

## RESEARCH REPORT

# Adoption Rates for Contact Tracing App Configurations in Germany

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## 1. Executive Summary

Contact tracing apps are a widely discussed means to safely ease or lift the lockdown of societies and economies due to the COVID-19 pandemic. Such apps aim to monitor contacts of people to trace potential infection chains. The goal is a more precise identification and, subsequently, a more targeted isolation of people – limited to those who have been in contact with an infected person. This report contributes to a more empirically grounded discourse about the acceptance of such an app among the German population.

We conducted a choice-based conjoint study with a representative German sample (n=1,472). Instead of merely asking for preferences and attitudes, this method uses realistic choice scenarios to measure preferences for specific features of an app. The app options were described in terms of 11 attributes and multiple implementations options ranging from who will control and oversee the app to whether the app is a prerequisite to free movement, what type of data will be collected and for how long it will be stored. From the participants' choices, preferences for the different options and importance for the different attributes can be derived. Based on these results, the adoption rates for various app configurations can be estimated.

Our results indicate that while widespread adoption of a contact tracing app seems possible, the adoption by the German public strongly depends on the following factors:

- An independent research institute (e. g. RKI) or the government is in charge and has oversight of the app.
- Use of the app is voluntary and data is collected anonymously.
- There is an “end date” and any data collected is only stored for a limited duration.
- Priority access to testing in case of contacts with potentially infected persons would be an additional benefit driving app adoption.

It is not surprising that the likelihood of adoption correlates with the fear of COVID-19, trust in the German government, and personal experience with the diseases while there was no noteworthy difference between different levels of being negatively impacted by the lockdown and other measures to contain the virus.

Respondents who reported to follow the discussion about contact tracing apps in the media to a larger extent showed higher adoption rates. This may suggest that available information about the app and its risks and benefits can make a difference for app adoption in Germany.

Figure 1 gives an overview of the app configuration that would meet user preferences best and reach the highest adoption rate of 69.4%.

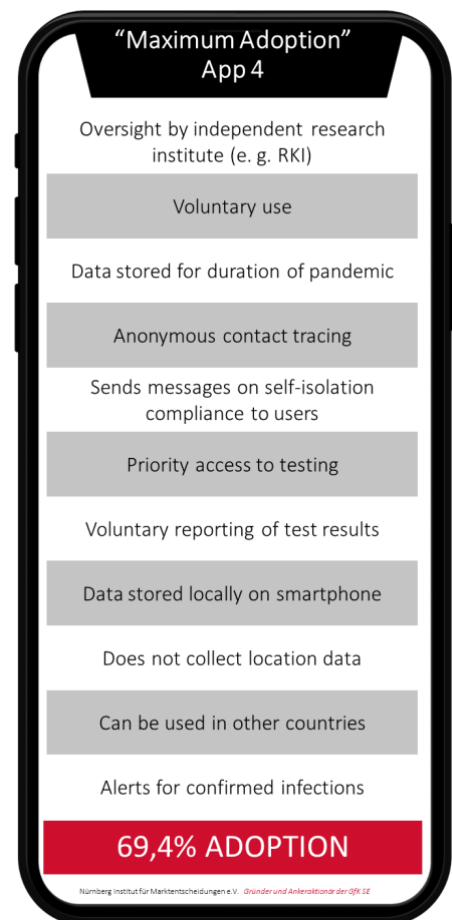


Figure 1 | App configuration with highest adoption rate in Germany

## 2. Introduction

Governments all over the world have used social distancing and quarantine to contain the spread of the COVID-19, or Coronavirus, pandemic. The lockdown of societies and economies has led to a severe economic downturn. To restart social and economic life, governments now look for a solution to allow more free movement and social contacts while still limiting the spreading of the virus until a cure or a vaccination is available.

A widely discussed solution are so called contact-tracing apps that aim to monitor contacts of people and to trace potential infection chains. The goal is a more precise identification and, subsequently, a more targeted isolation of people – limited to those who have been in contact with an infected person. This way the pandemic may be kept under control while at the same time avoiding another nationwide standstill.

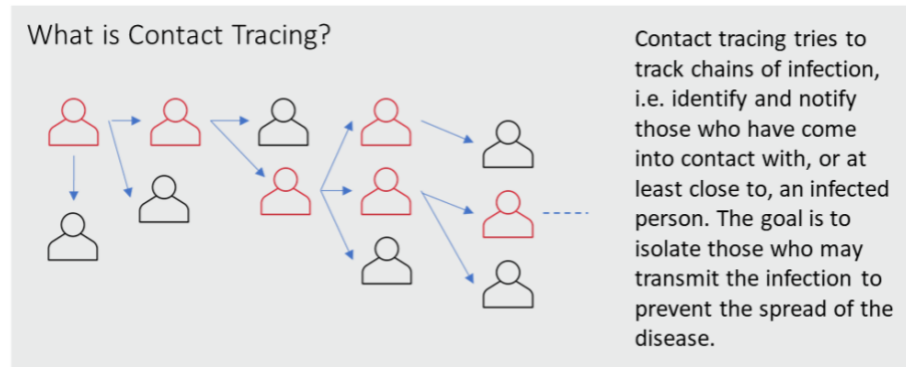


Figure 2 | Contact Tracing

While this sounds like a perfect and easy digital solution to a real-world problem, the tricky part is to find the right means to maximize adoption in the population. In a recent Science article (Ferretti et al., 2020), researchers from the University of Oxford suggest that to be an effective tool to control the spread of the Coronavirus, approximately 60% of the adult population of a country must adopt such an app.

