

Towards a formalization of Lewis' context-dependent notion of knowledge in Dynamic Epistemic Knowledge

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In his 1996 paper (Australasian J. of Philosophy, Vol. 74, pp. 549-567) David Lewis discusses a context-dependent notion of knowledge. It is only when we consider claims of knowledge within a context that knowledge analysed within a possible worlds framework makes sense. His treatment is semi-formal, however, he suggests that his views can be rendered formally. In this paper we accept the challenge of formalizing Lewis' notion of knowledge of which this paper is the first step.

A traditional definition of knowledge runs as follows:

- (1) S knows that p if and only if S has eliminated all possibilities where not- p .

Either we interpret this definition in its strictest sense, *i.e.*, we consider *all* possibilities imaginable, which has the unfavorable consequence that we are rid of all *everyday* knowledge that we normally suppose we have. Or, we relax the interpretation and admit that we are mere fallibilists, allowing that we cannot possibly eliminate all possibilities where not- p , ridding the word 'knowledge' of its content.

In order to sidestep these problems David Lewis adds a *proviso* to the above definition, making knowledge a context-dependent notion:

- (2) S knows that p if and only if S has eliminated all possibilities where not- p – Psst! – except for those possibilities that we are properly ignoring.

By introducing a set of rules he aims to determine exactly which possibilities are relevant and which ones we can properly ignore.

There are seven rules in total of which there are three rules, or prohibitions, which tell us which possibilities cannot be properly ignored and four which tell us which ones can be properly ignored.

Rule of Actuality: The possibility of the actual world obtaining can never be ignored

Rule of Belief: If an agent believes a possibility to hold then this possibility is relevant.

Rule of Resemblance: If two possibilities are resembling each other in a salient way and one is relevant, then so is the other.

Rule of Reliability: Processes like perception and memory can be taken for granted, we can suppose that they work.

Rule of Method I: If a sample is taken we can ignore the possibility that it is not representative.

Rule of Method II: We can take the best explanation of our evidence to be the true explanation.

Rule of Conservatism: If those around ignore certain possibilities and this is common knowledge, then these generally ignored possibilities may properly be ignored.

Rule of Attention: If a possibility that not- p is not ignored, then it means just that, it is attended to and serves as a counter-example to the claim that p . Accordingly, the same holds if a possibility is ignored.

Some of these rules have a dynamic character. For instance, by the Rule of Attention the context potentially grows by bringing certain possibilities to the attention which were ignored before.

A cat owner claiming that he knows that his cat is not in his study may do rightly so after convincing himself by looking around in his study without opening the drawers; he has eliminated all relevant alternatives. If a conversation partner now utters the statement 'But what if Possum is hiding in the drawer?', this knowledge becomes defeated as new possibilities have to be included by the Rule of Attention. The reader familiar with logics of public announcement and update will feel that this reminds of the changes of an epistemic model in Dynamic Epistemic Logic (DEL). We intend to explore this intuitive connection by providing a formalization for Lewis' Elusive Knowledge in the style of DEL.

The natural formalizations of some of Lewis' rules (Rule of Reliability, Rule of Conservatism) would create serious problems to a formal system if applied literally. One consequence of this is that a formalization of his set of rules with the goal of implementing an artificial system that evaluates its knowledge claims according to Lewisian epistemic theory will be difficult if not impossible. We therefore aim at the much simpler task of a descriptive theory of knowledge in communication exchanges. We fix a concrete communication situation with a fixed finite set of agents and the complete transcript of their communication. The aim is to provide a background theory describing the epistemic states of the agents in a Lewisian model at each state, evaluating the epistemic statements the agents make.