RESEARCH NOTE

Content analysis of behaviour change techniques in government physical distancing communications for the reopening of schools during the COVID-19 pandemic in Ireland [version 1; peer review: 1 approved, 1 approved with reservations]

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Abstract

Background: Effective government communications and leadership are central to the management of pandemics. Behavioural science can offer important insight into the development of such communications strategies. The extent to which established behaviour-change science is reflected in current government messaging campaigns to promote adherence to physical distancing measures in the context of the coronavirus disease 2019 (COVID-19) pandemic is unclear. The current study aimed to describe the behaviour-change content of a set of government-issued poster communications for the reopening of schools in Ireland during the COVID-19 pandemic in September 2020.

Methods: Posters targeting physical distancing behaviours in school settings were retrieved from the Government of Ireland website for analysis. Posters were independently coded for behaviour change techniques (BCTs) using the BCT Taxonomy Version 1, a hierarchically clustered taxonomy of 93 distinct BCTs across 16 groups. The Theories and Techniques tool was used to identify mechanisms of action (MoAs) linked to each of the identified BCTs. Eight posters were independently content-analysed by two members of the research team for BCTs and linked MoAs.

Results: Eight unique BCTs from six unique groups were identified in at least one poster. These BCTs were linked with 11 unique MoAs through which behaviour change is theorised to occur. Several
theoretically important groups of BCTs, such as Natural Consequences, Social Support, Shaping Knowledge, and Comparison of Behaviour, were underutilised or not included in any of the posters.

**Conclusion:** Future poster communications could benefit from including additional BCTs from key groups, particularly Natural Consequences. This article provides proof-of-concept evidence for future evaluations of government public health communications for behaviour-change content using existing taxonomies and tools.

**Keywords**
COVID-19, SARS-CoV-2, social distancing, physical distancing, behaviour change, BCT coding

This article is included in the [Coronavirus (COVID-19) collection](https://www.hrbopenres.org).
Introduction
Effective government communications and leadership are central to the management of pandemics. In response to public health crises, such as that posed by the ongoing novel coronavirus disease 2019 (COVID-19) pandemic, the government’s role includes enlisting public trust and cooperation with infection mitigation strategies to reduce the spread of infection and protect healthcare systems from becoming overloaded (Jetten et al., 2020; Levy, 2020; Siegrist & Zingg, 2014). Effective communications strategies can facilitate public trust and confidence, which can in turn increase public adherence to behaviour-based infection mitigation strategies (Carter et al., 2011; Siegrist & Zingg, 2014).

The fields of applied risk communication, cognitive and social psychology, sociology, and public policy have all traditionally provided important insights to guide pandemic communications strategies. The role of health psychology and behavioural sciences more broadly in responding to public health emergencies has become increasingly clear across the course of the COVID-19 pandemic. Several key principles in harnessing behavioural science in the development of public health campaigns to maintain physical distancing in response to the COVID-19 pandemic have been identified (Bonell et al., 2020). Specifically, communications should provide clear and specific guidance; utilise pro-social messages promoting collective group identities and supportive social norms (e.g., “protect each other,” “stand together”); avoid messages based on fear or disgust in relation to others; avoid authoritarianism; promote action planning; utilise rewards and incentives; be professionally designed, visually appealing and widely visible (e.g., using responsible mass and social media campaigns and trusted spokespeople to emphasise collective adherence); be transparent regarding theory of behaviour change and evidence used in their development; and involve relevant stakeholders and audience groups in their design (Bonell et al., 2020). Furthermore, messaging strategies must be consistently evaluated and re-evaluated to ensure evolving technical knowledge of the disease as well as relevant socio-cultural dynamics are reflected (Hyland-Wood et al., 2021).

The behaviour change technique (BCT) taxonomy (Michie et al., 2013) is an extensive catalogue of 93 distinct BCTs, which offers a method for specifying interventions. BCTs are the smallest observable, replicable component or active ingredient of an intervention designed to change behaviour. Since its publication, coding of BCTs within individual and group-level behavioural interventions using the BCT taxonomy has become commonplace (e.g., Bayly et al., 2018; Bentley et al., 2020; Goodwin et al., 2016; Presseau et al., 2015). However, this type of analysis has been much less frequently applied to government public health communications that aim to change the public’s behaviour on a mass scale. Furthermore, recent advances in our understanding of the mechanisms of action (MoA) through which individual BCTs have their effects (Carey et al., 2019) may provide important insight to support future intervention development and evaluation. The current article presents a content analysis to identify which BCTs and associated MoAs were present in a set of government poster communications issued in preparation for the reopening of schools during the COVID-19 pandemic in Ireland.

