Mill's Methods[1]

Purpose: Establish *causal connections* between types of events

The Method of Agreement (MoA) (identifying *necessary* factors for x, where x is an effect)

Purpose: show that a factor (or factors) are *necessary* for a certain effect.

"Method of Agreement: where instances of phenomenon *A* are always accompanied with phenomenon *a*, even when other circumstances accompanying *A* are varied, we have reason to believe that *A* and *a* are causally related.[2]"

    (1) Examine instances in which a certain effect occurs. The more *variable* these instances are, the better.
    (2) Try to identify a factor (or combination of factors) that is present in all of those instances.

The method of agreement helps show that a certain factor (or factors) is *necessary* for bringing about a certain effect. One can use the method of agreement to *undermine* a causal link between an effect and some purported cause by showing that sometimes the effect occurs without the factor.

The Method of Difference (MoA) (identifying *sufficient* factors for x, where x is an effect)

Purpose: show that a factor (or factors) are *necessary* for a certain effect.

"Where the only distinguishing feature marking situations in which phenomenon *a* occurs or does not occur is the presence or absence of phenomenon *A*, there is reason to think that *A* is an indispensable part of the cause of *a*.[3]"

    (1)   Compare situations in which a putative causal factor is present to ones in which it isn't. *The more similar these situations are in other respects, the better.*
    (2)   Determine whether there is any difference in the observed effect.

The method of difference helps establish that a certain factor is *sufficient* for bringing about a certain effect.

One can use the method of difference to *undermine* a causal connection by showing that the presence or absence of the factor makes **no difference** to the observed effect.

Upper case letters are possible causes; under case letters are effects.

MoD formalized:[4]

    A B C D occur together with w x y z
    B C D occur together with x y z
    _____

    Therefore A is the cause, or the effect, or a part of the cause of w.

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[1] notes from http://beisecker.faculty.unlv.edu//Courses/Phi-102/Mills_Methods.htm

[2] From https://plato.stanford.edu/entries/mill/, accessed 3/17/23
[3] Ibid
[4] From https://en.wikipedia.org/wiki/Mill%27s_Methods, accessed 3/17/23

Joint method of agreement and difference (weaker than MoD)

"If we have noted, via the Method of Agreement, that in all instances of A, a is present, we can, where possible, systematically withdraw A, to determine whether A is a cause of a by the Method of Difference. Mill terms this the Joint Method of Agreement and Difference.[5]"

Formalized[6]:

> A B C occur together with x y z
> A D E occur together with x v w
> F G occur with y w
> _____
>
> Therefore A is the cause, or the effect, or a part of the cause of x.

Questions:

What about events for which the joint causes differ from the causes they (putatively) generate independently? E.g. A = "I strike a match." B = "I am under water."

More Theories of Causation

Humean Regularity Theory (HRT)
c is a cause of iff
- (i)   c is spatiotemporally contiguous to e,
- (ii)   c precedes e in time, and
- (iii)   all events of type C are followed by an event of type E.

Mill (1843) refined the Humean Regularity Theory of causation

The totality of present positive factors $\{C_{1-n}\}$ and absent negative factors $\{\overline{D}_{1-m}\}$ is a cause of an event e of type E iff

(i) there are events of type $C_1, C_2, \ldots, C_n$ which are spatiotemporally contiguous to e and there are no such events of type $D_1, D_2, \ldots, D_m$,

(ii) the events of type $C_1, C_2, \ldots, C_n$ precede e in time, and

(iii) it is a *law of nature* that an instantiation of all positive factors $\{C_{1-n}\}$ is followed by an instantiation of factor E when none of the negative factors $\{D_{1-m}\}$ is instantiated. [7]

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[5] From https://plato.stanford.edu/entries/mill/, accessed 3/17/23
[6] From https://en.wikipedia.org/wiki/Mill%27s_Methods, accessed 3/17/23
[7] From https://plato.stanford.edu/entries/causation-regularity/, accessed 3/17/23.