

Dissertation Abstract

Title. The Web of Questions: Inquisitive Decision Theory and the Bounds of Rationality

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Abstract. Something important is missing from the standard account of the connection between belief and action. The way a given belief should be expected to manifest itself in action is not a function of its informational content, but also depends systematically on the *question* that the belief answers. This dissertation articulates that dependence with a simple new theory of belief-guided action, explaining a range of ordinary patterns of behaviour that cannot be accounted for given the standard account of belief, desire and action. The appeal to questions is especially fruitful when it comes to explaining behaviour that displays some inconsistency, or which is less than ideally rational. I call this new account of belief and action *inquisitive decision theory*.

Besides providing a new model for less than ideally rational behaviour, the inquisitive account of belief also suggests new ways of thinking about deductive reasoning and deliberation, and throws new light on certain long-standing issues in doxastic logic. It brings together a converging set of recent insights about the role of questions in cognition stemming from epistemology, the philosophy of language, the metaphysics of propositions, linguistic semantics, formal pragmatics and psychology. In addition, it builds on work in decision theory, computer science, behavioural economics and the philosophy of mathematics.

Introduction

Imagine you find yourself in the middle of a cold, inhospitable forest at dusk, bereft of supplies and surrounded by disheartening animal noises. You come to a crossroads and have to choose a path. Hungry eyes are tracing you, and you face an almost palpable question: *How do I get out of here?* Questions await us at all the crossroads of life, both literal and metaphorical, even if they are usually less consequential. The choice of how many eggs to get at the supermarket raises the question *How many eggs go into a spaghetti carbonara for four?* Plotting your next chess move, you face the question *How do I put my opponent on the defensive?* In the flower shop, you wonder *What is his favourite colour?* And so on: whenever you make a choice, you face a question.

And what you decide to do normally depends on your answer to the question raised. Take the supermarket situation. If you reckon you need five eggs for your carbonara, you will buy half a dozen. If you think you need eight, you get a dozen. If you are unsure, maybe you still get a dozen just to be on the safe side. Thus the decision you make is guided by your answer to the question that the choice confronted you with. If you know the right answer to this question, you

will generally make the right choice, while wrong answers lead to bad choices. If you are faced with a question that you have no answer to at all, then you are likely also unsure what to do.

In this dissertation, I develop this question-centric or *inquisitive* way of thinking about belief-guided action in a systematic way. The idea of connecting choices to questions is so natural and intuitive that it may appear innocuous. But it actually yields a substantial departure from the received view, making sense of a range of otherwise puzzling psychological phenomena, like the distinction between recognition and recall. Most importantly, the inquisitive picture suggests a systematic account of the behaviour of agents who fail to see some of the consequences of their beliefs, and agents with inconsistent beliefs.

The inquisitive theory I propose is modelled on the traditional, *classical* account of belief-guided action. This account has its fullest, most influential articulation in standard decision theory, interpreted the way economists and psychologists do: as an attempt to explain and predict behaviour in terms of an agents' beliefs and desires.¹ On that descriptive interpretation, decision theory is already highly controversial in exactly the sort of way that motivates the inquisitive turn. According to its critics, the strong rationality assumptions baked into the classical theory are so unrealistic that the theory cannot be trusted to yield accurate predictions about ordinary people. Celebrated exponents of that critique include Daniel Kahneman (2012) and Richard Thaler (Thaler and Sunstein 2008). Their groundbreaking work led to a call for less idealised,

¹ For the record, inquisitive decision theory *can* also be interpreted normatively, as an account of what we rationally ought to do given our (possibly inconsistent) beliefs and desires. I think this normative interpretation is both interesting and well-motivated, but it will not be my focus here.

more realistic accounts of decision making. The inquisitive theory of belief-guided action is one answer to that call.

