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What Achilles should have *asked* the Tortoise

Outline

1) Carroll's dialogue in context
2) What the Tortoise asked Achilles
3) What Achilles should have asked the Tortoise
4) Some general remarks

The context

- 1895: Lewis Carroll publishes a short paper in *Mind*, presenting a problem in the shape of a dialogue between Achilles and the Tortoise (from Zeno's paradox)
  - It is likely that Carroll came up with the problem while thinking about the nature of conditionals.
- The traditional lesson taken from the paper is there is a series of general problems about:

  a) How does the uptake of logical rules happen? (the *acceptance problem*)

  b) What justifies the use of basic logical principles?
- The argument has also been appealed to in connection to the so-called *adoption problem* (see Kripke (forthcoming))

My goal

- Is to explore some aspects of the dialogue that to my estimation have not been sufficiently addressed, and that anticipate some ideas that people have brought up in relation to the problems I mentioned—for example, the issue of rule circularity.
- In particular, I want to explore the possibility of turning the dialogue around *against* the Tortoise, and to see what that move yields.

What the Tortoise asked Achilles (1)

So you've got to the end of our race course? Even though it does consist of an infinite series of distances? I thought some wiseacre or other had proved that the thing couldn't be done?

The Tortoise is puzzled or pretends to be puzzled.

How do we read these questions? (This is just to introduce some ideas, it is not really substantially important)

- Each at a time: the Tortoise knows the answer to the first question. The subsequent ones built on it to explain the Tortoise's surprise:

  1) So you've got to the end of our race course even though it does consist of an infinite series of distances?

  2) So you've got to the end of our race course even though it does consist of an infinite series of distances and I thought some wiseacre or other had proved that the thing couldn't be done?

- As a complex question: we treat the 1st and 2nd question marks as commas (essentially, we read 2).

Presuppositions and questions

- The range of possible answers to a question in a given context is given by the content of the question and its interaction with the presuppositions working in the context.
- The Tortoise's questions can only be answered as yes/no questions.
- The first question on its own could be answered both ways.
- Supplemented by 2nd question, it could also be answered both ways (as far as we know).
- Supplemented by the 2nd and 3rd questions, it can *only* be answered negatively.

The puzzle arises

- But the answer to the question was positive! Achilles *did* arrive at the goal.
- This is a case of presupposition failure in an interrogative context.
  - It is not catastrophic! (see Yablo 2006)
    - Is it ever catastrophic in an interrogative context? The point of making a question is to raise a problem for the listener/reader/consumer/answerer (to make the question arise for them).
- The question actually suggests a way forward.

A piece of reasoning in the background

- What is suggested here is a sort of *reductio* argument:

  1) If it is impossible to X, then not X. (principle)

  2) It is impossible to X (presupposition)

  3) Not X (MP, 1, 2)

  4) X (from observation)

  5) $\perp$ (contradiction, 3, 4)

  6) Not (it is impossible to X) (by reductio, 2, 5)

Is this the Tortoise's reasoning?

- I think it is *at least* suggested.
- If so, it is the first inkling that the Tortoise is not really in the position of someone who, as she says later, 'accepts the premises but fails to accept the conclusion'. But I am getting ahead of myself.

Moving forward

- Now, Achilles picks up on the fact that the presupposition that there was an impossibility proof against him completing his task is faulty:

  It can be done, it has been done! Solvitur ambulando. You see the distances were constantly diminishing, and so—

- The Tortoise then does a move that is very neat:

  But if they had been constantly increasing? How then?

Why this is neat

- I think any competent language speaker could have made the question the Tortoise asks—Achilles simply accepts the appropriateness of the question, and so do we.
- But *why* is it appropriate?
- *Inferentialism*: Because of the inferential profile of the concept of 'diminishing' that Achilles used: that X diminishes is incompatible with X increasing.
- The point is that the Tortoise has *reasoned into the question*.

The strategy

1) If there are cases incompatible with F, G
2) (Suppose) there are cases incompatible with F
3) G

(Now, we are sort of reasoning backwards (from 2, and 3 we get 1 by →Intro))

This is the Tortoise's strategy: if there are cases where there is an increasing series in a relevant way, then there are tasks that can't be completed. And by showing that there are such cases, she can show that certain tasks can't be completed.

