

# MSc thesis defense presentation

## Christos Moyzes defends his MSc thesis

<b>Date:</b>	Tuesday, 29 Jul 2014
<b>Thesis title:</b>	<a href="#">Variants of Stalnaker Stable Belief Sets</a>
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### Thesis abstract

Stable belief sets were introduced by R. Stalnaker in the early '80s, as a formal representation of the epistemic state for an ideal introspective agent. This notion motivated Moore's autoepistemic logic and greatly influenced modal nonmonotonic reasoning. Stalnaker stable sets possess an undoubtedly simple and intuitive definition and can be elegantly characterized in terms of S5 universal models or KD45 situations. However, they do model an extremely perfect introspective reasoner and suffer from a KR version of the logical omniscience problem. We vary the context rules underlying the positive and/or negative introspection conditions in the original definition of R. Stalnaker, to obtain variant notions of a stable epistemic state, which appear to be more plausible under the epistemic viewpoint. For these alternative notions of stable belief set, we obtain representation theorems using possible world models with non-normal (impossible) worlds and neighborhood modal models. En route, we identify some modal axioms which appear to be of some interest in KR and develop the proof theory of some regular and classical modal logics with a notion of strong provability. This stream of research resembles the questions posed and (partly) settled in classical (monotonic) epistemic reasoning about logical omniscience, now examined under the perspective of Knowledge Representation. Additionally we investigate the minimal knowledge approach of Halpern-Moses 'only knowing' in the context of the aforementioned syntactic variants. The 'only knowing' approach of J. Halpern and Y. Moses provides equivalent characterizations of 'honest' formulas and characterizes the epistemic state of an agent that has been told only a finite number of facts. The formal account of what it means for an agent to 'only know  $\alpha$ ' is actually based on 'minimal' epistemic states and is closely related to ground modal non-monotonic logics. We examine here the behaviour of the HM-'only knowing' approach in the realm of our weaker variants of stable epistemic states. We define the 'honest' formulas - formulas which can be meaningfully 'only known' - and characterize them in several ways, including model-theoretic characterizations using impossible worlds. As expected, the generalized 'only knowing' approach lacks the simplicity and elegance shared by the approaches based on Stalnaker's but it is more realistic and can be handily fine-tuned.