TECHNOLOGICAL SOLUTIONS IN A COVID-19 EXIT STRATEGY

Societal conditions

University of Amsterdam

Summary of the research

Purpose

Digital technologies can be part of solutions to societal crises. In fact, technological solutions are important in strategies to manage the current pandemic. These technologies range from medical data mining, use of cell phone location data to monitoring population movements and compliance, self-reporting and -diagnosis applications, and apps for contact tracking and tracing (Bullock, Luccioni, Hoffmann Pham, Sin Nga Lam, & Luengo-Oroz, 2020).
The aim of this research is first, to observe societal attitudes towards such technologies, concerns related to their implementation, levels of trust, experiences and behavioral intentions, and second to identify groups (e.g. based on demographics, health status or literacy levels) that differ in their degree of acceptance of such technologies, or that are excluded or disproportionality affected.

Sample

This report presents preliminary findings from the first wave of a longitudinal survey carried out by I&O. In total, 2274 Dutch respondents from all regions of the Netherlands took part in the survey (response rate 49%). A closer inspection shows:

1. 49% females
2. Average age of 52 (*SD* = 16, range: 18-100)
3. 22% finished lower level of education, 39% finished medium level of education, while 39% finished higher level of education

Main findings

1. While awareness of the contact tracing app is high (93% of respondents have heard about the app), preliminary analyses show confusion about the working of the proposed CoronaMelder app. Motivation to install such an app (after receiving a short explanation of how the app works) is rather low and does not substantially increase (or decrease) with age.

2. Respondents report a number of concerns about both short- and long-term consequences of using the contact tracing app. Particularly long-term consequences, such as negative consequences for vulnerable groups, contribute to lower motivation to install such an app. Short-term consequence, such as being denied access to certain public spaces, do not play a significant role in one's willingness to use the app.

3. Regarding health of respondents and motivation to install the contact tracing app, perceived health status is of importance for particularly older respondents. For respondents 60 years old and older, the worse their perceived health, the more motivated they are to install the app. For these respondents perceived susceptibility to covid19 also plays a stronger role in predicting their motivation to install the app (while perceived severity is of less importance for younger respondents).

4. Regarding social norms, descriptive norms (i.e., perception that installing the app is common) do not play a role in motivation to install the contact tracing app. Injunctive norms (i.e., the perceived approval of installing the app by others) predicts motivation to install the

app for younger respondents (under 49). For older respondents, we find no relation between norms and motivation to install the app.

5. Trust is an important predictor for motivation to install the contact tracing app. Specifically, trust in government and risk perceptions about sharing data with the government significantly and substantially predict motivation to install the contact tracing app. While individuals with higher trust are more motivated to install the app, perceived risk lowers this motivation.
   On the contrary, trust in platforms such as Google and risk perceptions about sharing data with such platforms significantly, but less substantially contribute to motivation to install the contact tracing app.

6. Regarding the aim of the app, respondents see it as acceptable to share the data from it with public health institutions for the purpose of helping the society and improving public health. Sharing for different purposes (e.g., with employers) is seen as not acceptable. This shows the rejection of so-called context creep (using information in a context different than the original context of the app).

Methodology

Sample characteristics

The target population for this study consisted of people living in The Netherlands above the age of 18. The sample is representative for the Dutch population. The online survey ran from July 6 to July 21 (15 days) and was distributed by I&O. The total sample size was N = 2274. Below, a detailed breakdown is offered from the sample:

- 49% were women, and 51% men.
- 19% was 18-34 years old, 20% 35-49 years old, 34% 50-64, and 27% 55+ years old
- 22% had a lower education level, 39% medium education level, and 39% higher education level

Age was measured as a continuous variable, but was re-coded into three groups. The variable educational level was re-coded as well to form a smaller set of options (low-moderate-high). The initial education variable consisted of seven levels of Dutch education system.

Measures

Measures for **awareness of the contact tracing app & motivation** to install it, as well as **motivation to use different technologies**, were constructed by the researchers.

