

JITSUVAX:
Jiu-Jitsu with Misinformation in the Age of Covid

Report on field test of inoculation talk

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Summary

This document reports on Experiment 2 of Task WP3.2 of the JITSUVAX project, designed to explore the interpersonal transfer of psychological inoculation by prompting people to participate in discussions on a closed-loop social media network.

Scope and purpose of this document

Here we describe the methodology and development of the study and the outcomes of this work. We describe the methods and outcome of this experiment to study the effects of psychological inoculation (i.e., warning individuals about potential future attacks on their attitudes and beliefs in order to safeguard them from persuasion and misinformation) on subsequent talk between members of the general public in a closed-loop social media network.

Project overview

Vaccine hesitancy—the delay or refusal of vaccination without medical indication—has been cited as a serious threat to global health by the World Health Organization (WHO), attributing it to misinformation on the internet. The WHO has also identified Health Care Professionals (HCPs) as the most trusted influencers of vaccination decisions.

JITSUVAX will leverage those insights to turn toxic misinformation into a potential asset based on two premises:

1. The best way to acquire knowledge and to combat misperceptions is by employing misinformation itself, either in weakened doses as a cognitive “vaccine” in the inoculation paradigm, or through thorough analysis of misinformation during “refutational learning”.
2. HCPs form the critical link between vaccination policies and vaccine uptake.

The principal objective of JITSUVAX is to leverage misinformation about vaccinations into an opportunity by training HCPs through inoculation and refutational learning, thereby neutralizing misinformation among HCPs and enabling them to communicate more effectively with patients. We will disseminate and leverage our new knowledge for global impact through the team’s contacts and previous collaborations with WHO and UNICEF.

Background

Anti-vaccination attitudes are supported and sustained by misinformation, widely spread on the internet and via social media. Misinformation is notoriously difficult to debunk: when people learn that information they have previously acquired is incorrect, they may acknowledge the correction (and even reduce their belief in the corrected information; Swire et al., 2017; Swire-Thompson et al., 2020), but they may nonetheless continue to rely on this (false) information in the future when making inferences about a situation (e.g., Ecker et al., 2011; Ecker et al., 2010). This seemingly paradoxical “I know it’s false but I think it’s true” behaviour is the signature of the “stickiness” of misinformation. Misinformation sticks to people’s minds even in situations in which they have no ideological or motivational incentive to stick to their erroneous beliefs.

Psychological “inoculation” has been widely implemented as a method to counter the influence of misinformation by preemptively exposing people to the misleading information they could encounter (Lewandowsky & van der Linden, 2021). In the same way that a vaccination stimulates the body into generating antibodies by imitating an infection, which can then fight the real disease when an actual infection occurs, psychological inoculation stimulates the generation of counterarguments that prevent subsequent misinformation from sticking. This is done in a controlled setting that teaches participants about the flaws in misinformation and warns them to not get influenced by them. As van der Linden and colleagues (2017) put it: “By preemptively warning people against misleading tactics

and by exposing people to a weakened version of the misinformation, cognitive resistance can be conferred against a range of falsehoods in diverse domains” (p. 1141).

Inoculation interventions have been widely implemented and meta-analyses show that they are successful at increasing resistance to misinformation (Banas & Rains, 2010; Lu et al., 2023). Nevertheless, a challenge remains to spread this “psychological vaccine” (inoculation) in a way that matches the spread of the “psychological virus” (misinformation). A promising avenue to explore is whether the effects of inoculation interventions spread beyond those who have been inoculated. In WP2.2 of JITSUVAX we developed two gamified inoculation interventions, Bad Vaxx and VaxBN. In Deliverable 2.2 we reported on studies exploring whether the effects of inoculation interventions spread beyond those who have been inoculated through a gamified intervention by looking at discussions on the social media platform Reddit. Specifically, we investigated whether people who had played an inoculation game and commented about it on a Reddit thread about the game subsequently engaged in more issue-relevant discussions (e.g., about education, misinformation, or vaccinations). We found preliminary evidence that this was the case, but we were not able to draw firm conclusions about the extent to which inoculation interventions lead to subsequent ‘post-inoculation talk’.

Another approach is to look at whether former inoculation-intervention participants are talking about what they have learned and thereby protecting others in their network (friends, family, peers). A first step towards exploring this was taken in WP3.2 study 1 which was reported in Deliverable 3. There post-inoculation talk was explored in the context of discussions on online forums after a session of the Bad News intervention (a gamified inoculation intervention related to Bad Vaxx). In this current study, we aimed to build on this by inoculating people and prompting them to participate in discussions on a closed-loop social media network.