In this report, we focus on understanding opinions and preferences of the German public regarding different configurations of a contact tracing app for Germany – ranging from who will control and oversee the app to whether the app is a prerequisite to free movement, what type of data will be collected and for how long it will be stored. We provide data-driven insights into the impact of app implementation decisions, some with severe potential privacy and civil liberty implications, on the acceptance and public adoption of a contact tracing app for Germany.

This report is based on a survey that is largely a replication of an earlier survey in the UK by researchers from Cass Business School, London (Wiertz et al., 2020).

Please be aware that this research does not cover the ethical, social, political or economic issues or consequences that may arise from implementing any given app configuration. The authors also do not give any recommendation whether any kind of contact tracing app or specific app configuration is an effective means to control the COVID-19 pandemic or not.

### 3. Data & Methodology

For data collection and analysis, we applied a choice-based conjoint design. Our approach allows to study not only the preferences of respondents for isolated aspects of a contact tracing app but also how people trade off different attributes when making adoption decisions for complete configurations. Based on a series of choice tasks between randomized app configurations it is possible to calculate individual preference functions for each respondent. These preference functions enable us to estimate how changing the implementation of an attribute of the app will affect the adoption rate in the aggregate. That way, we can compute ideal rates<sup>1</sup> for different app configurations if brought to the app stores.

We identified 11 potential attributes and corresponding implementation options based on contact tracing app functionalities that currently exist, for example in Singapore, or are being considered by the German and other governments. Table 1 (p. 8) gives a complete overview over the attributes and their implementation options that we considered to be potentially relevant for a German contact tracing app.

A sample of 1,472 respondents – representative for the German online population – was then asked to give their preferences using a partial profile choice-based conjoint design with a dual response/none option (Wlömert & Eggers, 2016). The survey was conducted in the time period from May 6<sup>th</sup> to 18<sup>th</sup> 2020. Please see the table in the Appendix for a more extensive overview of the sample demographics.

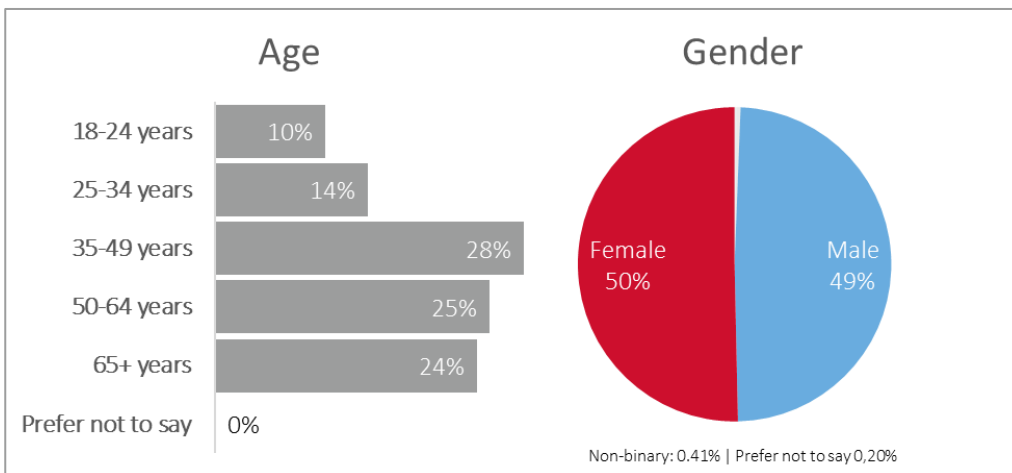


Figure 3 | Sample Age and Gender

<sup>1</sup> The calculated adoption rates are ideal rates since 100% of the respondents were informed about the app and made considered adoption choices. Real-life adoption rates would be expected to be lower and may depend on additional factors, e.g., legal, technical or usability aspects, that were not considered in the model.

## 4. Results

### 4.1 The App that Achieves Maximum Adoption Combines Oversight by a Public Entity with Privacy

Given the attributes from Table 1 (p. 8), what configuration of an app would reach the highest rate of adoption in the German (online) population?

Our analysis allows us to calculate the respondents' individual preference functions for the different options of the app attributes. We used those preference functions to estimate the ideal adoption rates for different app configurations: 1) a **"Minimum Adoption"** app that combines the attribute levels that have achieved the lowest utility in the conjoint analysis, as a benchmark for comparison, with an adoption rate of 30.2%<sup>2</sup>, 2) a **"Big Brother"** like app controlled by the Government that would sacrifice privacy for the sake of maximizing control over chains of infection, 3) an **"Initially Discussed App"** configuration that best matches the configuration that was initially published on GitHub and was widely discussed in the media, and 4) a **"Maximum Adoption"** app configuration that, regardless of any other implications<sup>1</sup>, would reach the highest rates of adoption of 69.4%<sup>2</sup>.

Figure 4 gives an overview over the four simulated app configurations. Generally, the very large span between the minimum adoption of less than a third of respondents and the maximum adoption of almost 70% highlights the leverage exerted by the app configuration. The "Maximum Adoption" app would even be adopted by more than those 55.3% of respondents who agree or strongly agree that a contact tracing app is a useful tool to contain COVID-19 infections until an effective cure or vaccination is found.

