Short communication

A workshop to co-design messages that may increase uptake of vaccines: A case study

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ABSTRACT

The present case study describes a co-produced and theoretically informed workshop wherein messages were co-designed to increase the uptake of future COVID-19 vaccines in the United Kingdom. Co-design can enhance the legitimacy and effectiveness of public interventions, but many researchers, service providers, and policymakers may be uncertain where to start. This demonstrative example applies behavioural science and design thinking theory, illustrating how others can integrate theoretically informed co-design into similar and more complex projects efficiently. The workshop brought together members of the public, immunisers, and public health specialists. A narrative analysis was conducted to identify themes related to vaccine hesitancy. The workshop's supporting materials are made available as supplemental materials, which can be modified for future workshops. The discussion encourages additional workshops to be conducted, including diverse members of the public, to co-design novel solutions to improve public health more generally.

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1. Introduction

Even where vaccines are widely available and accessible, as in the United Kingdom, public health campaigns may still face vaccine hesitancy. The effectiveness of pro-vaccine campaign messages based on facts and figures is likely limited, as systematic reviews do not identify knowledge as a predictor of vaccine hesitancy.[1,2] Behavioural science can offer empirically informed ways forward by acknowledging that choices are influenced by factors other than knowledge, such as habits and values.[3] The current study demonstrates how pro-vaccination messages can be informed by behavioural science.

While some pro-vaccination messages are deeply informed by behavioural science, it is often unclear whether or how those messages were co-designed.[4,5] Co-design is part of a co-production process, which represents a shift away from isolated experts designing interventions to multi-perspective teams that include end-users,[6] and it is recommended to create better public policy and services.[7] The present study applies a theory of design thinking to the co-design process.[8] Design thinking is a creative process that matches people's needs with what can be converted into a product or service.

Co-design can increase the acceptance and feasibility of campaigns to improve public health. However, planning for effective co-design requires time, flexibility, and financial resources, all of which can be stifled by structural factors.[9] Additionally, during the COVID-19 pandemic, co-design in the United Kingdom had to be conducted in a socially distanced fashion. While the details of a co-design process will differ across projects,[10] a demonstrative example can provide foundational support for researchers, service providers, and policymakers to start integrating co-design into similar and more complex projects. The aim of the current workshop was to co-design pro-vaccination messages that may increase the uptake of future COVID-19 vaccines in the United Kingdom.

2. Methods

The workshop took place as a two-hour Microsoft Teams meeting on the 1st of July 2021. The supporting materials are provided in Supplemental Materials A. Narrative analysis is used to describe the results, which focuses on emergent themes.[11] The workshop was discussed with five public contributors before obtaining ethical approval from the University of Warwick (BSREC ID: 87.20–21). The workshop facilitators included the chief investigator, a

research fellow, a public involvement lead, and our dedicated public contributor.

2.1. Participants

Recruitment commenced six weeks before the workshop. We aimed to recruit eight members of the public, four immunisers, four public health specialists, and four policymakers. For the purposes of the present workshop, we aimed to recruit people who could offer diverse perspectives across ages, genders, and occupations. Although we did not target people based on their vaccine hesitancy status, the messages for the workshop were informed by vaccine hesitant people [12]. We identified professional participants using medical school networks and snowballing. We recruited public members to participate in the workshop through links with the NIHR Applied Research Collaboration (ARC) West Midlands Public Advisory Committee (adults with experience of involvement in research) and 'Envision' (an organisation working to empower young changemakers to shape their future).[13] Participants provided their informed consent via an online survey, which included an item confirming that they could attend using their video camera.

2.2. Workshop

The workshop agenda was emailed to participants the day before the workshop, see Fig. 1. The agenda applied a five-stage design thinking process. The five stages include Empathise, Define, Ideate, Prototype, and Test.[14].

Empathise. To help participants empathise with the moral intuitions of individuals who exhibit high levels of vaccine hesitancy, the workshop began with a presentation summarising behavioural research on the Moral Foundations Theory.[15] Moral Foundations Theory describes automatic intuitions, called foundations, that influence moral judgements around what people ought to do. The foundations include care (concerns about others' wellbeing), fairness (concerns about proportionality), loyalty (about group relations), authority (about tradition), sanctity (about purity), and liberty (about freedom). Research conducted in Australia and the United States identified links between several foundations and parental attitudes towards vaccination.[16,17] Both studies suggest that foundation-aligned messages could increase parents' vaccine uptake for their children. A survey conducted in the United Kingdom in April 2021 identified relationships between several foundations and people's attitudes towards vaccines in general, including