The current study

In Experiment 2 of WP3.2, we aimed to explore the interpersonal transfer of cognitive inoculation against misinformation by inoculating people against misinformation techniques and prompting people to participate in discussions in a closed-loop social media environment.

The research questions were:

- 1) does inoculating people against vaccine misinformation lead to more issue-relevant post-inoculation talk in a social media environment?
- 2) does post-inoculation talk lead to higher resilience against vaccine misinformation among people who have not received the inoculation treatment?

We made use of the open-source closed-loop social networking service Mastodon, which allows for the creation of separate social media environments similar to Twitter, but with the option to limit access to specific individuals. In the social media environment, participants were able to write posts, share and like others’ posts, and engage in discussions with other participants. We also seeded the environment with posts by fictional profiles. The aim was to investigate whether the inoculation (and post-inoculation talk) affected the participants engagement in the Mastodon environment, vaccination knowledge and ability to distinguish vaccine misinformation from neutral content about vaccines.

Methods

Recruitment and consent

Data collection was carried out in Finland. In our recruitment of participants, we aimed to target the Ostrobothnia region, because it has a lower uptake of childhood and influenza vaccines compared to other regions in Finland. The Ostrobothnia region is bilingual, with 50.7% of inhabitants having

Swedish and 41.5% Finnish as their mother tongue. Because of the complex and labour-intensive study design, we decided to carry out the study in one of the languages. Because a Swedish-speaking anti-vaccination activist has been active in the region, we decided to conduct the study in Swedish. To mitigate the risk that we would end up with an insufficient response rate by restricting data collection to one region, we also included other Swedish-speaking regions in the data collection. As we asked participants to report their region of residency, we could still carry out subgroup analysis on the responses from Ostrobothnia if we achieved a satisfactory response rate from that region. Otherwise, we would analyse data across regions. The initial plan was to recruit individuals by letters sent to a random sample of residents in the Ostrobothnia area drawn from the Finnish Population Information System. However, our positive experiences with recruitment through Facebook encouraged us to conduct the recruitment by marketing the study invitation through Facebook. Facebook recruitment offered several advantages over letter invitations. First, it was more cost-effective, allowing us to reach a larger number of individuals at a much smaller cost. Second, we could better control that participants engaged in the social media platform at the same time (a requirement for the success of the study) and, third, we could be more certain that the targeted individuals were acquainted with how to use social media platforms. Furthermore, a previous barrier, that the respondents would have to transfer the web link from the written letter to their web browser, was eliminated.

We thus recruited individuals via Facebook, with a post including the study invitation marketed to adult (18-year-olds and older) Facebook users in cities and towns in which the Swedish-speaking population was a majority (i.e., more than 50%; except for one included city with ~30% Swedish speakers; Figure 1). The number of individuals reached in the selected regions, as estimated by Facebook before marketing the post, was between 375,700 and 442,000 individuals. Due to the need for continuous monitoring of the social media environment while participants are present in the environment, and the fact that spreading out the marketing of the post over multiple days would decrease the likelihood that people would be present at the same time and engage with one another, we opted to conduct an intensive 12-hour marketing campaign for the post. The post was thus marketed for 12 hours (from 8AM to 8PM) on September 6th, 2023. The post included a brief explanation of the study and contained a link to the online survey platform Qualtrics. The post read “We are inviting you to take part in a study that examines how people communicate about vaccines on social media. The study is a collaborative project between the University of Turku, the University of Cambridge, and the University of Bristol. To participate in the study, you must be at least 18 years old. It takes about 30-40 minutes to participate. You can get more information and participate in the study via the following link: [URL]” (translated from Swedish).

After clicking the link and entering the online platform, the participants were presented with information about the study and their potential participation (an English translation of the study information administered to participants can be found in the Appendix). Participants who completed the full study were able to take part in a voluntary lottery where 100 respondents could win a 50-euro gift card to the S Group (a Finnish network of companies operating in the retail and service sectors). Participants were informed about this before consenting to participate in the study. We aimed to recruit a minimum of 600 participants, which would have resulted in 200 participants per condition.