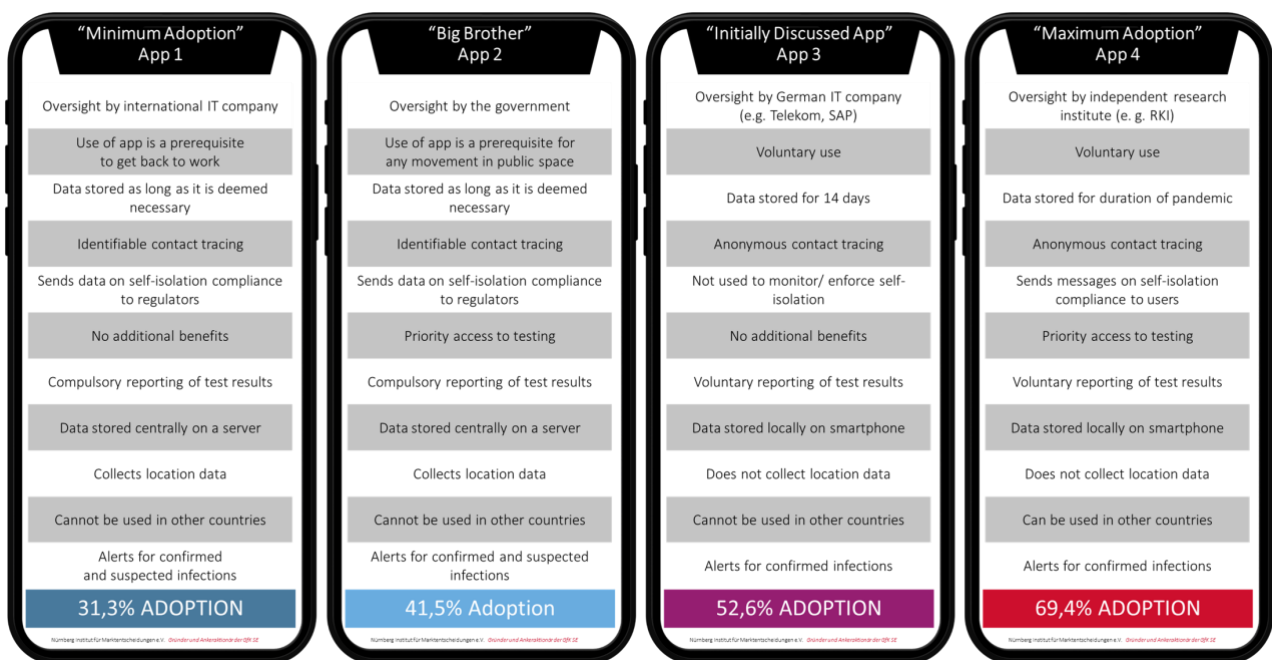


Figure 4 | Adoption rate estimates for different app configurations | Note: App attributes are listed in order of importance for adoption. Adoption projections are based on a choice-based conjoint study with a nationally representative sample of the German online population (n=1,472).

<sup>2</sup> The "Minimum Adoption" and the "Maximum Adoption" configurations are composed of levels with the lowest respectively highest utility within each attribute (Table 1). An exhaustive search of all possible configurations yielded slightly different configurations with minimal and maximal adoption rates of 28.6% and 70.4%, respectively. However, the differences between these adoption rates and the corresponding rates in Fig. 4 were not statistically significant.

### App 1: “Minimum Adoption”

Minimal adoption (30.2%) can be expected for an app that shows no concern for privacy, collects as much data as possible and stores it on a central server for as long as possible. In addition, it is overseen by an international IT company and offers no additional benefits for users whatsoever.

### App 2: “Big Brother”

The app configuration of the so called “Big Brother” app would allow a government maximum data access. As expected, it also reaches a rather low adoption rate (41.5%). What sets it apart from the minimum configuration, thus positively impacting adoption, is oversight by the government instead of a big international IT corporation, and the benefit of granting users priority access to testing when they have been in contact with an infected person – two features that have relatively high utility for the respondents (cf. Table 1).



### App 3: “Initially Discussed App”

We used public information available on GitHub and the developer website<sup>3</sup> and recent press coverage<sup>4</sup> to simulate an app configuration that best matches the initially discussed app configuration for Germany. This configuration achieves an adoption rate of 52.6%. While it meets the preferences of users regarding important criteria like voluntary use, limited duration of storage and no use of the app to enforce isolation, it is lagging considerably behind the maximum adoption rate of 69.4%. A factor that seems to be of particular importance is that control and oversight lied in the hands of two German IT-companies, SAP and Telekom, at least for the programming. This implementation option decreases adoption relative to the preferred alternative, namely oversight by an independent research institute like the RKI.

### App 4: “Maximum Adoption”



The maximum adoption rate that any app configuration could reach in our study is 69.4%. The most important difference in comparison with the current state of discussion is that an independent research institute like the renowned RKI would have oversight and control of the app. While the longer duration of storage of contact data on the phone (for the duration of the pandemic instead of just 14 days) and additional notifications on self-isolation compliance seem to be rather small changes, the maximum adoption app would

also offer a tangible benefit for users in the form of priority access to testing in case of a contact warning by the app and resulting self-isolation.

<sup>3</sup> [https://github.com/corona-warn-app/cwa-documentation/blob/master/translations/scoping\\_document.de.md](https://github.com/corona-warn-app/cwa-documentation/blob/master/translations/scoping_document.de.md) [2020-05-26]  
<https://www.coronawarn.app/de/> [2020-06-03]

<sup>4</sup> [https://www.deutschlandfunk.de/coronavirus-die-schwierigkeiten-mit-der-tracing-app.1939.de.html?drn:news\\_id=1131602](https://www.deutschlandfunk.de/coronavirus-die-schwierigkeiten-mit-der-tracing-app.1939.de.html?drn:news_id=1131602) [2020-05-17]  
<https://www.sueddeutsche.de/digital/tracing-app-github-konzept-sap-telekom-1.4907097> [2020-05-13]



## 4.2 Detailed Analysis – What Makes a Difference for Users?

Our study included 11 attributes that cover important potential implementation decisions regarding the configuration of a contact tracing app for Germany. The applied simulation approach allows to estimate the importance of those attributes and their impact on the public adoption of a contact tracing app. Our analysis shows that some attributes are significantly more important than others in determining respondents' app adoption choices. The results of our study for all 11 attributes and their specific implementation options are summarized in Table 1.