Perceived health status was measured using validated instrument from Jansen-Kosterink et al. (2020). The variable consisted of three items measured on a 7-point scale ranging from strongly disagree to strongly agree. An example item was: “I am sick more often than other people of the same age and gender”.

Privacy concerns were measured using validated instrument from Baek and Morimoto (2012) and Allen (2013) consisting of seven items. To measure **concerns about short- and long-term consequences**, we constructed a variable with five items. All concern variables were measured on a

7-point scale ranging from strongly disagree to strongly agree. An example item was: “I am concerned that data collected through the contact tracing app will not be stored securely”.

To measure **social norms**, we used validated instrument from Kaushik and Rahman (2015). We used 5 items (two for descriptive norm and three for injunctive norm) and asked them on a 7-point scale ranging from strongly disagree to strongly agree. An example item was: “People who are important to me think I should use the contact tracing app”.

Perceived severity & susceptibility to covid19 was measured following the instrument developed by the RIVM. The variables consisted of each two questions answered on a 7-point scale. An example question was: “What are the chances that you will become infected with the corona virus in the coming months?”.

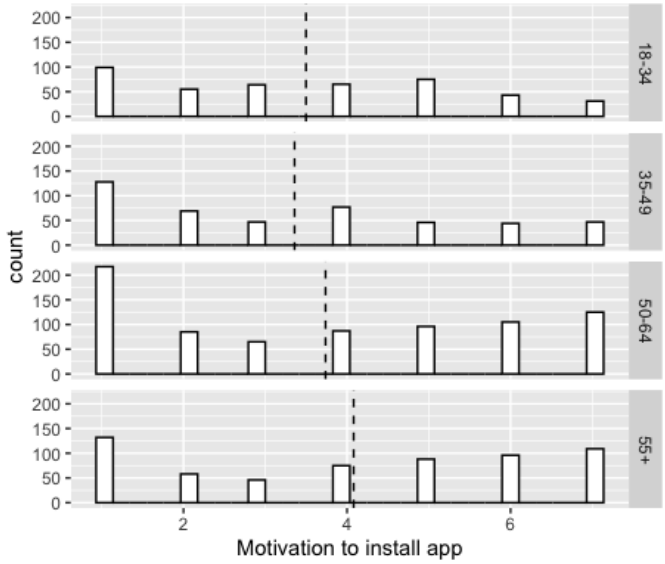
To measure **digital efficacy**, validated instrument by Eastin and LaRose (2000) was used. The variable consists of 8 items, and are measured on a 7-point scale ranging from no confidence to a lot of confidence. An example item was: “How much confidence do you have that you can use apps on mobile devices?”.

To measure **trust perceptions & risk perceptions** regarding the government and platforms, we used validated instruments from Malhotra et al. (2004). Both variables consist of 5 items, and are measured on a 7-point scale ranging from strongly disagree to strongly agree. An example item was: “The government is fair when it comes to the use of my personal data.”

All latent variables were found to be reliable constructs (Cronbach’s alpha of at least .7).

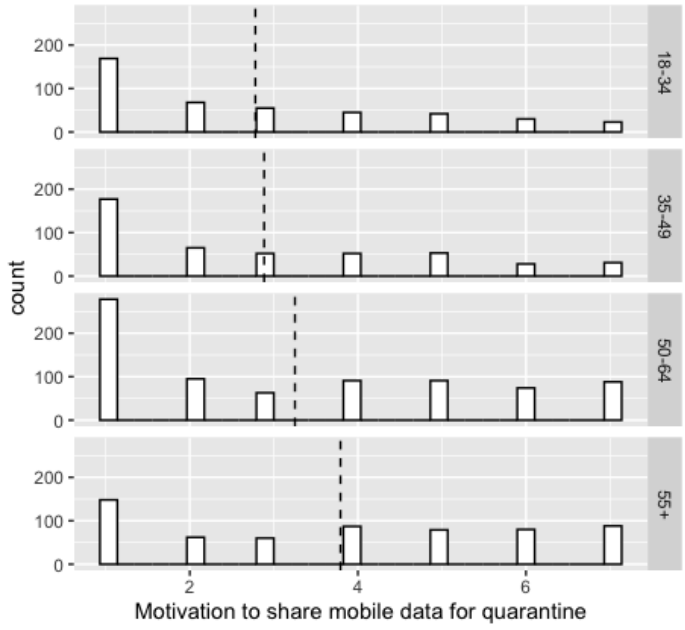
Awareness of the contact tracing app and motivation to install it