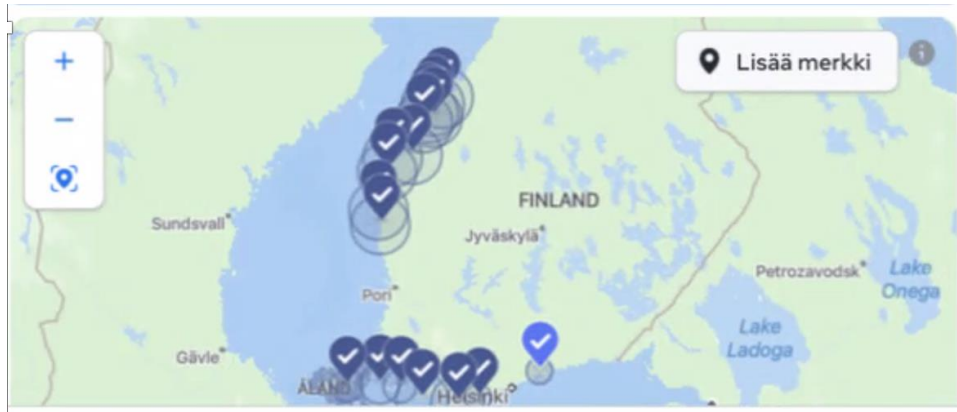


Figure 1. Regions selected for marketing of the invitation.

Procedure

Participants were first administered a measure of vaccination knowledge as pretest (all tasks and measures are described in more detail below). Then, they were randomly assigned to one of the following three conditions:

- Control (uninoculated participants)
- Inoculation (inoculated participants; played the *Bad Vaxx* game, see below)
- Mixed (both uninoculated and inoculated participants; i.e., half of them played *Bad Vaxx*, the others did not)

We initially planned to include HCPs in the study, with an HCP condition group. In this condition, HCPs who received the inoculation would be mixed with a group of uninoculated general public participants. However, these HCPs were to be recruited from the medical students taking part in WP2.3 and very few of these were Swedish speaking (in the whole of Finland, Swedish-speaking Finns constitute a minority group, making up 5.2% of the population; Statistics Finland, 2024). Therefore, the mixed condition was changed so that both inoculated and uninoculated participants were members of the general public.

After having been assigned to their condition, all participants in the Inoculation condition and half in the Mixed condition played the *Bad Vaxx* game (approximately 10 minutes) and filled out a scale on epistemic emotions. The rest of the participants did not play any game. All participants then received a link to a closed-loop social media environment on the Mastodon platform and were asked to create a Mastodon account. Each condition had its own separate environment. Participants were asked to spend a minimum of 10 minutes in the environment and then return to the survey platform. They were encouraged to actively participate in the discussions, talk to other people, and publish their opinions during their time in Mastodon. The “Proceed” button in the survey was set to appear after 10 minutes to avoid participants skipping the Mastodon part. Back on the survey platform, participants received posttest measures. These included the measure of vaccination knowledge, a social media item-rating task, and a series of demographic questions (see Measures below). Lastly, participants were debriefed. The entire experiment was estimated to take approximately 30–40 minutes. The experiment flow is depicted in Figure 2.

