1992) in the Netherlands. He earned his PhD in 1997 with his dissertation 'Attitudes and Changing Contexts' at the Institut fuer Masschinelle Sprachverarbeitung in Stuttgart (Germany). Since then he is working at the Institute for Logic, Language, and Computation (ILLC) at the University of Amsterdam (Netherlands). He published many articles on formal semantics, pragmatics, and logic in journals like *Linguistics and Philosophy, The Journal of Semantics*, and *The Journal of Philosophical Logic*.

Stewart Shapiro is the O'Donnell Professor of Philosophy at The Ohio State University and a Professorial Fellow at the Arché Research Centre at the University of St. Andrews. His major works include *Vagueness in context* (Oxford, Oxford University Press 2006), *Philosophy of Mathematics: Structure and Ontology* (Oxford University Press 1997), and *Foundations without Foundationalism* (Oxford University Press 1991). He has taught courses in logic, philosophy of mathematics, metaphysics, epistemology, philosophy of religion, Jewish philosophy, social and political philosophy, and medical ethics.