- 93% of respondents were aware of the contact tracing app.
- Almost half of respondents were rather not motivated to install the app (1046 (46%) answered that they are at least rather not motivated, 302 (13%) were neutral)
- Age is weakly positively correlated with the motivation to install the app (Pearson's r = .10, $p < .01$).

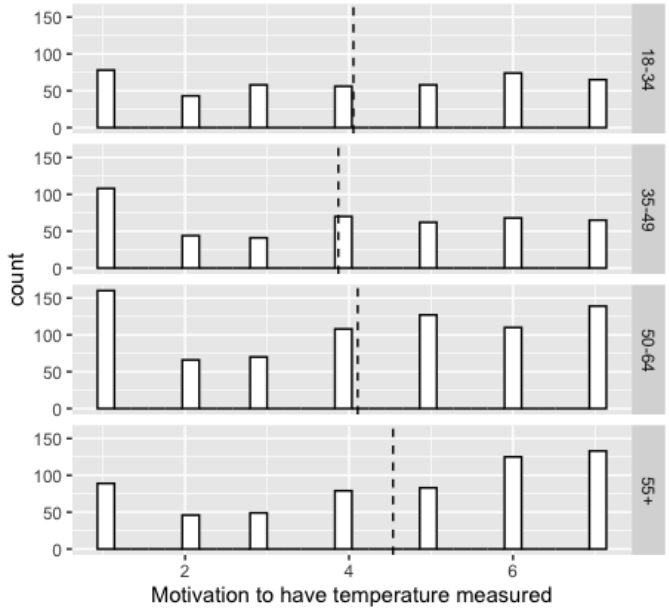


Motivation to use different technologies

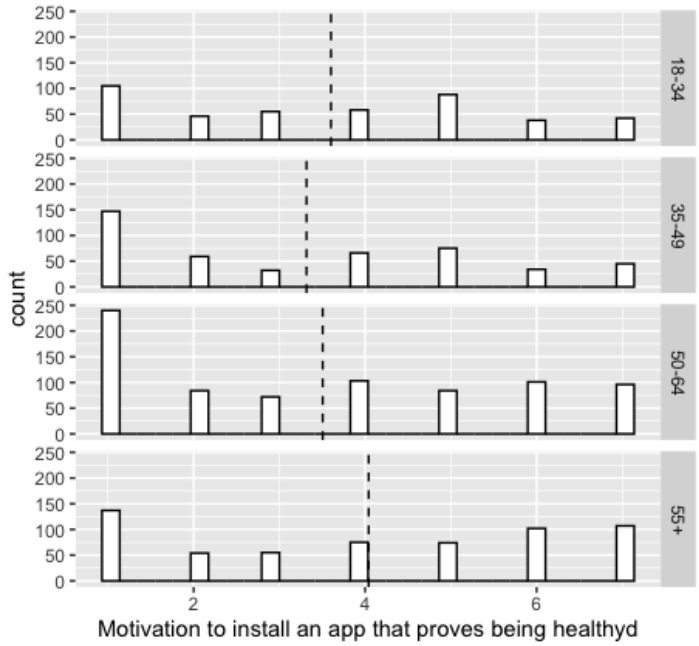
1. Sharing mobile phone data for obligatory quarantine
    - Most respondents were rather not motivated to share mobile phone data for obligatory quarantine (1292 answered that they are at least rather not motivated, 275 are neutral)
    - Age is moderately positively correlated with the motivation to share mobile phone data for obligatory quarantine (Pearson's r = .18, $p < .01$)