Methods
The current study forms part of a broader project focused on physical distancing in Ireland, which is registered with the Open Science Framework (Durand et al., 2021). A protocol for this research has previously been published (Durand et al., 2020). Ethical approval for the broader project was obtained from the Research Ethics Committee at NUI Galway (Ref no.: HRB20-Apr-18).

Study aim
The aim of this study was to describe the content of government COVID-19-related public health physical distancing communications using BCTs and MoAs.

Procedure
Data gathering and descriptive analysis. Posters for the reopening of schools in September 2020, following their closure in response to the third wave of COVID-19 infections in Ireland, issued by the Department of Education and published in English were retrieved from the Government of Ireland website. Posters designed for both primary and post-primary schools that targeted physical distancing behaviours were included. The only exclusion criterion was not targeting physical distancing behaviour. It was anticipated that posters would likely target multiple COVID-19 mitigation behaviours in addition to physical distancing. Physical distancing behaviour was operationalised as any behaviour aimed at reducing the number of times a person comes into close physical contact with others from outside of their household. The following data were extracted independently by two members of the research team (HD and GJM) from each poster: poster title as issued on the government website; number of pages; target population; target behaviours; and type of content (specifically, text, illustrated images, or pictograms/icons).

BCT content analysis. Posters were independently coded for behaviour-change content by two coders (HD and GJM). Specifically, posters were coded for BCTs using the BCT Taxonomy Version 1 (Michie et al., 2013). MoAs associated with all BCTs identified within the posters were then identified using the Theories and Techniques tool, which provides a “heat map” of 74 BCTs and 26 MoAs linked to each BCT. These links between BCTs and MoAs were determined via a literature synthesis study (Carey et al., 2019) and an expert consensus study (Connell et al., 2019), evidence from which was triangulated to produce the Theories and Techniques tool (Johnston et al., 2021).

The coding protocol used to guide this process is available as Extended data (Durand et al., 2021). The study protocol dictated that disagreements between independent coders would be resolved through discussion; however, agreement between reviewers was 100%. Data were then tabulated and presented to the wider research team for consensus. This approach to
content-analysing government communications draws on previous work by Seppälä et al. (2018), which involved a content analysis of policy papers using the BCT Taxonomy Version 1.

Results
A total of eight posters were included in the content analysis. According to Government of Ireland policy, all posters issued for public use have been published on the government website; therefore, this sample of posters is considered exhaustive for the setting and time period in question. All posters were published online on the 7th of September 2020. These were either originally issued or re-issued with modifications specific to the school setting on this date. All but one poster addressed multiple COVID-19 mitigation behaviours in addition to physical distancing. A description of included posters is provided in Table 1.

The results of the content analysis and examples of behaviour-change content from the posters are presented in Table 2. Eight unique BCTs were identified in the posters, linking to 11 unique MoAs. Instruction on how to perform a behaviour, prompts/cues, and credible source were the most frequently coded BCTs, appearing in all included posters. All other coded BCTs ($n = 5$) were utilised in 50% or fewer posters. Note that although the majority of posters targeted several COVID-19 mitigation behaviours (e.g., symptom awareness, wearing a face covering, hand washing), the following content analysis pertains only to aspects of the posters related to physical distancing behaviours.

Discussion
The current article presents results of a content analysis of government physical distancing posters issued ahead of school reopening during the COVID-19 pandemic in Ireland. Most posters targeted several COVID-19 mitigation behaviours in addition to physical distancing. Eight unique BCTs from six unique groups were identified in at least one poster. Instruction on how to perform a behaviour, prompts/cues, and credible source were the most commonly used BCTs, appearing in all included posters. The eight present BCTs were linked to 11 unique MoAs through which behaviour change is theorised to occur. These MoAs reflect a diversity of psychological and physical/environmental processes upon which the included BCTs may act to promote adherence to physical distancing in the school setting. Findings from this content analysis may be used to inform future refinement of poster communications strategies, specifically to guide selection of additional relevant BCTs to target key MoAs theorised to increase adherence behaviour.