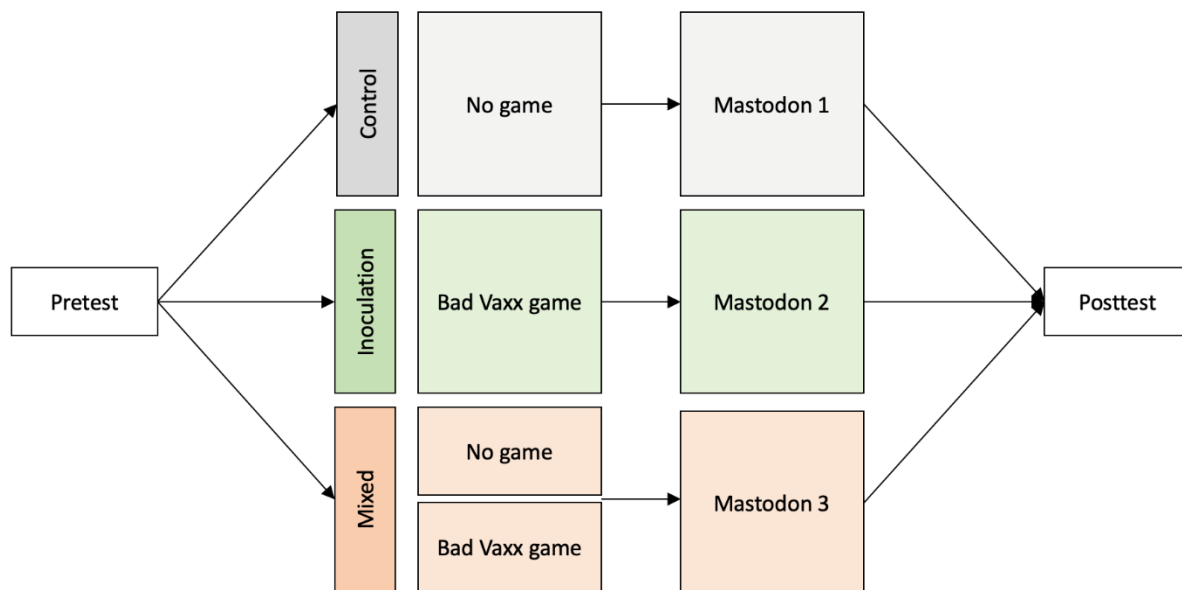


Figure 2. Experiment flow demonstrating the procedure.

Inoculation

The inoculation intervention consisted of a 10-minute game called Bad Vaxx that inoculates players against vaccine misinformation by exposing them to four different misinformation techniques that are commonly used in vaccine misinformation specifically (for an overview, see Kata, 2010, 2012) over the course of four levels: (1) emotional storytelling, (2) fake expertise and pseudoscience, (3) the naturalistic fallacy, (4) conspiracy theories. Each manipulation technique is represented by a particular character whom players are tasked with “defeating” as part of their effort to combat vaccine misinformation. The game is choice-based, and players can win and lose points by making correct or incorrect in-game choices.

In a previous study (Appel, Roozenbeek et al., 2024), playing Bad Vaxx was shown to significantly increase people's ability to distinguish manipulative from non-manipulative social media content about vaccinations. The game can be played here: <https://badvaxx.aboutbadnews.com/book/test/>. For the purpose of the present study, we translated the game to Swedish and adapted it to the context (link to Swedish version: <https://badvaxx.aboutbadnews.com/book/swedish/>). All inoculated participants were administered the Epistemic emotions scale (Pekrun et al., 2016) after playing the game; see below.

Mastodon environment

Mastodon is similar to X (previously Twitter) in terms of design and layout (Figure 3). However, what makes Mastodon unique is that it is possible to create isolated and modified social media environments that are closed off from other parts of the platform. By using isolated social media environments, we could control what content participants were exposed to. We created three separate Mastodon environments and members of the same condition were assigned to the same Mastodon environment so they could only talk to each other (and respond to the content being posted there), but not to participants in the other conditions. All three Mastodon environments were seeded with the same posts—called toots—by fictional Mastodon users. Some toots concerned vaccination, whereas others concerned every-day topics. Of the vaccine toots, 50% were vaccine positive and 50% vaccine negative. The vaccine-negative posts were a mix of misinformation and general vaccine-negative attitudes. Part of the misinformation posts employed the misinformation techniques included in the Bad Vaxx game. To the participants, all posts seem to come from other community

members. Participants were free to discuss any topic of their choice. Participants could write and post their own toots as well as like, share, and comment on other participants' and fictive profiles' toots.