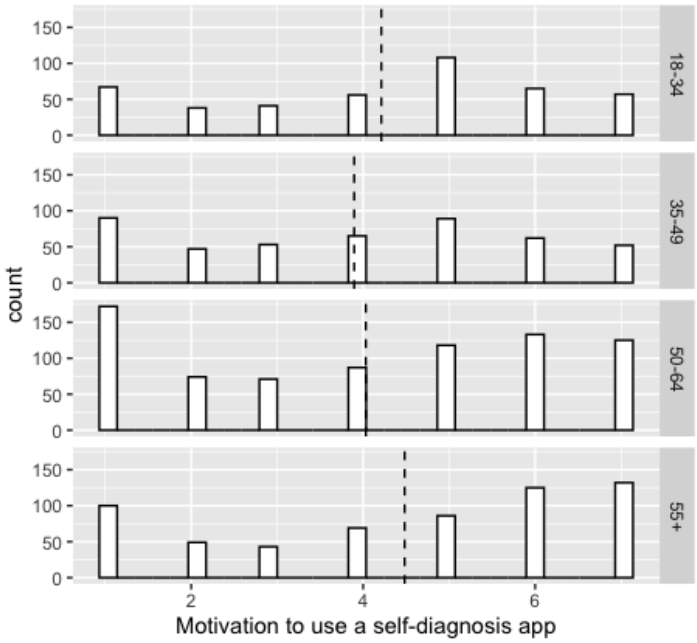
2. Having temperature measures e.g., when entering a shop
    - Almost half of respondents were rather not motivated to have their temperature measured when e.g., entering buildings (1109 (49%) answered that they are at least rather motivated, 313 (14%) are neutral)
    - Age is weakly positively correlated with the motivation to have temperature measured when e.g., entering buildings (Pearson's r = .09, $p < .01$).



3. Motivation to install an app that proves being healthy
    - Almost half of respondents were not motivated to install an app that proves that they are healthy (1086 (48%) answered that they are at least rather not motivated, 302 (13%) are neutral)
    - Age is weakly positively correlated with the motivation to install an app that proves being healthy (Pearson's r = .08, $p < .01$)

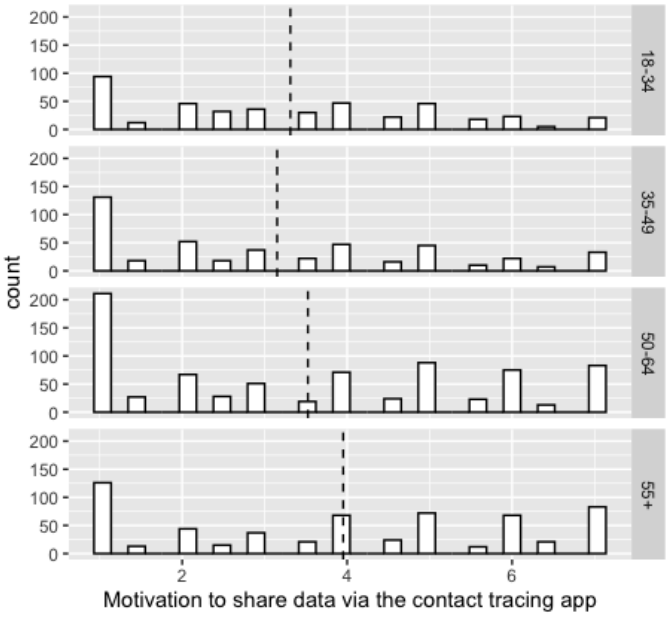


4. Using self-diagnosis app
    - Half respondents were motivated to use an diagnosis app (1152 (50%) answered that they are at least rather motivated, 277 (12%) are neutral)
    - Age is weakly positively correlated with the motivation to use a self-diagnosis app (Pearson's r = .05, $p < .01$)



