Pretesting community interventions is key: How best intention may lead to harm

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Abstract

In this preregistered online study, we compared the debunking of two common COVID-19 misconceptions in a community intervention: (1) the fast development of the mRNA vaccine and (2) low vaccine efficacy, addressed on billboards. Both were tested against an unrelated control poster. Visualized as chat conversations, all posters were part of an out-of-home intervention in Germany in the fall of 2021. Among n=570 unvaccinated respondents, we anticipated increased

vaccination intention, and among n=297 vaccinated participants, an increase in intention to discuss the topic of vaccination was expected. Reactance and psychological correlates of vaccination intention were also examined. Unexpectedly, intentions did not increase post-exposure, but reactance did, negatively affecting vaccination intention. The study underscores the importance of pretesting interventions and identifies potential psychological barriers to effective debunking. Despite adherence to evidence and best practices, materials may fail to achieve intended effects or even produce negative outcomes.

Keywords: community interventions, pretest, vaccination intentions, conversation intention, health decision-making, debunking, reactance, backfire effect

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Since the beginning of the COVID-19 pandemic in early 2020, global efforts have been directed urgently towards finding a vaccine against this new virus. The US government named its vaccine development process 'Operation Warp Speed', utilizing a science fiction term to emphasize the need for fast results (Slaoui & Hepburn, 2020). Indeed, success arrived quickly: Only one year after the virus was detected, several vaccines had been developed, tested, approved, and rolled out in most countries. Ending the COVID-19 pandemic requires fast and large-scale uptake of these vaccines. In many countries, access was restricted and increased only slowly when the vaccine still was scarce, but uptake eventually increased sharply, then stagnated around the summer/fall of 2021 in many countries (Mathieu et al., 2020). Researchers have identified knowledge gaps and misinformation (Mønsted & Lehmann, 2022), as well as emerging information on side effects (Wadman, 2021), as factors behind people's refusal to take the vaccine. The success of vaccination as a public health measure depends on a large number of individuals' willingness to apply this measure (Lazarus et al., 2021); therefore, it is of utmost importance to understand the reasons for vaccine hesitancy.

Several models have aimed to explain vaccine hesitancy. Betsch et al.'s (2018) 5C model extends and complements previous vaccine hesitancy models (Dubé et al., 2014) with underlying psychological profiles and provides a validated measurement tool to assess the psychological antecedents of individual vaccination decisions. Next to *confidence* (trust issues related to vaccines' safety and efficacy), the model (and scale) assumes other factors – namely *complacency* (lack of risk perceptions), *constraints* (structural barriers), *collective responsibility* (free-riding on other people's vaccination behavior vs. contributions to societal herd-immunity achievements) and *calculation* (weighing pros and cons in vaccination decisions). It has been assumed

that by addressing relevant reasons through a suitable intervention, vaccination demand should increase accordingly. Results from the [BLINDED FOR REVIEW]-Study ([BLINDED FOR REVIEW]) regarding the 5C antecedents, as well as vaccination intention and behavior, indicate that a lack of confidence in COVID-19 vaccines has been one of the major factors that have kept people from getting vaccinated (BLINDED FOR REVIEW). In addition to the quantitative findings, qualitative analyses of open-ended questions in the same surveys revealed two arguments that participants with low vaccination intention cited frequently: (1) COVID-19 vaccine development occurred too quickly for them to have confidence in its safety, and (2) the vaccines lack efficacy, i.e., vaccinated people still can get infected (BLINDED FOR REVIEW). Therefore, it was concluded that interventions that aim to increase confidence should include evidence-based information about these two topics. Another result from the repeated monitoring studies was that the population in general, but particularly the unvaccinated, experienced a drastic decrease in trust in government authorities in the early years of the pandemic (BLINDED FOR REVIEW). Even though trust in public health institutions was high during the first six months of the pandemic (BLINDED FOR REVIEW), people who remained unvaccinated often relied more on unofficial sources. Studies found that they used particularly interpersonal sources to get information about vaccination, e.g., trusted doctors, family, friends, and colleagues (Sinclair & Angerström, 2021). Therefore, interventions not only should think about the delivery of information to the target group, but also develop strategies to empower trusted others to talk to the target group in follow-up conversations (Brewer, 2021). During a global pandemic with fast-changing information, early adopters of vaccines and those who are very convinced about their necessity might want to communicate their experiences to hesitant individuals, and they need evidence-

based information to take a stand and answer critical questions (Chevallier et al., 2021). Thus, interventions also should support early adopters.

