Vicious cycles and questions without answers

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Abstract

We provide a framework, which explains how vicious cycles can thrive inspite of some of us rejecting them. Then, as a corollary, we show how easily one can escape them. Keywords: Conclusion, Habit, Question, Symptom, Vicious cycle.

1 Introduction

Agents live in a nature that contains atoms in form of *questions*. If an agent claims to understand a question, they form a *conclusion*. (Thus, in common language, a conclusion is a question with an answer.) If an agent holds a *forced* conclusion, with respect to the given nature, then this nature signals low utility, through a *symptom*.[1] [2]

The practical gain of this construction is as follows: an agent's conclusion usually feels true to them; indeed, this is why they hold a conclusion, and there can be one or more arguments supporting a conclusion (although none is necessary) but at the same time they might contradict the given nature. Even if an agent likes their conclusion, if it is forced, then utility should be low. This is why we at this stage do not define the utility on the set of conclusions, but on the set of symptoms of conclusions. A symptom of low utility is inevitably percieved by the agent, so message sent is message received. But perhaps the message is misconcieved.

For example, suppose that our agent asks the question: does an agent have a utility function? If they have come to the (forced) conclusion that there is no

[1] We assume here that an agent cannot choose which nature they live in, but it is a given to them. Any thoughts, beliefs, intentions, actions, etc takes place in this one given nature. In a sense nature is bigger than the agent, and its rules (if any) are beyond their immediate control.

[2] We were about to introduce some notation, such as: if an agent experiences a *symptom* S_C to a forced conclusion C, then this has low utility, and we write $U(S_C) < 0$. However, all proofs of results in this note turn out to be immediate by axiom, so we decided to note have any extra notation. In the spirit of "Reverse mathematics", we seek to optimize the axioms so that results and proofs become as simple as possible.

utility function, then the utility should be low. So, in particular, nature provides a signal to an agent, if they contradict fundamental axioms. A particularly interesting situation is as follows.

Theorem 1. *If an agent holds a forced conclusion with respect to a symptom, then their nature signals a symptom of low utility.*

Proof. It is immediate by axiom that there is a symptom of low utility to any forced conclusion, so in particular if the the forced conclusion concerns a symptom, then this should be signalled by a symptom of low utility. (Notice, that the firstly mentioned symptom may or may not be the same as the second, and the conclusions may be different, but it does not affect the result.) □

Note that if a conclusion is forced, the agent might hold onto it inspite of it providing an invalid answer to the underlying question.[3] But the good news is that nature never ceases in their attempts to inform the agent. The agent will keep receiving messages, until they realize the amount unnecesary effort spent, and abandons (foor good) any forced conclusion. Their own nature is their sovereign teacher in this sense.

2 Vicious cycles

If an agent reinforces a forced conclusion, then they are caught in a *vicious cycle*. In other words, this is the case when nature gives a signal of low utility, but the agent does not abandon their forced conclusion. Hence, by axiom, they should experience a repeated symptom (and where the low utility signal is triggered again for the same reason the second time as the first). If on the other hand the agent abandons their forced conclusion, then, by axiom, they would not experience the symptom of holding a contradictory conclusion (at least not for the same reason as before). In this way, an agent can avoid to reinforce a vicious cycle. Obviously, since agents have a preference order where they dislike low utility, then they also prefer not to be caught in a vicious cycle (hence the name).

Observe however that agants may like their conclusions disregarded of them being valid or not. Thus, the importance of symptoms, and it motivates that utility is defined on symptoms (rather than conclusions). When agents learn to identify the symptoms with the underlying questions that they are (recall the atoms are questions), then fewer symptoms are triggered, and hence the agent will experience fewer signals of low utility.

We say that an agent *holds onto a forced conclusion* if they hold a forced conclusion on a symptom of a forced conclusion.

[3] A common forced conclusion with respect to 'back problems', is that individual muscles need to be strenghtened, stretched and/or relaxed. In the spirit of this note, such a conclusion is forced, unless it is consistent with nature's axioms, but we argue that many symptoms are better explained when people are not conceptualized into parts. This is understood by many "Alexander teachers" and other practiotioners, but probably still misconcieved by the vast majority of the population (and practitioners).

