

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

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Potential competing interests: I am currently working at the Centre for Behaviour Change at UCL on a secondment one day per week.

This article is a very useful summary of how different versions of the COM-B model have evolved, and how greater model precision might be achieved by highlighting additional causal influences. The article provides important context for those working across behavioural science, and points towards future model testing and specification which can help efforts to positively influence behaviour change at an individual, organisational, and population level. What follows are some suggestions and clarifications, which will hopefully be helpful to the authors and make the article even more beneficial for the reader.

Abstract

- In the penultimate sentence, the authors suggest that Capability and Opportunity can influence the relationship between Motivation and Behaviour rather than behaviour directly. I agree with the first part of the sentence, but the last part, as currently written, suggests that a direct effect is not possible. At the end of the sentence, would the words 'rather than' be better phrased as 'as well as'? This would reflect the fact that Capability and Opportunity can have both direct effects on behaviour and also effect the relationship between Motivation and Behaviour (alongside the fact that both can have indirect effects on behaviour through Motivation i.e., if a person's ability to regulate their behaviour improves this could change that behaviour via an increase in Motivation).

Main paper

- This paper is a welcome elaboration on the different versions of the COM-B that have appeared in recent years in a range of publications or guidance.
- The original (or simplest) model presents a partial mediation model where capability and opportunity have both direct effects on behaviour and indirect effects through Motivation. The more elaborate diagrams present versions where this is not the case and the most complex version even suggests there is no direct effect of Capability and Opportunity on Behaviour. It would be good for the authors to explain this in more detail. In the example of physical activity behaviour, if someone does not have the physical capability (e.g., skills to swim or cycle) to be active then this would have a degree of impact on their behaviour irrespective of their Motivation levels. Therefore, suggesting a model that affords the possibility of both direct and indirect effects.
- This paper speaks to the greatest strength of the COM-B model and the biggest challenges with it, particularly if researchers are trying to test the model in terms of prediction of behaviour/s. The strengths lie in the huge range of

potential factors that the COM constructs cover and the fact that it can be applied to individuals, organisations, and populations. The challenge this presents is defining, with any precision, the exact factors that are contained within each construct and how to use the model in vastly different contexts (i.e. individual vs organisation behaviour). The former challenge is often partially overcome by using the Theoretical Domains Framework (TDF) and accompanying paper (Cane, O'Connor & Michie, 2012) to try to specify key factors within each construct. This may not have been the intention of that paper, but it remains (to my knowledge) the only peer-reviewed paper that provides a potential breakdown of the range of factors that might be contained within the three constructs (and 14 TDF domains). The issue here is that factors such as habits do not feature much in this paper and are therefore not clearly linked to their intended construct in Automatic Motivation.

- Having a version of the model that is testable (and falsifiable) in the way that the Theory of Planned Behaviour, and other similar models are, would be really beneficial for groups of researchers that want to test how well the COM-B predicts certain behaviours in certain groups and/or contexts in a data-driven manner. For examples see Howlett, Schulz, Trivedi, Troop, and Chater (2019; 2020) and Willmott, Pang, and Rundle-Thiele (2021).
- The authors end the main passage by calling for future development of the model to apply to more complex contexts such as organisations. It would be helpful to readers and the wider scientific community to provide a more detailed breakdown of the type of research that teams of behavioural scientists might conduct that would be helpful in achieving some of this development or providing more robust testing of the model.