Artificial Intelligence 174 (2010) 1339–1368

Double preference relations for generalised belief change .

Richard Booth [a,1], Samir Chopra[b], Thomas Meyer[c,*], Aditya Ghose [d]

[a] University of Luxembourg, Luxembourg

[b] Dept. of Philosophy, Brooklyn College of CUNY, Brooklyn, New York, USA

[c] Meraka Insitute, CSIR, and School of Computer Science, University of Kwazulu-Natal, South Africa

[d] School of Computer Science and Software Engineering, University of Wollongong, Wollongong, Australia

[*] Corresponding author

e-mail addresses: richard.booth@uni.lu (R. Booth), schopra@sci.brooklyn.cuny.edu (S. Chopra), tommie.meyer@meraka.org.za (T. Meyer), aditya@uow.edu.au (A. Ghose)

[1] Also affiliated to Mahasarakham University, Thailand, as Adjunct Lecturer.

ABSTRACT

Many belief change formalisms employ plausibility orderings over the set of possible worlds to determine how the beliefs of an agent ought to be modified after the receipt of a new epistemic input. While most such possible world semantics rely on a single ordering, we investigate the use of an additional preference ordering—representing, for instance, the epistemic context the agent finds itself in—to guide the process of belief change. We show that the resultant formalism provides a unifying semantics for a wide variety of belief change operators. By varying the conditions placed on the second ordering, different families of known belief change operators can be captured, including AGM belief contraction and revision, Rott and Pagnucco's severe withdrawal, the systematic withdrawal of Meyer et al., as well as the linear liberation and σ-liberation operators of Booth et al. Our approach also identifies novel classes of belief change operators worthy of further investigation.