

## Research Article

# Enabling countries to apply behavioural science in using global survey data to inform their Covid-19 policies

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The COVID-19 pandemic highlighted the vital importance and impact of human behaviour on viral transmission. During 2020, large amounts of global survey data were collected and made freely available to help the response. Many teams responding to the pandemic lack capacity to interpret and apply behavioural data. A collaboration of the World Health Organization's Behavioural Insights team and UCL's Centre for Behaviour Change designed and piloted two templates to enable survey data use during the first months of the pandemic. The first template documents key behaviours, thoughts and emotions related to the pandemic, with social interactions and population adherence to behavioural guidelines. The second template enables countries to formulate questions or issues that they would like behavioural data to address. This collaborative process applying behavioural science theory produced structured templates to enable the organisation, interpretation, sharing and application of survey data to inform policy and practice in different country contexts.

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## Introduction

The December 2019 outbreak of the respiratory virus SARS-CoV-2, which causes COVID-19 led to its characterisation as a global pandemic by the World Health Organization (WHO) in March 2020 (Li et al., 2020; World Health Organization, 2020a). Human behaviour is at the heart of viral transmission (Michie & West, 2020a). Human behaviour is also at the heart of breaking viral transmission through effective delivery of public health measures, clinical management of patients, and deployment of vaccines and treatment (Flaxman et al., 2020; Islam et al., 2020; World Health Organization, 2020b).

The development and nature of the COVID-19 crisis is a 'wicked problem'. A wicked problem is difficult to resolve due to incomplete or contradictory understandings, differing and changing contextual requirements and difficulties in recognising the components of the problem (Rittel & Webber, 1973; Waddell, 2016). There is usually no single solution to wicked problems, and they require expertise from multiple disciplines through academic-practitioner collaborations to find a way forward (Rittel & Webber, 1973; Waddell, 2016). Long-term resolutions to wicked problems involve many complex processes and a lack of understanding of vital aspects of the problem, such as human behaviour, can undermine efforts (Michie et al., 2015).

Understanding the transmission of COVID-19 and how best to suppress it is a global priority. Large scale behaviour change is required to reduce transmission (Schwarz & Stensaker, 2020; West et al., 2020). Understanding the behaviours concerning COVID-19 requires collecting, analysing, sharing and acting on large amounts of data referring to different aspects of the population, their everyday behaviours and their social and economic contexts (Michie & West, 2020). A vast amount of data collection efforts are underway, recording COVID-19 related perceptions, knowledge, beliefs and behaviours of populations across the globe (e.g. (Bacon et al., 2021; Kantar, 2020; YouGov, 2020)). Attempts are also ongoing to track data collection relating to COVID-19 (Matias & Leavitt, 2020). Collecting survey data to understand human behaviour requires the investment of financial and human resources. Much of the COVID-19 related data collected is freely available to support policy teams, governments and other organisations in their pandemic response. Although freely available data lessens the burden of data collection, data collection itself is only one aspect of the complex task of tracking, reporting and interpreting data, especially within capacity-constrained teams, to ensure a behaviourally informed public health response.

There has been little to guide and support country-based stakeholders in how to translate data interpretation into action recommendations and implementation, using the survey data collected and made available by entities such as universities or polling agencies. Challenges with applying research evidence to health-related policy implementations are widely recognised (Evans et al., 2013). The lack of guidance is partially due to the scale and speed of data becoming available for use. Increasing the data interpretation and application capacity of stakeholders can increase local understanding of behavioural patterns and contribute to a more coordinated and effective response, enabling rapid and informed decision-making in an emergency response. Without guidance being made available, there is a risk of relevant data being siloed within teams, not being used to inform and improve responses, or of misinterpretation of the data (Flaxman et al., 2020; Islam et al., 2020; World Health Organization, 2020b).

Frameworks and templates enable policy-makers and practitioners to structure data to develop a behaviourally-informed public health pandemic response. Templates can help organise data (for example, by constructs, meaning or function), make them more understandable and useable for policy-makers and

practitioners in a range of country contexts (West et al., 2019). Templates enable the identification of links between research findings and theory through the organisation of behavioural data. To mitigate differing underlying methodologies used to collect COVID-19 data on a local level, using the same template to collate previously collected data can ensure the systematic application of theory for policy and practitioner recommendations internationally (Schwarz & Stensaker, 2020). The use of templates can also allow for the systematic application of theory, guided by local contextual knowledge. A further benefit of using templates is the ability to share digestible and actionable information within and between teams with differing functions relating to the COVID-19 response. Templates also provide a record of the data and evidence used to make policy or action recommendations. Templates have been used successfully by organisations such as the UK's National Institute for Health and Care Excellence (NICE) (National Institute for Health and Care Excellence, 2014).

