Intuition Pumps

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Intuition pumps

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Abstract The award of the 2003 Barwise Prize to Daniel Dennett by the American Philosophical Association signifies Dennett's importance in the developing area of philosophical inquiry into computing and information. One source of Dennett's intellectual stature is his command of scientific and engineering ideas, which he effectively applies to philosophical debates over machine intelligence, consciousness, and intentionality. Dennett regards the computer as both a model and a tool that will transform the ways that philosophy is pursued in the 21st century. In order to understand Dennett's conception of how philosophy changes and fares, if his mechanistic and reductionist conception of the life of the mind succeeds, we turn to an examination of a central idea in Dennett's thought: the intuition pump.

Keywords Computational turn · Dennett · Intuition pump · Philosophy · Metaphor

Daniel Dennett maintains that philosophy is undergoing a radical transformation. Through that transformation, philosophy will gain rigor and lose much of its traditional humanistic character. The engine of this transformation is the computer. Dennett describes two ways that computers change philosophy. First, computers provide the first genuinely effective model for mental process. By understanding how information may be more complexly processed as computer technology progresses, the mechanist and reductionist positions in the philosophy of mind gain support. Second, philosophy itself is on the path of becoming technologized as computing increasingly becomes important as a feature of philosophical method. Computers provide tools which allow philosophers to check their claims in systematic and robust fashions heretofore not possible. Dennett characterizes both roles of computers in philosophy as *intuition pumps*. The idea of an intuition pump is a frequent and central image in Dennett's writing. To understand Dennett's conception of how

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computers change philosophy, it is necessary to clarify his notion of intuition pumps and their role in philosophic thought.

Dennett views philosophy as an activity to which thinkers bring assumptions and cognitive commitments which condition in advance how facts and theories may be received. Philosophical theorizing and argument is limited by the preconceptions of the individuals engaged in the process. For instance, concerning the philosophy of mind he observes;

> Although quite a few philosophers agree that content and consciousness are the two main issues confronting the philosophy of mind, many—perhaps most—follow the tradition in favoring the opposite order: consciousness they think, is the fundamental phenomenon, upon which intentionality ultimately depends. This difference in perspective is fundamental, infecting the intuitions with which all theorizing must begin, and it is thus the source of some of the deepest and post persistent disagreements in the field. (Dennett, 1994, p. 356).

Philosophical theories and the issues they comprise are grounded in intuitions which are difficult for us to perceive and assess on the level of theories, arguments, and observations. Our education, training, the vocabulary that we accept, and the examples that stand clear for us, pre-dispose us to attitudes about issues before we even enter the debate;

> If your initial allegiance is to the physical sciences and the third-person point of view, this disposition of the issues can seem not just intuitively acceptable, but inevitable, satisfying, natural. If on the other hand you starting point is the traditional philosophical allegiance to the mind and the deliverances of introspection, this vision can seem outrageous. (Dennett, 1994, pp. 357–358)

Even stronger, our individual intuitions may be manifestations of fixed patterns of thought, perception, and judgment;

> The first stable conclusion I reached, after I discovered that my speculative forays always wandered to the same place, was that the only thing brains could do was to approximate the responsivity to meanings that we presuppose in our everyday mentalistic discourse. (Dennett, 1994, p. 357)

Our whole lives carry forward on committed systems of assumption and belief. These systems inform our most sophisticated investigations, leading us inexorably back to conclusions and theories that confirm the deep, unreflective intuitions. This conception of the human mind (for Dennett, *the human brain*) as a self-correcting system of pre-dispositions bears similarities to the inertia seeking mechanisms of belief described by C.S. Peirce (Peirce, 1923) and the power of the conceptual pictures embedded in language described by Wittgenstein (Wittgenstein, 1953). Under such conditions, as Dennett supposes, where one's mechanisms of judgment and conviction are guided by set brain structures, the hopes for the philosophic enterprise of reasoned judgment to truth seem pretty dim. Fortunately, there is a way that human judgment can operate upon our own intuitions, thus creating reform in our conviction guidance systems.

Philosophers have always made use of techniques that are capable of creating cognitive change at the level of intuitions. Dennett calls the family of such techniques *intuition pumps*. He speaks of intuition pumps as thought experiments and points out examples such as Zeno's paradoxes, Plato's cave, Descartes' evil demon, Hobbes's state of nature, Quine's 'gavagai', Putnam's twin earth, Searle's Chinese room, and many more. These intuition pumps are stories, metaphors, analogies, puzzles, parables, and paradoxes. They move thought the way that a pump moves water or air. When successful, they move

thought deeply enough to affect our intuitions which can lead to an entirely new frame and perspective for the intellect.