With these goals in mind, posters were created with both the content and communication approaches in mind. As the intervention models suggested (Kok et al., 2016), the reasons underlying vaccine hesitancy (low confidence in vaccine safety and efficacy, as well as mistrust due to fast development) have been identified. As it became clear that confidence was the main factor hindering vaccination acceptance, communication approaches that corrected underlying misconceptions seemed reasonable. Posters that used a conversational approach were designed carefully (as Figure 1 indicates). The information on the target group of those unvaccinated against COVID-19 was included in a written dialogue between two people: one vaccinated and the other unvaccinated. The first poster's content was created using extant literature on mRNA vaccine development. Developmental milestones were depicted in a timeline, starting with the MERS epidemic in 2002 (Zhang et al., 2014; Azhar et al., 2019). The vaccine efficacy poster was designed as a 'Swiss cheese' metaphor in which multiple protective measures (e.g., mask-wearing, physical distancing) and vaccination were depicted as slices of cheese with holes that reflected their potential to protect against the spread of COVID-19 (Kampf et al., 2020).

In this preregistered experimental study, the two posters were evaluated. We expected this intervention to increase confidence and vaccination demand in the unvaccinated group, as well as conversation intention in the vaccinated group. A control group read an unrelated poster that included handwashing information, but no vaccine messages. The control was compared with the two experimental groups, in which the participants read either the poster with information about vaccine *development* or the poster containing information about vaccine *efficacy* in

the context of pandemic containment. We recommend this procedure and the measures used as a blueprint for piloting future interventions before putting them in the field.

Hypotheses

We preregistered the following hypotheses [blinded OSF-Preregistration attached as Supplement 2]:

- H1 – *5C confidence: interaction time x poster type*. For both vaccinated and unvaccinated participants, confidence in COVID-19 vaccination safety and efficacy will increase in the vaccination-related poster conditions, but not in the control poster condition.
- H2 – *COVID-19 vaccination intention: interaction time x poster type.* Intention to vaccinate against COVID-19 will increase after exposure to the vaccination posters compared with the control condition.
- H3: *Conversation intention: main effect for poster type.* Conversation intention: Conversation intention (for vaccinated participants to speak about vaccination) will increase after participants see the vaccination posters compared with those who see the control poster.
- H4: *Conversation intention: interaction poster type x vaccination status.* Conversation intention will be even stronger in vaccinated compared with unvaccinated individuals.
- H5: *Reactance: If the materials elicit reactance, the intention to vaccinate will decrease.* When educational materials about personal health decisions favor one option over another, the reader might perceive a threat to one's freedom of choice. Consequently, reactance (Brehm & Brehm, 2013) might cause boomerang effects, and vaccination intention

may even decrease. A mediation analysis (Hayes, 2017) assessed whether materials (control vs. vaccine development and control vs. vaccine efficacy) cause boomerang effects due to reactance and, therefore, decrease vaccination intention.

Methods

Design and Participants

The online experiment implemented a 2 (measurement time, within: before poster presentation [T1], after poster presentation [T2]) x 3 (poster type, between: control; development; efficacy) mixed design. A panel provider (Bilendi) invited and incentivized all participants. The posters are displayed in Figure 1. Hand washing served as a control topic unrelated to vaccination. Of the 932 eligible participants who started to participate in the online study, 907 (97.32%) completed the study. After excluding participants with missing values in the sociodemographic variables, a final sample of $N = 867$ participants ($M_{age} = 47.5$, $SD_{age} = 14.5$; 52% female) was included in the data analysis ($n_1 = 279$ [control group]; $n_2 = 291$ [efficacy]; $n_3 = 297$ [development]). The unvaccinated subsample included n = 570 participants ($M_{age} = 45.4$, $SD_{age} = 12.6$; 54.7% female) who were analyzed for intention to vaccinate ($n_1 = 182$ [control group], $n_2 = 199$ [efficacy] and $n_3 = 189$ [development]).

[Figure 1 here]

The main dependent variables were the 5C psychological antecedents of vaccination (Betsch et al., 2018), intention to get vaccinated against COVID-19, reactance, and conversation intention. The intention to get vaccinated and the 5C were measured before and after the poster presentation. Conversation intention and reactance were measured after the poster presentation.