The reasoning into the question

- In case C, F — *In this case, it diminishes (Achilles' observation)*
- In case C, F v -F — *In this case, it diminishes or increases*
- In case C, if -F, then ? — *What would happen if in this case it had increased?*
- In some other case C', if -F, then ? — *What would happen if in some other case, it had increased?*

Question building

- *Blanks*
  Certain semantic structures (questions) contain ‘blanks’, which build questions. Blanks are typed. ‘Then ?’ is a typed blank $\__{then}$.
- *Abstraction rule for questions*
  Every point or branch or set of points or branches in a semantic structure S can be turned into the focus of a question. (We get questions from an arbitrary structure by *blanking* and focusing on part of it)

  {R, {a, b}} → {_, {a, b}}, {R, {a, _}}, {_, {_, _}}, {R, _}, {_}, and so on
- *Embedding rule for questions*
  Every semantic structure s can be embedded into a question.
- *Replacement*
  In a semantic structure, if there is a rule R that allows it, a node n can be replaced by some other node n’.

The reasoning reconstructed as question building

- {In case, {C, F}} *('In case' works as a binder/quantifier)*
- {In case, {C, $\_{Fv}\_$}} *(we ask about the alternatives to F)*
- {In case, {C, -F}} *(applying some replacement rule based on the inferential profile of F)*
- {{In case, {C, -F}, $\_{then}$} *(embed into an if-then question)*
- {{In case, {_, -F}}, $\_{then}$} *(blank the case; this motivates relaxing the binder)*
- {-F, $\_{then}$} *(applying some replacement rule based on the inferential profile of 'In case')*

Is this inferential?

- So we are building questions out of sentences/propositions.
- Is this a kind of inference? Wisniezcki (1998) would maybe say that this is a case of *erotetic* inference (the formalism is different however).
- More generally, we can think of these a sequences of rule-based transitions between attitudes
  - Should the attitude be one of belief? I don't think so.
- But in any case, we can *only* make sense of the Tortoise's strategy if they had reasoned along similar lines.

What the Tortoise proposes

- At this point in the dialogue, the Tortoise presents Achilles with the challenge.
- Suppose someone considers premises of the form {A, A→B} but does not accept that B. Can we make them accept it by coming to believe more premises?
- Maybe (A & A→B) → B?
- Not sufficient. The problem reiterates *ad infinitum*.
- Achilles never stops adding more premises.

What Achilles should have asked the Tortoise

– Well, now you tell me to suppose that you are the sort of person who would accept the premises but fail to accept the conclusion, right?

– That is correct, dear Achilles.

– And you mean to tell me that this is an instance of the problem you raised before? Which meant that the task couldn't be completed?

– Yes, exactly.

– Well, now suppose that I am the kind of person who would accept your description of the case, but who won't accept that this means that the task couldn't be completed. How could you make me accept that?

– Well, you need to accept that if it is an instance of the problem, then the task couldn't be completed.

– Can you write that down for me, dear Tortoise? Let me give you my notebook and pen...

The generality problem

- Besson (2019) raises the following problem: in order to apply a rule of inference, one may seem to need to recognize that the premises at hand can be taken as instances of what the rule of inference applies to. But then, every rule of inference requires universal instantiation for its use, leading to rule-circularity.
- Their response to the challenge: actually, it is not inference, but non-inferential pattern recognition.
- I think one can put pressure on the boundary between inferential and non-inferential processes. It is not clear to me that inference couldn't go through pattern recognition.
  - Maybe I am too much of an empiricist?

Ellipses

- We feel reasonably entitled to cut the conversation between the Tortoise and Achilles short.
- Strictly speaking, the process goes on ad infinitum.
- In the dialogue we use ellipses—a strategy that Carroll also uses implicitly (besides a convenient time skip).
- The significance is that we know that the argument recurs, and that the process will go on in the same way. This, however, is subject to worries related to rule-following skepticism (Kripke 1982)

The upshot

- That the Tortoise could fall prey to the same worries as Achilles is not surprising: the worry is real for us as well.
- The real upshot has to do with the kind of inferences that the problem applies to, and where we should place them.
- It also arises for at least some forms of reasoning that are supported in non-assertoric formats: here, inquisitive, but perhaps others as well.
- It seems as if our *logica utens* or *folk logic* has an ineliminable inquisitive/erotetic component.
- But the problem generalises: it seems that there is such a component at a level that applies to both folk and scientific logic (and at logical and metalogical levels).
  - It is a worry about general logical competence.

Thanks!

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