HSSCOMMS-04106-T Major Revision

Dear Gino D'Oca,

Thank you for the possibility to revise our manuscript.

Following your and the reviewer’s helpful suggestions we have revised the manuscript considerable. On the next pages, please find our detailed responses to each of the point raised by the reviewers.

Kind regards

**Reviewer #1**

Thank you for the time to review our manuscript and the helpful comments. We have responded to each of the points below.

Major points

**Comment 1:** Although the Introduction is generally well written, much of the material on pp. 5-6 does not relate terribly well to DCTAs. In particular, it is unclear why people would want to “freeride” on DCTAs. The usual motivation for freeriding is to avoid an expense or potential harm (e.g., side effects of one’s own vaccination), but in the case of DCTAs the cost and harm to the individual have not been sufficiently specified. Figure 1 eventually provides that perspective—without however explaining the risks of the DCTA in any detail—but it seems misplaced and should be in the Introduction not the Method.

*Response.* Thank you for the comment, we agree that the connection to DCTAs needed clarification, therefore the revised paragraph reads as follows

*“The use of DCTAs can also be viewed as a means to manage the capacity of the health system. This means that besides the individual perspective, there is a societal perspective on the acceptance of DCTAs. A pandemic such as the COVID-19 pandemic represents a threat to the health system which can be mitigated through DCTA use. From a societal perspective DCTA usage may prevent a situation in which an exponential growth in the number of infected cases causes the number of people requiring treatment in intensive care units to exceed capacity. From such a societal perspective, the health system, and specifically intensive care unit capacity, can be viewed as a common-pool resource (Ostrom, 1990) that has to be managed sustainably to prevent overuse.”* (p. 5)

**Comment 2.** It was not clear to me how comprehension of DCTAs was measured (although this shows up as a predictor in the analysis), and how much information participants were provided about the technology. From the Supplement it appears as though knowledge of the tracking app was simply presumed, and people were asked for their opinions without being explicitly told how the app works. It is therefore difficult to evaluate how much participants actually knew about the technology they were evaluating. If comprehension is measured, should the analysis not also conditionalize on those responses and restrict consideration to people who understood what they were evaluating?

*Response.* Apologies for this, we agree that this needs clarification. Participants were informed about that the COVID app detects close contacts but not about the application details. Beyond this brief information, we were interested in participants’ comprehension of the functioning of the application and measured it using a four-item scale. The revised manuscript includes this information in the main text and the supplement:

“Before reporting their acceptance and compliance, participants read a brief one-paragraph vignette that explained contact tracing and that the SwissCovid application detected close contacts.” (p. 9)

*“Comprehension of the SwissCovid application was measured wasmeasured on a four-item scale asking, for instance, if the data was stored anonymously(Supplement B presents the wording).”* (p. 10)

*Supplement:*

*“The comprehension scale included the following questions (translated to English, original wording was German):If I use the SwissCovid App I will help other people to stayhealthy. When using the SwisCovid App all data will be stored anonymously If I use theSwissCovid App this will help me to stay healthy. If I use the SwissCovid App I help peoplethat belong to risk groups to stay healthy.The comprehension was score was higher themore participants agreed with statements 1, 2, and 4 and the less they agreed with statement 3.”*

**Comment 3.** The paper does not cite several recent papers that have looked at tracking-technology acceptance in various countries and that constitute direct precedents

*Rsponse. Tbd.*

Detailed comments

**Comment 5.** 3:1 A brief additional sentence explaining how DCTAs operate would be helpful here. For non-experts this may not be clear.

**Comment 6.** 3:1:L These figures for Germany seem low; uptake has increased since then.

**Comment 7.** 4:1:L-3 Some discussion of the changes in technology (e.g., from central storage to Bluetooth) should be provided here to characterize the actual threat to data security. > 5:1 Several typos and grammatical glitches

**Comment 8.** 9:4 Is there any evidence that people understand fairly abstract numbers such as X out of 100,000 infected?

**Comment 9.** 10:1 How were the predictors coded? Were responses to the various items averaged for each construct?

**Comment 10.** 10:2:L Does “last to be excluded” mean they were retained in the model? Awkward phraseology. It is also unclear what “using a penalty” means in this context. Is this the loss-of-fit criterion mentioned earlier?