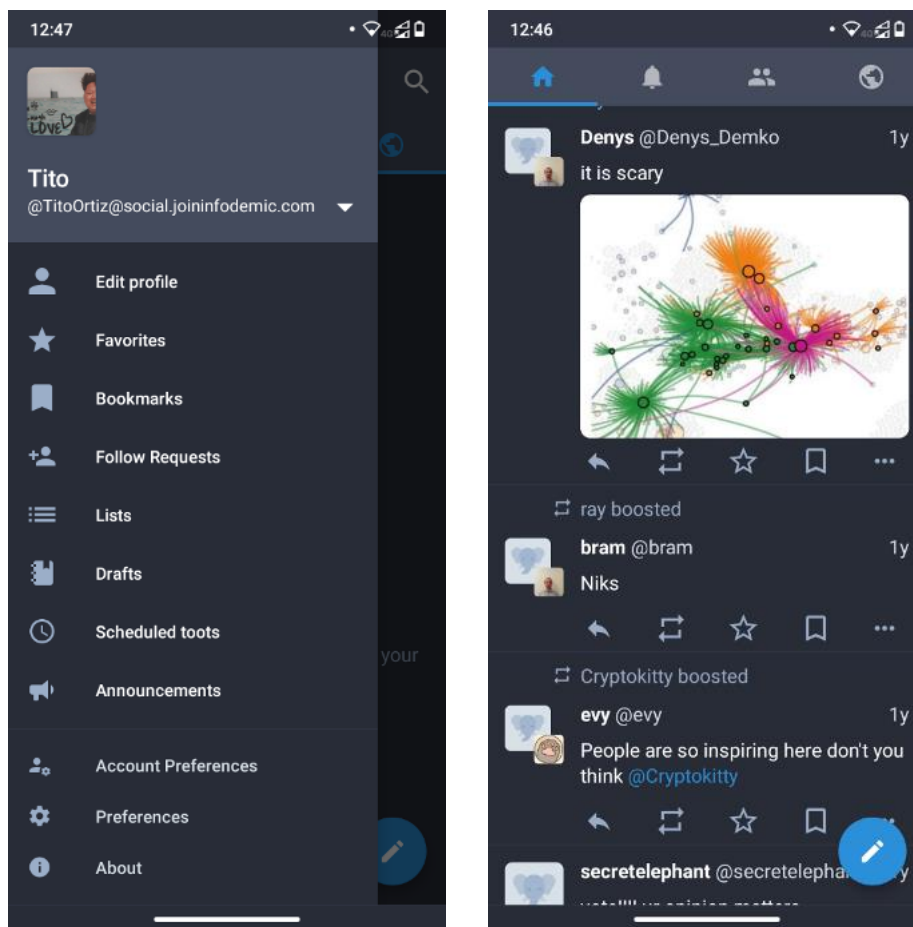


Figure 3. Examples of a mobile Mastodon environment.

Measures

Demographic information

Participants were asked about their gender, age, level of education, and region of residence.

Vaccination knowledge

Participants knowledge about vaccination was assessed before and after the inoculation and social media discussion with the scale developed by Zingg and Siegrist (2012). The scale includes the following nine items to which the participant can answer “correct”, “incorrect”, or “do not know” (Item 1, 4, 5, 7, and 9 are incorrect):

- Vaccines are superfluous, as diseases can be treated (e.g. with antibiotics).
- Without broadly applied vaccine programs, smallpox would still exist.
- The efficacy of vaccines has been proven.
- Children would be more resistant if they were not always vaccinated against all diseases.
- Diseases like autism, multiple sclerosis, and diabetes might be triggered through vaccinations.
- The immune system of children is not overloaded through many vaccinations.
- Many vaccines are administered too early, so that the body’s own immune system has no possibility to develop.

- The doses of the chemicals used in vaccines are not dangerous for humans.
- Vaccinations increase the occurrence of allergies.

Epistemic emotions

After playing the game, inoculated participants answered questions about their emotional responses to the game. For this, we used the Epistemically-Related Emotions Scale (Pekrun et al., 2016) along with two additional emotions unique to measuring reactance (i.e., the resistance to an instruction that is seen to impair one's freedom of choice). The scale measures the emotions individuals experience during a learning process. It consists of seven emotions to be rated in response to the following question: "We are interested in the emotions you experienced when playing the game. For each emotion, please indicate the strength of that emotion by clicking the number that best describes the intensity of your emotional response while reading." Responses are provided on a 5-point scale (1 = not at all, 2 = very little, 3 = moderate, 4 = strong, 5 = very strong). The seven emotions are surprised, curious, excited, confused, anxious, frustrated, bored. The additional emotions for measuring reactance were angry and irritated.

Social media item rating task

Participants were shown 12 social media posts. Each post was randomly either a misinformation-containing post (i.e., making use of one of the manipulation techniques learned about in the Bad Vaxx game) or a paired neutral post (with the same topic and of the same length, but phrased to not be manipulative; Table 1). Participants rated each item's manipulateness and their willingness to share each post ("This post is manipulative" and "I would share this post with people in my network", on a 1-7 scale going from "strongly disagree" to "strongly agree"; Example shown in Figure 4).

Table 1. Items of the Social media item rating task

Neutral items
The US database on vaccine injuries launched.
Vaccines "key health issue" as world leaders discuss vaccination programs at summit.
Vaccination programs have been broadly beneficial for public health.
Flu shot might reduce coronavirus infections, early research suggests.
CDC study looks at how well the HPV vaccine works against infections and pre-cancers caused by certain types of HPV.
Several peer-reviewed studies have looked at the link between autism spectrum disorder and vaccinations. To summarize: there is no evidence that vaccines cause autism.
Vaccines contain trace amounts of glyphosate. A scientist explains why.
Homeopathic prophylaxis: Scientists sceptical about homeopathy as a preventative measure against serious infectious diseases.
Scientists' findings hint at link between viruses and later health issues, including cancer.
Why do babies get several vaccines at a time? Health practitioners explain why.
Approximately 1 in 1 million vaccinations administered leads to compensation by US Vaccine Court
Hepatitis B Vaccine prevents hepatitis B infections, but, like any medicine, can have side effects
Misinformation items
Vaccine database wiped by government to hide uptick in admitted vaccine injuries.
The more our world leaders insist on vaccinating, the more suspicious you should be.
Vaccinations being for "the Greater Good" is an excuse. Their real goal is social control.
Prestigious vaccine journal: Flu vaccine increases coronavirus infection risk 36%.
This Oncology dietitian exposed unbelievable fraud in a HPV vaccine study by the Center for Disease Control.

