












STUDY PROTOCOL

REVISED

Investigating and evaluating evidence of the behavioural determinants of adherence to social distancing measures – A protocol for a scoping review of COVID-19 research [version 2; peer review: 2 approved]

Chris Noone ¹, Nikolett Warner ¹, Molly Byrne ¹, Hannah Durand ¹, Kim L. Lavoie^{2,3}, Brian E. McGuire ¹, Jenny Mc Sharry ¹, Oonagh Meade ¹, Eimear Morrissey⁴, Gerry Molloy¹, Laura O'Connor ¹, Elaine Toomey ⁵

¹School of Psychology, National University of Ireland, Galway, Galway, Galway, H91 TK33, Ireland

²Department of Psychology, University of Quebec at Montreal, Montreal, Quebec, H2L 2C4, Canada

³Montreal Behavioral Medicine Centre, CIUSSS-NIM – Hôpital du Sacre-Coeur de Montreal, Montreal, Quebec, H4J 1C5, Canada

⁴School of Medicine, National University of Ireland, Galway, Galway, Galway, H91 TK33, Ireland

⁵School of Allied Health, University of Limerick, Limerick, Limerick, V94 T9PX, Ireland

V2 First published: 21 Jul 2020, 3:46
<https://doi.org/10.12688/hrbopenres.13099.1>

Latest published: 10 Sep 2020, 3:46
<https://doi.org/10.12688/hrbopenres.13099.2>

Abstract

Background: The WHO has declared the outbreak of coronavirus disease 2019 (COVID-19) as a pandemic. With no vaccine currently available, using behavioural measures to reduce the spread of the virus within the population is an important tool in mitigating the effects of this pandemic. As such, social distancing measures are being implemented globally and have proven an effective tool in slowing the large-scale spread of the virus.

Aim: This scoping review will focus on answering key questions about the state of the evidence on the behavioural determinants of adherence to social distancing measures in research on COVID-19.

Methods: A scoping review will be conducted in accordance with guidelines for best practice. Literature searches will be conducted using online databases and grey literature sources. Databases will include Medline, Web of Science, Embase and PsycInfo, alongside relevant pre-print servers. Grey literature will be searched on Google Scholar. Screening, data extraction and quality appraisal will be conducted by members of the research team, with any discrepancies resolved by consensus discussion. Quality appraisal will be conducted using the Cochrane's ROBINS-I tool, the Cochrane Risk of Bias tool, and the JBI Critical Appraisal Checklist where appropriate. Results will be analysed by mapping findings onto the Theoretical Domains Framework and visualising characteristics of the included studies using EviAtlas. This scoping review is [pre-registered with Open Science Framework](#).

Open Peer Review

Reviewer Status  

Invited Reviewers

1 2

version 2

(revision)
10 Sep 2020

version 1


21 Jul 2020




report



report

1. **Emma Norris** , Brunel University, Uxbridge, UK

2. **Luiza Siqueira do Prado**, Université Claude Bernard Lyon 1, Lyon, France

Alexandra L. Dima , Université Claude Bernard Lyon 1, Lyon, France

Any reports and responses or comments on the article can be found at the end of the article.

Conclusions The results of this study may facilitate the systematic development of behavioural interventions to increase adherence to social distancing measures.

Keywords

COVID-19, coronavirus, social distancing, physical distancing, pandemic



This article is included in the [Coronavirus \(COVID-19\)](#) collection.

Corresponding author: Chris Noone (chris.noone@nuigalway.ie)

Author roles: **Noone C:** Conceptualization, Funding Acquisition, Methodology, Project Administration, Supervision, Writing – Original Draft Preparation, Writing – Review & Editing; **Warner N:** Writing – Original Draft Preparation, Writing – Review & Editing; **Byrne M:** Writing – Review & Editing; **Durand H:** Writing – Review & Editing; **Lavoie KL:** Writing – Review & Editing; **McGuire BE:** Writing – Review & Editing; **Mc Sharry J:** Writing – Review & Editing; **Meade O:** Writing – Review & Editing; **Morrissey E:** Writing – Review & Editing; **Molloy G:** Writing – Review & Editing; **O'Connor L:** Writing – Review & Editing; **Toomey E:** Writing – Review & Editing

Competing interests: No competing interests were disclosed.

Grant information: This study was funded by a summer scholarship award [CBES-2018-001] from Health Research Board-Trials Methodology Research Network, Evidence Synthesis Ireland and Cochrane Ireland for NW to work with CN on this review. *The funders had no role in study design, data collection and analysis, decision to publish, or preparation of the manuscript.*

Copyright: © 2020 Noone C *et al.* This is an open access article distributed under the terms of the [Creative Commons Attribution License](#), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

How to cite this article: Noone C, Warner N, Byrne M *et al.* **Investigating and evaluating evidence of the behavioural determinants of adherence to social distancing measures – A protocol for a scoping review of COVID-19 research [version 2; peer review: 2 approved]** HRB Open Research 2020, 3:46 <https://doi.org/10.12688/hrbopenres.13099.2>

First published: 21 Jul 2020, 3:46 <https://doi.org/10.12688/hrbopenres.13099.1>

REVISED Amendments from Version 1

This update version responds to both reviewer comments and some necessary but minor deviations from the method set out in version 1 of this paper. These deviations will be noted in our results paper too. The changes are as follows:

- * There is now reference to other evidence synthesis work in relation to social distancing and it is noted that these studies focus on the effectiveness of social distancing measures whereas our scoping review focuses on potential behavioural determinants of adherence to social distancing measures.
- * We have added the “RQ” abbreviation where the research questions are first presented.
- * We clarified what we mean by the term “behavioural determinant” and clarified that as an independent variable it could be observed or manipulated.
- * Though data extraction has not taken place yet, it is clear that we do not have the resources to independently extract the data in duplicate. Therefore, in a deviation from the first version, we are now planning to have the data extracted by one reviewer and checked by another.
- * There was a contradiction in the first version of the protocol where in the eligibility section it was simultaneously stated that only reports of primary quantitative data would be included, and that reports of plans for studies that would collect primary quantitative data would be included too. This was a mistake - we did not intend to include, and have not included, study plans in the scoping review and this has been corrected in the new version of this protocol.
- * We fixed a typo that one of the reviewers kindly pointed out.

Any further responses from the reviewers can be found at the end of the article

Introduction

Coronavirus disease 2019 (COVID-19) has had a devastating effect globally since it was first identified in China in December 2019 (Johns Hopkins University, 2020). While several vaccines against SARS-COV-2, the virus which causes COVID-19, are in development, there are none currently available (WHO, 2020). The lack of a vaccine means that behavioural strategies for reducing the transmission of COVID-19 are vital to the global pandemic response (Michie *et al.*, 2020). Some refer to these strategies collectively as a “behavioural vaccine” (Speight *et al.*, 2020).

Societal and community-level strategies for controlling the pandemic including various levels of lockdown and quarantine focus on preventing physical contact between people through public health recommendations, environmental restructuring or legal mandates (Perkins & Espana, 2020). These and other activities that prevent or reduce the frequency and closeness of contact between people as a means of interrupting disease transmission are often collectively referred to as social distancing measures (Kinlaw & Levine, 2007). Individual-level preventative strategies include effective handwashing, properly disinfecting surfaces, coughing and sneezing into a tissue, wearing protective masks, avoiding touching one’s face and keeping a physical distance from others – which is *also* often referred to

as social distancing, though many now refer to this behaviour as physical distancing (West *et al.*, 2020).

While understanding and developing interventions for hand-washing, mask-wearing and cough and sneeze etiquette have been the focus of research in psychology previously and in relation to other infectious diseases, less is known about how to effectively encourage behaviours related to social distancing and research in the context of COVID-19 is obviously just emerging (Berry & Fournier, 2014; Jefferson *et al.*, 2007; Lunn *et al.*, 2020; Luong Thanh *et al.*, 2016). Adherence to measures which increase social distance is vital to the success of exit strategies of countries that underwent lockdown and efforts to end the COVID-19 pandemic (Gilbert *et al.*, 2020). Social distancing measures have been shown to reduce the spread of COVID-19 (Courtemanche *et al.*, 2020). Recent evidence syntheses have focused on the efficacy of social distancing measures (Chu *et al.*, 2020; Mahtani *et al.*, 2020; Regmi & Lwin, 2020). One found observational support for keeping a distance of at least 1m, with the chances of COVID-19 transmission decreasing with distance (Chu *et al.*, 2020). Another found support from systematic reviews for self-isolation of ill and exposed individuals, and strategies for reducing people’s social contacts and mobility (Mahtani *et al.*, 2020). Our scoping review will focus on the determinants that potentially increase adherence to social distancing measures, which may inform the development of behavioural interventions to increase adherence to these measures, and thereby increase their effectiveness. Understanding how people successfully adhere to these measures will also be vital to the control of future pandemics.

Behavioural interventions aimed at ensuring high levels of adherence to social distancing guidelines (and other preventative behaviours) have been described as “urgently needed” (Glasziou *et al.*, 2020). However, as of April 2020, only a handful of studies had been registered to test behavioural interventions for preventing COVID-19 transmission – and none focused on increasing adherence to social distancing measures (Hoffmann & Glasziou, 2020). It is crucial that behavioural interventions that can reduce the transmission of COVID-19 are rapidly developed, tested, optimised and implemented in a systematic and evidence-based manner.

A vital step in developing behavioural interventions, regardless of the development framework being employed, is collating the relevant evidence regarding the potential determinants of the behaviour that needs to be changed (O’Cathain *et al.*, 2019a). It is therefore crucial to facilitate the development and testing of such interventions by mapping and evaluating the research on the behavioural determinants of adherence to social distancing measures. The Theoretical Domains Framework is a useful tool for mapping the determinants of behaviours and linking them to specific intervention functions (Michie *et al.*, 2005). It summarises 128 constructs derived from 33 theories of health behaviour into 14 domains. Thus, it provides a method for collating and summarising research on determinants of health behaviours such as adherence to social distancing measures.

Emerging areas of research are often described using scoping review methods as they allow for a broader focus than systematic reviews and present results in descriptive formats that highlight what kinds of evidence exist, where there are evidence gaps, and the quality of the existing evidence (Nyanchoka *et al.*, 2019). Scoping reviews are also specifically indicated when there is a need to clarify the key constructs and operational definitions employed in an area of research, to examine the ways in which research in an emerging area is being conducted and to identify the factors associated with a specific concept (Munn *et al.*, 2018).

The COVID-19 pandemic has caused an exponential increase in research on ways of tackling this crisis and concerns have been raised about the level of research waste that this has produced (Glasziou *et al.*, 2020). Given that there are also concerns about the readiness of psychology as a discipline to contribute to policymaking in emergencies (Ijzerman *et al.*, 2020), it is imperative that we consider this growth in research carefully and evaluate the quality of its products – particularly in new areas such as social distancing in research on COVID-19. This scoping review will focus on answering key questions about the state of the evidence on the behavioural determinants of adherence to social distancing measures in research on COVID-19.