5C psychological antecedents of vaccination: We measured the 5C antecedents of vaccination on a seven-point scale ranging from 'strongly disagree' to 'strongly agree'. The five items on the short scale read as follows: complacency ('Vaccination against COVID-19 is unnecessary because COVID-19 is not a major threat'); confidence ('I am completely confident that vaccination against COVID-19 is safe'); constraints ('Everyday stress keeps me from getting vaccinated against COVID-19'); calculation ('When I think about getting vaccinated against COVID-19, I carefully weigh the benefits and risks to make the best possible decision'); and collective responsibility ('When everyone is vaccinated against COVID-19, I need not get vaccinated'). Even though only confidence was addressed in the experiment, it is important to control for unexpected effects on other dimensions and to assess whether differences in other dimensions influence the perception of the arguments.

Vaccination status: During data collection, two immunization events (infection or vaccination) were viewed as constituting complete immunization status. Booster vaccines were discussed for people over age 80 only and, thus, did not apply to our study sample. Therefore, vaccination status was determined using one item: 'Have you been vaccinated against COVID-19?' (1) 'Yes, I am fully vaccinated (two shots OR one-shot Johnson & Johnson OR one shot after a COVID-19 infection)'; (2) 'Yes, I have received one shot, but need a second dose'; or (3) 'No, I am not vaccinated against COVID-19'. In the analyses, unvaccinated participants were compared with participants with at least one vaccination. Differences between unvaccinated participants and those who began or completed vaccination are provided in Figure 2.

Intention to vaccinate: Intention to vaccinate was measured using one item ('How would you decide if you had the opportunity to get vaccinated against COVID-19 next week?') on a scale

ranging from ‘definitely not vaccinate’ (1) to ‘definitely vaccinate’ (7). This variable was collected only from unvaccinated participants.

Conversation intention: Intention to engage in conversations about COVID-19 vaccination was measured using two items that were employed to build an average score (‘I will try to convince those around me of my attitude towards COVID-19 vaccinations,’ ranging from ‘do not agree’ [1] to ‘fully agree’ [7], and ‘How often do you think you will talk about vaccination with family and friends in the next week?’, ranging from ‘never’ [1] to ‘often’ [7]).

Reactance: An adapted version of the experience with reactance subscale from the Salzburg State Reactance Scale (Sittenthaler et al., 2015) was used. Reactance was measured using four items, which were used as an average score (‘How much do you feel the poster restricts your freedom?’, ‘How much does the poster bother you?’, ‘How frustrated are you with the poster’s content?’ and ‘How much does the content of the poster annoy you?’, ranging from ‘not at all’ [1] to ‘very much’ [7]).

Sociodemographic Variables: We collected demographic variables on age (continuous), gender (male/female/diverse), children (‘yes, under 12’/’yes, 12 to 18’/’no, I do not have children’), education (‘up to nine years’/’10 years without university qualification’/’at least 10 years with university qualification’), community size (<5,000 inhabitants/<20,000/<100,000/<500,000/more than 500,000 inhabitants), federal state residence (all German federal states), relationship status (being in a relationship yes/no), household size (‘living alone’/’two people’/’three to four people’/’more than four people’/’prefer not to say’), chronic disease (yes/no/don’t know), migration background (‘Was one of your parents born in another country?’ yes/no/don’t know), job status (working/not working), working in healthcare (yes/no), monthly household income and whether

they owned a smartphone (yes/no/don't know). As for COVID-19-related demographic questions, we asked about infection status ('Are you or have you been infected with SARS-CoV-2 (Coronavirus)?' yes/no) and quarantine restrictions ('Have you been officially put under quarantine?' no/one time/two times/three times/more than three times).

Pandemic context: The study was conducted between September 4 and October 6, 2021. At the time of data collection, 68 percent of the German population had started COVID-19 immunization (received at least one vaccination), and the incidence in Germany was 67/100,000 on average, with the Delta variant being the dominant virus type (Willrich et al., 2021). Although sufficient vaccination coverage had not been achieved at that time, mandatory vaccination had not been discussed seriously yet. Instead, public access was used as an incentive, i.e., people were not allowed into public gatherings, restaurants, stores, etc., unless they were either fully vaccinated, recovered, or tested. Moreover, people were advised to keep their distance, wash their hands, wear a mask, and air rooms regularly. Masks were mandatory in stores and on public transport.