AGENDA		
Empathise	11.00 – 11.05	Welcome -Workshop aims -Time for latecomers -Agenda
	11.06 – 11.10	Warm Up / Stage Setting
	11.11 – 11.20	Background Theory and Empirical Findings
	11.21 – 11.30	More recent research during COVID-19
Define	11.30 – 11.35	Defining team tasks
Ideate / Prototype	11.36 – 12.00	Breakout teamwork (draft)
	12.01-12.10	Break
Test	12.11– 12.25	Share draft message in main gallery
Ideate / Prototype	12.26 – 12.40	Breakout teamwork (revise)
Test	12.41– 12.55	Share final message in main gallery
	12.56 – 13:00	Closing

Fig. 1. Workshop agenda.

vaccine hesitancy, and COVID-19 vaccines specifically.[12] Briefly here, people with greater vaccine hesitancy tended to endorse the sanctity and liberty foundations more strongly and to endorse the authority and care foundations more weakly.

Define. Participants split into four breakout teams composed of participants from each planned participant group and one facilitator. Each team aimed to design a message that could increase the uptake intentions of people likely to refuse future COVID-19 vaccinations using one of the identified foundations: high-sanctity, high-liberty, low-authority, and low-care. For example, the high-liberty team aimed to design a message that could increase the intentions of people who strongly endorse the liberty foundation.

Ideate and Prototype. To encourage creativity, facilitators asked participants to draw a half-image of an object semantically related to their team foundation. Then, participants introduced themselves as they shared their images, see Fig. 2. Next, facilitators asked participants to write words/phrases related to their foundation's relationship with vaccine hesitancy on an online discussion board, see Fig. 3, and helped participants thematically arrange those words/phrases. Reflective thinking, storytelling, and conversations were encouraged. Finally, facilitators asked participants to draft a prototype message using identified themes.

Test, Revise, and Final Test. Teams returned to the main gallery to share their prototypes. Our dedicated public contributor invited
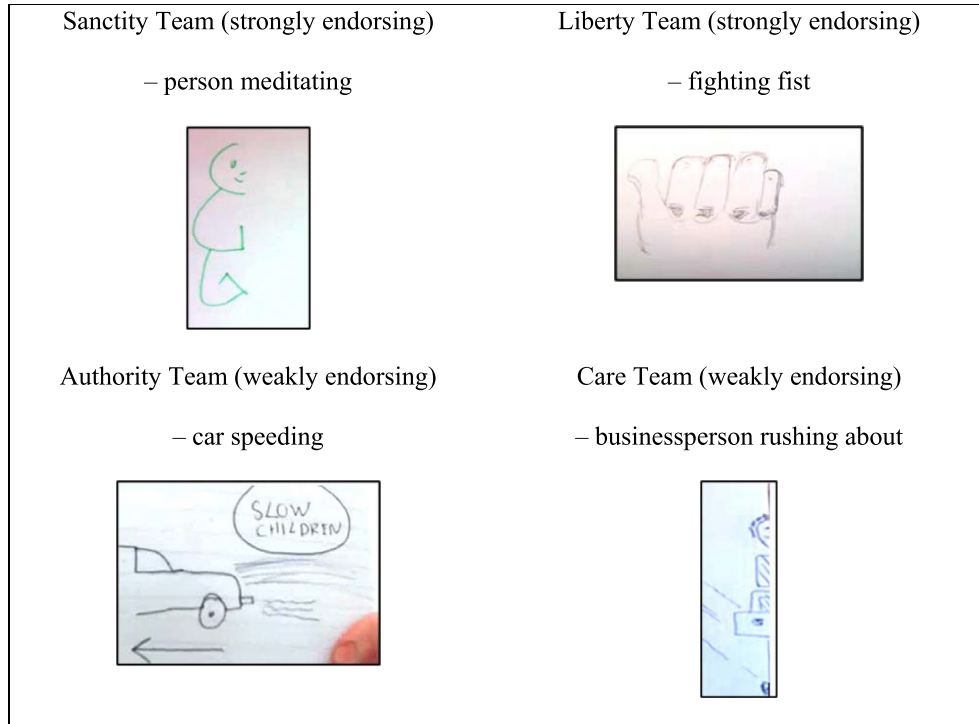