A pump is a mechanism that moves liquid, gas, or heat from one state to another. Pumps use mechanical forces (compression or lifting) to push the material. The earliest pump made by Archimedes was a spiral screw that lifted water from an underground stream to the surface. Dennett employs the metaphor of a pump to describe major changes in belief. The intuition pump invokes the picture of human convictions being moved by a mechanical process. This is a description of intellectual change, not controlled by higher reasoning and intellect, but moved by much more basic and sub-intellectual forces, which are themselves not intelligent. Dennett views philosophy as a long tradition of such techniques of movement and finds it fully fitting that we should continue that tradition by accepting a general description of the technique;

> After all, an intuition pump should be the ideal tool in the philosopher's kit, if we take seriously one of the best-known visions of what philosophy is for. It is for enlarging our vision of the possible, for breaking bad habits of thought. As Wittgenstein said, ''Philosophy is a battle against the bewitchment of our intelligence by means of language.'' (Wittgenstein, 1953, sec. 109) For such tasks, the regimented marshaling of rigorous argument is seldom more than an insurance policy, a check on the freewheeling intuition mongering that has laid down the lines of some new vision. (Dennett, 1984, p. 18)

Like Wittgenstein, Dennett fosters the suspicion that traditional philosophy is a main source of the bewitchment (mystification) of intelligence. For Dennett this allusion to the ''bewitchment of intelligence'' applies both to the mystification of concepts as they occur in the perennial problems of philosophy (e.g. ''freedom,'' ''consciousness,'' and ''life'') and also to the mystification of the concept of ''intelligence'' as it occurs in AI debates. The mystification of these concepts that interests Dennett is typically of the forms that the concept must indicate something which is prior to and separate from the material and mechanical building-blocks that make up dynamic and biological systems.

Dennett holds out the possibility that philosophers might reform their practices in order to clear up the mass of conceptual confusions that comprise modern and contemporary philosophy.

> There is a novel texture to my work and an attitude, which grows primarily, I think, from my paying attention to the actual details of the sciences of the mind—and asking philosophical questions about those details. This base camp in the sciences has permitted me to launch a host of differently posed arguments, drawing on overlooked considerations. These arguments do not simply add another round to the cycle of debate, but have some hope of dislodging the traditional intuitions with which philosophers previously have to start. (Dennett, 1994, p. 358).

In order to dislodge us from the traditional intuitions of philosophy Dennett employs metaphors, puzzles, stories, and examples which are designed to lift (pump) the flow of thought out of the cycles of debate reinforced by our starting intuitions.

The intuitions being pumped are those pre-conceptions and cognitive commitments that direct the flow of thought. Dennett targets what he regards as key philosophical intuitions because they are the epitome of mystification;

> When we say we do something 'by intuition' we are saying we don't know how we do it, and that is consistent with any story at all. When we discover how 'intuitive'

thinking is accomplished, we will probably be surprised about many of the details—and we will probably feel that mixture of amusement and letdown that often accompanies learning how a magic trick is done. I think it is quite clear that the answer will be comprehensible in computational terms—a massively parallel dynamical competitive process, in which the ''magic'' gets replaced, one way or another, with a lot of mindless drudgery. (Newshour, 1997).

The mystification of concepts (bewitchment of intelligence) in philosophy arises from the mystery of how we arrive at our philosophical positions in the first place. If we could clearly see where our ideas come from and how our patterns of thought flow, then we would dispel the mystical sense that adheres to those ideas. Dennett is advancing his agenda of the demystification of intelligence by treating philosophy as a mechanical system. If we can describe the process of philosophical insight, belief, and change in mechanistic terms, then a large range of human activities may be likewise described. Were it so reformed, philosophy would become a giant intuition pump by which other realms of cultural discourse could be clarified; a model for the de-mystification of the intellect.

Computers provide means by which philosophy may be de-mystified. Dennett proposes two ways that computers can fill this role: computation as a model for mental process and computers as tools for testing philosophical ideas. The computer provides a model for the reduction of mental concepts into material components and mechanistic processes. Dennett regards computation as the first idea that supports a description of mental process, thus eliminating the need for a conscious agent. All former theories of mind, memory, thought, and meaning have involved metaphors in which the conscious agent is moved to a different part of the mental process, but not eliminated. While mechanists and reductivists have tried to eliminate what Dennett calls the ''middleman'' or the ''homunculus,'' they have only succeeded in moving the conscious agent around to different parts of various models.

According to Dennett, the philosophic intuition of the need for a conscious agent changes with the computation mathematics of von Neumann and Turing.

