

The COVID-19 Snapshot Monitoring in Denmark

Temanummer: Coronakrisen i samfundsperspektiv

The COVID-19 pandemic has required massive behavioural adaptations to curb the spread of the disease. Since March 2020, the COVID-19 Snapshot Monitoring (COSMO) survey has assessed (and continues to do so) Danish citizens' perceptions and behavioural reactions to the COVID-19 pandemic. Herein, we report selected results of the COSMO survey, highlighting factors related to the Danish response strategy.

Introduction

The rapid spread of the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), causing the coronavirus disease 2019 (COVID-19), has taken many countries by surprise, posing threats to individuals and societies worldwide. Denmark is no exception to this, with 27,464 confirmed cases and 650 deaths related to COVID-19 as of 1 October 2020 (WHO, 2020a). On 11 March 2020, the World Health Organization (WHO) declared the COVID-19 outbreak a global pandemic (WHO, 2020b). As there was no effective treatment or vaccine available at that time, health organizations and governments have relied on a number of behavioural guidelines and regulations aimed at curbing the spread of the disease, ranging from regular hand washing to closing down schools and businesses (Cheng et al., 2020). Citizens may consider some of these interventions drastic, affecting not only their health, but also their social life, their well-being, and economic welfare. In Denmark, for instance, the government imposed a fairly strict lockdown policy starting from 13-18 March 2020, including the closing of schools and kindergartens, restaurants and shopping malls as well as restricting social gatherings to a maximum of 10 people. These measures were partially relaxed as of mid-April (reopening of liberal professions), mid-May (reopening of restaurants, shopping malls etc.), and the beginning of June (allowing social gatherings of up to 50 people), but then partly reintroduced in autumn 2020.

Because the success of curbing the spread of COVID-19 depends on citizens' willingness to adhere to the behavioural guidelines and regulations (e.g., increased hygiene and keeping physical distance), it has become of great interest to both health institutions and governments as well as social and behavioural scientists to investigate citizens' reactions in this regard (e.g., Betsch et al., 2020; Habersaat et al., 2020; Van Bavel et al., 2020). As a major initiative in this domain, the WHO introduced a "tool for rapid, fle-



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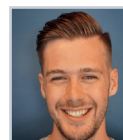
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xible and cost-effective monitoring of public knowledge, risk perceptions, behaviours and trust” – the **COVID-19 Snapshot Monitoring (COSMO)** survey, which has been implemented in several countries across the world. Herein, we describe selected results from COSMO Denmark. Specifically, we discuss the (changes in) survey responses between late-March and late-August 2020, with a particular focus on the success of Denmark’s response strategy at the beginning of the outbreak.

Method

Participants and study design

The study followed a pre-registered study protocol (Böhm et al., 2020) and contains a series of cross-sectional surveys.¹ Starting in calendar week 13 (23-29 March 2020), every week (from week 20: every second week) we invited 5,000 to 7,500 Danish citizens via e-Boks to participate in one of the COSMO surveys. For each survey, we invited random subsamples of a larger sample representative of the Danish adult population with regard to the distribution of age, gender, and place of residence.²

Sample sizes vary between $n = 527$ (week 25) and $n = 1,002$ (week 13) per week. The overall sample size across 15 weeks (until week 35) is $N = 11,399$ (54.2% female; $M_{\text{age}} = 56.43$, $SD_{\text{age}} = 15.66$, age range [18, 93] years; for further information on sample characteristics, see <https://cosmo.ku.dk>). More details on the procedure and measures are available in the online supplementary materials at the Open Science Framework (OSF): <https://osf.io/nzufw/>.