You can think of both the inquisitive and the classical theory as consisting of three nested, interrelated components. Each of the first three chapters concerns one of these components. The core component of each theory is a view about the content of a belief, and about the way an individual full belief affects an agent's choices: these views are the topic of Chapter 1. The second component is a distinctive view of the way individual beliefs come together in belief *states*, to be described in Chapter 2. The third and final component is the account of doxastic uncertainty and *credences* or partial beliefs, to be covered in Chapter 3. With this third component in place, my proposal takes the form of a novel, *inquisitive* decision theory. Along the way, we build an increasingly detailed understanding of the way our cognitive limitations manifest themselves in the inquisitive theory, and in Chapter 2 I introduce and examine a simple inquisitive model for deductive reasoning.

In Chapter 4, I turn to some formal results that underpin the theory articulated in the first three chapters. I will provide a unified formal framework for thinking about behavioural dispositions generally, and use this framework to prove representation theorems for both classical and inquisitive decision theory. These formal results give us a precise way of seeing just how much less idealised the inquisitive decision theory is, allowing a direct comparison of the rationality assumptions that go into classical and inquisitive decision theory.

The decision-theoretical issues that are the central motivation in Chapter 1-4 intersect with a

longstanding issue in doxastic logic known as the *problem of logical omniscience*. Roughly speaking, this is the problem of constructing a tractable and realistic formal model of the beliefs and credences of agents who do not know every consequence of their beliefs, and whose beliefs may be inconsistent. In addition to its decision-theoretical manifestation, the problem of logical omniscience has many other faces: it is a complex, many-faceted issue at the intersection of psychology, economics, philosophy and linguistics. I cannot attempt to do justice to every aspect of the problem explicitly within this dissertation. However, I do think the inquisitive theory of belief set out below has the potential to cast new light on many of its manifestations. In Chapter 5, I illustrate this with an excursion beyond decision theory.

Chapter 5 concerns the problem of *mathematical omniscience*. According to the classical view of belief states, an agent's beliefs are closed under entailment (necessitation). In particular, that means everyone believes every necessary truth, which includes every mathematical truth. But of course we do not know every mathematical truth, and this difficulty gives rise to the problem of *explicit* mathematical omniscience. The other half of the problem is that classical agents also cannot manifest any *implicit* mathematical ignorance. For instance, if a classical agent knows the diameter of Martha's perfectly circular yard is 12 feet, it would follow that they also know the circumference of Martha's yard to arbitrarily many decimal places.

The inquisitive account of belief and credence provides a more promising basis for an account of mathematical belief. It does not face an implicit problem of mathematical omniscience at all, and I argue that it brings us an important step closer to addressing the explicit problem as well. Some of the considerations about the problem of mathematical omniscience are also relevant to

Frege's Puzzle, which can be regarded as another manifestation of the problem of logical omniscience. In the final section of Chapter 5, I draw those connections.

Apart from a few stray remarks, what is missing from the dissertation is a treatment of the semantics of belief *reports* — the sentences we use to describe and attribute beliefs. This would be a surprising omission in any philosophy dissertation about belief, but especially coming from someone who specialises in the philosophy of language. My excuse for this hiatus is that it reflects what I have come to think is the proper order of inquiry here. The problem of logical omniscience as it arises in semantics and doxastic logic can formally be addressed using a wide variety of fine-grained conceptions of belief content. But such formal solutions do not touch the root of the problem unless they explain what it is about our doxastic mental states that makes it the case that belief contents are fine-grained in this or that particular way. As Stalnaker put it, “One needs an account of what states of belief, desire and intention *are* that explains how the fine-grained structure of some notion of proposition contributes to distinguishing between different states of belief, desire or intention.” (Stalnaker 1999b, p. 27)

Below I provide such an explanation for the kind of inquisitive propositional structure I favour. The account certainly suggests a moral for the semantics of belief reports, and it provides the conceptual groundwork for a new semantics. But I will remain neutral on the details of how this moral is to be implemented. Should we appeal to alternatives semantics, to questions under discussion, or inquisitive semantics? What is the relation to embedded questions in knowledge reports? How ambiguous are belief and knowledge attributions? What is the role of focus? These are all great questions. But we will face them another day.