| Poster label | No. pages | Target population | Target behaviours | Type of content |
|--------------|-----------|-------------------|-------------------|----------------|
| 1. School specific measures in place | 1 | School-going students; teachers | Hand washing, coughing/sneezing etiquette, distancing, symptom awareness | Text and icons |
| 2. Information for visitors | 1 | Visitors to schools | Distancing | Text and icons |
| 3. Stay safe guidelines at work | 1 | School staff | Symptom awareness, wearing a face covering, hand washing, distancing, hygiene, coughing/sneezing etiquette, allowing ventilation, recording contacts | Text and icons |
| 4. Returning to Primary Schools Junior Infants to 2nd Class | 2 | Parents of primary school-going students | Symptom awareness, distancing, hand washing, coughing/sneezing etiquette | Text and illustrations |
| 5. Safe school advice for parents | 2 | Parents of primary school-going students | Symptom awareness, distancing, hand washing, coughing/sneezing etiquette, wearing a face covering | Text and illustrations |
| 6. Support for post-primary students | 1 | Post-primary school-going students | Distancing, hand washing, wearing a face covering | Text and illustrations |
| 7. Returning to Primary and Post Primary Special Schools | 2 | Parents of primary and post-primary school-going students in special classes | Symptom awareness, distancing, hand washing, coughing/sneezing etiquette, wearing a face covering | Text and illustrations |
| 8. Returning to special schools advice for parents | 2 | Parents of school-going students in special schools | Symptom awareness, distancing, hand washing, coughing/sneezing etiquette, wearing a face covering | Text and illustrations |
The current analysis revealed some important gaps in the poster communications strategy for the school setting. Several theoretically important groups of BCTs were underutilised or not utilised at all. In particular, BCTs grouped under the Natural Consequences cluster heading within the BCT taxonomy did not appear in any of the posters. BCTs within the National Consequences grouping relate to a range of possible social, emotional, and health consequences of performing (or not performing) a behaviour. This omission is despite recent evidence indicating that emphasising natural consequences of physical distancing behaviours (e.g., slowing the spread of COVID-19 in the community, saving lives) was the most strongly endorsed approach to motivate adherence to physical distancing guidance in a nationally representative sample of Irish participants (Durand et al., 2021). Several of these Natural Consequences BCTs (e.g., Information about health consequences) could be integrated into future poster communications. In addition, MoAs reflecting social processes (e.g., social influences, norms, subjective norms) were not targeted by any of the included BCTs, despite being highlighted as important targets for public health messages to promote physical distancing (Bonell et al., 2020). BCTs under Social Support and Comparison of Behaviour groups within the BCT Taxonomy Version 1 may be integrated into future poster communications to target these processes.

Though this analysis provides useful information to inform future poster design, it is important to consider that posters are just one form of communication utilised in public health communication strategies. Some of the limitations of the poster communications identified in this study are inherent to the poster medium itself. For example, feedback and monitoring are theoretically important strategies to promote adherence to physical distancing that do not lend themselves to the poster medium. Furthermore, the static nature of posters means their design for inclusion in public messaging campaigns is challenging. The posters included in this analysis are required to convey a lot of information to target several distinct behaviours, which may cause confusion. Recent evidence identified confusion about government guidelines as a barrier to adherence to physical distancing (Farrell et al., 2021). Poster communications must convey clear, specific, and consistent guidance in the context of rapidly changing situations and environments.

**Strengths and limitations**

The current study represents one of few attempts to content-analyse government public health communications for BCTs. That said, there are certain limitations that must be considered. First, only poster communications, specific to
the school setting, were analysed. Posters are only one part of the government’s communications strategy, and shortcomings in posters may not be reflective of shortcomings in the overall communications approach. It may be that other important BCTs (e.g., Feedback and Monitoring BCTs) may be present in other communication formats, such as video or audio transmissions. Limitations notwithstanding, this article provides important proof-of-concept that this kind of analysis can be applied to public health communications, which may play an important role in strategy refinement.

**Data availability**

**Underlying data**

Open Science Framework: Identifying and addressing psychosocial determinants of adherence to physical distancing guidance during the COVID-19 pandemic. [https://doi.org/10.17605/OSF.IO/YSV98](https://doi.org/10.17605/OSF.IO/YSV98) (Durand et al., 2021).

This project contains the following underlying data:

- Return to School Posters 1-8 in PDF format (under ‘Work Package 3: Content Analysis’)

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

**Extended data**

Open Science Framework: Identifying and addressing psychosocial determinants of adherence to physical distancing guidance during the COVID-19 pandemic. [https://doi.org/10.17605/OSF.IO/YSV98](https://doi.org/10.17605/OSF.IO/YSV98) (Durand et al., 2021).

This project contains the following extended data:

- WP3 Coding Protocol.pdf (under ‘Work Package 3: Content Analysis’)

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

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Open Peer Review

Current Peer Review Status: ✓ ?

Version 1

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This study identifies the behaviour change techniques (BCTs) and the associated mechanisms of action (MoAs) included in a set of Irish government physical distancing posters issued ahead of school reopening during the COVID-19 pandemic.

The article is clearly written. It contains useful information for the behavioural science community and government public health, which can contribute to optimise communication strategies.

There are a couple of suggestions and minor points that might be useful to clarify in the text:

Methods:
- In the first paragraph, the authors mention that the current study is part of a broader project and cite the published protocol. By reading the published protocol, we gained a deeper insight about the project. We therefore suggest adding the objective of the broader project to contextualise the readers.