See below for 29 studies that link Autism to vaccine toxicity. Thousands of parents describe their children as fine one day and then their children suddenly develop autism (a neurological regression) after vaccines...
CONFIRMED: Vaccines are contaminated with glyphosate.
Homeopathic prophylaxis: Science accepts Homeopathy as a Safe and Effective Alternative to Conventional Vaccines.
Scientists find that common natural viruses such as measles REDUCE later health issues, including cancer.
After paralyzing 6-month old baby with too many vaccines, doctor suggests MORE vaccines.
Chickenpox vaccine permanently disabled a young boy, vaccine court forced to admit.
Warning to Parents: Hepatitis B Vaccine Linked to Sudden Infant Death...

Results and discussion

Although the Facebook post reached 37,368 individuals in the 12 hours it was posted, only 177 (0.5%) clicked on the link to find out more and only 7 completed the survey. As our target sample size was 600 (200 per condition), we were unable to collect enough data to do meaningful analyses. The reasons for the lack of interest and participation in this study are likely to be multifactorial.

Our previous data collections conducted in Finland through Facebook have generated large samples. For example, in two separate data collections including adult Facebook users in Finland, we recruited 1325 (Soveri et al., 2021) and 710 (Karlsson et al., 2024) individuals, respectively. In another study, we recruited 1099 vaccine-hesitant individuals through Facebook (Mäki et al. 2023). Also, our previous research in Ostrobothnia has been successful. In a survey study, we recruited 1101 individuals from the Pietarsaari region within Ostrobothnia (e.g., Slotte et al, 2022). Of these, 84.7% were Swedish speakers. With these and other successful studies as reference points, we now discuss potential reasons for why the present study did not achieve a sufficient sample size.

The initial post generated little interest, in contrast to our previous work. First, as the study was conducted in only one language in bilingual areas, and language could not be selected as a criterion for the Facebook marketing, it is likely that a larger proportion of invitations than in our previous data collections were sent to individuals who do not speak the language of the survey. Second, a difference between the present study and our previous ones is that we were not able to include the University of Turku (UTU) logo as the link to the survey in the current Facebook marketing. This was due to a difference in how the survey link is displayed on Facebook between the Qualtrics platform used in the present study and the QuestionPro platform used in previous successful Facebook campaigns. Also, as the University of Cambridge were providing the infrastructure for this study, participants were presented with a University of Cambridge (UCAM) banner in the survey program. Although this should provide assurance that the study is genuine and from a trusted source, it does not provide the familiarity of an institution in the participant's own country.

We were also limited in our ability to reward participants for their time. In other settings, panel providers are frequently used to act as the intermediary between researcher and participant, making payments directly to the participants who are recruited from people who have signed up with the service in order to take part in studies. This has the advantage that there is no need for the research team to manage payments to individuals and any registration for tax purposes or similar is handled by the panel provider. However, the use of panel providers is unusual in Finland and the small population targeted here (Swedish-speaking Finns) means that a significant proportion of the population would need to sign up in order to get useful results. Therefore, recruitment needed to be carried out directly by the research team, in this case via recruitment ads posted on Facebook. This has been done successfully in the UK and elsewhere within JITSUVAX by for example sending out gift voucher codes as a 'thank you gift' for participation. However, as the present study was carried out in Finland, the

details of every individual receiving a gift would need to be recorded and reported to the tax office due to Finnish taxation laws. This presents a major barrier to making individual payments or gifts.

As an alternative, we offered participants an entry into a lottery. With a lottery, there is no guaranteed reward for participation (e.g., a monetary sum). Instead, participants are asked to donate their time voluntarily, with a small chance of gaining a reward. Therefore, lottery incentives are likely to yield fewer participants.