Theorem 2. *An agent is caught in a vicious cycle if and only if they hold onto a forced conclusion. In particular, if they hold no conclusion at all on a symptom, then they are not caught in a vicious cycle.*

Proof. The 'if' direction is clear by definition. For the 'only if', if there is no symptom, there is nothing to prove, so suppose there is a symptom, but they do not hold a forced conclusion on the symptom. Then, by definition, there is no vicious cycle. Nature does not signal low utility to a question without an answer, so if an agent gives up their conclusion on the given question, and instead ponder upon atomic questions, then the vicious cycle is broken. □

There is 'no' mathematics in these proofs. We only need to use the most elementary logic (or even no logic at all). On the other hand when real people get caught in real vicious cycles, they sometimes tend to hold many arguments to justify their positions. This reflects one of the main points with this research note. The way out of vicious cycles does only require very elementary skills. But to force a vicious cycle running against better evidence takes a lot of effort, argumentation and hard work, and moreover, the arguments cannot be consistent with nature, at least not if nature includes/follows above axioms.

If an agent tries to remove a symptom with brute force, or otherwise, whether they succed or not, there will be a new symptom, unless they also abandon their forced conclusion. But, if the symptom is removed, then the reason to abandon the forced conclusion also dissapeared. This follows since the utility function takes the symptom as input (and not the forced conclusion). If the low utility message is removed, then there is less information, and less guidance in learning which conclusions are forced. We state this as a corollary, but it is really direct by axiom.

Corollary 3. *If a symptom is removed (without abandoning the forced conclusion) then there will be a new symptom of the forced conclusion.*

Proof. Given the nature as described, this is immediate from axiom. □

The low utility symptoms provide agents the motivation to learn. The reward is not only increased utility, but if they are succesful, they most likely will also develop a new and more sensitive utility function, which can take as input, not only symptoms of forced conclusions, but more instantaneously testing their conclusions consistency, becuse they do no longer habitually try to separate nature into parts, but instead experience more of their full nature all at once.

3 Open questions

If nature functions any other way, then described in this note, or if the symptom concerns something else than a forced conclusion, then the Corollary 3 does not hold (and is not applicable). But, recall, each symptom is a messenger of something: there is a question. Sometimes it is better to leave this question

without an answer, and other times it is important to find a (quick) answer. The point is that we can learn to distinguish symptoms of various kinds. If the utility signal is low, and we feel familiar with the situation, then (before taking any other action) we may ask: this is a symptom of what? For example, in case it is a symptom of "trying to" understand a given symptom, then obviously it is much better not to understand at all.

A converse of Theorem 1 holds.

Theorem 4. *If an agent does not hold any forced conclusion on a given symptom, then nature does not signal with a symptom of low utility.*

Proof. This result is a rewording of the axioms. □

Note that nature might signal low utility for other reasons, but not for the given reason of a symptom to a forced conclusion, and note again that there is nothing to prove. Hence, this research note is "mathematically empty", and this is a good thing in this case. If results of this kind were not immediate (by axiom), then they were too complicated, and probably not so useful, at least not for real agents in a real world.

4 Habits

Habits usually serve as energy savers, and an agent mostly closes questions without generating symptoms. Usually when habits are formed, they benefit the agent. Here, we choose atoms as questions, rather than perhaps "knowledge" or "belief". The reason for this is that the latter terms are often used in very different context (see for example the classical the work of R. Aumann and D. Samet on "Common knowledge" and "Agreeing to Disagree"). When questions are closed, they come with an answer, and in either way the concusion is regarded by an agent as 'knowledge' (the truth), but if the closure is signalled with low utility then the truth value should be reconsidered. However, mostly the agent have forgotten the origin of various conclusions, because this is the idea of *habits*: we do not need to conceptualize them in any way (once they are learned), because they are and should be automatic. In fact, only, when/if they turn hurtful, it is time to unlearn, and return to the roots, but this does not take hard work. Any forced conclusion is forced because they contradict a self-evident nature in a way, so this is the good news. However habits are often persistent, because usually they have been practiced for many years, so the untangeling can last some time, even though the method out is beautifully simple and direct.

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