Motivation to share data via contract tracing apps

- On average, respondents were rather not motivated to share their data via the contact tracing app ($M = 3.52$, $SD = 2.06$)
- Age is positively correlated with motivation to share their data via the contact tracing app (Pearson's r = .12, $p < .01$)

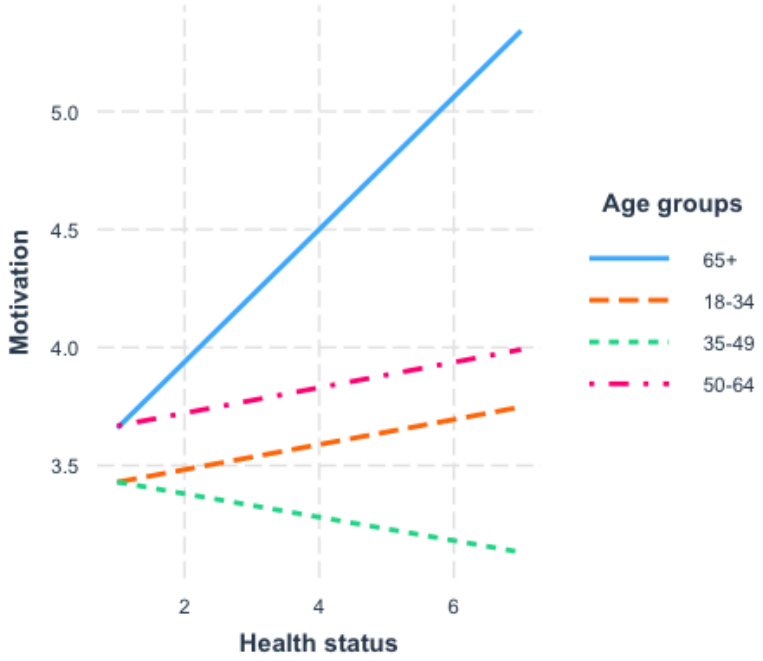


Awareness of events related to the crisis

Event	Not heard of at all	Heard of at least a little
First demonstration against corona rules	30% (679)	70% (1595)
Local lockdown in Germany	48% (1090)	52% (1184)
Proposal for the new corona law	49% (1105)	51% (1169)
No corona-related casualties in the Netherlands on June 22nd	63% (1426)	37% (848)
Appathon organized by the Ministry of Health	73% (1673)	26% (601)
Data leak from the RIVM-infectieradar	80% (1818)	20% (456)
Approval for the RIVM to use mobile network data	92% (2089)	8% (185)

Perceived health status and motivation to install the app

Overall, perceived health status positively predicts motivation to install the app, $b = 0.28$, $t = 3.62$, $p < .01$. A moderation analysis shows that effect of perceived health status is stronger for older individuals (65+) and weaker for individuals between 35 and 49 years old, $R^2 = .02$, $F(7, 2259) = 7.11$, $p < .01$.