It is possible that the study was too lengthy for many participants, or too complicated in its design. Within Qualtrics, participants read the information leaflet about the study and inoculation group participants played the *Bad Vaxx* game (+/- 10 minutes). After this, participants were asked to sign up for a Mastodon account (in a separate window) and use the Mastodon environment for +/- 20 minutes. Their Mastodon profile needed to be verified with their email address, which might have decreased the perception of anonymity. To activate their Mastodon account, they had to visit their email and click a verification link sent by Mastodon (the verification email frequently ends up in the Trash folder, which might be a barrier although participants were informed about this). After spending time in Mastodon, they were asked to return to Qualtrics and complete the final questions. Overall, average completion time was around 37 minutes, a substantial amount of time especially if no guaranteed monetary compensation is offered. This may be the reason for why many participants who were initially interested in the study and clicked on the recruitment link did not finish. The design also required that the participants read information texts about how to proceed with the study in the middle of the experiment, which may have demotivated potentially interested participants.

In a pilot study with the Mastodon environment, the team had used ResponDi/Bilendi (a panel provider) to recruit approximately 100 pilot study participants (from the United Kingdom) to answer a set of survey questions in Qualtrics (similar to the present study) and then use Mastodon for a total of 10 minutes per day for 4 days, before completing a final set of Qualtrics questions. With an initial recruitment sample of 100, a total of 10 people completed the study in its entirety, a drop-off rate of 90%. This was despite participants being offered financial compensation for their participation. In other words, we have found that using the Mastodon platform for scientific research suffers from complications, is complex to use, and can yield substantial drop-off rates.

Therefore, following discussion within the UTU and UCAM teams, and with the JITSUVAX management and steering committee we decided that the barriers to participation in the current form of this study could not be overcome in the available time. Therefore, we decided to terminate the study at this point.

Conclusion

The Mastodon environment is potentially a useful and original method of scientific inquiry, particularly as it allows researchers to control exactly what study participants see in a 'live' social media environment. This method can thus yield substantial new insights into how people interact with information online, and whether the information they engage with on social media can influence key behaviours (such as vaccine uptake) and attitudes.

Although we encountered challenges with collecting a sufficient amount of data, the groundwork carried out for the study is valuable for future work and demonstrates the potential of this method to yield substantial new insights. The study design is original; almost no other studies have used a 'live' social media environment to collect data. The framework and environment worked well, and any part of it would be reusable provided other researchers have the funding required to carry out the study and are able to address the identified barriers to participation.

Another significant outcome of this work is also that the Bad Vaxx inoculation game is now available in Swedish and adapted to a Swedish-speaking population.

We have also gained additional knowledge that will be of use in the future. Lessons include:

- Recruiting participants in limited geographical areas presents challenges. Approaches such as collaboration with local community groups and networks to promote recruitment are difficult and time-consuming but worth investing in.
- Data collection in bilingual regions has particular challenges, especially when it is not possible to run a study in both languages simultaneously.
- Technical solutions to alleviate the challenges associated with transitioning between platforms should be sought in order to simplify the participant journey as much as possible.
- The particular difficulties of recruitment in Finland needs careful consideration in order to find alternative ways of incentivising participation that are sufficiently motivating for participants.
- Highlighting the involvement of the institution most familiar in the region is important as familiarity with the institution conducting the study could influence an individuals' decision to participate.

The Ostrobothnia region has been of particular interest to the JITSUVAX project due to its lower vaccination coverage compared to other Finnish regions. In WP2.3, we recruited nurses working in the Wellbeing Services County of Ostrobothnia for an online survey. Invitations to participate in the study were sent by email to head nurses in the county, who then forwarded the invitations to nurses in their team. This data collection resulted in only 26 responses. We have thus previously encountered challenges with recruitment in the region. Nevertheless, we also have positive experiences from approaching the HCPs in Ostrobothnia. In June 2023, we organized an event for nurses in the region at Vaasa Central Hospital together with the H2020-funded VaxTrust project. The event included dissemination of research results from our respective projects and was well received. Within WP4, we are also planning to offer training in the vaccine communication technique developed within the JITSUVAX project (the Empathetic Refutational Interview) to nurses in the Ostrobothnia region.

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Appendix

INFORMATION ABOUT THE STUDY

You have been invited via Facebook to participate in a scientific study. The invitation has been sent to adults in coastal regions in Finland. Please read the information about the study below before making a decision about your participation.

