

## "Coarse Contingencies"

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Consider an agent who must choose an action today under uncertainty about the consequence of any chosen action but without having in mind a complete list of all the contingencies that could influence outcomes. She conceives of some relevant (subjective) contingencies or states of the world but she is aware that these contingencies are coarse — they leave out some details that may affect outcomes. Though she may not be able to describe these finer details, she is aware that they exist and this may affect her behavior. How does one model such an agent?

The standard Savage framework, based on a primitive state space, is inappropriate for two reasons. First, in the Savage model each state is a complete description of the world — it determines a unique outcome for any chosen action. Second, even if we knew how to model a "coarse or incomplete state" and we redefined the Savage state space accordingly, the resulting approach would still be unsatisfactory if, as in Savage, the state space is adopted as a primitive. In that case, the state space is presumed observable by the modeler, an assumption that is all the more problematic when states are coarse. Ideally, the agent's conceptualization of the future should be subjective — it should be derived from preference.

Kreps (1979, 1992) and Dekel, Lipman and Rustichini (2001) have rendered the state space subjective, thus addressing the second concern. However, we argue in this paper that their models do not capture coarse perceptions. We focus primarily on the model of Dekel, Lipman and Rustichini. They describe (p. 893) the agent they are modeling: "...she sees some relevant considerations, but knows there may be others that she cannot specify. For simplicity, we assume henceforth that the agent conceives of only one situation, 'something happens,' but knows that her conceptualization is incomplete." Though they frequently refer to "unforeseen contingencies", it seems that, at least in part, they have in mind what we prefer to call "coarse contingencies." Later (pp. 919-20), they describe what is needed for a critique of their model: "... just as Ellsberg identified the role of the sure-thing-principle in precluding uncertainty-averse behavior, we believe that one must find a concrete example of behavior that is a sensible response to unforeseen contingencies but that is precluded by our axioms. An important direction for further research is to see if there is such an Ellsbergian example for this setting and, if so, to explore relaxations of our axioms." This is the direction we pursue here.