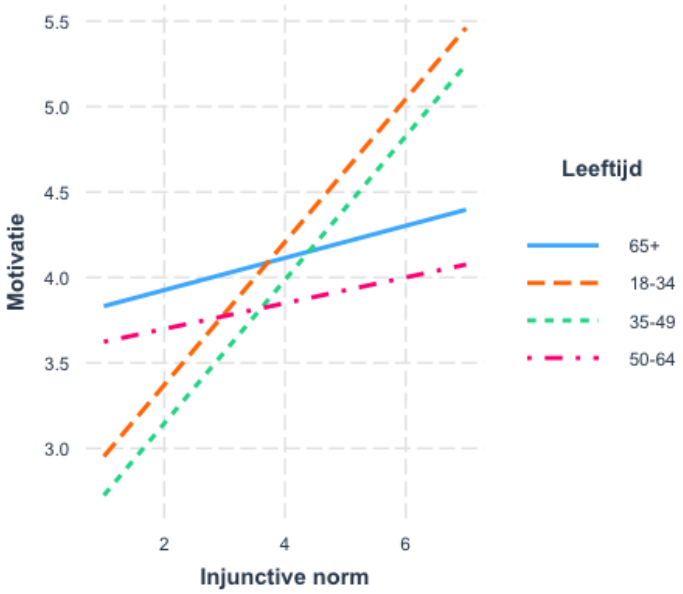


Concerns about consequences of using the app and motivation to install it

Privacy concerns significantly lowered people's motivation to install the app, $b = -0.42$, $t = -12.65$, $p < .01$. Similarly, concerns about long-term consequences of using the app, such as negative consequences for vulnerable groups, significantly lowered the motivation to install the app, $b = -0.38$, $t = -10.79$, $p < .01$. In contrast, concerns about short-term consequences of using the app, such as being denied access to public space, did not significantly predict motivation to install the app, $b = .02$, $t = 0.70$, $p = .49$, $R^2 = .32$, $F(5, 2268) = 219.1$, $p < .01$.

Social norms and motivation to install the app

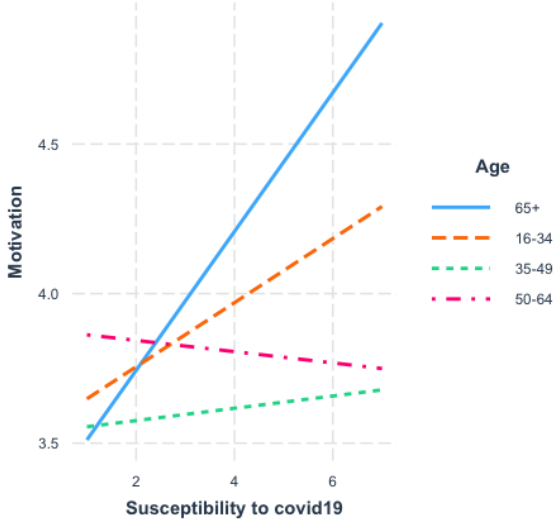
Injunctive norms do not predict motivation to install the app for the entire population, $b = 0.09$, $t = 1.64$, $p = .10$. However, moderation analysis shows that injunctive norms do predict motivation to install the app for individuals between 18 and 34 years old, b = 0.32, t = 3.21, p < .01 and for individuals between 35 and 49 years old, b = 0.33, t = 3.47, p < .01, $R^2 = .22$, $F(11, 2262) = 60.51$, $p < .01$.



Descriptive norms positively predict motivation to install the app, $b = 0.61$, $t = 9.66$, $p < .01$ and it does not differ per age group, $R^2 = .22$, $F(11, 2262) = 60.51$, $p < .01$).

Susceptibility to and severity of covid19

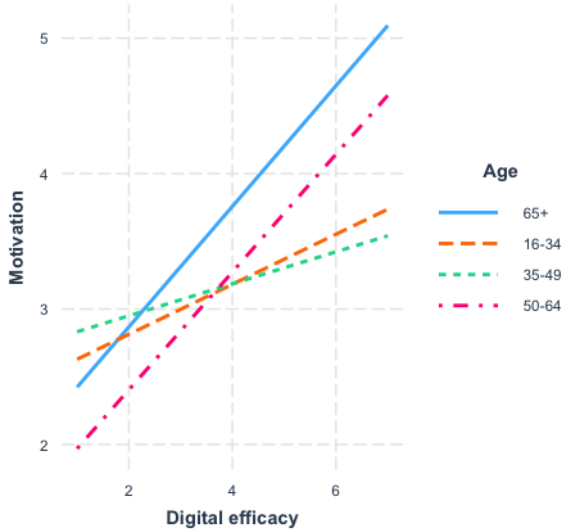
Susceptibility to getting infected significantly predicted motivation to install the app, $b = 0.61$, $t = 9.66$, $p < .01$. Looking at age groups, this relation is stronger for individuals 65 years old and older, $b = -0.25$, $t = -2.55$, $p = .01$, $R^2 = .04$, $F(15, 2258) = 6.27$, $p < .01$.