Theories of behaviour and behaviour change summarise what we know about how behaviour is influenced and the influences on thoughts, emotions, and the social and material environments in which people live. Using theory-based templates to interpret behavioural data has two advantages concerning the development of science. First, templates enable a shared language to describe and apply behavioural data across datasets and stakeholders, improving communication between researchers and between researchers and knowledge users. Using shared language can avoid confusion when the same term describes different things (concepts or constructs) or when several terms apply to the same thing (Colquhoun et al., 2014; Kok et al., 2016). Second, templates can also help generate testable hypotheses about associations between behaviours and other factors (Davis et al., 2015; Michie et al., 2014; West et al., 2019).

A widely used theory-based model of behaviour is COM-B (Capability, Opportunity, Motivation and Behaviour) (Michie et al., 2011; West & Michie, 2020). The COM-B model suggests that behaviour is a result of the capability (both psychological and physical) to perform the behaviour, the opportunity (both physical and social) to carry out the behaviour and the motivation (both automatic and reflective) of a person to carry out the behaviour (see Figure 1). The model highlights that behaviour is a complex process and results from an interaction of factors rather than a linear progression from knowledge to intentions and behaviour (Sniehotta et al., 2005).

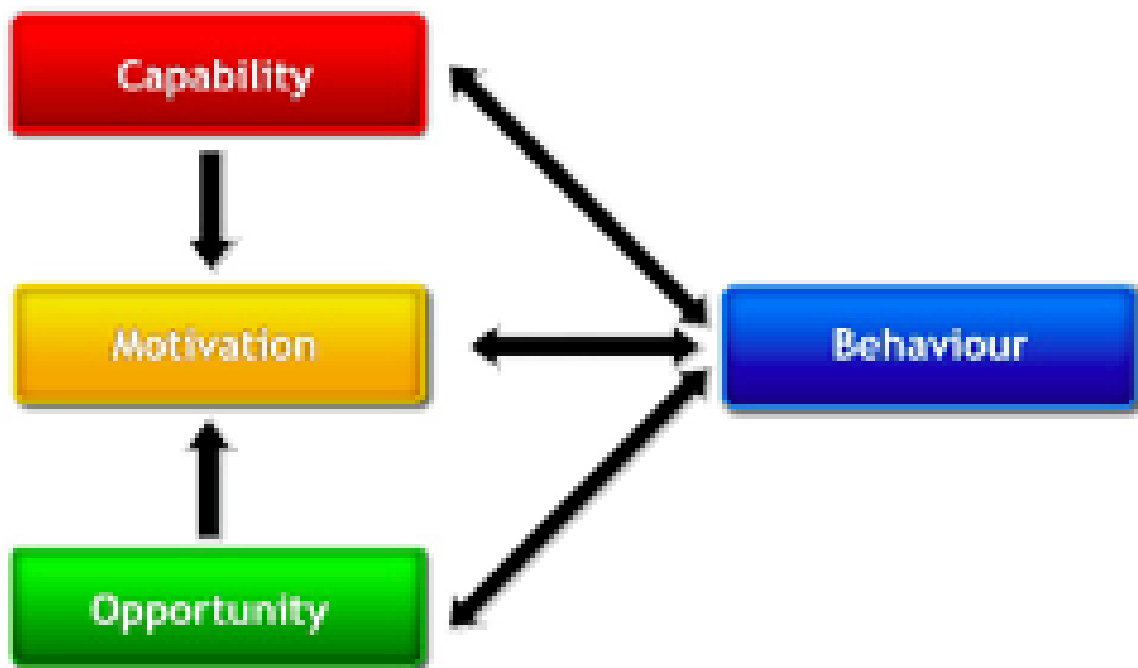


Figure 1. The COM-B model of behaviour. Taken from Michie, S. et al 2011.

