

# If Rescher were mistaken about counterfactuals, his theory of counterfactual reasoning might not be in need of improvement.

Hans Lycke

Centre for Logic and Philosophy of Science  
Universiteit Gent, Belgium  
Hans.Lycke@Ugent.be

*Rescher's Account of Counterfactuals.* Two basic presuppositions lie at the root of Rescher's theory of counterfactuals, as presented in [5]. The first presupposition is that counterfactual conditionals are the result of a reasoning process that started from a belief-contravening hypothesis. The second presupposition is that a counterfactual conditional  $cf(C/H)$  — if  $H$  were the case, then  $C$  would be the case as well — is explicated adequately when the following four conditions are met:

- (1)  $H$  must be false,
- (2)  $H$  is not self-contradictory,
- (3)  $cf(C_1/H)$  and  $cf(C_2/H)$  can both be true counterfactuals, but only when  $C_1$  and  $C_2$  are compatible, and
- (4) there should be some “genuine connection” between  $H$  and  $C$ .

*Rescher's Theory of Counterfactual Reasoning.* According to Rescher, the reasoning process that results in a counterfactual conditional  $cf(C/H)$  is adequately captured by the prioritized logic **CSE** (Compatible Subset Entailment):

**Definition 1.**  $cf(C/H)$  iff  $\langle \{H\}, \Gamma_1, \dots, \Gamma_n \rangle \vdash_{\mathbf{CSE}} C$ .

As is clear from the above definition, the logic **CSE** defines a consequence relation  $\Sigma \vdash A$ , with  $\Sigma$  an  $n$ -tuple  $\langle \{H\}, \Gamma_1, \dots, \Gamma_n \rangle$  of sets of closed formulas, such that each  $\Gamma_i$  in  $\Sigma$  has a different preference ranking ( $\Gamma_i$  is preferred over  $\Gamma_{i+1}$ ). A formula  $A$  is a **CSE**-consequence of a premise set  $\Sigma$  iff  $A$  is a **CL**-consequence of all maximal consistent subsets of  $\Sigma$  that all contain  $\{H\}$ .

*Problem with Rescher's Account.* It is easily recognized that not all counterfactual conditionals based on the **CSE**-consequence relation meet the conditions Rescher himself laid down for counterfactual conditionals. Consider e.g. the following example:

*Example 1.*  $cf(q/p)$ , because  $\langle \{p\}, \{-p, q\} \rangle \vdash_{\mathbf{CSE}} q$ .

It is obvious that there is not a “genuine connection” between the counterfactual hypothesis  $p$  and the formula  $q$ , despite the fact that the latter is definitely

a **CSE**-consequence of the former (together with some prioritized background knowledge). In other words, there is no relation of relevance between the counterfactual hypothesis and all of its consequences.

The absence of a “genuine connection” (or relevance) between a counterfactual hypothesis and some of its counterfactual consequences shows us that Rescher is fundamentally mistaken either about counterfactuals or about counterfactual reasoning. I take it that the problem is to be situated within Rescher’s theory of counterfactual reasoning and suppose that his account of counterfactuals is more or less adequate.

*Proposed Solution.* In this talk, I will show that Rescher’s theory of counterfactual reasoning can be improved by replacing the logic **CSE** by the adaptive (modal) logic **CfR**.

## References

1. Diderik Batens. Towards the unification of inconsistency handling mechanisms. *Logic and Logical Philosophy*, 8:5–31, 2000. Appeared 2002.
2. Diderik Batens. A strengthening of the Rescher–Manor consequence relations. *Logique et Analyse*, To appear.
3. Salem Benferhat, Didier Dubois, and Henri Prade. Some syntactic approaches to the handling of inconsistent knowledge bases: A comparative study. Part 1: The flat case. *Studia Logica*, 58:17–45, 1997.
4. Salem Benferhat, Didier Dubois, and Henri Prade. Some syntactic approaches to the handling of inconsistent knowledge bases: A comparative study. Part 2: The prioritized case. In Ewa Orłowska, editor, *Logic at Work. Essays Dedicated to the Memory of Helena Rasiowa*, pages 473–511. Physica Verlag (Springer), Heidelberg, New York, 1999.
5. Nicholas Rescher. *Hypothetical Reasoning*. North–Holland, Amsterdam, 1964.
6. Nicholas Rescher. *Conditionals*. MIT Press, Cambridge MA, 2005.
7. Nicholas Rescher and Ruth Manor. On inference from inconsistent premises. *Theory and Decision*, 1:179–217, 1970.
8. Liza Verhoeven. Proof theories for some prioritized consequence relations. *Logique et Analyse*, 183–184:325–344, 2003. Appeared 2005.