Susceptibility to getting others infected did not significantly predict motivation to install the app, $b = 0.09$, $t = 1.77$, $p = .08$, $R^2 = .04$, $F(15, 2258) = 6.27$, $p < .01$).
Severity of covid19 significantly predicted motivation to install the app, $b = 0.34$, $t = 3.08$, $p < .01$ and this relation did not differ per age group, $R^2 = .04$, $F(15, 2258) = 6.27$, $p < .01$).

Digital efficacy and motivation to install the app

Digital efficacy significantly predicted motivation to install the app, b = 0.44, t = 6.83, p < .01. Looking at age groups, compared to 65+ individuals, for younger individuals the impact of digital efficacy is less strong, 18-34: b = -0.26, t = -2.43, p = .02; 35-49: b = -0.33, t = -3.14, p < .01, R^2 = .06, F(7, 2266) = 20.46, p < .01).



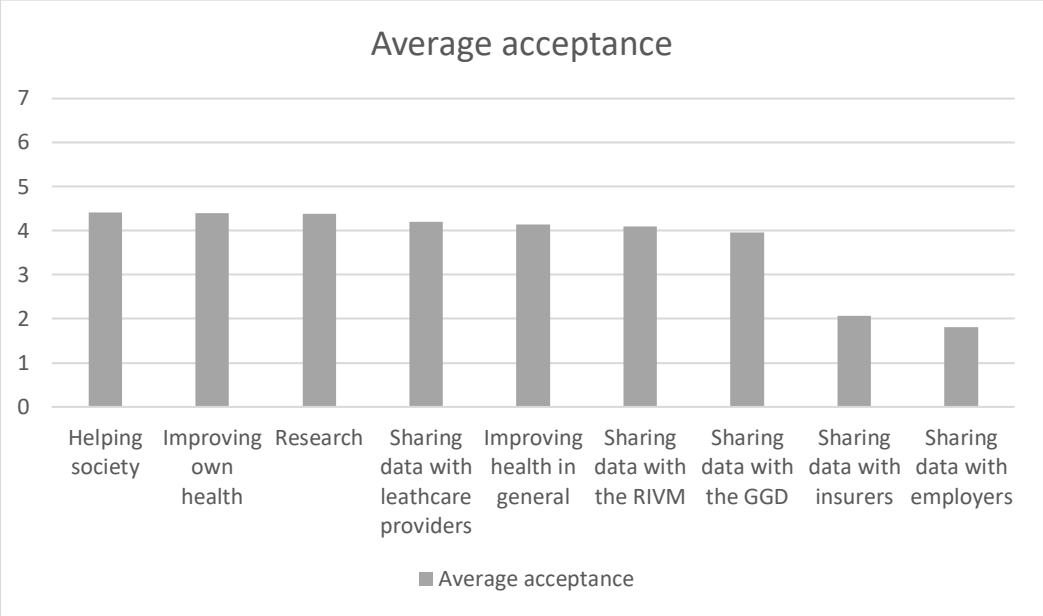
Beliefs about government and motivation to install the app

Trust in the government (b = 0.46, t = 4.63, p < .01) and risk perceptions about sharing data with the government (b = -0.41, t = -3.47, p < .01) significantly predicted motivation to install the app. The relation did not differ with age, R^2 = .32, F(5, 2268) = 209.9, p < .01.