Results

The analyses for confidence, intention to vaccinate, and conversation intention were repeated while controlling for age, gender, and education, which did not change the pattern of results. Figure 2 provides the mean differences for all dependent variables in the three experimental conditions. Changes for the unvaccinated, fully vaccinated, and exploratory evaluation were included for participants who started vaccination. Complete analysis scripts and results are stored in the OSF repository (https://osf.io/uqs6m/?view_only=80ddc9f89c0f41818961182267f4a0dd).

Confidence

H1 expected that confidence would increase in the experimental, but not in the control, conditions. In a repeated measurement ANOVA with confidence measurements as a within factor and experimental conditions as a between factor, no main effect was found in the experimental condition (F[2,567] = 0.33, p = .717). A small, but significant, increase in confidence was observed after seeing the posters (F[1,567] = 5.83, p = .016, M_{pre} [SD] = 2.1[1.6] to M_{post} [SD] = 2.1 [1.7]), but this applied to all posters alike, as indicated by the nonsignificant interaction effect (F[2,567] = 0.09, p = 0.917). All results and distributions are provided in Figure 2A. As the predicted interaction effect did not occur, conducting preregistered contrast analyses was unnecessary.

Intention to vaccinate

To test for changes in intention to vaccinate, we conducted a preregistered repeated measurement ANOVA with the experimental condition as a between-subjects factor. No significant increase in intention to vaccinate was found over time (F[1,567] = 0.45, p = .502), nor did intention differ between conditions (F[2,567] = 0.34, p = .714). Because the interaction effect expected in H2 also was not significant (F[2, 567] = 0.29, p = .749), we did not conduct the preregistered contrast analyses. Figure 2B indicates that no significant effects were found with unvaccinated participants, as well as participants who started their COVID-19 immunization.

Conversation Intention

To test the third hypothesis, concerning conversation intention, we conducted an analysis of covariance (ANCOVA), including experimental conditions (control vs. development vs. efficacy) and vaccination status (vaccinated vs. unvaccinated) as factors. As evident in Figure 2C, no significant increase was found in conversation intention in the different conditions (F[2,858] = 0.75, p = .471), but conversation intention differed depending on vaccination status (F[2, 858]

= 11.11, $p < .001$): Intention to talk about vaccination was significantly lower for unvaccinated (M[SD] = 2.8 [1.4]) than with vaccinated participants (M[SD] = 3.9 [1.8]). No significant interaction effect was found (F[4, 858] = 0.46, $p = .767$).

[Figure 2 here]

Reactance

To test for unwanted results and backfire effects from the interventions among the unvaccinated subsample, we used Model 4 of the PROCESS macro for R (Hayes, 2017). For both intervention posters, we tested, against the control group, whether reactance occurred and whether it mediated the poster's effect on the intention to get vaccinated. For both mediations, Tables 1 and 2 provide the results for each comparison of development vs. control and efficacy vs. control, respectively. Compared with the control group, whose participants saw the handwashing poster, reactance increased significantly after seeing either intervention poster. In turn, the intention to get vaccinated decreased. No evidence was found of a direct effect of the interventions on the intention to vaccinate.

[Table 1 and Table 2 here]

Finally, we were interested in changes in the 5C determinants of vaccination over the course of the experiment. We conducted mixed-measures ANOVAs for changes in the remaining determinants—complacency, constraints, calculation, and collective responsibility. As independent variables, we used experimental condition and vaccination status and statistically controlled for age, gender, and education. Full analytical results were uploaded into the OSF repository, and a visualization of the results can be seen in supplementary Figure S1. The experimental conditions did not influence any of the 5C determinants significantly. Except for constraints, i.e., the determinant referring to perceived structural barriers, all other determinants were associated significantly with vaccination status. Unvaccinated participants perceived less risk (complacency), lower collective responsibility, and a greater need to calculate individual benefits and risks.

Lastly, we explored potential differences in the subjective evaluation of the posters. A 2x3 between-subjects ANOVA with vaccination status and poster condition was conducted to find the potential mean and interaction effects on the subjective evaluation score. There was no significant effect of the experimental conditions on the evaluation, $F(2,861) = 1.52$, $p = .219$. There were, however, significant differences in the subjective evaluation between the vaccinated and unvaccinated participants, $F(1,861) = 109.77$, $p < .001$, $\eta 2 = .11$. The interaction effect between vaccination status and poster condition was also significant $F(2,861) = 4.13$, $p = .016$, $\eta 2 = .009$. Looking at the single items in Figure 3, it is evident that the unvaccinated participants perceived all three posters as less than appealing, poorly done, and unprofessional and boring compared to the vaccinated participants, who centered their subjective evaluations around the means of the scales. For the item 'convincing', the unvaccinated participants showed decreased evaluations of the debunking posters compared to the control poster, whereas the vaccinated participants did not show any differences in their evaluations of the posters concerning the adjective 'convincing'. All the posters were rated as equally comprehensive by all participants.