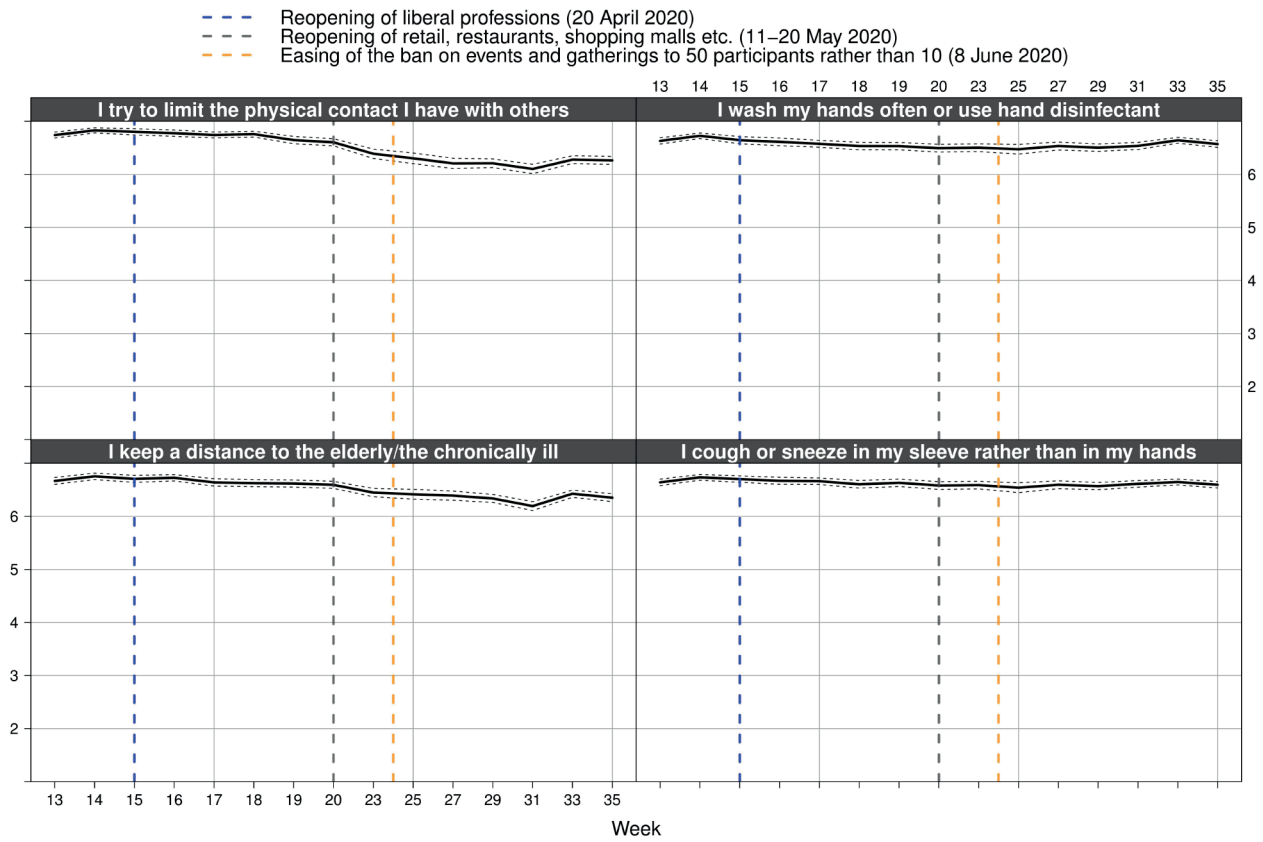
Results

Here, we present mean values of selected outcome measures across the survey samples (see https://cosmo.shinyapps.io/COVID_DK/ for an interactive tool displaying mean values separately for different population groups).

Figure 1 shows participants’ average self-reported adherence to various behavioural recommendations by the government throughout the pandemic. Participants reported having strongly adhered to all measures. Yet, limiting physical contact with others and keeping a distance to people who are particularly at risk somewhat decreased over time (after week 20).

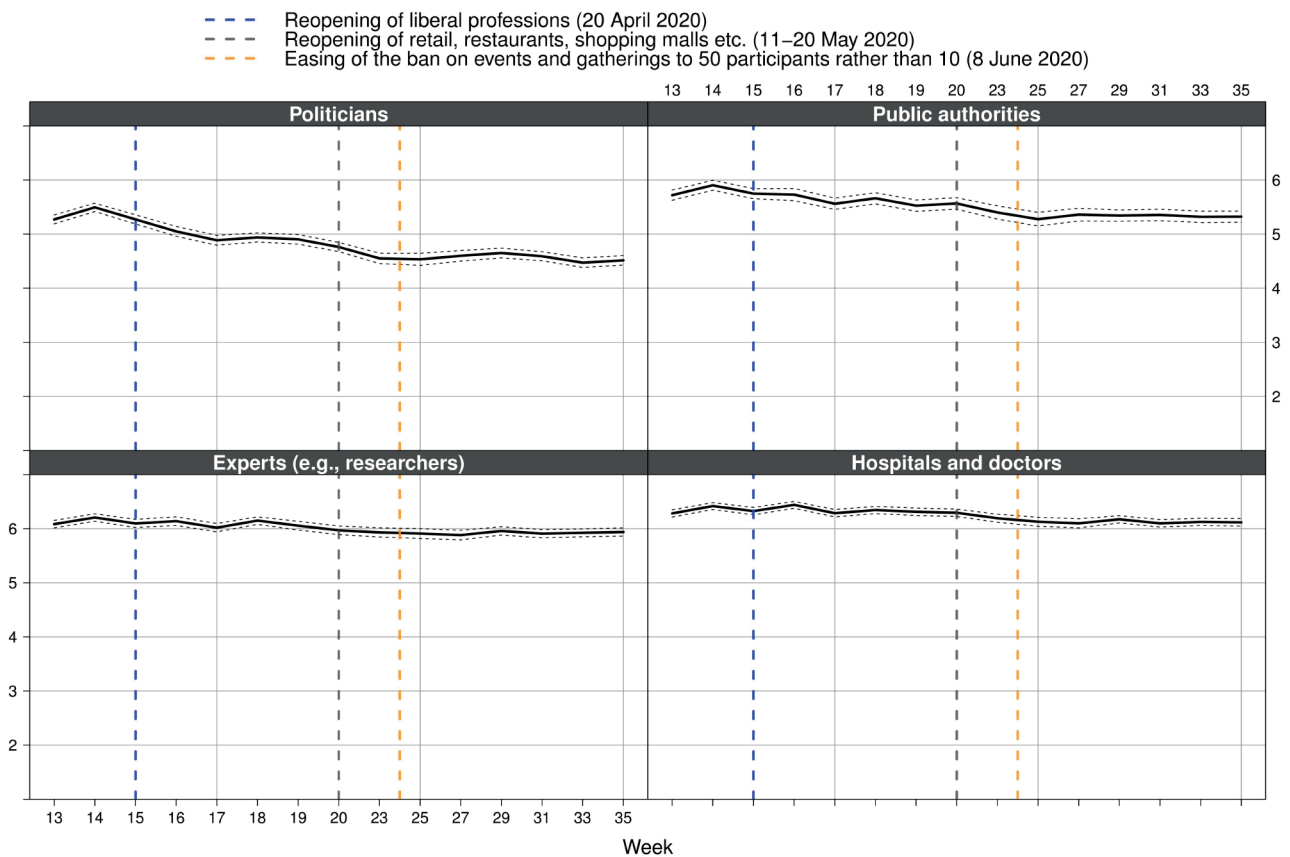
Figure 2 shows participants’ average trust in different governmental institutions/individuals throughout the COVID-19 pandemic in Denmark. Whereas trust in experts (e.g., researchers) and hospitals/doctors started and remained high, trust in public authorities and, even more so, trust in politicians decreased during the lockdown, and did not increase after the lockdown was eased.