Protocol

This scoping review will be carried out in accordance with guidance from the Joanna Briggs Institute, which builds on previous guidance on best practice in scoping review methodology (Arksey & O'Malley, 2005; Levac *et al.*, 2010; Peters *et al.*, 2019) and reported in accordance with PRISMA-ScR guidance (Tricco *et al.*, 2018). This protocol is structured according to the steps suggested by Arksey & O'Malley (2005). Any deviations from this protocol will be tracked on the review's Open Science Framework project; the protocol is pre-registered at <https://doi.org/10.17605/OSF.IO/TMKUX>.

Stage 1: Identifying the research question

We aim to address the following research questions (RQ) relating to social distancing in research on COVID-19:

- RQ1. In what ways have social distancing measures been defined and how has adherence to these measures been operationalised in research on their behavioural determinants conducted in research on COVID-19?
- RQ2. What behavioural determinants of adherence to social distancing measures have been studied in research on COVID-19?
- RQ3. How do the behavioural determinants of adherence to social distancing measures that have been studied in research on COVID-19 map onto the Theoretical Domains Framework (TDF; Cane *et al.*, 2012)?
- RQ4. What is the quality of the evidence from the included studies in this scoping review?

RQ5. What study designs have been used to study the behavioural determinants of adherence to social distancing measures in research on COVID-19?

RQ6. Where has this research taken place?

RQ7. What gaps exist in the literature that need to be addressed in future research on social distancing measures?

Stage 2: Identifying relevant studies

Eligibility criteria. Studies must focus on human participants, but no further exclusions on the basis of participant characteristics will be made. Included studies must measure adherence to social distancing measures (i.e. quarantine, lockdown, and physical distancing) and include potential behavioural determinants of adherence to these measures as independent variables (i.e. as either an observed or manipulated variable). By behavioural determinants, we mean any intrapersonal, interpersonal, community, societal or cultural influences on behaviour as commonly represented by ecological models of health (Golden & Earp, 2012). Included studies must have collected primary data using quantitative designs. The included studies must have specifically been conducted in relation to COVID-19 (see Table 1). There will be no restriction on languages. We will use Google Translate to aid in the screening and data extraction of sources that are not reported in English as there is evidence that this is an effective approach (Jackson *et al.*, 2019). A definitions and elaboration document has been developed based on these criteria to aid screening (see *Extended data* (Noone *et al.*, 2020)).

Information sources. We will identify potentially relevant published literature by searching Medline, PsycInfo, Embase, and Web of Science Core Collection, as this combination of databases has been recommended for adequate and efficient search coverage (Bramer *et al.*, 2017). We will also identify potentially relevant pre-prints by searching PsyArXiv, medRxiv, SocArxiv and Preprints.org. We will search ClinicalTrials.gov and the WHO International Clinical Trials Registry Platform to identify any potentially relevant trials. Grey literature will be searched for using Google Scholar, according to the guidance

Table 1. Inclusion criteria for this study.

Inclusion criteria	Details
Participants	Any human participant
Concept	Potential behavioural determinants of adherence to social distancing measures
Context	The outbreak of COVID-19
Sources	Any study that employs a quantitative design and collects primary data

from [Haddaway & colleagues \(2015\)](#), which suggests using the title-only search option and screening the first 1000 records.

Search strategy. The Medline search strategy for the review was developed with assistance from a research support librarian and includes terms related to COVID-19 and social distancing measures. The searches will be restricted to 2020 to ensure that only sources relevant to the COVID-19 pandemic are identified. The Peer Review of Electronic Search Strategies checklist ([McGowan et al., 2016](#)) was applied to this strategy by an independent information specialist. Once the suggested adjustments were applied, the search strategy was translated to the other databases using the Polyglot Search Translator ([Clark et al., 2020](#)). Separate search strategies were developed for each pre-print server and Google Scholar. We will use the [medrxiv](#) app to search medRxiv ([McGuinness, 2020](#)). For each of the other sources, we will use the native search interface. The full search strategy is documented in the Extended data ([Noone et al., 2020](#)).

Reference management. Search results from Medline, PsycInfo, Embase, and Web of Science will be exported to .ris files and then imported to Zotero. Search results from both trial registries, each pre-print server and Google Scholar will be imported to Zotero using the Zotero Connector. Specific folders for each literature source will be created in the Zotero Group library for this project, which is available at https://bit.ly/BDSDA_Library. All search results will be exported to a single .ris file so that deduplication can be conducted using the DeDuplicator tool within the [Systematic Review Accelerator](#) suite ([Rathbone et al., 2015](#)). The deduplicated library will then be exported for screening.

Stage 3: Study selection

Screening will be conducted within [Covidence \(Covidence, 2019\)](#). The screening process will be piloted initially – 25 titles and abstracts will be selected at random and the entire research team will screen these using the predefined eligibility criteria and definitions/elaboration document. If any discrepancies are identified, these will be discussed within the team and modifications will be made to the eligibility criteria and the definitions and elaboration document. Screening will then begin once an agreement rate of 75% or greater is reached based on the screening of a further 25 titles and abstracts. The screening process will involve two reviewers screening each title and abstract, with conflicts resolved by consensus or a third reviewer. Full texts will also be screened in duplicate with conflicts resolved by consensus or a third reviewer.