This survey is carried out within the framework of the JITSUVAX project (Work Package 3; Vaccine communication on social media) which is a European collaborative project. The project is funded by the European Union's Horizon 2020 research and innovation programme under grant agreement No 964728 (JITSUVAX). The Finnish part of the project is carried out at the University of Turku and is led by Academic Researcher Anna Soveri. This study is carried out by researcher Linda Karlsson, in collaboration with researchers at Cambridge University and the University of Bristol.

Purpose and content of the study

This study investigates how people communicate about vaccines on social media. Among other things, you will be asked to answer some questions and participate anonymously in a closed social media environment for about 10 minutes. For this purpose, we will ask you to create an anonymous, temporary profile on the social media platform Mastodon. You must be at least 18 years old to participate in the study. We estimate that it will take about 30-40 minutes to complete the study and that about 600 people will participate.

Voluntary participation

Participation in the study is completely voluntary and you can cancel your participation at any time during the study without giving a reason. If you cancel your participation by leaving the website before completing the entire questionnaire, your answers will not be included. Once you have submitted the form, it is no longer possible for you to withdraw your participation without providing additional information that allows us to identify your survey responses. Choosing not to participate or discontinuing participation will not result in any penalties for you.

Risks and benefits

There are no costs involved in participating in the study. Neither does participation involve any pre-known risks that would exceed what a person is normally exposed to in everyday life. Please note that you may be exposed to misleading or manipulative arguments. Some of what you read may give you positive or negative emotions, but the content is no different from what you might normally encounter when reading the news or talking to other people. If you feel uncomfortable, you can stop at any time. The study has been evaluated and approved by the University of Turku's Humanities Ethics Committee.

Those who complete the full study will be given the opportunity to participate in a prize draw where 100 people will win a €50 S-Group gift card. The winners will be selected at random. In order to contact the winners, we ask those who wish to participate in the prize draw to provide their e-mail address. These email addresses will not be linked to the information provided in the study. After the draw has taken place, we will contact the winners and ask for additional information needed to send the gift card, such as name and address. Again, this information will not be linked to the survey responses at any time. Please note that if you are an employee of the University of Turku and win a prize, the prize is considered a salary and therefore taxable income.

Handling of information you provide

The information collected is kept in accordance with good research ethics. In the questionnaire, we will ask you to report background information, such as gender and age. In cases where the background information makes it possible to identify a person, the information will be anonymised before it is processed. Only anonymised data files will be used for statistical analysis. The anonymised data is kept for at least 20 years.

When you create an anonymous, temporary profile on the social media platform Mastodon, you will be asked to provide an email address. The address is only needed to create the profile and will not be displayed in the profile. The email address you provide when creating the profile will be deleted from the research data once the experiment is completed. Your profile, and all your engagement on the closed Mastodon platform, will be deleted from the platform once data collection has been completed and the research data has been downloaded to a password-protected platform.

Data files containing non-anonymised information (non-anonymised demographic information and email addresses reported in connection with the lottery) will be stored on secure, password-protected electronic platforms and destroyed at the end of the study. The email addresses collected from those wishing to participate in the lottery will be destroyed once the draw has been completed. Only researchers within the project at the University of Turku and Cambridge University will have access to non-anonymised information.

The results of the statistical analyses will be reported in scientific journals. The reports will be openly available to the public. In conjunction with the reporting of our results, we will also make available to the public the data file containing the collected anonymous information on which the reports are based. The file will be available on the Open Science Framework website (<https://osf.io/>). This accessible data will not contain any background information and there is no possibility to identify you. Making data available means it can be used by anyone interested in the research and we will not have control over how this data is used. Sharing research data is considered best scientific practice and many funders and scientific journals require data to be made openly available. Sharing data helps to maximise the usefulness of the information collected as it can lead to new research projects.

More information on the study's data protection can be found [here](#).

Contact details

If you have any questions or comments regarding the survey, please contact researcher Linda Karlsson (linda.karlsson@utu.fi; Faculty of Medicine, Kinakvarngatan 8-10, FI-20014 University of Turku) or academic researcher Anna Soveri (anna.soveri@utu.fi; Faculty of Medicine, Kinakvarngatan 8-10, FI-20014 University of Turku).

By agreeing to take part in this study, I confirm that I:

- have received sufficient information about the study, data collection, data storage, and the future use of collected data and I have understood the information.
- have received sufficient information about my participation, my rights, and the possible risks and benefits of the study.
- have been given enough time to consider my participation in the study.
- have not been forced to participate in the study and I understand that participation is voluntary.
- have been offered the opportunity to ask questions and I have received answers to any questions I may have.
- have reached the age of 18.

I agree to participate in the study/I do not agree to participate in the study.