Attribute Importance for App Adoption	Attribute	Implementation options	Relative Impact on Adoption
21.82%	<b>Ownership and Oversight</b> <i>Who is responsible for the app project and has oversight?</i>	An independent research institute such as the RKI (Robert Koch Institute)	++
		Government	+
		A German IT/technology company (e.g. Telekom, SAP)	-
		An international IT company (e.g. Apple, Google)	--
11.31%	<b>Freedom of Movement after Lockdown</b> <i>To what extent is freedom of movement linked to app use?</i>	Voluntary use	+
		Use of app is a prerequisite for any movement in public space	-
		Use of app is a prerequisite for returning to work s	--
10.69%	<b>Data Storage Period</b> <i>How long will data be stored?</i>	For the duration of the COVID-19 pandemic	+
		14 days	-
		As long as it is deemed necessary	--
10.19%	<b>Anonymity</b> <i>What kind of contact tracing does the app use?</i>	Anonymous contact tracing	+
		Identifiable contact tracing	-

Table 1 – Part I | Importance and relative impact of app attributes<sup>5</sup> on app adoption, ranked by attribute importance. The marks „++, +, -, --“ reflect the sign and the order of the average impact of levels within an attribute on adoption likelihood.

<sup>5</sup> Convenience translation for information purposes. Please see the German document for the original attributes used in the study.

Attribute Importance for App Adoption	Attribute	Implementation options	Relative Impact on Adoption
8.54%	<b>Monitoring/Enforcement of self-isolation</b> <i>Is the app used for monitoring and/or enforcing self-isolation?</i>	Used to monitor self-isolation by sending alerts to the user	++
		Not used for these purposes	+
		Sends data on self-isolation compliance to regulators so quarantine can be monitored by police	-
8.41%	<b>Additional Benefits</b> <i>What additional benefits does the app offer to users?</i>	Priority to get tested for COVID-19 when in self-isolation	++
		Information about how busy local shops and parks are	+
		Priority to book food delivery slots when in self-isolation	-
		No additional benefits	-
7.81%	<b>Reporting of COVID-19 Test Result</b> <i>Is reporting of COVID-19 test results through the app voluntary or compulsory?</i>	Voluntary	+
		Compulsory	-
5.97%	<b>Location of data storage and processing</b> <i>Where is the data collected by the app stored and processed?</i>	Locally stored on the app user's smartphone	+
		Centrally stored on a server of the responsible organization	-
5.92%	<b>Data Type</b> <i>Does the app also collect the user's location data?</i>	No	+
		Yes	-
5.67%	<b>International Use</b> <i>Can the app be used in other countries?</i>	Yes	+
		No	-
3.66%	<b>Infection Alerts</b> <i>What kind of infection alerts does the app send you?</i>	Alerts for confirmed cases with which one had contact	+
		Alerts for confirmed and suspected cases with which one had contact	-

Table 1 – Part II | Importance and relative impact of app attributes<sup>6</sup> on app adoption, ranked by attribute importance. The marks „++“, +, -, -- “reflect the sign and the order of the average impact of levels within an attribute on adoption likelihood.

Our results suggest that the most important question for app adoption is who is responsible for the app project and has oversight. Putting an independent research institute like the Robert-Koch-Institute (RKI) in charge or keeping it under control of the government would positively impact adoption rates relative to the other options. This means that changing the oversight from an international IT company to the RKI would increase adoption and changing it from the RKI to either an international or a German IT company would decrease adoption (as indicated by the +/- signs) in the model.

Looking at the two app configurations that reach the highest adoption rates in our set - Apps 3 and 4 in our simulation – it seems that two aspects are important for respondents: data protection and voluntary use of the app. Those preferences can clearly be seen in the importance of certain attributes for app adoption choices. The attribute “Ownership and Oversight” makes the biggest difference for users in our analysis, accounting for

<sup>6</sup> Convenience translation for information purposes. Please see the German document for the original attributes used in the study.

21.8% of differences in the average utilities estimated for each attribute level. Together with the next three attributes “Freedom of Movement after Lock-down”, “Data Storage Period”, and “Anonymity” it covers 54.0% of the differences. Thus, making those four attributes by far the most important for the adoption rate of any app configuration.

The preferences of potential users for the implementation of top four attributes are relatively clear: they would most likely adopt an app whose use is voluntary, which stores the data for a limited amount of time, and which traces contacts anonymously. In addition, they prefer also voluntary reporting of test results and only limited use of the app to enforce self-isolation. While they are not among the most important attributes, the preference for local storage of data on the user’s smartphone instead of on central servers as well as the preference for not collecting location data are also clearly in line with the other preferences.

However, it is important to keep in mind that these are average results – the attitude towards contact tracing and whether it should be voluntary varies among respondents. The following two comments from an open question in the survey highlight the range of opinions, marking opposite extremes, from unconditional rejection to obligatory and sanctionable enforcement.