The COM-B model forms the hub of the Behaviour Change Wheel, a framework of interventions and policies, which links to a taxonomy of 93 specific behaviour change techniques (Michie et al., 2013; Michie et al., 2011). These tools have informed the development and evaluation of interventions and policies and to synthesise evidence about effectiveness (Chadwick et al., 2020; Gould et al., 2019; Public Health England, 2018; The British Psychological Society, 2019; Webb et al., 2016). Associated with the Behaviour Change Wheel is a set of criteria to guide implementation, termed APEASE which stands for Acceptability, Practicability, Effectiveness, Affordability, Spillover and Equity (Michie et al., 2013). An example of applying these criteria was in the UK Government's Scientific Advisory Group in Emergencies report evaluating options for COVID-19 related restrictions, such as physical distancing (Michie et al., 2020). This work was aided by the use of a structured template.

An essential part of a pandemic response is communication (Hyland-Wood et al., 2021). However, along with providing information is needed the range of actions available to enable behaviour change for an effective pandemic response (Zarocostas, 2020). Combining behavioural science, through the use of COM-B, and communications expertise to produce theory-based templates could help countries assess survey data in a way that relates to their specific context.

### **Aim and Objectives**

This work aimed to combine behavioural science and communication expertise to develop templates usable across global contexts that enable the extraction, organisation and application of behavioural survey data in a way that is maximally useful and useable to a range of users (users were WHO staff in regional and country offices including field workers, emergency and technical advisors, and communication team members, and local partners).

The objectives were to:

1. Develop a theory-based data organisation template.
2. Develop a template to assist users to identify additional survey questions to provide data to inform their policy and practice.

### **Methods**

This piece of work was produced by a collaboration between the Centre for Behaviour Change and the Behavioural Insights Initiative Team in the Department of Communications at WHO. Between April and June 2020, we designed two theory-based templates. The first template allows users to extract and organise behavioural data collected from large-scale surveys and to examine these specific behavioural findings through their local contextual knowledge, enabling them to apply this knowledge in the form of specific behavioural recommendations. This is named the Survey Findings Template.

The second template allows users to identify additional survey questions that may facilitate data collection. This is named the Additional Survey Items Template.

The templates were populated using data from international surveys. We piloted the templates with intended users (users were WHO staff in regional and country offices including, field workers, emergency and technical advisors, and communication team members, along with local partners). We provided training to use the templates through webinars to users.

#### *Survey Findings Template*

To ensure that the templates were comprehensive, coherent, and linked to an overarching model of behaviour, we used the COM-B components to organise the structure. Two template sections were designed to allow users to extract key data from international surveys. The first section records the reported influences on the behaviours reported in the survey data. These influences are:

- Feelings (for example, emotional responses to risk).
- Thoughts (for example, beliefs or perceptions of risk).
- Behaviours (for example, health-related behaviour or media consumption).

The second section recorded data from the survey, relating specifically to influences (capability, motivations and opportunity) impacting adherence to government guidelines. This was an important section, as behaviour change is central to reducing transmission of pandemics. Alongside the development of the Survey Findings Template, we developed guidelines for users to follow.

#### *Additional Survey Items Template*

The Additional Survey Items Template acknowledged limitations of available data to answer specific questions that may be important to answer within local contexts. This template asked users to specify the questions they would like data to answer. The questions taken from the Additional Survey Items Template can be used to complete a Survey Findings Template to extract behavioural data and draw on expertise in behavioural science to suggest specific actionable recommendations. Alongside the development of the Additional Items Template, we developed guidelines for users to follow.

#### *Piloting the Templates*

Both templates underwent a round of pilot testing with users from regional offices responsible for several countries. We sent completed templates to them for review, and they provided written comments and feedback in teleconference calls. We asked for feedback about how useable and useful they were and suggestions for additions or other changes. We used this feedback to refine the templates.

Several revisions were made to the Survey Findings Template and accompanying guidance notes. The first was to add a top-line summary section to the start of the template to indicate key actions points. The second was to add a glossary section to define infrequently used or technical words. The third was to amend wording in the adherence to government guidelines section to indicate the need to record a specific survey finding. The fourth was to include space to report instances of stigma and discrimination in social situations within a population. Stigma is the attitudes and beliefs directed towards a person or group

of people and discrimination relates to negative behaviour directed towards a person or a group of people (Thornicroft, 2006). To capture data recording these social interactions, we included an additional section:

- Social interactions: Data relating to instances of stigma or discrimination aimed at particular populations or groups.

The final revision was to add examples of contextual information that may be helpful when applying the survey data to the guidance notes. Examples of contextual information included were: whether or not the region was under lockdown restrictions at the time of the data collection, demographic details or the healthcare model used in the region.