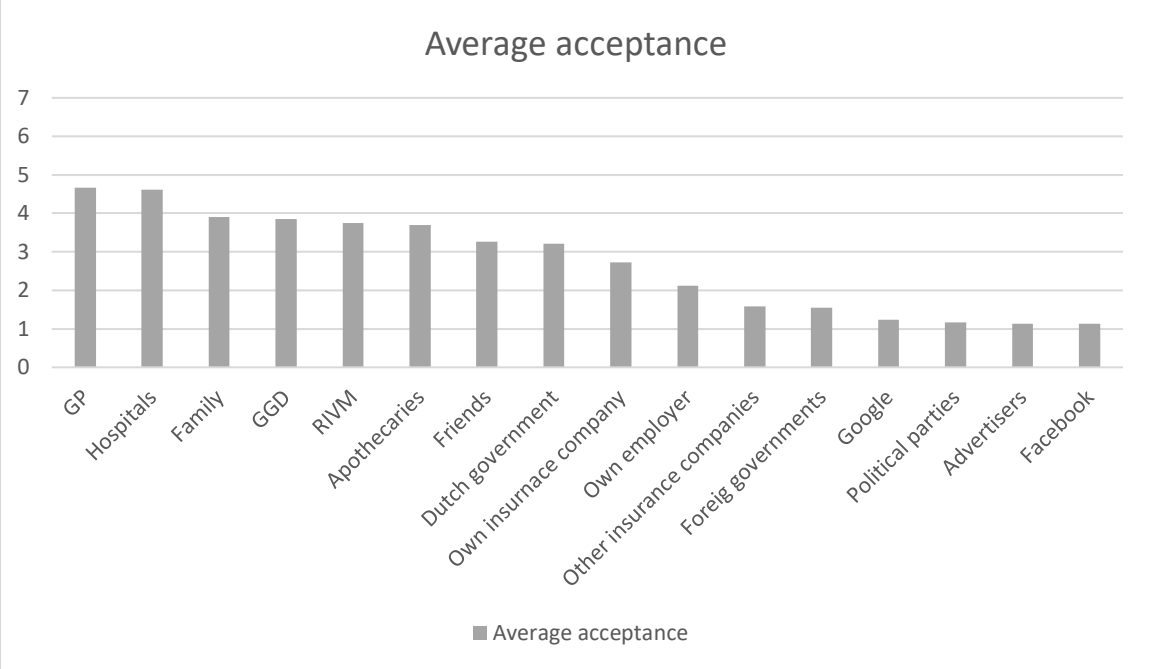
Beliefs about platforms and motivation to install the app

Trust in platforms such as Google (b = 0.30, t = 2.17, p < .01), and risk perceptions about sharing data with such platforms (b = -0.41., t = -2.82, p < .01) significantly predicted motivation to install the app. The relation did not differ with age, R2 = .06, F(5, 2268) = 32.23, p < .01.

Aims of the app and acceptance of it



Acceptance of different parties having access to the data collected by the app



Discussion

Overall, understanding of the functioning app as well as the motivation to install the contact tracing app are rather low. This also means that if the government hopes to reach broad adoption, it will need to step up its efforts to explain the app and communicate why people should install it. In so doing, it is important to notice that different societal groups are motivated by different arguments to install the app. In particular, among the group of 60+, health related concerns play a more important role. Thus, when communicating about the app to this groups, it is critical to explain how the app can help to avoiding contracting the virus. To the contrary, among the group of under 50, social pressure seems to be a more important factor to install the app, raising potential red flags about the voluntariness of installing the app in that age group that should be further researched.

Remarkable is the fact that concerns about the long-term consequences and in particular the impact on potential vulnerable groups as well as privacy concerns influence the motivation to install the app in all age groups. This finding highlights the importance of considering also long-term implications of technological solutions, such as the app, as well as communicating about the fact that the government is aware of, and prepared to act to protect against adverse impact on privacy and long-term negative consequences for particularly vulnerable groups or function creep. Findings like these lend further weight to the importance of adopting formal legislation, such as the *Tijdelijke wet notificatieapplicatie covid-19.*

In terms of democratic legitimatisation of government's decisions, it is remarkable to constat that the majority of Dutch citizens are not aware of the Appathon – a measure that has been designed with the explicit goal of enhancing transparency and including the population into the design process of the contact tracing app. Whereas the Dutch approach has been celebrated throughout Europe for its transparency, the findings from this survey also raise questions regarding the effectiveness of that particular measure, and highlight the need for even clearer communication vis-a-vis the general population.

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