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*“Such an app is, in every respect, a violation of privacy and data protection. I would even go so far as to call it unlawful digital imprisonment. Under no circumstances should anyone develop, publish, or use such an app.”*

“

”

*“Those who resist that their data is stored until it is safe again, those who resist downloading an app that tracks their movements and warns them of infected contacts, should not be allowed to leave the house with impunity anymore!”*

“

In the following we will provide a more detailed analyses of the top four attributes that are most important for adoption.

#### Attribute 1: “Responsibility and Oversight”



Respondents are most likely to adopt the app if an independent research institute such as the RKI is in charge. Another option that has a positive impact on adoption is oversight by the government. Conversely, control and oversight by a private company impacts negatively on adoption – less so when the company is German, more so when it is an international IT company.

These results are in line with how respondents answered some additional questions from the survey. A majority of 70.8% agrees or strongly agrees that the government’s top priority is saving lives. And still 52.6% agree or agree strongly that the government will be able to provide widespread testing capacity by the time the

lockdown is lifted (17.4% disagree or strongly disagree, the rest is undecided). Both results together can be taken as an indication that trust in the intentions and abilities of the German government and affiliated official bodies to tackle this crisis is quite high and thus may influence adoption of government controller apps positively.

#### Attribute 2: “Freedom of Movement after Lock-down”

If app use is entirely voluntarily, respondents are more likely to adopt the app. Making app use a requirement – whether for returning to work or for any movement in public space – reduces adoption rates. If app use is to be linked to freedom of movement, requiring app use for returning to work is even less desirable than linking it to movement in public spaces in general.

#### Attribute 3: “Data Storage Period”

When it comes to duration of storage, the most preferred option is to store data for the duration of the COVID-19 pandemic. A vague, noncommittal time frame of “as long as necessary” decreases adoption noticeably. Somewhat surprisingly, a shorter storage period of 14 days – corresponding to a frequently reported time period ascribed to incubation and development of symptoms – also decreases adoption slightly. Given the insecurities around the new virus, people seem to perceive this time period as too short and, if storage has a binding end, prefer longer durations of storage.

#### Attribute 4: “Anonymity”

Anonymous contact tracing significantly increases the adoption rate while the possibility to identify individuals decreases it. The importance placed on anonymity corresponds to the press coverage<sup>7</sup> in recent weeks, highlighting the importance of protecting data privacy when designing a contact tracing app and the vehement campaigning by civil liberty groups and internet activists like the Chaos Computer Club<sup>8</sup> against implementation options that may put personal data at risk.



#### Remaining Attributes

Table 1 (Part II, p. 9) includes the relative importance of the remaining seven attributes and respondents’ preferences for the different attribute options. Among those, the additional benefit that an app offers may be most interesting. Among the four implementation options, getting priority access to testing for COVID-19 during self-isolation after a potential contact with an infected person seems to be the most tangible benefit of such an app and increases the likelihood of app adoption.

Respondents seem aware that mass contact tracing can only work in conjunction with mass testing, as suggested by researchers (Ferretti et al., 2020; Salathé et al., 2020): 72.1% of respondents agree or strongly agree that “testing capacity will be essential to manage the spread of COVID-19 after lockdown.”

Finally, the two attributes of least importance are whether one is informed about contacts with confirmed cases only or additionally about contact with suspected cases (with a preference for the former) and whether the app can be used in other countries (with a preference for international compatibility).

<sup>7</sup> <https://www.tagesschau.de/investigativ/swr/tracking-app-101.html> [2020-06-03]

<sup>8</sup> <https://www.ccc.de/de/updates/2020/corona-tracing-app-offener-brief-an-bundeskanzleramt-und-gesundheitsminister> [2020-06-03]

### 4.3 Personal Correlates of App Adoption – The Role of Trust and Fear

The survey accompanying the conjoint analysis we additionally asked respondents about the following topics:

- A. Sociodemographic questions
- B. Fear of COVID-19
- C. Attitudes towards the government's handling of the crisis
- D. Negative impact from the implemented restriction of public life due to the pandemic
- E. Personal experience of COVID-19 symptoms or infections
- F. Attitudes towards testing and tracing as requirements to ease restrictions
- G. Prior exposure to media reports on contact tracing apps

We will briefly report key findings and highlight aspects that coincide with striking differences in app adoption.

#### A. Sociodemographic questions

Some media reports have suggested that – paradoxically – the older population, while carrying the highest mortality risk from COVID-19, may be particularly careless about the virus.<sup>9</sup> Others claim that young people are inconsiderate and may selfishly ignore social distancing rules, thus risking the spread of the virus.<sup>10</sup>



When it comes to app adoption, however, we do not find evidence supporting such claims. We have computed adoption rates for both the maximum-adoption and for the state-of-discussion app, separately for different age groups (see Figure 5). Differences are small; however, adoption rates are slightly higher for the youngest among our respondents as well as for those of 50 years and older, compared to respondents between 25 and 49 years of age.