Results:
- The results are clearly described; tables systematise the results in a comprehensive way.
- In Table 2, we recommend including the BCTs cluster. This allows a greater understanding of the behaviour-change content, and it is useful for the discussion section, when authors mention the clusters that are not present in the posters.
- In our perspective using the term unique associated with the BCTs and the MoAs is a
redundancy, according to their definition and characteristics. We recommend removing this aspect in the results and discussion section and the abstract.

- It could be helpful for future poster design to present information on measures of central tendency and dispersion (e.g., average number of BCTs per poster, the maximum and minimum number of BCTs per poster). We understand that this is a Research Note and space is limited, but this information can be presented in one or two sentences.

- As supplementary material, we suggest presenting the tabulated data (mentioned in the methods section) with the posters’ content and the associated BCTs; it provides transparency and may be useful, for example, for researchers and poster developers.

**Discussion:**
- The discussion presents a relevant reflection on what could be considered in future communication strategies and clearly identifies the study limitations.

- The authors acknowledged that posters convey a lot of information to target several distinct behaviours, which may cause confusion. Information about the maximum and minimum number of BCTs per poster for social distancing (see our previous comment) may further reinforce the notion that posters targeting single behaviours could be pursued and evaluated, particularly in light of limitations inherent to their static nature.

- In the results section, the authors coded the BCT prompts/cues (7.1) considering that “the present of posters in public places may act as a prompt/cue”. We understand the rationale for this decision. Nonetheless, posters are also a mode of delivery of BCTs, based on the Mode of Delivery Ontology (Marques et al., 2020). Considering that this work focuses on the content analysis of posters, another option would be not to regard a poster *per se* as the BCT 7.1. We suggest acknowledging this aspect in the discussion section.

- This work shows that BCTs in the Natural Consequences, Social Support, Shaping Knowledge, and Comparison of Behaviour clusters, were underutilised or not included in any of the posters. We suggest comparing these findings with the work of Dimanlig-Cruz et al. (2021), on physical distancing messages on social media, which overall showed a slightly different use of BCTs. Such comparison may be helpful for e.g., researchers and poster developers in future work.

**Other comments:**
- We suggest adding a conclusion section with a short paragraph.

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Is the work clearly and accurately presented and does it cite the current literature?
Partly

**Is the study design appropriate and is the work technically sound?**
Yes

**Are sufficient details of methods and analysis provided to allow replication by others?**
Yes

**If applicable, is the statistical analysis and its interpretation appropriate?**
Not applicable

**Are all the source data underlying the results available to ensure full reproducibility?**
Yes

**Are the conclusions drawn adequately supported by the results?**
Yes

**Competing Interests:** No competing interests were disclosed.

**Reviewer Expertise:** Behaviour change interventions in health

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, however we have significant reservations, as outlined above.

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**Stephan U. Dombrowski**
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Thanks for the opportunity to review this interesting paper. I have a few minor comments. In general, this is a clear, succinct and nicely presented study examining the BCT content of Government produced public health posters in Ireland.

Abstract: Is the word 'unique' required in the results section, or are the BCTs, groups and MoAs unique by definition? (same question applies to results in the main paper).

Abstract: I am not sure the following is a result of the study: "Several theoretically important groups of BCTs, such as Natural Consequences, Social Support, Shaping Knowledge, and Comparison of Behaviour, were underutilised or not included in any of the posters." The aim of
the study was to examine the content of the posters, not the content that was not in the posters. It is also not clear how the underutilized groups of BCTs were determined. This might be more of a discussion point, rather than a result of the study.

Abstract: Similarly, the conclusions state: "Future poster communications could benefit from including additional BCTs from key groups, particularly Natural Consequences." - it might be more useful to provide an answer to the research aim which was a focus on what was present, rather than what was not present, or could have been present.

Discussion: I think the discussion does well presenting reflections on what else could be considered in future campaigns, and is the appropriate place for such elaborations.

Discussion: I agree with the notion that additional BCTs might add value to the posters, but wonder if that view is due to the specific focus on social distancing alone. The more BCTs that are added, the more words and pictures are likely to be added, which could perhaps distract from the other key behaviours and messages. A balance needs to be struck between number of behaviours, BCTs, words, pictures and icons. Perhaps adding more does not always lead to better effects and outcomes, unless something else is taken away, which in itself might have consequences? Is there anything in the posters that perhaps shouldn't be there?

Discussion: I wonder if the article could finish with a conclusion section, rather than ending with strengths and limitations.

Is the work clearly and accurately presented and does it cite the current literature? Yes

Is the study design appropriate and is the work technically sound? Yes

Are sufficient details of methods and analysis provided to allow replication by others? Yes

If applicable, is the statistical analysis and its interpretation appropriate? Not applicable

Are all the source data underlying the results available to ensure full reproducibility? Yes

Are the conclusions drawn adequately supported by the results? Partly

Competing Interests: No competing interests were disclosed.

Reviewer Expertise: behaviour change

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.