To demonstrate how to use the templates and to provide support for practitioners, data from international surveys were used to populate both sections of the Survey Findings Template for 11 countries: Algeria, Brazil, Chile, China, India, Malaysia, Nigeria, Peru, Philippines, Thailand and Vietnam. These countries were selected because they represented a range of geographical and other contexts, allowing for diverse learning in applications of the template; there was interest within each country or regional team to use and act upon the data available.

## Results

A collaboration between behaviour scientists, communications experts and pandemic responders resulted in two templates to allow users to apply behavioural theory to data and contribute to a behaviourally informed public health pandemic response.

Figure 2 displays an illustrative example of each section of a populated Survey Findings Template (we do not have the rights to share the data from the international surveys, the figures throughout this article present fictional data). This figure illustrates data relating to one of the three influences on behaviour, feelings.

In the 'Feeling 1' row, users are prompted for information relating to each corresponding column: survey finding, context/interpretation and application/action point/s. In the 'survey finding' cell users add a specific piece of behavioural data from a survey. In the 'context/interpretation' cell, users add information regarding the specific local context. In the 'application: action point/s' cell, users suggest a specific actionable recommendation based on the data from the previous two cells. Users can add rows as they are needed to reflect the amount of data available that refers to feelings, thoughts and behaviours.

In the 'Social interaction 1' row, users are prompted for the same types of information as with the behavioural influences. Again, users can add rows as they are needed to reflect the amount of data available.

How is the population:	Survey finding	Context/ interpretation	Application: Action point/s
<b>Feeling</b> (add rows as appropriate)			
Feeling 1	45% of the population are worried about falling sick no matter what precautions they take.	<p>This country has high rates of COVID-19 morbidity and mortality compared to other countries in the region.</p> <p>This country has an older than average population and the biggest source of employment in this country is factory work.</p> <p>There is some distrust regarding how the government has handled the pandemic.</p>	<p>Ensure that national media communications acknowledge the levels of concern and provide clear messaging from trusted sources about the likelihood of being infected, including information for more vulnerable groups and steps the population can take to decrease that likelihood.</p> <p>Communications regarding measures related to health should be made via increasingly popular social media channels, such as WhatsApp and print media to ensure the information is not restricted to those with internet access.</p>
<b>Social Interactions</b> (add rows as appropriate)			
Social interaction 1	36% of the population report concern regarding people returning from trips to other countries.	<p>There have been several reports in the media regarding 'super spreaders', along with contradicting reports regarding how the virus is transmitted.</p> <p>Evidence suggests that adherence to travel guidelines is high.</p>	<p>Ensure that national media communication acknowledge levels of concern and provide clear messaging from trusted sources about the likelihood of being infected. Ensure that policies and guidance related to travel are clear and that measures are taken to ensure these measures can be followed.</p> <p>Communications regarding measures related to travel should be made via increasingly popular channels such as WhatsApp and print media to ensure that the information is not restricted to those with internet access. Communications should emphasize the high levels of adherence.</p>
<b>Adherence to government guidance</b> (add row as appropriate).  Influences on adherence are categorised according to the COM-B model, see <a href="https://www.ucl.ac.uk/behaviour-change/abc-guides">https://www.ucl.ac.uk/behaviour-change/abc-guides</a> and <a href="https://www.youtube.com/watch?v=-6RvEF9L4IY&amp;feature=youtu.be">https://www.youtube.com/watch?v=-6RvEF9L4IY&amp;feature=youtu.be</a>			
<b>Adherence 1</b> Increased handwashing	<b>Influence: capability</b> (e.g. knowledge & skills)	<b>Influence: motivations</b> (e.g. emotions & attitudes)	<b>Influence: opportunity</b> (social & physical)
<b>Survey Finding:</b>  Over time, the majority of those surveyed have reported increasing frequency of hand washing increases (from 79% to 89%).	Awareness of links between personal protective behaviours and virus spread.	Concerns around catching COVID-19 remains high.	Requires access to water and soap or hand sanitiser.
<b>Action point/s</b>	Use trusted media sources to maintain awareness of importance of personal protective behaviours and to demonstrate good practice.	Appeal to social norms regarding majority adhering to handwashing guidance.	Ensure supply chains of soap and hand sanitiser are clear and soap or sanitiser available when needed. Ensure that hand washing facilities are available for all.

Figure 2. Illustrative example of the Survey Findings Template.

Figure 3 displays an illustrative example of a completed row of the Additional Survey Items Template. This figure illustrates how users can ask questions about the data. In the 'issue/questions 1' cell, the user adds the question they would like to be addressed. In the context of 'your issue or question column', the user adds information to illustrate the significance and implications of the issue or question. In the 'how you would like to use the advice' column, the user adds details as to how the data will be used.