<sup>9</sup> <https://www.welt.de/debatte/kommentare/article206633115/Senioren-in-der-Corona-Krise-Oma-Opa-bleibt-bitte-endlich-zu-Hause.html> [2020-06-03]

<https://www.br.de/nachrichten/bayern/einhaltung-der-corona-regeln-problem-mit-altersgruppe-45-plus,Ru4gfMe> [2020-06-03]

<sup>10</sup> <https://www.frankenpost.de/region/bayern/Besonders-junge-Menschen-halten-Beschaenkungen-nicht-ein;art2832,7185662> [2020-06-03]  
<https://www.abendblatt.de/region/stormarn/article228749491/Kommentar-zu-Corona-Partys-Pflichtprogramm-fuer-Unbelehrbare.html> [2020-06-03]

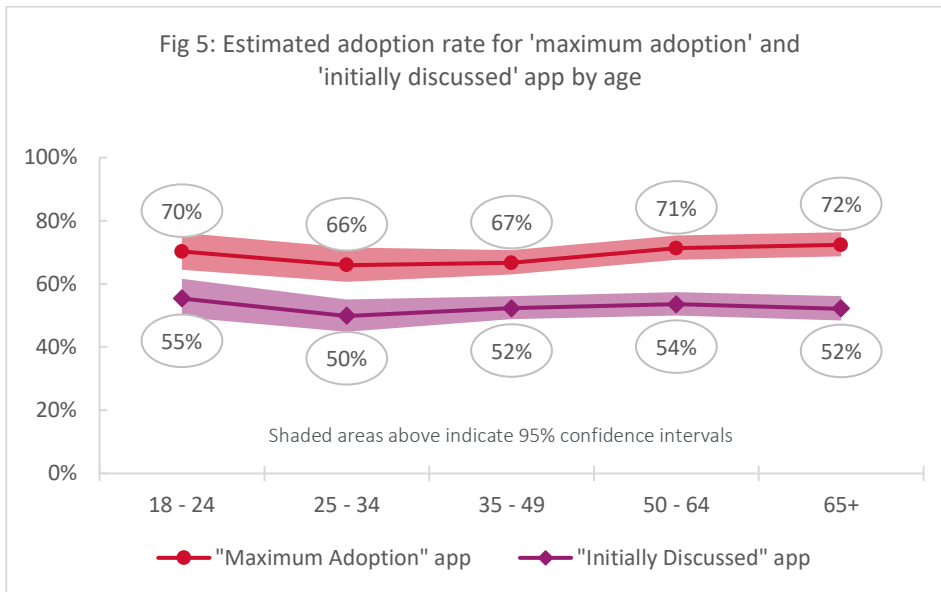


Figure 5 | Estimated adoption rate for “Maximum Adoption” and “State of Discussion” app by age

### B. Fear of COVID-19

Many respondents report that they are afraid of COVID-19. A share of 43.8% agrees or strongly agrees with the statement “I am afraid of COVID-19”. Adoption rates for both simulated app configurations are positively correlated with fear of COVID-19 (see Figure 6)

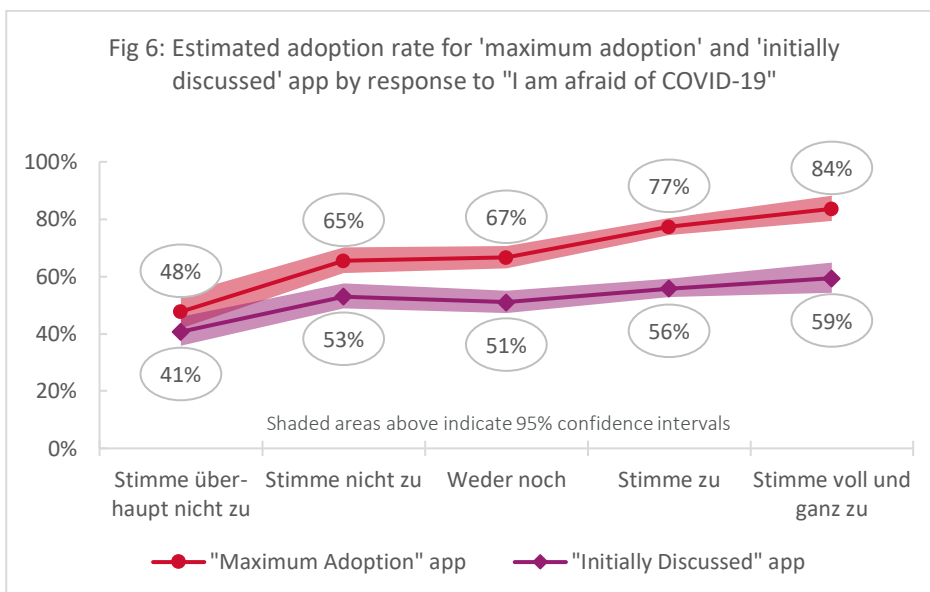


Figure 6 | Estimated adoption rate for “Maximum Adoption” and “State of Discussion” app by response to “I am afraid of COVID-19”

### C. Attitudes towards the government’s handling of the crisis

As reported above, the German government enjoys a relatively high level of trust by most of our respondents. However, the agreement varies, especially when trust in information provided by the government is addressed: 57.9% trust the information about COVID-19 provided by the government and only 17.7% disagree or disagree strongly. But around 41.0% suspect that the government is withholding information and around 44.5% worry that the government may take advantage of the situation and abuse the contact tracing app as a means of surveillance.

While not generally rejecting contact tracing, one respondent expressed concerns about whether it will really be limited to the duration of the pandemic. Along the same lines, another respondent argues for regular data safety checks.

