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**Article (Accepted version)
(Refereed)**

Original citation:

Bradley, Richard (2017) *Supporters and underminers: reply to Chandler*. [Mind](#), 126 (502). pp. 603-608. ISSN 0026-4423

DOI: [10.1093/mind/fzw003](https://doi.org/10.1093/mind/fzw003)

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Available in LSE Research Online: July 2017

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SUPPORTERS AND UNDERMINERS: REPLY TO CHANDLER

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In ‘A Defence of the Ramsey Test’, I argued that the triviality results for the Ramsey Test hypothesis were misdirected and that we should instead reject one or more of the premises of these results. The Preservation condition, in particular, seemed doubtful to me and I offered two arguments for rejecting it; one which relied on a commutativity condition for belief revision and the other on a general version of Modus Ponens. In his discussion paper Chandler contests the significance of these results, though not the broader argument in favour of the Ramsey Test hypothesis. Since I concur that neither the commutativity condition nor Modus Ponens are incontestable and Chandler does not, I think, deny the need to restrict Preservation condition, I won’t have much to say about this part of his paper. Instead I will focus my remarks on the more positive parts of his paper and on the general issue of the suitability of the AGM framework for modelling defeasible reasoning.

1. Belief Preservation

In my reply to Brian Hill’s (2011) earlier critical notice, I argued that we do not want a version of the Preservation condition that forces us to retain beliefs that have been undermined by what we have learnt. If I initially believe that *B* but my reasons for doing so are undermined by learning that *A*, I should be free to give up my belief in *B* even if my belief together with *A*, do not logically entail the falsity of *B*. Suppose, for instance, that I measure the temperature of a glass of water using a thermometer and, as a result, come to believe that it is 15 degrees Celsius, but that I am subsequently told that the thermometer has not been functioning correctly for some time. I should be free to abandon my belief about the temperature of the water even if I did not explicitly hold the prior belief that the thermometer was functioning correctly. For I cannot reasonably be expected to anticipate all the things that I might learn that would undermine my current belief were I to learn that they were true. But this is precisely what the unrestricted Preservation condition requires.

The phenomenon of belief undermining speaks in favour of the Acceptance interpretation of the AGM model and against the Informational interpretation. On the Acceptance interpretation, an epistemic state is just the set of propositions that the agent accepts, perhaps because they are sufficiently credible or because they constitute working hypotheses or

because they are central to her plans. On the Informational interpretation, on the other hand, the agent's epistemic state is the set of propositions or sentences that the agent knows to be true or is certain about. This latter interpretation leaves little room for the possibility of learning something that undermines one's beliefs, restricting it to cases in which one learns something that contradicts what one believes (which should be a rare event if one's beliefs are certainties).

On the Informational interpretation, beliefs should be preserved unless contradicted, precisely because they are certainties. On the Acceptance interpretation, on the other hand, the motivation for preserving beliefs is an economic one. The thought is that it is costly to acquire beliefs and that consequently we should not give them up without good reason. Learning something inconsistent with what one believes is clearly such a reason, but so too is learning something that undermines what one currently believes; for instance by casting doubt on evidence which supports a particular belief. So the Acceptance interpretation would mandate weakening the Preservation condition to require that upon learning something I should retain any current beliefs not undermined by what I have learnt. In this spirit, let us say that a belief B is stable under revision by some proposition A of the belief set in which it is contained, just in case A does not undermine B . Then the principle I proposed can be formulated as:

(Stable Belief Preservation) Suppose that $B \in K$, $\neg A \notin K$ and A does not undermine B in K . Then $B \in K * A$.

This formulation was vague on the question of what it takes for one belief to undermine another. Intentionally so, because although a belief being inconsistent with another is surely sufficient for it to undermine it, there seems to be no consensus amongst epistemologists as to how to characterise this undermining relation more precisely. I did however argue that conditionals could be undermined by acceptance of a proposition that was inconsistent with its antecedent and, on that basis, tentatively suggested something close to what Chandler labels PRES₂^{*}.

Chandler argues that PRES₂^{*} is too strong, offering both a counterexample and a technical result to support this claim (Observation 6). Chandler's counterexample is intuitively compelling but assumes a concept of defeasibility that I find doubtful (more on this later).¹

¹ Chandler supposes (i) agnosticism on the truth of factual propositions A , B , C and D , (ii) that A is a 'sufficient but defeasible reason' to believe B and (iii) that $B \in K * A$. But from (i) and (iii) it follows by VAC₀ and INC₀ that $B \in Cn(K \cup \{A\})$. And this, in my view, contradicts (ii) since A cannot be a defeasible reason to believe B given K , when they jointly imply it. But B is a non-defeasible reason to believe D , so C cannot undercut D as his example presumes.

Nonetheless I think Chandler is right to say that $PRES_2^*$ is too strong. Here is an alternative counter-example to it that also serves to illustrate his technical result. Suppose that of the horses running this afternoon, I consider only Speedy, Steady and Plodder to be potential winners. So I believe that if Steady is not going to win, then Plodder will win if Speedy (for some reason) does not. I then learn that Plodder has been disqualified. Should I continue to believe that if Steady doesn't win, then Plodder will if Speedy doesn't? Of course not, for I now know that Plodder can't win under any circumstances. But $PRES_2^*$ licenses preserving this belief since Plodder's disqualification is logically consistent with the supposition that Speedy won't win. So what $PRES_2^*$ fails to pick up is that the disqualification undermines my belief that Plodder will win if Speedy does not. The upshot is that $PRES_2^*$ is not the right way to make Stable Belief Preservation more precise.