**Comment 11.** 10:L This claim seems a little exaggerated; see references above about previous work on DCTAs.

**Comment 12.** 12 What are the correct numbers?

**Comment 14.** 13 Figure 2 is very dense and the X-axis labels for age are very difficult to read. Panel B2 should be removed because it only reports two values. For symmetry, A2 could also be turned into a table which would uncrowd the figure and make it more legible.

**Comment 15.** 13:L:L Footnote 4 should be in the main text.

**Comment 16.** 16:L It is intriguing that support for political measures, which presumably include social distancing, increases with lower mental health. Given the adverse effects of isolation on mental health, one would have perhaps expected the opposite.

**Comment 17.** 18 This part of the Discussion appeared a little verbose.

**Reviewer #2**

Thank you for the time you took to carefully review our manuscript and for the helpful comments. We have responded to each of the points below.

**Comment 1.** You may wish to be less categorical in the opening sentence of your abstract: “DCTAs can help control the spread of epidemics” may be better – they surely could not control Covid in isolation. Also, it would not be the apps themselves doing the controlling.

*Response.* Thank you, we agree and have softened the opening statement, reading “A powerful intervention that can help mitigate the spread of a pandemic …” (p. 3)

**Comment 2.** Why have you said in your abstract that the results show a low acceptance of DCTAs, when the average acceptance was 3.75 with a SD of 1.1 (p.12)?

**Comment 3.** A few sentences at the end of the introduction explaining what the paper is about specifically (i.e. the empirical study) and the structure of the paper would be useful for the reader. You could borrow from the abstract for this.

**Comment 4.** On p.4 you appear to conflate psychological, individual and social factors. Please relook at how you present these. The relationship between them only becomes clear later on in the “Method” section.

**Comment 5.** The final sentence on p.4 implies that DCTAs are a behavioural intervention – but aren’t behavioural interventions things like bans on gatherings and social distancing? Of course DCTAs may lead to behavioural interventions – but do they change behaviour in and of themselves?

**Comment 6.** The paragraph on pp.5-6 does not quite align with the previous one. There is no mention of the young person’s social preferences, only what is generally perceived to be for the benefit of society. It might be that their individual risk perception is low, but they have a social preference to protect their family and community which outweighs this, meaning they accept the behavioural interventions.

**Comment 7.** In the hypotheses on p.6, it would be much clearer if you specified whether you were hypothesising about high or low risk perceptions in each instance, i.e. “…in the form that high health risk perception will increase…”, “…low data-security risk perception will decrease…” and “High economic risk perception should increase…”.

**Comment 8.** It is unclear why you hypothesised that high economic risk perception would increase acceptance of DCTAs. Couldn’t the opposite be true? E.g. a person may not wish to run the risk of having to isolate as this could negatively impact their income if they are unable to work [I see later that this is borne out by your findings].

**Comment 9.** How can the sample have been nationally representative if it was drawn from the German-speaking part of Switzerland?

**Comment 10.** It is odd to have a “Materials and Methods” section when you earlier have a “Method” section. Please relook at this and revise as appropriate.

**Comment 11.** What M = 3.86 (for example) on p.11 means should be clarified (i.e. 3.86 on a 1-5 scale).

**Comment 12**. It is not clear why you find it surprising that high policy support correlates with low security risk perception (p.18). In these sections, too, when talking about correlations between perceptions, it would be useful to include whether the perceptions that are correlating either positively or negatively are high or low. At the moment it is left for the reader to work out.

**Comment 13.** At the end of the discussion, where you conclude that “broadly increasing acceptance of DCTAs must have a high priority”, it would be useful to have a reminder here of the overall figure for acceptance of DCTAs, so that the reader can assess the scale of the problem of non-acceptance. On p.12 you have said that the average was 3.75 with a SD of 1.1, which does not seem too bad. Are the effects of individual risk perception etc on acceptance therefore quite mild?

**Comment 14.** Sources are needed for the claims made about individual health risks in the recommendations. Also some indication of the degree of risk would be useful. What percentage of the population (and in conjunction with what risk factors, e.g. age, comorbidity etc) have an overreaction of the immune system? How many young people are affected by long Covid? It would be unethical to present the risks as greater than they are in order to scare people into using DCTAs.

**Comment 15.** Please do a final proof-read, as there are some typos.