Short report: Who does or does not use the “Corona-Warn-App” and why?

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Abstract

To slow the spread of SARS-CoV-2, the German government released the “Corona-Warn-App”, a smartphone application that warns users if they have come into contact with other users tested positive for SARS-CoV-2. Since using the "Corona-Warn-App" is health-relevant behavior, it is essential to understand who is (and who is not) using it and why. In $N = 1,972$ German adults, we found that non-users were on average older, female, healthier, in training, and had low general trust in others. The most frequently named reasons by non-users were privacy concerns, doubts about the effectiveness of the app, and lack of technical equipment.

Keywords: Covid-19, Corona-Warn-App, contact tracing, health behavior
Introduction

In combating the spread of SARS-CoV-2 (coronavirus), governments in many countries focus on changing people’s health-related behavior. Recommendations include frequent hand washing, wearing a mouth-nose cover, keeping physical distance, and, in several countries, using contact tracing apps. For example, in Germany, the tracing app “Corona-Warn-App” is a smartphone application available since June 16, 2020, offered by the German Federal Government in cooperation with the Robert Koch Institute. Via Bluetooth tracing, the “Corona-Warn-App” can help determine whether a person has come into contact with anyone tested positive for COVID-19 and can thus help to break chains of SARS-CoV-2 infections.

Scientists estimated that the pandemic could be stopped if approximately 60% of the population use the app, but lower numbers would already help to slow the pandemic (1). However, before the availability of the app, some studies reported possible acceptance problems of the app, such as privacy concerns and doubts about the app helping to slow the pandemic (2,3).

In July 2020, about 16 million Germans had already installed the app (4). To the best of our knowledge, there is no large-scale evaluation that examines the reasons for and against an actual installation of the “Corona-Warn-App”. Moreover, no study has examined predictors of “Corona-Warn-App” use. In the present study, we explored reasons for and against an installation of the “Corona-Warn-App” and sociodemographic and psychological predictors of app use. Our results could guide future public health campaigns to change health behavior during the Covid-19 pandemic.
Methods

Study Population

We used data of the Bochum Berlin Covid-19 Study, a large-scale online daily diary study that was launched in mid-March 2020 and is still ongoing (for a detailed description of the study, see 5). The study comprises a diverse sample of German adults aged between 18 and 88 years ($M = 43.26, SD = 15.19$) from across Germany (20.72% male, 78.56% female, 0.71% non-binary). See osf.io/ecgxu/ for all supplemental materials.

Measurements

Since the app became available, participants were asked if they have installed the app on their smartphones. Depending on their response, they were then asked to indicate why they have or have not installed the app by selecting several reasons from a pre-specified list. Additionally, further reasons for or against the app use could be specified in an open-response field. These open responses were later coded to build broader response categories. All final response categories are listed in the note of Figure 1. For a description of the coding procedure, see OSM A.

We further assessed age, gender (men, women, non-binary), education in years, parental status (no parent, parent), occupational status (full-time employed, in training, not working, another employment status, part-time employed), and risk group status for a Covid-19 disease (no, yes) as predictors of the app use. Frequencies for each response category are displayed in OSM C.

Further, we examined general trust as a predictor of app use. Trust was operationalized as trust belief (a person’s belief that their trust will be honored) and trust preference (a person’s
preference to be a trusting person), assessed with the general trust scale (6). Participants responded to the items on a 7-point scale from ‘do not agree at all to’ to ‘completely agree’.

**Statistical analyses**

We excluded participants not living in Germany as the app only works in Germany. Moreover, we excluded participants not providing any information about their app use, resulting in a final sample of $N = 1,972$. We used the first measurement occasion at which participants indicated that they did or did not use the app. Descriptive analyses and multivariate logistic regression analyses for the prediction of app use were performed in R 4.0.0 (7). The significance level was set at 0.05. We report odds ratios (OR) and 95% confidence intervals (CI).

**Results**

We identified 1,291 “Corona-Warn-App” users in our study. They indicated that there was simply no reason not to use it ($n = 926$), that they thought the benefits would outweigh the risks ($n = 840$), and that the app will help in slowing down the pandemic ($n = 859$). We identified 681 “Corona-Warn-App” non-users. The most frequent reason for not using the app was data privacy concerns ($n = 245$). Others indicated that they were doubtful that the app was useful to slow the pandemic ($n = 199$) or that they lacked technical equipment ($n = 191$). Further reasons are summarized in Figure 1.

– Figure 1–

Results from the multivariate logistic regression analysis, including all predictors simultaneously, showed that participants with a risk group status for a Covid-19 infection were more likely to use the app (OR = 1.59; CI [1.200; 2.112], $p = .001$), controlling for all other predictors in the model. With increasing age, the likelihood of using the app decreased (OR = 0.99; CI [0.979; 0.998], $p = .021$). Additionally, women were less likely to use the app than men
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(OR = 0.77; CI [0.598; 0.992], p = .045). People who were in training (e.g., university, vocational training) were less likely to use the app than people who were full-time employed (OR = 0.56; CI [0.411; 0.765], p < .001). Moreover, with increasing general trust believes, the likelihood of using the app increased (OR = 1.30; CI [1.164; 1.445], p < .001). Years of education, parental status, and general trust preferences were not significantly related to app use. Further, we neither found differences between men and non-binary participants regarding the app use nor between full-time employed participants and those not working, part-time working, or indicating another employment status. For full model results, see OSM B.

Discussion

The majority of participants followed the governmental recommendation to use the “Corona-Warn-App”, most frequently stating that “there was no reason not to use it”. However, a substantial proportion did not use the app, naming privacy concerns, doubts about the effectiveness of the app, and lack of technical equipment as reasons. Similar concerns were expressed months before the app was launched. That these concerns are still raised against app use today indicates that the public health campaigns that promoted the “Corona-Warn-App” have not been able to eliminate initial concerns. For example, concerns regarding the effectiveness of the “Corona-Warn-App” might stem from media reports stating that at least 60% of the population must use the app for it to be effective. However, this statement does not fully reflect the results by Hinch et al. (2020), who mention that lower numbers would also help to slow the pandemic. More sensitive science communication seems to be important here. The generalizability of our findings is limited as the sample is not nationally representative (e.g., app-users were overrepresented, 65% compared to about 20% app-users in the German population (4)), and future studies should aim at collecting more diverse samples, with a special focus on those who do not use the app.
We found that people who did not want to or could not use the “Corona-Warn-App” were on average older, female, not a risk group for a Covid-19 disease, in training, and had low general trust in others. These groups could be the target of future public health campaigns on health-behavior changes regarding Covid-19.
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Conflicts of interests

There are no conflicts of interest.

Key points

- To slow the SARS-CoV-2 pandemic, governments around the world make use of contact tracing apps that alert a user if they had been in close proximity with an infected person.
- These apps can only be effective if enough people use it; however, it is unknown who does and does not use the app and why.
- In a large sample of German adults (N = 1,972), we found that frequent reasons not to use the app were data privacy concerns or a disbelief in the usefulness of the app.
- We found that app use was, among other things, related to age, gender, work status, and a person’s tendency to trust others.
- The results show that more precise and targeted science communication is needed to convince more people to use the Corona-Warn-App.
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Figure legends

*Figure 1.* Relative frequencies (in percent) of reasons for and against using the app. The participants were able to select several reasons for or against using the app at the same time. Dark grey bars indicate relative frequencies of chosen original response categories. Light grey bars indicate relative frequencies of open response answers that were coded based on open-text responses. For more information about coded categories, see OSM A1.
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