Stage 4: Charting the data

The research team will design a data charting tool, as set out by the PRISMA-ScR Checklist ([Tricco et al., 2018](#)), to which the following information will be extracted by two members of the research team:

- Author(s)
- Year of publication
- Country of origin (i.e. where the study was conducted)

- Funding
- Aims/purpose
- Time of data collection
- Context (e.g., description of local COVID-19 impact at time of data collection, description of relevant public health policies in place; if available in the study report)
- Population
- Sample size
- Study design
- Pre-registration (if any)
- Specific theory (if any)
- Intervention type, comparator and details of these (e.g., duration of the intervention; if applicable).
- Outcomes and details of these (e.g., how measured)
- Key findings that relate to the scoping review question/s.

The data charting tool will be independently piloted by two reviewers who will conduct full data extraction on five sources chosen to cover the diversity of different study types included.

Any discrepancies that arise will be discussed by the full team before proceeding with the data extraction process. As per the iterative nature of scoping reviews, it is expected that this tool may be adjusted during this process to ensure accurate representation of all data sources. Data from each included source will be extracted by one reviewer and checked by another. All data extracted will be compiled into a summary spreadsheet.

Quality assessment. We will use the following quality appraisal tools for studies included in the review: the Cochrane Risk of Bias Tool ([Sterne et al., 2019](#)) for randomised controlled trials, the Cochrane ROBINS-I Tool ([Sterne et al., 2016](#)) for quasi-experimental studies, and the Joanna Briggs Institute Critical Appraisal Checklist ([Moola et al., 2020](#)) for analytical cross-sectional research.

Stage 5: Collating, summarising, and reporting of results

To visually represent study selection and reasons for exclusion at full text review, a PRISMA flow diagram will be presented. The diversity of definitions of social distancing measures and the operationalisations of adherence to these measures will be recorded in a table (RQ1). A table of study characteristics will summarise the aim, design and results (if available) of each study (RQ2). A framework analysis using the TDF ([Cane et al., 2012](#)) will be used to summarise and report the types of evidence available regarding the behavioural determinants of adherence to social distancing measures that have been studied in research on COVID-19. Two reviewers will independently judge which domains of the TDF are most applicable to each behavioural determinant of adherence to social distancing measures reported

in the included studies. Additional headings will be employed should the framework not be sufficient in representing the data (RQ3). While there is little consensus on the exact definition of what constitutes an evidence gap map (Miake-Lye *et al.*, 2016), for the purpose of this review, we aim to produce a visual depiction of current research and any gaps in the literature, alongside an assessment of study quality (RQ4). This will be presented using a bubble plot, whereby the colour of and size of each bubble will represent research type and research quality. A heat map will present counts of the different research designs used in the included studies (RQ5). A geographical map will be produced to visualise the volume of included studies carried out in different countries (RQ6). Knowledge gaps will be represented through the development of an evidence gap map (RQ7). We will also produce a timeline of the studies based on the reported time of data collection. The visualisations described above will be produced using EviAtlas, an open science tool for mapping and graphing study characteristics (Haddaway *et al.*, 2019). Clusters and heat maps of frequently occurring terms in the included studies will be visualised using VOSviewer (van Eck & Waltman, 2010). Strengths and limitations to the review will be discussed, alongside future recommendations for research.

Step 6: Consultation with stakeholders

We consider the primary stakeholders in this study to be the researchers developing work in this area, in particular those who develop behavioural interventions. We will invite open consultation and seek comments on this article. We will disseminate this invitation through relevant professional societies (e.g. the International Society for Behavioural Medicine, the European Health Psychology Society, the Asian Congress of Health Psychology), social media networks and mailing lists. We will summarise all feedback received and record any changes in the study that are made as a result.

Dissemination

To facilitate rapid dissemination, the results of this review will be reported in a pre-print which will be uploaded to PsyArXiv. This report will also be submitted to a peer-reviewed journal.

Discussion

Developing interventions that effectively increase adherence to social distancing measures is vital to the success of efforts to tackle the COVID-19 pandemic and will contribute to preparedness for future pandemics. This scoping review will systematically collate and describe the available evidence regarding the behavioural determinants of adherence to social distancing measures. It will also highlight gaps in this area of research. This may reduce research waste by making it easier to avoid the unnecessary duplication of work and instead contribute to cumulative research on this topic.

Ideally, the results of this study will facilitate the systematic development of behavioural interventions to increase adherence to social distancing measures based on behavioural evidence and theory using established approaches such as Intervention

Mapping (Bartholomew Eldredge, 2016) and the Behaviour Change Wheel (O’Cathain *et al.*, 2019b; Michie *et al.*, 2014). These interventions should then be tested within methodological frameworks that can rapidly and efficiently identify the optimal set of components that the interventions should contain. The Multiphase Optimisation Strategy (Collins *et al.*, 2011) and the Agile Science process (Hekler *et al.*, 2016) are two such frameworks that make intelligent use of innovative research designs such as fractional factorial experiments, microrandomised trials and sequential multiple assignment randomised trials.

To facilitate this work, this review will produce an accessible summary of how social distancing measures are defined and how adherence to these measures has been operationalised in research conducted on COVID-19. It will also identify the behavioural determinants that have been studied in relation to adherence to social distancing measures and map them to the TDF. Finally, it will analyse and visualise key characteristics of the included studies.

Data availability

Underlying data

No underlying data are associated with this article.