> The only idea anyone has ever had which demonstrably does get rid of the middleman is the idea of computers. Homunculi are now O.K., because we know how to discharge them. We know how to take a homunculus and break it down into smaller and smaller homunculi, eventually getting down to a homunculus that you can easily replace with a machine. We've opened up a huge space of designs—not just von Neumannesque, old fashioned computer designs but the designs of artificial life, the massively parallel designs. (Dennett, 1995, p. 181)

The computer provides a new opportunity for modeling the mind because we can push the metaphor backwards to receive an analogue of how we arrive at mystified mental concepts. For example, we witness IBM's Deep Blue beat a grand master at chess. This does not mystify because we have fairly clear ideas about how Deep Blue operates. However, if we push the metaphor (the chess player is a chess computer) backwards, we can hypothesize what our reaction may be if we did not know how Deep Blue worked at all. In the absence of that knowledge we would be likely to ascribe intelligence, skill, creativity, and perhaps even intuitive genius to the victor. Given only the game moves to judge from, it is easy to see how any of us might draw the conclusion that the Deep Blue player is an intelligent and creative player.

Having drawn an insight from pushing the computer/mind metaphor backwards, Dennett advances on his main point by pushing the model forwards;

> If we didn't know how Deep Blue did what it did, we'd be very impressed with its intuitive powers, and we don't know how people live in the informal world very well. And as we learn more about it, we'll probably be able to reproduce that in a computer as well. (Dennett, 1995, p. 181)

We do not know how human chess players are able to do what they do. In the absence of that knowledge we ascribe intelligence, skill, creativity, and perhaps even intuitive genius to the players. This is analogous to our tendency to ascribe such qualities to Deep Blue, were we to lack knowledge of its workings. Dennett's use of the computer/mind metaphor invites us to imagine what would happen were we to gain a fair working knowledge of how human chess players (i.e. minds) operate. In such a case we would likely find our sense of mystification gone just as it is in the case of Deep Blue. Dennett makes such use of the computer/mind model for a variety of human abilities. He regards the computer as the first technology for which the metaphor to the mind holds up for the materialist conclusion desired by mechanists and reductivists.

Perhaps computer technology is unique in its features as a philosophical model of mind. It is not however, unusual to use new technologies as models for the solutions of old philosophical problems. From the ancient Greek pneumatic image of the soul, through the early modern clock and hydraulic metaphors, to the late modern electrical network comparisons, there have always been technological metaphors for human function in philosophy and science. What may be genuinely new is the application of information technology (computers) to the methods of philosophy. We may be used to steam engine and hydraulic metaphors, but no one sought to do philosophy by means of steam power or hydraulic lifts; e.g. to generate or prove a philosophical theory using steam engines and hydraulic lifts. Dennett suggests that computers change the character of philosophy by providing tools by which philosophical thought, judgement, theory, and change will be mediated. With the computer, philosophy is on the verge of being technologized. Just as science has fully incorporated technology into its basic methods (i.e. observation, measurement, calculation, analysis, and construction), so too will philosophy find the use of computers increasingly essential to forming and testing positions through simulations;

> It is important to recognize that these computer simulations are actually philosophical thought experiments, intuition pumps, not empirical experiments. They systematically explore the implications of sets of assumptions. Philosophers used to have to conduct their thought experiments by hand, one at a time. Now they can conduct thousands of variations in an hour, a good way of checking to make sure that the intuitions they pump are not artifacts of some arbitrary feature of the scenario. (Dennett, 2003, p. 218)

Modeling and simulation are already part of the philosophical repertoire, as with the modeling of ethical claims in the field of artificial morality Dennett is correct to note that such uses of computers will increase and spread creating fundamental change in the methods of the discipline.

What Dennett asserts, however, is more than the observation that philosophy is becoming increasingly technological. He maintains that philosophy is undergoing a fundamental change in character. Some philosophers have long held that philosophy is near the top of the intellectual hierarchy; an activity which is characterized as specially utilizing the features that are unique to the human intellect, such as reason, understanding, and insight. Dennett considers such conceptions of human intellect and of philosophy as the results of mystification. By taking philosophy down a peg or two from the intellectual

hierarchy, philosophers will be less liable to ascribe mystical features to the world that they philosophize about, especially the human mind.

Philosophy is indeed undergoing a computational turn. As this shift occurs, Dennett's prediction that philosophy will steadily lose its mystification will be tested. If he is correct, then as computer technique becomes essential to philosophic methods we will also find a decrease in the power of philosophic intuitions. As those intuitions fade, so too will the mystification that they confer to concepts such as consciousness, freedom, intention, creativity, and intelligence. If this is so, then philosophy is undergoing the most momentous change in its character since the Golden Age of Greece. If Dennett is mistaken, however, then mechanists and reductionists will need to wait for the next wave of technological progress in order to fashion a new metaphorical challenge to the life of the mind.

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