

Title:

A Parallel Literature: Causation in Medicine

Abstract:

While causation is used and discussed extensively in medicine, the medical and philosophical literatures on the subject rarely intersect. However, there are examples of publications which display uncanny parallels to those in the other discipline.

Rothman, 1976, put forward a notion of causation that became known as the 'sufficient/component cause model' [Greenland, 1995]. In summary, any factor which can be considered causal is at least a necessary component of a group of factors which, acting together, are sufficient to evoke a cause. These groups may have interchangeable components, and a component may be necessary if it is part of all possible groups of cause – Rothman gives the example of 'having an appendix' as a necessary component of all causal groups for appendicitis.

This causal scheme has been influential in medicine, and it deals rather nicely with many problems of applied causation when compared to earlier causal schemes, such as the Koch-Henle postulates, which were based in the 'aetiological standpoint' – that is, a position where disease is defined in terms of its causative entity, rendering the causal pathogen a universal, necessary and sometimes sufficient cause for the disease. Rothman's model is useful not only in conceiving of the causes of multifactorial disease, such as cancer, but also in dealing with the modern concept of host factors in disease. To illustrate, while the aetiological standpoint would have the bacteria *Mycobacterium tuberculosis* as a universal, necessary and sufficient cause of the disease tuberculosis, the sufficient/component model leaves the presence of *Mycobacterium tuberculosis* as an insufficient but necessary part of the cause, requiring other host factors – vaccination status, immune function, appropriate exposure etc. – to achieve sufficiency. This appears to me a much better reflection of causation in clinical medicine.

A feature of the model that has not been previously discussed in the literature is its resemblance to Mackie's INUS (insufficient and non-redundant parts of unnecessary but sufficient causes) conditions. [Mackie, 1974: 62]. Dealing with the "plurality of causes" [Mackie, 1974: 61], Mackie claims that causes are instantiated by the collective action of logical conjunctions of necessary but insufficient constituent factors. The resemblance and temporal proximity of these two models of cause is intriguing, suggesting either some unacknowledged influence of Mackie's ideas on Rothman or, more interestingly, some sort of convergence between disciplines.

In this paper, I therefore propose to introduce both of these schemes of causation and compare them. I will then look at some of the problems faced by Mackie's INUS conditions (for instance, issues of causal priority) and transcribe them into a critique of Rothman's component causes. Finally, I'd like to discuss more generally the implications for philosophy of this parallel literature on causation.

Greenland, S. 1995. "Invited Commentary on 'Causes'," *American Journal of Epidemiology*. **141**: 89.

Mackie, J.L. 1974. *The Cement of the Universe: A Study of Causation*. Oxford: Clarendon Press.

Rothman, K.J. 1976. "Causes," *American Journal of Epidemiology*. **104**: 587–92.