”

*“It should be ensured in regular and short intervals that the app is not hacked, because I am very worried about my data. The German government should think about how to use the app to make sure that we don't live in a surveillance state again.”*

”

”

*“It should be ensured in regular and short intervals that the app is not hacked, because I am very worried about my data. The German government should think about how to use the app to make sure that we don't live in a surveillance state again.”*

”

App adoption rates vary widely depending on whether respondents trust the information about COVID-19 provided by the government – higher levels of trust go along with higher adoption rates for both simulated apps (see Figure 7)

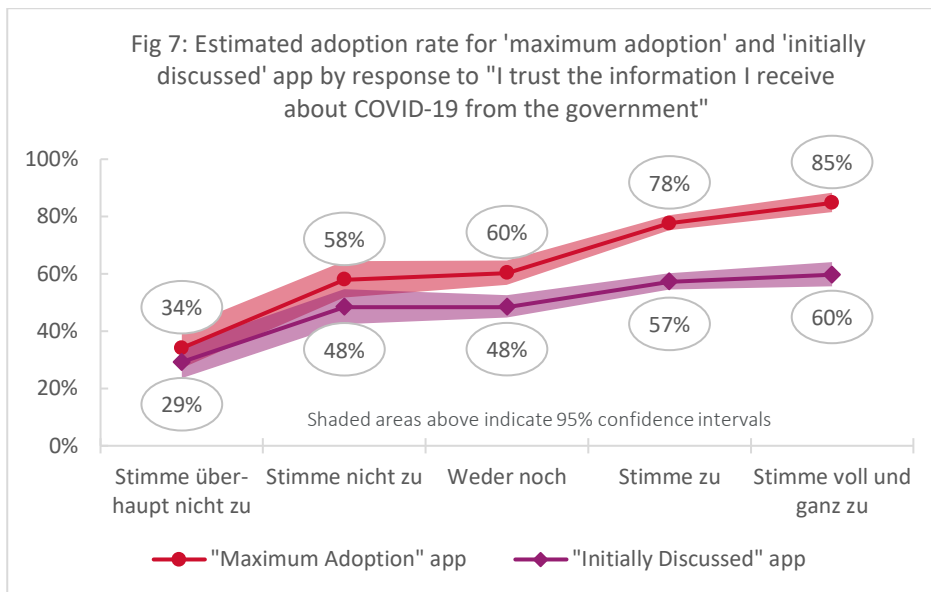


Figure 7 | Estimated adoption rate for “Maximum Adoption” and “State of Discussion” app by response to “I trust the information I receive about COVID-19 from the government”

#### D. Negative personal impact of the implemented restriction of public life due to the pandemic

Between a quarter and a third of the respondents report that they are negatively affected by the restrictions due to COVID-19: 33.2% of the respondents feel negatively impacted regarding their financial situation by the COVID-19 pandemic, and 24.4% of respondents even say that the situation negatively influenced their mental health. However, app adoption choices do not differ significantly depending on whether respondents report negative impact by the restrictions.

#### E. Personal experience of COVID-19 symptoms or infections

Only a small proportion of our sample reported having experienced COVID-19 symptoms, having been tested positive, or family and friends who were infected. However, those respondents that reported such experiences showed higher adoption rates than other respondents.

#### F. Attitudes towards testing and tracing as requirements to ease restrictions

Respondents largely agree on the need for contact tracking and testing: 72.1% agree or strongly agree that widespread testing will be important to contain COVID-19 infections when easing restrictions. And still 55.3% agree or strongly agree that, until an effective drug or vaccine is discovered, a contact tracking app will be a useful tool to contain COVID-19 infections. Unsurprisingly, seeing contact tracing as a useful containment tool is positively associated with app adoption rates.

One respondent emphasized the gain in liberty that contact tracing may provide:

“*I would very much appreciate it if an app is finally available. I would also have full confidence. That would be gaining a bit of freedom.*”



### G. Prior exposure to media reports on contact tracing apps

When being asked about the extent to which they have followed media reports on contact tracing apps the respondents' answers vary from "not at all" to "very intensively". Interestingly, the responses are associated with different app adoption rates. Respondents who reported to follow the current media coverage on contact tracing to a larger extent also showed higher adoption rates for both simulated apps (see Figure 8).

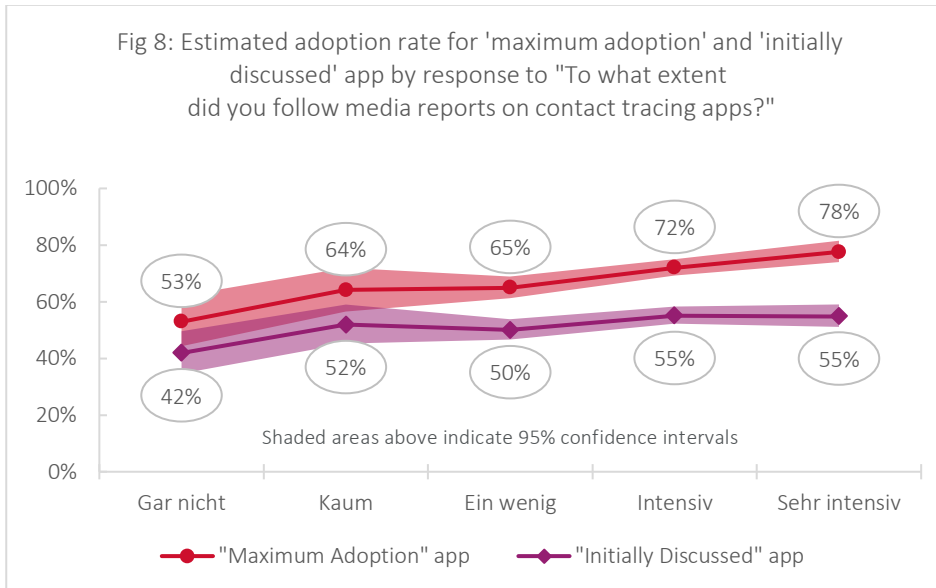


Figure 8 | Estimated adoption rate for "Maximum Adoption" and "State of Discussion" app by response to "To what extend did you follow media reports on contact tracing apps?"

