

Review of: "Why are there different versions of the COM-B model diagram?"

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Potential competing interests: No potential competing interests to declare.

The purpose of the West and Michie paper is unclear. This paper discusses four slightly differing behaviour change models consisting of four variables. Hughes (2007) published a model that is almost identical to the COM-B four years earlier, but this earlier model remains uncited by the COM-B authors (Michie et al., 2011).

The COM-B follows a tradition of tetradic models in psychology. The same tetradic system can be organized in a large array of different combinations depending on the form of organization and the number of active interconnections. A tetradic system can have up to 12 interconnections between its four nodes and is capable of being organized and reorganized with, in the region of, 355 combinations and permutations of interconnections (Ashby, 1943, p. 1211). If variables and the organization change, then the number of possible tetradic systems, and theories, becomes indefinitely large. For example, with only 50 different variables, the population of unique tetradic theories consists of the product: $50 \times 49 \times 48 \times 47$, which is more than five and a half million.

West and Michie present four out of these five and a half million models. One has to ask, why? The purpose is unclear. West and Michie do not specify the four models in sufficient detail to enable empirical testing. There is vagueness and ambiguity in the use of arrows. They need to specify what all of the different kinds of arrows mean. Does an arrow mean cause and effect, or does it mean correlation? What is the difference between the combination of an arrow pointing in one direction and a second, parallel arrow pointing in the opposite direction, on the one hand, compared to a single arrow with double arrow heads pointing in two directions at once? Are these two cases the same or different? If different, how?

It is recommended that the authors: 1) Explain the purpose of the article; 2) Explain the relationship between the COM-B and the Hughes (2007) model; 3) Explain what the different kinds of arrows mean; 4) Explain which of the four models has/have been empirically tested to date and which provide(s) the best account of the data.

References

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- Michie, S., Van Stralen, M. M., & West, R. (2011). The behaviour change wheel: a new method for characterising and designing behaviour change interventions. *Implementation science*, 6, 1-12.