Extended data

Open Science Framework: Investigating and evaluating evidence of the behavioural determinants of adherence to social distancing measures – A scoping review of COVID-19 research. <https://doi.org/10.17605/OSF.IO/TMKUX> (Noone *et al.*, 2020).

This project contains the following extended data:

- Cochrane ROB Tool.pdf (Risk of bias tool to be used).
- Codebook.docx
- Data Extraction Form.xlsx (Blank data extraction form).
- Eligibility Criteria.docx
- EMBASE.docx (Search strategy for EMBASE).
- JBI Critical Appraisal.pdf (JBI Critical Appraisal check)
- MEDLINE.docx (Search strategy for MEDLINE).
- Pre-print, Grey Lit and Registry Search Strategies.docx (Search strategies for pre-prints, grey literature and registries).
- PRESS 2015 checklist for search strategies.docx
- PSYCINFO.docx (Search strategy for PSYCINFO).
- ROBINS-I Tool.pdf (Blank ROBINS-I assessment tool).
- Web of Science.docx (Search strategy for Web of Science).

Extended data are available under the terms of the [Creative Commons Attribution 4.0 International license](https://creativecommons.org/licenses/by/4.0/) (CC-BY 4.0).

References

- Arksey H, O'Malley L: **Scoping studies: Towards a methodological framework.** *Int J Soc Res Methodol.* 2005; **8**(1): 19–32.
[Publisher Full Text](#)
- Bartholomew Eldredge LK: **Planning health promotion programs: An intervention mapping approach (Fourth edition).** Jossey-Bass & Pfeiffer Imprints, Wiley. 2016.
[Reference Source](#)
- Berry TD, Fournier AK: **Examining university students' sneezing and coughing etiquette.** *Am J Infect Control.* 2014; **42**(12): 1317–1318.
[PubMed Abstract](#) | [Publisher Full Text](#)
- Bramer WM, Rethlefsen ML, Kleijnen J, et al.: **Optimal database combinations for literature searches in systematic reviews: A prospective exploratory study.** *Sys Rev.* 2017; **6**(1): 245.
[PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
- Cane J, O'Connor D, Michie S: **Validation of the theoretical domains framework for use in behaviour change and implementation research.** *Implement Sci.* 2012; **7**: 37.
[PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
- Chu DK, Akl EA, Duda S, et al.: **Physical distancing, face masks, and eye protection to prevent person-to-person transmission of SARS-CoV-2 and COVID-19: A systematic review and meta-analysis.** *Lancet.* 2020; **395**(10242): 1973–1987.
[PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
- Clark JM, Sanders S, Carter M, et al.: **Improving the translation of search strategies using the Polyglot Search Translator: A randomized controlled trial.** *J Med Libr Assoc.* 2020; **108**(2): 195–207.
[PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
- Collins LM, Baker TB, Mermelstein RJ, et al.: **The multiphase optimization strategy for engineering effective tobacco use interventions.** *Ann Behav Med.* 2011; **41**(2): 208–226.
[PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
- Courtemanche C, Garuccio J, Le A, et al.: **Strong Social Distancing Measures In The United States Reduced The COVID-19 Growth Rate.** *Health Aff (Millwood).* 2020; **39**(7): 1237–1246.
[PubMed Abstract](#) | [Publisher Full Text](#)
- Covidence: **Veritas Health Innovation.** 2019.
[Reference Source](#)
- Gilbert M, Dewatripont M, Muraille E, et al.: **Preparing for a responsible lockdown exit strategy.** *Nat Med.* 2020; **26**(5): 643–644.
[PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
- Glasziou PP, Sanders S, Hoffmann T: **Waste in covid-19 research.** *BMJ.* 2020; **369**: m1847.
[PubMed Abstract](#)
- Golden SD, Earp JAL: **Social Ecological Approaches to Individuals and Their Contexts: Twenty Years of Health Education & Behavior Health Promotion Interventions.** *Health Educ Behav.* 2012; **39**(3): 364–372.
[PubMed Abstract](#) | [Publisher Full Text](#)
- Haddaway N, Collins AM, Coughlin D, et al.: **The Role of Google Scholar in Evidence Reviews and Its Applicability to Grey Literature Searching.** *PLoS One.* 2015; **10**(9): e0138237.
[PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
- Haddaway N, Feierman A, Grainger MJ, et al.: **EviAtlas: A tool for visualising evidence synthesis databases.** *Environmental Evidence.* 2019; **8**(1): 22.
[Publisher Full Text](#)
- Hekler EB, Klasnja P, Riley WT, et al.: **Agile science: Creating useful products for behavior change in the real world.** *Transl Behav Med.* 2016; **6**(2): 317–328.
[PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
- Hoffmann T, Glasziou P: **What if the vaccine or drugs don't save us? Plan B for coronavirus means research on alternatives is urgently needed.** *The Conversation.* 2020.
[Reference Source](#)
- Ijzerman H, Lewis NA, Weinstein N, et al.: **Is Social and Behavioural Science Evidence Ready for Application and Dissemination?** [Preprint]. PsyArXiv. 2020.
[Publisher Full Text](#)
- Jackson JL, Kuriyama A, Anton A, et al.: **The Accuracy of Google Translate for Abstracting Data From Non-English-Language Trials for Systematic Reviews.** *Ann Intern Med.* 2019; **171**(9): 677–679.
[PubMed Abstract](#) | [Publisher Full Text](#)