Your issue or question (add rows as appropriate)	Context of your issue or question	How you would like to use the advice
<b>Issue/question 1:</b>  What proportion of the population believes that good hand hygiene is important during a pandemic, and is there a difference between younger and older generations?		
	The country has an older population and the main source of employment is within factories.	We will use the advice to inform recommendations relating to the types and mechanisms of communication with the general public or within specific groups within the population.

Figure 3. Illustrative example of the Additional Survey Items Template.

The Survey Findings Template and associated guidelines for use are available as Supplementary File 1. The Additional Survey Items Template and associated guidance are available as Supplementary File 2.

## Discussion

A collaborative process allowed for the successful application of behavioural science within an applied context to produce structured, theory-based, data organisation templates. These templates allow pandemic respondents to organise, interpret, share and present behavioural survey data to contribute to a behaviourally informed public health pandemic response across different global contexts.

The Survey Findings Template provides space to document key self-reported behaviours, thoughts and emotions that occurred within specific populations concerning the pandemic. It records social interactions and population adherence to behavioural guidelines. It also offers space for interpreting data within the local country context. Extracting and interpreting data related to behavioural aspects of the pandemic allows for the development of understanding how and why behaviours occur in specific contexts along with the potential of finding a progressive way to influence them. Adding to the understanding of the influences and outcomes of human behaviour is vital to understanding complex societal problems (Michie et al., 2015).

The Additional Items Template enables countries to formulate questions or issues they would like behavioural data to address. This Template has several potential uses. First, as is demonstrated in the fictional data presented, the Template can be used to ask specific questions that might reasonably be expected to be answered by existing data. Secondly, this Template can be used as a way of developing an understanding of the outcomes users want to achieve from interacting with the dataset, or from a collaboration with behavioural scientists more generally. Discussion relating to the contents of the template can assist in ensuring that users and behavioural scientists are using a shared language and have a clear idea of the expected outcomes for the collaboration. Thirdly, the template can be used to develop research questions that arise after working the Survey Findings Template.

Understanding and moving towards resolutions for global issues requires expertise from multiple disciplines (Rittel & Webber, 1973). We presented and discussed the templates with teams who do not have behavioural science expertise. This work demonstrates how collaborations between different areas of expertise, in this case, behavioural science theory and effective pandemic response, can be beneficial for producing useable results within fast-changing global contexts such as pandemics. We recommend interdisciplinary ways of working in moving forward with complex global issues. Collaborative working will improve the formulation of problems and reduce the risk of overlooking aspects important to solutions (Rittel & Webber, 1973).

The practical implications of this work are as follows. First, using these templates could contribute to ensuring that behaviourally relevant data collected to improve the response to COVID-19 will be interpreted correctly and used by multiple teams and partners of the response. Providing users with a tool to extract, organise, share and apply data can reduce the data-related burden on response teams and allow them to formulate recommendations for action points faster. Secondly, using these templates facilitates users to identify links between survey findings and theory. This process makes data more accessible and useable for users who can engage with behavioural data that may otherwise be too complex or burdensome to use and communicate findings to relevant team members and partners. Thirdly, applying the same template to different behavioural survey datasets can allow users to be consistent in how they formulate responses and can enable them to identify discrepancies in the data or methodologies used to collect the data (Schwarz & Stensaker, 2020). Fourthly, the templates allow users to frame influences on behaviour within their local context, thereby understanding what actions may benefit the local population. As

new data emerge, this template can aid in understanding its relevance within the context of what is already known. Fifthly, the Survey Findings Template provides a record of why policy or action recommendations were taken within a particular context, easing auditing or evaluation processes. Finally, the collaborative process of developing these Templates demonstrated the application of behavioural theory within a practical context. The results show that through developing an understanding of the context (in this case, the Covid-19 pandemic), the problems faced by the population (in this case users of survey data) and the outcomes the population is trying to achieve within the specific context (in this case an effective public health response), behavioural science can be applied to increase the likelihood of achieving the desired outcomes whilst also increasing awareness of the utility of behavioural science itself. Since context is best understood at the local and country-level, strong coordination is needed with country teams to ensure locally-relevant action points are achieved.

Capacity building of local teams was found to be effective in building understanding of the relevance and utility of the Survey Findings Template. One WHO region conducted trainings with WHO staff and partners at country-level to aid understanding of the behavioural constructs and application of the Template. This resulted in teams replicating the Template for different data sources, presenting results in digestible formats for ministries of health, partners, internal leadership, and other pillars of the COVID-19 response at country and regional level.