[Figure 3 here]

Discussion

In this experiment, we evaluated two posters that correct common misperceptions about COVID-19 vaccinations using evidence-based information. The study was conducted in September and October 2021, before the second winter of the COVID-19 pandemic, and aimed to pilot posters for actual use in a community intervention. In the preregistered analyses, no intended effects were found from posters on intention to vaccinate or intention to talk with important others

about vaccination. Instead, we found that both interventional posters, tested against a control poster, increased reactance in unvaccinated participants, which was associated with decreased vaccination intention.

These effects must be at least partially contextualized. During the time of the study and planned enrolment in the community intervention, the topic of COVID-19 vaccination for the upcoming winter was discussed broadly in the media. As reasons for vaccination, personal health protection was cited, as well as prevention of public health system overload and avoiding possible lockdown restrictions (Diehl & Hunkler, 2022). Consequently, vaccination was not only an individual health decision, but also became a politicized topic (May, 2020), and vaccination status became a matter of identity [BLINDED FOR REVIEW]. In this emotionally charged atmosphere, even evidence-based information about vaccine efficacy and development can be perceived as identity-threatening. Therefore, for future community interventions, it is of utmost importance that piloting be conducted shortly before the planned rollout phase, with as many environmental insights as possible gathered. Putting interventions into the field without thorough pretesting could endanger public health goals by polarising each side of the debate further.

Notably, this study contains some limitations. First, the experiment was conducted online, so all advantages (e.g., fast and anonymous collection of unvaccinated online participants) and disadvantages (e.g., no control over participants' attention or self-reported answers) of online surveys apply here (e.g., Arechar et al., 2018). The biggest advantage is that no sample self-selection was used. Participants were incentivized to complete the survey and did not know about the experiment's topic before starting their participation. Dropout was rather low during the experiment, and due to this sampling, we were able to test the intervention with a sample that reflected the unvaccinated in their criticism and skepticism. Second, all results comprised self-

reported behavioral intention and did not necessarily reflect actual behavioral consequences. Nevertheless, countless longitudinal studies have indicated that COVID-19 vaccination intention is the best possible predictor of vaccination behavior (e.g., Shaw et al., 2022; Shiloh et al., 2022). Finally, our experiment showed posters to participants at one point in time. In a real-world intervention, people probably would see different posters repeatedly. The results from a representative evaluation after the rollout might have found different effects to be caused, e.g., by mere exposure to the posters (Zajonc, 1968). Seeing the posters within a large-scale intervention with more topics than just efficacy or facts about development also could lead people to think differently about the intervention.

Per its definition, evidence-based intervention planning includes a proper evaluation of materials. In this case, we tested a poster intervention built to increase intention to vaccinate and talk about vaccination. Even though we followed the suggested steps of evidence-based intervention planning, the posters created reactance associated with lower vaccination intention. Several explanations for this outcome are possible. First, the intervention was tested during times of high information density. During September and October 2021, it was almost impossible to consume any form of media without being exposed to information about the pandemic, the vaccines, and their rollout. Second, even though the topics were chosen based on previous research results, there might have been other unanswered questions or misinformation that were not addressed on the posters. Third, conversations between vaccinated and unvaccinated individuals, in which an unvaccinated person is convinced to re-think their vaccination decision, might have been perceived as highly persuasive, particularly among unvaccinated participants. This would be a second explanation for the high reactance, which is also applied to the theoretical foundations of reactance theory (Brehm & Brehm, 2013).