Of course, the results are merely correlational, but it seems possible that more objective information and education about the benefits but also threats and limits of contract tracing, in the form of an open debate, may provide the necessary transparency to increase acceptance and ultimately adoption of the upcoming contact tracing app. One respondent expressed similar thoughts:

”

*“The app must be brought to market quickly and the public must be fully involved in the development process to ensure high acceptance by the population.”*

“

## 5. Concluding Thoughts

Despite the discussion around the implementation of a contact tracing app and the risks that different groups see related to such an app, our results suggest that a majority of the German population believes that such an app can provide a solution until effective medical solutions are found. If an app respects their data privacy and the use is voluntary, our results give evidence that a large share of the population may be willing to adopt such an app. This report gives an overview over the impact of implementation decisions for the adoption of a contact tracing app and the issues that need to be addressed from the potential users' point of view.

We want to emphasize again that the calculated adoption rates are ideal adoption rates. In a real-world situation, adoption would also depend on other factors. For example, we strongly assume that the actual technical implementation of the app, i.e. usability, battery consumption etc. may influence the decision of potential users to download the app. In addition, in a real-world situation, there is no 100 % awareness of the offering and not an idealized and equal knowledge about the app like it is in the interview situation. Nevertheless, if those points are considered, the present result offer a good indication of what app configurations may be more or less successful.

This report provides useful insights for researchers and decisionmakers into preferences and opinions of the German population regarding contact tracing app, including those in charge of the COVID-19 containment measures.

## 6. Acknowledgements

The survey and methodology used follows that of Wiertz et al. (2020), and funds for the German survey have been covered by the Nuremberg Institute for Market Decisions.

The Cass Business School Research Ethics Committee, project ID ETH1920-139, has approved the data collection for this research. Cover image by Gerd Altmann on Pixabay.

## 7. References

Ferretti, L., Wymant, C., Kendall, M., Zhao, L., Nurtay, A., Abeler-Dörner, L., Parker, M., Bonsal, D., & Fraser, C. (2020). Quantifying SARS-CoV-2 transmission suggests epidemic control with digital contact tracing. *Science*, 368, 6491. doi:10.1126/science.abb6936.

Wiertz, C., Banerjee, A., Acar, O. A., & Ghosh, A. (2020). *Predicted Adoption Rates of Contact Tracing App Configurations – Insights from a Choice-Based Conjoint Study with a Representative Sample of the UK population*. Available at SSRN: <https://ssrn.com/abstract=3589199>. doi:10.2139/ssrn.3589199.

Wlömert, N., & Eggers, F. (2016). Predicting new service adoption with conjoint analysis: External validity of BDM-based incentive-aligned and dual-response choice designs. *Marketing Letters*, 27, 195-210. doi:10.1007/s11002-014-9326-x

Salathé, M., Althaus, C., Neher, R., Stringhini, S., Hodcroft, E., Fellay, J., Zwahlen, M., Senti, G., Battegay, M., Wilder-Smith, A., Eckerle, I., Egger, M., & Low, N. (2020). COVID-19 epidemic in Switzerland: On the importance of testing, contact tracing and isolation. *Swiss Medical Weekly*, 150, w20225. doi: 10.4414/smw.2020.20225.

## 8. Appendix

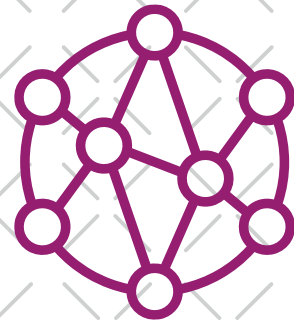
### Sample Description

Demographic Variable	Groups	% Representation in Sample
Age	18 - 24 years	9.92%
	25 - 34 years	13.79%
	35 - 49 years	27.85%
	50 - 64 years	24.73%
	65+ years	23.64%
	Prefer not to say	0.07%
Gender	Female	50.34%
	Male	49.05%
	Non-binary	0.41%
	Prefer not to say	0.20%
Federal state	East federal states	20.24%
	West federal states	79.55%
	Prefer not to say	0.20%
Education	School not (yet) finished	0.61%
	Certificate of secondary education ("Hauptschulabschluss")	15.83%
	General certificate of secondary education ("Mittlere Reife")	40.29%
	High school diploma ("Abitur")	24.39%
	Bachelor degree	7.95%
	Master degree	8.90%
	PhD	1.15%
	Prefer not to say	0.88%
Financial situation	I don't have any restrictions	9.38%
	I am well off and able to afford a number of things	25.88%
	On the whole, I can manage	38.38%
	I manage to make ends meet	18.48%
	I am struggling	6.25%
	Prefer not to say	1.63%

Table Sample Description Part I | Demographic characteristics of the sample (n = 1472):

Demographic Variable	Groups	% Representation in Sample
Employment status	Employed or civil servant	44.77%
	Self-employment	5.43%
	Marginally employed	4.96%
	Student/in training	6.05%
	Housewife/househusband	4.55%
	On parental leave or other kind of leave	0.61%
	Retired	26.15%
	Not employed	5.64%
	Prefer not to say	1.83%
Population size of place of residence	Up to 5.000	16.98%
	5.000 – 20.000	19.70%
	20.000 – 100.000	26.56%
	100.000 – 500.000	17.19%
	500.000 +	16.51%
	Don't know/prefer not to say	3.06%

Table Sample Description Part II | Demographic characteristics of the sample (n = 1472):



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