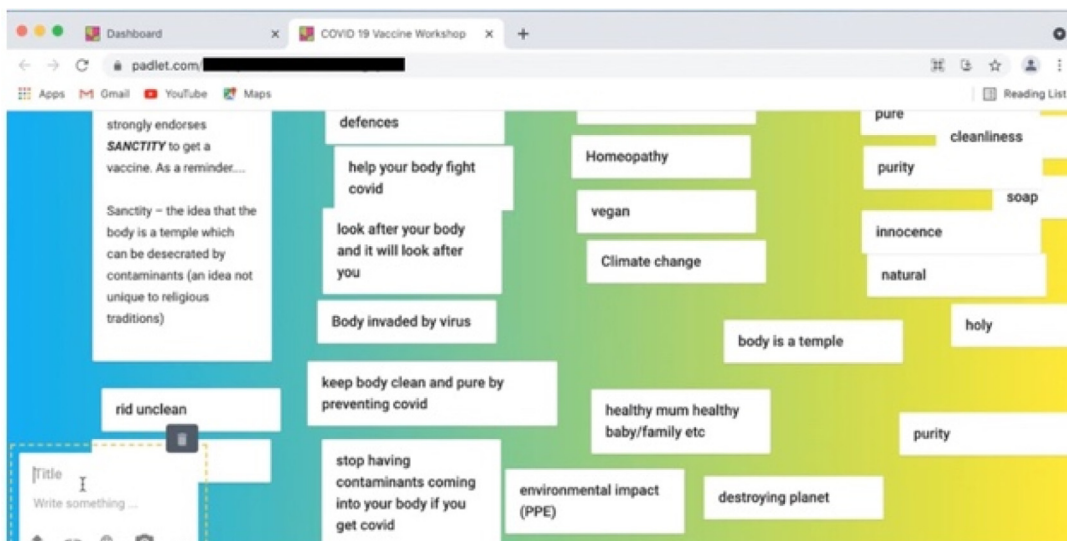**Fig. 2.** Example half images.

Fig. 3. The Sanctity Team's online discussion board mid-session.

participants to discuss what they liked about the messages and how they could be improved. Then, the teams returned to their breakout sessions to revise their messages, before returning to the main gallery to share their final messages. Lastly, participants were invited to provide feedback about what they liked and how future workshops could be improved via an anonymous survey.

2.3. Post-Workshop revisions

After the workshop, facilitators reflected on how original, logical, and well-crafted each message was, as defined by the Creative Product Analysis Matrix.[18] Then, one week later, they met to revise messages. A professor of public health and a market expert also attended to provide outsiders' perspectives. After the messages were finalized, the half-images, discussion boards, and revised messages were shared with a graphic designer who created accompanying illustrations with facilitator input.

3. Results

Seven public members, five immunizers, and five public health specialists participated. No policymakers attended. Policymakers expressed that an invitation sent six weeks ahead was too far in advance to commit and that an invitation received one week ahead was not enough notice. At least one participant in every team was unable to turn their camera on, e.g., due to an unexpectedly poor internet connection.

3.1. Ideation and prototyping.

During the initial ideation and prototyping stages, participants discussed their experiences talking to people about taking up COVID-19 vaccines. Healthcare workers recalled conversations that took place in practice that took place with people who had decided to vaccinate. Public contributors recalled conversations that took place away from vaccination sites where people could express more hesitant attitudes.

Themes underlying each team's message emerged. The sanctity team discussed 'treatment trade-offs'. One trade-off involved people taking the vaccine now to avoid potential medications later, e.g., one participant said: "*if you catch COVID you're going to have to have all these treatments to stay alive, and, therefore, actually have the vaccine*" (-public contributor). The second trade-off involved taking the vaccine now to avoid ongoing environmental contamination, e.g., another participant said: "*I wonder whether we can balance putting something into my body versus destruction of the planet with all the extra PPE, plastics, etc.*" (-immuniser). The liberty team discussed the 'embodiment of freedom', e.g., one participant pondered: "*[how] about starting with a 'what would make you free'... 'family holiday', 'partying', 'football'? All of these become possible with the COVID vaccination.*" (-public contributor). The authority team talked about 'meaningful relationships', e.g., one participant recalled: "*a granddaughter and a grandmother came for the grandmother's vaccination, and she [the granddaughter] was translating for her... it was just lovely*" (-immuniser). Participants in the care team discussed 'self-serving perspectives', e.g., one participant noted: "*They don't have a chance to think on wider issues that are affecting everyone. You know that they are, they just shut them out*" (-public contributor).

3.2. Test

During the first test participants noted that they liked familiar and punchier messages. However, caution was raised against this as the only guiding principle. For instance, an initial message stat-

ing "party like it's 1999" did not resonate with younger contributors.

3.3. Revisions

As teams revised their messages, some focused on improving message clarity while others explored novel ways forward. The liberty team believed that further research was needed to determine what opportunities would persuade different people to be vaccinated, e.g., haircuts or vacations. The authority team explored the possibility of using other media, e.g., animations. In both these instances, facilitators expressed positive interest and guided participants back to the defined task.