Even though this intervention was unsuccessful in increasing intention, the research elicited important insights. We view this experimental procedure and measures like reactance and conversation intentions as highly valuable for piloting interventions before putting them in the field. Reactance is an important measure used to learn about potential psychological barriers to effective debunking of misinformation. Extant research has indicated that increased reactance levels (e.g., due to mandatory regulations) can motivate people to work against vaccination goals (e.g., participating in protests, signing petitions, omitting desired behaviors; [BLINDED FOR REVIEW].). Thus, knowing about reactance in advance can be an important warning sign that the campaign is pushing too hard. Second, even evidence-based interventions could backfire and, therefore, should be evaluated before rollout. On one hand, defining both the primary target group (in this case, the unvaccinated) and a secondary target group (their trusted others as opinion leaders) might be integrated into campaign design and evaluation. On the other hand, it might take more than just a display of conversations and evidence-based information about vaccine safety to equip people with the knowledge needed to talk about vaccinations effectively. Future community interventions could try multimedia learning opportunities or interactive edutainment (e.g., the Bad News Game; Basol et al., 2020) with repeated and diverse evidence-based information targeted at trusted others and the target group separately. We recommend the experimental procedure and measures used in this study for piloting interventions before putting them into the field. Moreover, we also suggest measuring knowledge and credibility to evaluate whether people at the very least can remember the evidence. Materials and commented analysis codes were uploaded into the OSF and are reproducible with free R software. This way, future researchers and practitioners can collect data and use the code to learn quickly about their materials' intended and unintended effects.

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Conflicts of interest

The authors declare that they have no conflicts of interest.

Author contributions

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Data and materials availability

Materials, data, and analysis codes are available at OSF:

https://osf.io/uqs6m/?view_only=80ddc9f89c0f41818961182267f4a0dd

Figure notes

Figure 1. *Procedure, measurement overview, and sociodemographic distribution per experimental group within the online experimental study.*

Control	Development	Efficacy

Sociodemographic variables: (age, gender, education, having children, community size, federal state residence, smartphone use, vaccination status)

Sociodemographic variables II: Martial status, household size, chronic illness, previous infection and quarantines, job status, immigration status, working in healthcare, income

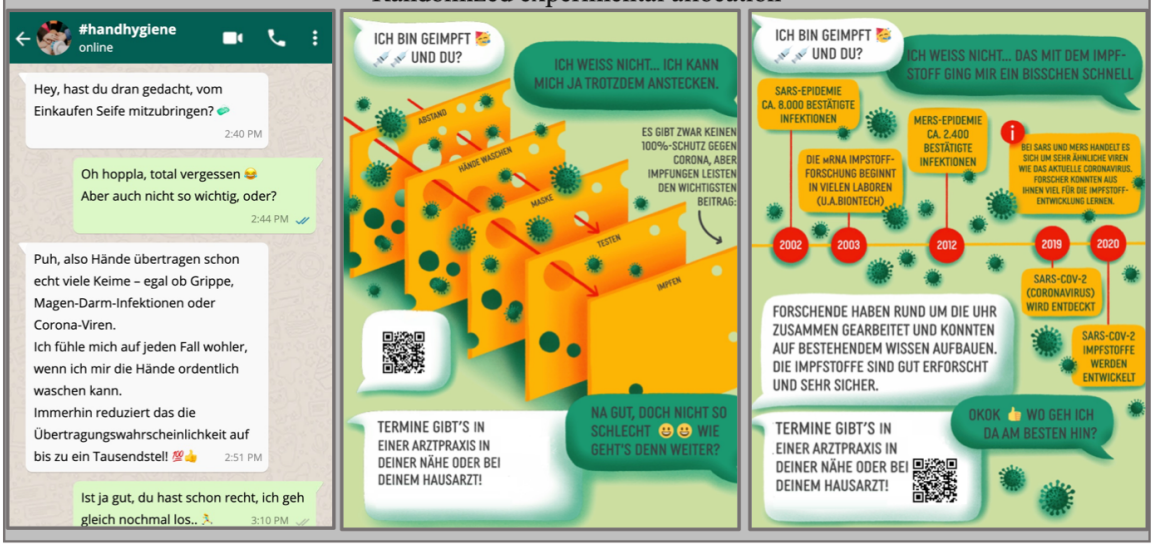
Risk perceptions (Brewer et al., 2007)

Trust in institutions (Pearson & Raeke, 2000; Schweitzer et al., 2006)

5C antecedents of vaccination (Betsch et al., 2018)

Intention to vaccinate (Source blinded for review)

Randomized experimental allocation



5C antecedents (Betsch et al., 2018)

Intention to vaccinate (Source blinded for review)