Despite having high demands, stretched capacity and an overload of available data, and thus finding it difficult to have the opportunity to complete the template, users found it a useful exercise. Different data sources were able to be presented alongside each other, to connect gaps and identify opportunities for action. Moreover, the Template provided a means for prioritising actions for urgent response. The framework was useful for creating and adapting communications messaging and strategies, and for justifying of approaches when advocating to leadership, partners and health authorities. For example, one country found the template highlighted specific knowledge gaps in COVID-19 symptoms and modes of transmission and were able to focus on generating messaging to raise awareness to fill the identified gap. Another country found the template valuable in identifying how population groups were feeling, creating targeted messaging that validated concerns and could resonate with the target groups. Another country found it supported their strategy to use social norms to encourage public health and social measures, as the social opportunity was clearly linked to particular adherence behaviours.

One challenge identified in view of a complex and fast-moving situation was that results needed to be extracted, interpreted and shared quickly, as delay could mean that results would be less relevant and hold less weight among decisionmakers.

The scientific implications of this work concern increasing awareness and usability of science. Enabling those without behavioural science expertise to engage with and apply behavioural data can increase awareness of the relevance of applied behaviour science across multiple disciplines. Increasing capacity in data interpretation can contribute to building a more scientific understanding of behaviour related to a particular issue. The Additional Survey Items Template allows users to acquire some behavioural science knowledge, including (i) an awareness of the need for specific behavioural data by identifying gaps in the data available, and (ii) formulating questions for future research. The Additional Survey Items Template also helps users to clarify the types of issues and questions they are trying to answer with behavioural data and can highlight issues relating to different terms being used to describe constructs across different contexts.

A limitation of this work is that we did not have ownership of the survey data collected. Consequently, we were unable to influence the design of the surveys. Lack of data ownership may appear to reduce the usability of data. Working with unfamiliar datasets is a common occurrence for the end-users. Thus, using datasets that we did not produce provided an ideal test case for these templates aimed at enabling the extraction, interpretation and application of existing data. We were able to demonstrate how to maximise the use of available data in three ways: first, by identifying the key points, second by interpreting them using local knowledge and finally, applying them through actionable recommendations. Furthermore, we tested the templates on data from multiple countries, and with users from different geographical locations indicating the generalisability and usability of the templates across contexts. Additionally, users of the templates are from different disciplines demonstrating usability from those without a behavioural science background. Overall, the templates enable theoretically informed recommendations to be accessible to a wide-ranging cohort of users.

Although we developed these templates in response to data concerning the COVID-19 pandemic, we regard them as useful for data extraction, interpretation and application concerning other global issues such as climate change or health inequality. Future work could include collaborations with teams holding expertise in different disciplines such as climate science or health service design. To ensure that the templates will be maximally useful different contexts, we recommend the following:

- Engagement with key stakeholders who will be the users of the datasets to understand:
  - The context in which they work
  - The details of the behavioural issue they want to understand

- The outcomes they want to achieve
- Engagement with key stakeholders who will be the recipients of the desired outcome to gain knowledge of factors in the local context regarding factors that are relevant for the behaviour.
- Enable necessary adjustments to the templates as a result of engagement with stakeholders, for example it is possible that 'adherence to government guidelines' may not be relevant within contexts outside of public health emergencies.

In addition to the informal evaluation of the Templates developed in this piece of work, we also recommend that the use of Templates be formally evaluated. For behavioural science to be applied in ways that are productive and progressive, it is vital that there is an understanding of what works and what does not work in different contexts. In relation to the Templates developed here, this could mean assessing the added value of each section. Assessing the utility of data organisation templates based on behavioural science within different contexts will enable a deeper understanding of the impact of human behaviour.

The templates designed here will support better coherence and collaboration amongst researchers, practitioners and policy-makers. They will enable the development of realistic recommendations that are evidence-informed and translatable into real-world practice through the structured assessment of data highlighting: what the behavioural issue is, what is driving the behaviour and what would work well to address this within local contexts. The development of data organisation templates may contribute towards the global effort of enabling behavioural science to inform the management of 'wicked problems' (Rittel & Webber, 1973).

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#### **Declarations of interest**

This grant for this work was received prior to SM becoming a nominated member of the WHO Technical Advisory Group on Behavioural Insights and Sciences for Better Health in July 2020.

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