Realistic common knowledge
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The common knowledge of an event among a group, introduced by David Lewis, originally aimed at explaining precisely the public nature of the event. Its formalization, first in a game theoretic then in an epistemic logic framework, lead to some definitions and technical developments which are now considered as fundamental. Yet these formal definitions generated two main criticisms blaming them for the idealized cognitive capacities they demand and their epistemic unlikelihood in the name of a faillibilist principle. The common technical answers turned to fixed point definitions and approximated version of common knowledge, which are perfectly founded on a normative point of view but seem to lack descriptive accuracy. In other words, the intuitive basis of common knowledge seems to have disappeared because of the priority of the formal point of view. For one who worries about the adequate description of the epistemic state a group is in when an event is public among its members, the multiple formal definitions offer no clear choice.

We propose to reconcile the analytical and formal trends by going back to Lewis' initial characterization, the closest to a "realistic" human common knowledge. Lewis uses formulations based on "reason to believe" where the common view speaks of effective beliefs or knowledge. But even the careful interpreters of Lewis' view posits that formal common knowledge is what only some ideal and cognitively unlimited versions of human being could attain. A "reason to believe" would be a proof fitting into a deductive system that weak normal human beings cannot cover. In consequence, there would be a gap between formal and informal versions of common knowledge: a common knowledge situation will hold when imaginary perfect reasoners could deduce formal common knowledge from it. So in this interpretation, nothing is said about the epistemic status of the real individuals implied in the situation.

But Lewis explicitly considers reason to believe as deductive or inductive. We'll focus, as he does, on the inductive aspect in taking a "reason to believe" only as a good reason instead of a logical justification - which is a heterodox position. From this point, a faithful formalization of Lewis' common knowledge can be obtained by using probabilistic degrees of belief. We'll show this definition is technically weakly equivalent to the classical probabilistic approximations of common knowledge, but that it allows a more accurate description of real epistemic states than they can as it successfully escapes the faillibilist critics in a descriptively adequate way. In con-

clusion, this allows us to reconcile the formalism with the intuition : the former gives a steady basis to the latter, which conceptually justifies it in return.