3.4. Final Test

The final messages produced during the workshop are in Table 1. Fifteen of the 17 participants completed the feedback survey. No participants commented on the readability of the messages. Responses suggest that participants liked the workshop's structure and the variety of people involved, e.g., that our dedicated public contributor had a large speaking part. Three participants noted technical problems and would have preferred a face-to-face workshop, but two others found the online platform more accessible. Five participants wanted more time for independent brainstorming.

3.5. Postworkshop revisions.

The facilitators, professor, and market expert agreed that elements of the messages could be better crafted. Revisions are described in Table 1. The final products with their accompanying illustration are provided in Supplemental Materials B and at Open Science Framework (https://osf.io/4wvur/).

4. Discussion

The present case study demonstrates how a theoretically informed workshop can be conducted to co-design public health messages. The workshop focused on future COVID-19 vaccinations but did not specify when or for whom they may be made available.

The messages produced at the workshop may be further revised to better fit the context within which they are delivered. In the spirit of co-design, such revisions could consider end-user insights. For instance, the messages themselves could be delivered as targeted text messages or on social media. Alternatively, adverts with pictures could be posted where people who are likely to automatically appreciate the messages tend to congregate.

A limitation of the workshop is that we did not purposefully recruit public contributors who are vaccine-hesitant and future workshops may seek to do so. The messages were, however, informed by research with vaccine-hesitant people – and they could be tested with vaccine-hesitant people. Another limitation was that no policymakers attended, and it is unclear when and how they should be invited. Where the event itself can be planned with policymakers, then those policymakers may be more likely to attend [19].

Although ethical approval was obtained for the current workshop, it may not be required for other events; project leads should consult with their administration. Participant feedback suggests ways to enhance future workshops. Some participants wanted time for individual brainstorming, which could be built into future workshops or material could be provided to facilitate brainstorming in advance. Some participants struggled with technology. Where online meetings are preferred, the technology and skills

Table 1
Co-designed messages and revisions.

Group	Message from workshop	Adjustments	Final Messages
Sanctity (strongly-endorse)	Viruses fight dirty: let's make COVID. a clean fight! Keep your body pure, safe and healthy. Boost your body's natural defences and avoid drugs if you catch COVID The COVID Pandemic is harming our environment: Restore the natural order. COVID has wasted enough time. Don't let COVID-waste impact our children's future.	Better crafting needed -work in behavioral directions to "get vaccinated" -avoid the term "drugs"	Viruses fight dirty: let's make COVID a clean fight! Keep your body pure, safe and healthy. Boost your body's natural defences. Restore the natural order. COVID has wasted enough time. Don't let COVID-waste impact our environment and our children's future. Get your vaccine now.
Liberty (strongly-endorse)	What would make you free? What did you miss most? Would you like that back? Get free from Covid.Get vaccinated.	Concerns about originality. Could be better crafted. -clarify spacing	What would make you free? What did you miss most? Would you like that back? Get free from Covid. Get vaccinated.
Authority (weakly-endorse)	It takes a community. As a family, let's live our lives with each other, hand in hand, around the world. Vaccinate to bring our families, young and old, back together.	Concerns about originality Could be better crafted. -avoid redundancy -sharpen tone	Let's live our lives hand in hand. Choose the vaccine: bring our families, young and old, back together.
Care (weakly-endorse)	One small jab for you, one life saving impact for your family and friends. Please have your jab to save others in your community.	Concerns about logic -this message must target people who weakly endorse care, so need to move away from 'saving lives' and 'protecting others'	One small jab for you, one giant step away from COVID.

required to engage should be as simple as possible. Participants should be informed of the technology and skills needed to fully engage pre-workshop, but inevitably some participants will attend without them. Facilitators should prepare to help participants experiencing challenges before the workshop through role-play and scenario planning. During the workshop, facilitators may need to actively invite quieter participants to contribute and ensure everyone's perspectives are considered.

5. Conclusions

A two-hour online workshop provided a successful platform for multi-disciplinary teams to co-produce pro-vaccination messages informed by behavioural science. Future workshops may use the same approach to tackle similar and more complex topics, e.g., designing new public health services. The content of such workshops should be tailored to fit the topic at hand. Our experience in running this workshop allows us to review some limitations and offer advice to those who choose to take up this methodology.

Author contributions

The workshop work idea was conceived by KAS and revised in collaboration with all co-authors. The investigation was conducted by SR, KAS, LK, and MS with supervision from AC. All co-authors helped revise the messages. KAS wrote the original draft. All co-authors contributed to the preparation, creation, and presentation of this work.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Acknowledgements

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