2. Defeasible Reasoning

One belief undermines another, Chandler suggests, if, having committed to the truth of the latter, the supposition that the former is true leads to this commitment disappearing. More formally, he postulates that $A \triangleright B \in K \Leftrightarrow B \notin (K * B) * A$, where $A \triangleright B$ reads as 'A is an underminer for B'. For our purposes however it is more natural to treat undermining as a relation between beliefs within a particular belief set (thus as a ternary relation on belief sets a pairs of sentences contained in them). So, in the spirit of Chandler's proposal, I suggest the following characterisation of belief undermining:

(Undermining) If $\neg A \notin K$, then A undermines B in K iff $B \notin (K * B) * A$

Note the restriction to cases in which $\neg A$ does not belong to K . This is required because when $\neg A$ does belong to K , revision by A undermines K as a whole rather than B alone.

Undermining, so characterised, may reasonably regarded as the opposite side of the same coin to Stable Belief Preservation. While the latter attempts to constrain belief preservation by drawing on an unspecified notion of undermining, Undermining draws on an unspecified belief revision operation to characterise the notion of belief undermining. Jointly they give us what I think we should regard as a basic principle (even platitude) relating conservative belief revision to defeasible reasoning:

(DEF) If $\neg A \notin K$ and $B \in K$, then $B \in K * A$ iff A does not undermine B in K

How far does this take us? One might hope that, together with the AGM postulates, it will give us the precise characterisation of undermining required, and hence of the restriction that should be imposed on Preservation. But alas not, for VAC_0 robs Undermining of its interest. When A is consistent with K and B is in K , VAC_0 implies that $B \in K * A$. So A can undermine

beliefs in K only when A is inconsistent with K . It follows that if DEF is to serve as a regulative principle of defeasible reasoning then VAC must be given up, even for factual sentences. And without VAC the vagueness in Stable Belief Preservation remains.

Defeasible reasoning is ampliative: it produces conclusions that are not deductive consequences of the propositions we accept. For instance when we infer properties of a population from that of a sample, or infer a universal generalisation on the basis of a finite number of observed instances of it, we add content to our beliefs beyond that contained in what we have observed. Amplification is just the flip-side of undermining. In cases of the former we take on beliefs not logically entailed by those already accepted, in cases of the latter we give up beliefs that are logically consistent with those we accept. A theory of defeasible reasoning should allow for both.

In the final section of his critical notice, Chandler makes a suggestion in this regard that I find helpful. Amplification has its source in the possibility of a belief being supported by one or more other beliefs, even when the latter don't entail the former, i.e. of one or more beliefs being a non-deductive reason to accept another. Chandler proposes that the belief that A is a reason to believe that B just in case, having withdrawn commitment to B , the supposition that A leads to the adoption of the belief in B . In this spirit, but again treating it as a relation between beliefs and a belief set, we can say:

(Supporting) A supports B in K iff $B \in (K \dot{-} B) * A$

The relation of supporting, so defined, is in tension with INC. For INC says that if you accept B upon revising your beliefs by A , then B must be a logical consequence of A together with your initial set of beliefs. So if your newly accepted belief B is not a deductive consequence of your other beliefs, it must have been obtained by reasoning that violates INC. So it seems that *just as the mark of undermining is the failure of VAC, the mark of amplification is the failure of INC.*²

Let's take stock. I think we should take both Undermining and Supporting as regulative of a theory that links defeasible reasoning and belief revision. Different candidates for such a theory will be more or less conservative in the degree to which they allow for beliefs to be adopted and rejected. In an Anglo-Saxon 'hire and fire' model of belief revision, beliefs will be readily accepted, and equally readily dispensed with, as experience or deliberation produces reasons for and against them. In a more Continental model, the barriers to entry into

² Levi (1996) makes a similar point and backs it up with a good deal more detailed analysis than I can give here.

a belief set will be higher and those that are already in it correspondingly more entrenched. These differences will be reflected in the balance that the models strike between the need to accept truths and to reject falsehoods, a balance achieved by calibrating the conditions on belief revision, and in particular those for belief inclusion and exclusion, to the adopted consequence relation.

The combination of a supra-classical consequence relation together with INC and VAC presented in Gärdenfors (1988) gives a system of reasoning that is more of the Continental than Anglo-Saxon variety. What we have learnt from the debate following my 2007 paper, and in particular from Chandler's contribution, is that this system does not leave enough space for defeasible reasoning. Not just because it is inconsistent with Ramsey Test hypothesis but because it reduces the relations of undermining and support between beliefs to cases of logical inconsistency and logical entailment. The cost of such conservatism is two-fold: restricted opportunities to adopt useful beliefs and the burden of entrenched poor beliefs still awaiting decisive refutation.³

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³ I am grateful to Jake Chandler for his useful comments on an earlier draft.