Conversation intentions

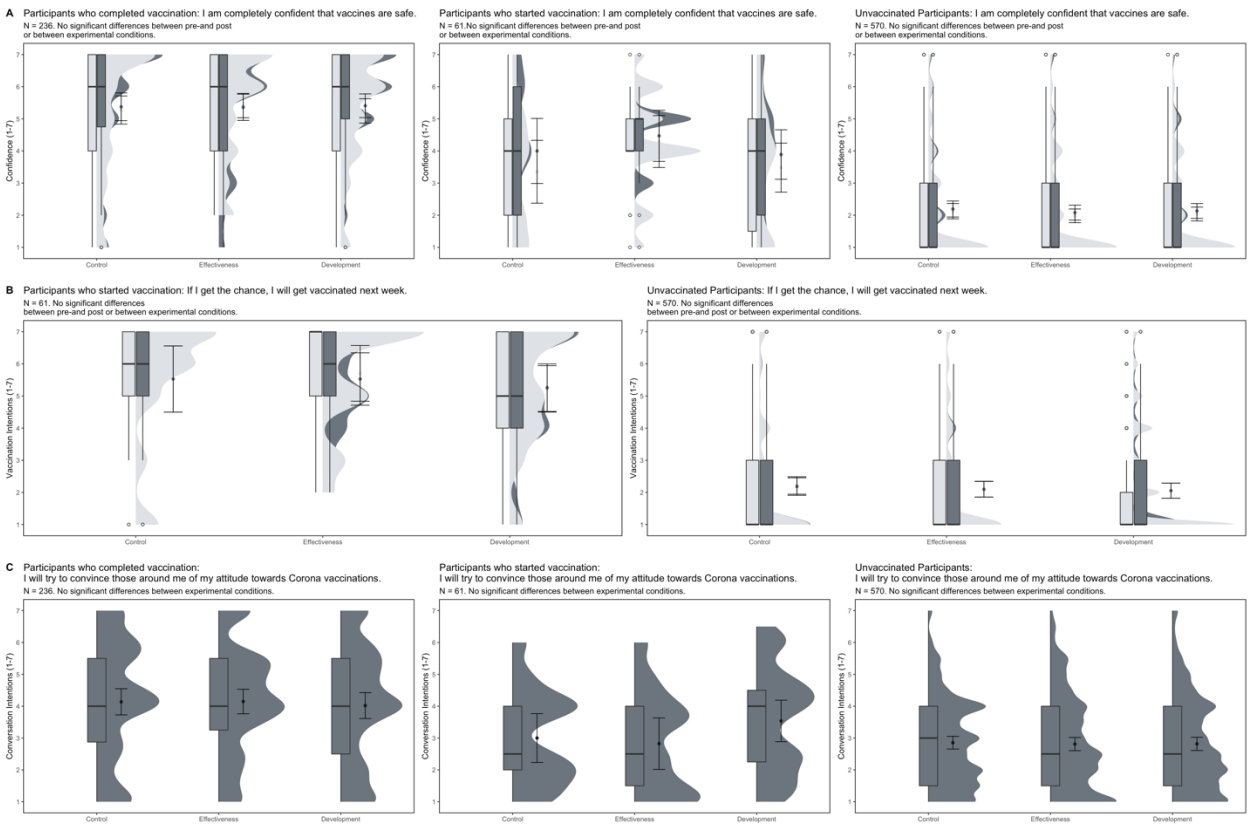
Reactance (Sittenthaler et al., 2015)

Evaluation & Manipulation check (Adapted from Rössler, 2011)

Control (n=279)	Development (n=297)	Efficacy (n=291)
Age	Age	Age
M(SD) = 47.01 (14.86)	M(SD) = 47.29 (14.61)	M(SD) = 48.14 (14.12)
Gender	Gender	Gender
m = 145 (52%)	m = 133 (45%)	m = 138 (47%)
f = 134 (48%)	f = 164 (55%)	f = 153 (53%)
Education	Education	Education
high = 102 (37%)	high = 103 (34%)	high = 116 (40%)
middle = 93 (34%)	middle = 97 (33%)	middle = 99 (34%)
low = 83 (29%)	low = 97 (33%)	low = 76 (26%)