- Jefferson T, Foxlee R, Del Mar C, et al.: **Interventions for the interruption or reduction of the spread of respiratory viruses.** *Cochrane Database Sys Rev.* 2007; **4**: CD006207.
[PubMed Abstract](#) | [Publisher Full Text](#)
- Johns Hopkins University: **COVID-19 Map.** Johns Hopkins Coronavirus Resource Center. 2020.
[Reference Source](#)
- Kinlaw K, Levine RJ: **Ethical guidelines in Pan emic Influenza—Recommendations of the Ethics Subcommittee of the Advisory Committee to the Director.** Centers for Disease Control and Prevention. Centers for Disease Control and Prevention. 2007; 12.
[Reference Source](#)
- Levac D, Colquhoun H, O'Brien KK: **Scoping studies: Advancing the methodology.** *Implement Sci.* 2010; **5**(1): 69.
[PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
- Lunn PD, Belton CA, Lavin C, et al.: **Using Behavioral Science to help fight the Coronavirus.** *Journal of Behavioral Public Administration.* 2020; **3**(1): Article 1.
[Publisher Full Text](#)
- Luong Thanh BY, Laopaiboon M, Koh D, et al.: **Behavioural interventions to promote workers' use of respiratory protective equipment.** *Cochrane Database Syst Rev.* 2016; **12**(12): CD010157.
[PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
- Mahtani KR, Heneghan C, Aronson JK: **What is the evidence for social distancing during global pandemics? A rapid summary of current knowledge.** 2020.
[Reference Source](#)
- McGowan J, Sampson M, Salzwedel DM, et al.: **PRESS Peer Review of Electronic Search Strategies: 2015 Guideline Statement.** *J Clin Epidemiol.* 2016; **75**: 40–46.
[PubMed Abstract](#) | [Publisher Full Text](#)
- McGuinness L: **Medrxiv.** 2020.
[Reference Source](#)
- Miake-Lye IM, Hempel S, Shanman R, et al.: **What is an evidence map? A systematic review of published evidence maps and their definitions, methods, and products.** *Syst Rev.* 2016; **5**(1): 28.
[PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
- Michie S, Johnston M, Abraham C, et al.: **Making psychological theory useful for implementing evidence based practice: A consensus approach.** *Qual Saf Health Care.* 2005; **14**(1): 26–33.
[PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
- Michie S, Atkins L, West R: **The behaviour change wheel: A guide to designing interventions.** (First edition), Silverback Publishing. 2014.
[Reference Source](#)
- Michie S, West R, Rogers MB, et al.: **Reducing sars-cov-2 transmission in the uk: A behavioural science approach to identifying options for increasing adherence to social distancing and shielding vulnerable people.** *Br J Health Psychol.* 2020; No Pagination Specified.
[PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
- Moola S, Munn Z, Tufanaru C, et al.: **Chapter 7: Systematic reviews of etiology and risk.** In *Joanna Briggs Institute Reviewer's Manual.* The Joanna Briggs Institute. 2020.
[Publisher Full Text](#)
- Munn Z, Peters MDJ, Stern C, et al.: **Systematic review or scoping review? Guidance for authors when choosing between a systematic or scoping review approach.** *BMC Med Res Methodol.* 2018; **18**(1): 143.
[PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
- Noone C, Warner N, Byrne M, et al.: **Investigating and evaluating evidence of the behavioural determinants of adherence to social distancing measures - A scoping review of COVID-19 research.** 2020.
<http://www.doi.org/10.17605/OSF.IO/TMKUX>
- Nyanchoka L, Tudur-Smith C, Thu VN, et al.: **A scoping review describes methods used to identify, prioritize and display gaps in health research.** *J Clin Epidemiol.* 2019; **109**: 99–110.
[PubMed Abstract](#) | [Publisher Full Text](#)
- O'Cathain A, Croot L, Duncan E, et al.: **Guidance on how to develop complex interventions to improve health and healthcare.** *BMJ Open.* 2019a; **9**(8): e029954.
[PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
- O'Cathain A, Croot L, Sworn K, et al.: **Taxonomy of approaches to developing interventions to improve health: A systematic methods overview.** *Pilot Feasibility Stud.* 2019b; **5**(1): 41.
[PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
- Perkins A, Espana G: **Optimal control of the COVID-19 pandemic with non-pharmaceutical interventions [Preprint]** *Epidemiology.* medRxiv. 2020.
[Publisher Full Text](#)
- Peters M, Godfrey C, McInerney P, et al.: **Chapter 11: Scoping reviews.** In E. Aromataris & Z. Munn, *JBI Reviewer's Manual.* (4th ed.). JBI. 2019.
[Publisher Full Text](#)
- Rathbone J, Carter M, Hoffmann T, et al.: **Better duplicate detection for systematic reviewers: Evaluation of Systematic Review Assistant-Deduplication Module.** *Syst Rev.* 2015; **4**(1): 6.
[PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
- Regmi K, Lwin CM: **Impact of social distancing measures for preventing coronavirus disease 2019 [COVID-19]: A systematic review and meta-**

analysis protocol. *MedRxiv*. 2020.

[Publisher Full Text](#)

Speight J, Skinner T, Hateley-Browne J, *et al.*: "Keep SAFE": A behavioural vaccine for COVID-19. *InSight+*. 2020.

[Reference Source](#)

Sterne JAC, Hernán MA, Reeves BC, *et al.*: ROBINS-I: A tool for assessing risk of bias in non-randomised studies of interventions. *BMJ*. 2016; **355**: i4919.

[PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)

Sterne JAC, Savović J, Page MJ, *et al.*: RoB 2: A revised tool for assessing risk of bias in randomised trials. *BMJ*. 2019; **366**: l4898.

[PubMed Abstract](#) | [Publisher Full Text](#)

Tricco AC, Lillie E, Zarin W, *et al.*: PRISMA Extension for Scoping Reviews (PRISMA-ScR): Checklist and Explanation. *Ann Intern Med*. 2018; **169**(7): 467–473.

[PubMed Abstract](#) | [Publisher Full Text](#)

van Eck NJ, Waltman L: Software survey: VOSviewer, a computer program for bibliometric mapping. *Scientometrics*. 2010; **84**(2): 523–538.

[PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)

West R, Michie S, Rubin GJ, *et al.*: Applying principles of behaviour change to reduce SARS-CoV-2 transmission. *Nat Hum Behav*. 2020; **4**(5): 451–459. Scopus.

[PubMed Abstract](#) | [Publisher Full Text](#)

WHO: Draft landscape of COVID-19 candidate vaccines. 2020.

[Reference Source](#)

Open Peer Review

Current Peer Review Status:  

Version 1

Reviewer Report 05 August 2020

<https://doi.org/10.21956/hrbopenres.14201.r27703>

© 2020 Dima A et al. This is an open access peer review report distributed under the terms of the [Creative Commons Attribution License](#), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.



Luiza Siqueira do Prado

Health Services and Performance Research EA 7425, Université Claude Bernard Lyon 1, Lyon, France

Alexandra L. Dima

Health Services and Performance Research EA 7425, Université Claude Bernard Lyon 1, Lyon, France

This is indeed a very well written protocol of a scoping review on determinants of adherence to social distancing measures during the COVID-19 pandemic. It provides a complete description of review items and fully adheres to the principles and practices of open science. They provide access to search strategies and the records retrieved, which, along with the codebook and the data extraction form, effectively ensure reproducibility. While we acknowledge that it is difficult to find points of improvement to such a thorough work, we would like to suggest the following points for authors' consideration:

1. One of the study eligibility criteria is that determinants should be included as independent variables (IV). We understand it as "excluding studies where determinants are dependent variables", but it may be interpreted also as selecting only quantitative observational studies. In the description of Stage 4, we see that experimental/interventional designs are included. In these studies, the intervention (vs control) would be the IV in the statistical analysis and determinants might be explicit or implicit in the choice of intervention components, or secondary outcomes. For some determinants, such as 'intention to distance physically', it might be difficult to tell whether the included studies consider it a determinant or a proxy for behaviour. Moreover, interventions to change determinants (with a view to changing behaviour) might also be informative. An explanation or further elaboration of this criterion might be useful.
2. The point above has implications for the data extraction – as it reads now in the codebook, determinants are only extracted for observational studies. But they could be implicit in intervention studies or explicitly stated in a logic model of the intervention. We agree with the first reviewer that it would be useful in this case to code the change techniques/methods used – and how they were linked with determinants by the authors of

the original study, if at all.

3. The focus of this review is on quantitative research, but in this emerging crisis qualitative inquiry is equally valuable for identifying determinants (e.g. Williams *et al.*¹). It would be useful to state why qualitative studies are excluded, or perhaps include them as well? If the authors prefer to focus only on quantitative information, mentioning this in the abstract will be useful for readers.
4. The term used for determinants is “behavioral determinants”. Are there ‘non-behavioral determinants’ in this context which would be excluded? The term “behavioral determinants” is used in public health to denote the impact of behaviour on health outcomes (as opposed to social, environmental, etc.), but in the context of studying determinants of a behaviour (distancing) can we talk about non-behavioral or is it just intended as ‘all determinants of this behaviour’? Would for example socio-demographic characteristics be excluded if they appear as IVs in a regression model with distancing as DV? Perhaps other distinctions to consider in the review would be between modifiable-non modifiable, and individual-environmental (and in the environment there could be different actors and behaviours facilitating social distancing). These would inform intervention by recommending modifiable determinants and identifying which actors it could target.
5. Following on the previous point, presence of interactions between determinants and background characteristics could be useful to code to guide tailoring of interventions.
6. In this topic, grey literature is likely to be very important. The Appendix with grey literature searches includes only ‘distancing’ as search term, while for the other sources it has already been expanded to other keywords (isolation, quarantine, etc.). It would be useful to use these other terms here as well. Moreover, from own experience with Google Scholar, title only searches might miss important contributions. It would perhaps be useful to compare with ‘allintext’ for relevance of entries.
7. The abbreviations RQ1, RQ2, etc., in "Stage 5: Collating, summarising, and reporting of results" refer to the research questions presented in Stage 1. Please add abbreviation where it first appears in the text.

References

1. Williams S, Armitage C, Tampe T, Dienes K: Public perceptions and experiences of social distancing and social isolation during the COVID-19 pandemic: a UK-based focus group study. *BMJ Open*. 2020; **10** (7). [Publisher Full Text](#)

Is the rationale for, and objectives of, the study clearly described?

Yes

Is the study design appropriate for the research question?

Yes

Are sufficient details of the methods provided to allow replication by others?

Yes

Are the datasets clearly presented in a useable and accessible format?

Yes

Competing Interests: We know the group and appreciate their work. We participate in several networking initiatives together. We do not feel this affected our ability to review impartially.

Reviewer Expertise: Behaviour change, health psychology, public health, health services research.