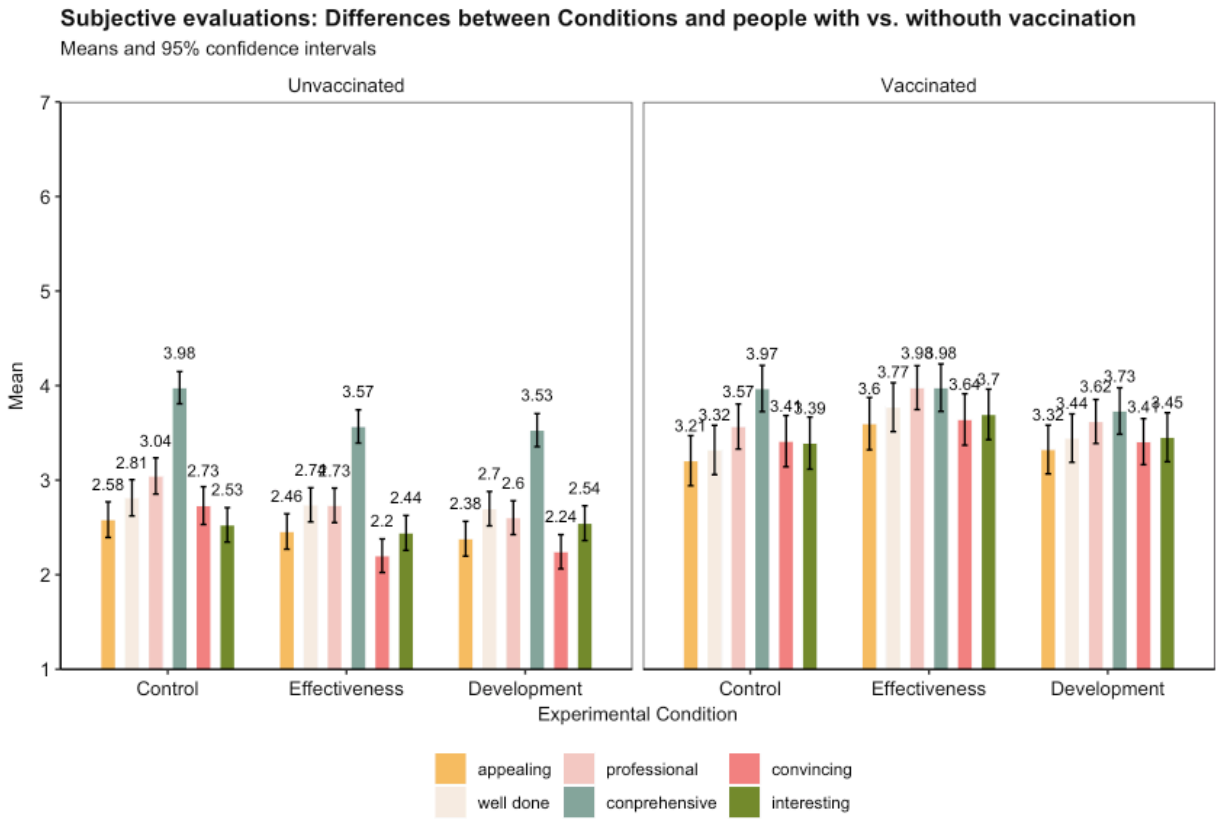
Notes. The questionnaire is available in German and English translations (https://osf.io/uqs6m/?view_only=b9e84ad7e7f5434d9e17565a2bb3bf69). Three posters in the randomized allocation are used, each with a different design and message: (a) an online dialogue about why handwashing and buying soap is important in fighting COVID-19, the flu, and other transmittable diseases; (b) a statement about successful vaccination, followed by a statement from an unvaccinated person with doubts about the vaccine's efficacy (a 'Swiss cheese' metaphor then is used as a debunking method, followed by a recommendation on where to find vaccine appointments); and (c) a statement about successful vaccination, followed by a statement from an unvaccinated person with doubts about the vaccine's fast development. A time frame then is used to explain the origins of mRNA vaccine development in the 2000s. The debunking is followed by information on where to find vaccine appointments.

Figure 2. *Pre-experimental vs. post-experimental values (light grey vs. dark grey) for 5c-confidence (A), intention to vaccinate (B), and post-experimental values for conversation intention (C).*



Note. Distributions, boxplots, means, and 95% confidence intervals. No significant changes were found in confidence (Panel A) for poster conditions. Confidence in vaccinated participants is significantly higher than that in unvaccinated participants. As for the intention to vaccinate (B), the same pattern emerged. No change in poster condition was found, but participants who started their vaccinations had higher intentions than unvaccinated participants. Finally, conversation intention (C) did not change for poster condition. Vaccinated participants had a higher conversation intention than unvaccinated participants.

Figure 3. *Material evaluations for different experimental conditions and between people with different vaccination status*



Note. Means and 95% Confidence Intervals. In general, unvaccinated participants evaluated all posters as less positive than vaccinated participants.