We confirm that we have read this submission and believe that we have an appropriate level of expertise to confirm that it is of an acceptable scientific standard.

Author Response 28 Aug 2020

Chris Noone, National University of Ireland, Galway, Galway, Ireland

We thank the reviewers for their constructive review of our protocol. In the revised version of the protocol, we have clarified that we think of behavioural determinants as the full range of factors that can be conceptualised within ecological models of health behaviour as potentially influencing behaviour. We also clarified that the determinants may be present in studies as either observed or manipulated variables. While we agree that categorising the potential determinants found as modifiable or non-modifiable, we feel that in the absence of behavioural intervention evidence, it is impossible to judge which potential behavioural determinants of adherence to social distancing measures can be modified. We have revised our codebook and data extraction form and these are now available on our OSF project page. Unfortunately, there are not enough members of our team with BCT coding experience available to carry this out. This would be an interesting follow-up study and we will note this in the discussion of our results paper and our data will be available for other teams who may wish to do this work. While we agree that qualitative research is vital to understand adherence to social distancing measures, we considered that it would be more feasible to focus specifically on quantitative research. We acknowledge that our grey literature search was limited by not including all of the terms related to social distancing and we will broaden the search if there are updates of this scoping review. Finally, we have added the abbreviation of research question at it's first mention.

Competing Interests: No competing interests were disclosed.

Reviewer Report 24 July 2020

<https://doi.org/10.21956/hrbopenres.14201.r27701>

© 2020 Norris E. This is an open access peer review report distributed under the terms of the [Creative Commons Attribution License](#), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.



Emma Norris 

Department of Clinical Sciences, Brunel University, Uxbridge, UK

This paper presents a thorough, clear protocol of a scoping review exploring the behavioural determinants of adherence to social distancing measures in research conducted during COVID-19. The authors are making clear attempts to make the results of this review as accessible as possible, using new visualisation techniques for evidence synthesis (EviAtlas), pre-registering their work, searches and data collection tools, as well as planning to pre-print the results to enable faster access by policy-makers etc.

My comments are:

1. There have been various other attempts to synthesise what is known about social distancing in COVID-19. Although these clearly do not focus on the behavioural determinants of social distancing, other related reviews should be mentioned and your own review distinguished from them e.g Chu *et al.* 2020¹; Mahtani *et al.* 2020²; Regmi & Lwin 2020³.
2. As well as coding for TDF, could you also code for the Behaviour Change Techniques used in studies using the BCTTv1? This would be particularly insightful for intervention studies.
3. Will inter-rater reliability of double-coding be performed, such as using Krippendorff's alpha? Such reliability calculations are typical for double-coding in systematic reviews and for behaviour change techniques e.g Howlett *et al.* 2018⁴.
4. PRISMA-ScR Checklist is described to be used for charting data – will this also be used as a reporting checklist for the final write-up?
5. Typo: 'must be measure' should be 'must measure'.

References

1. Chu D, Akl E, Duda S, Solo K, et al.: Physical distancing, face masks, and eye protection to prevent person-to-person transmission of SARS-CoV-2 and COVID-19: a systematic review and meta-analysis. *The Lancet*. 2020; **395** (10242): 1973-1987 [Publisher Full Text](#)
2. Mahtani KR, Heneghan C, Aronson: What is the evidence for social distancing during global pandemics? A rapid summary of current knowledge. *Oxford COVID-19 Evidence Service*. 2020.
3. Regmi K, Lwin C: Impact of social distancing measures for preventing coronavirus disease 2019 [COVID-19]: A systematic review and meta-analysis protocol. *medRxiv*. 2020. [Publisher Full Text](#)
4. Howlett N, Trivedi D, Troop N, Chater A: Are physical activity interventions for healthy inactive adults effective in promoting behavior change and maintenance, and which behavior change techniques are effective? A systematic review and meta-analysis. *Translational Behavioral Medicine*. 2019; **9** (1): 147-157 [Publisher Full Text](#)

Is the rationale for, and objectives of, the study clearly described?

Yes

Is the study design appropriate for the research question?

Yes

Are sufficient details of the methods provided to allow replication by others?

Yes

Are the datasets clearly presented in a useable and accessible format?

Yes

Competing Interests: Non-financial competing interests: I am Co-Chair of the European Health Psychology Society's Open Science SIG with Elaine Toomey.

Reviewer Expertise: Behaviour change, health psychology, evidence synthesis, open science.

I confirm that I have read this submission and believe that I have an appropriate level of expertise to confirm that it is of an acceptable scientific standard.

Author Response 28 Aug 2020

Chris Noone, National University of Ireland, Galway, Galway, Ireland

We're very grateful for these constructive comments. We have revised the protocol to highlight other recent evidence syntheses focused on social distancing measures and distinguished our scoping review from these. We appreciate the suggestion of including BCT coding of any interventions found. Unfortunately, there are not enough members of our team with BCT coding experience available to carry this out. This would be an interesting follow-up study and we will note this in the discussion of our results paper and our data will be available for other teams who may wish to do this work. Our limited resources are also forcing us to switch from data extraction in duplicate to the work of one reviewer being checked by another, so inter-rater reliability is no longer relevant. Regarding the use of the PRISMA-ScR for reporting, this is already mentioned in the first paragraph of the protocol section. Finally, thanks for pointing out the typo to us. It is now correct.

Competing Interests: I am on the EHPS Open Science Special Interest Group committee which is co-chaired by Dr Norris.