Figure 1. Self-reported adherence to behavioural recommendations (scale: 1 = “strongly disagree” to 7 = “strongly agree”) during the COVID-19 outbreak in Denmark.



Note. Solid horizontal lines show mean values and dashed horizontal lines indicate 95% confidence intervals. Dashed vertical lines indicate important policy changes in Denmark.

Figure 2. Trust in different governmental institutions/individuals (scale: 1 = “very little trust” to 7 = “a lot of trust”) during the COVID-19 outbreak in Denmark.

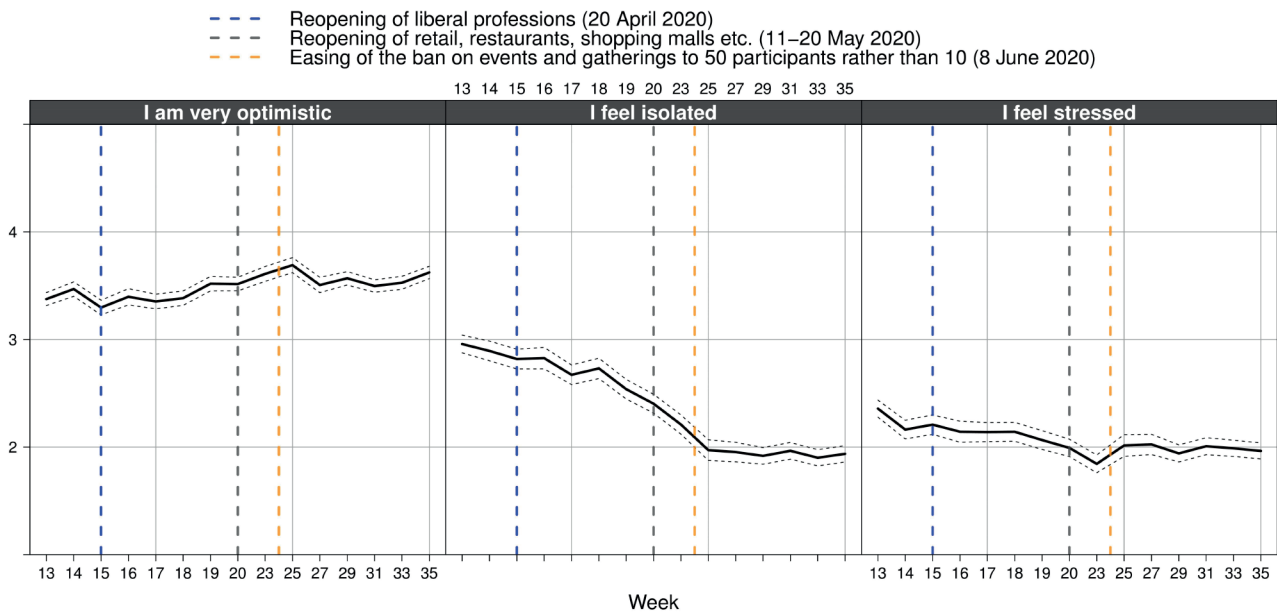


Note. Solid horizontal lines show mean values and dashed horizontal lines indicate 95% confidence intervals. Dashed vertical lines indicate important policy changes in Denmark.

Figure 3 displays how people felt psychologically during the different phases of the lockdown in Denmark. Interestingly, optimism increased soon after the first reopening phase, whereas feelings of isolation and stress decreased, indicating that the more extreme lockdown measures at the beginning of the pandemic potentially had a negative impact on citizens’ psychological well-being.

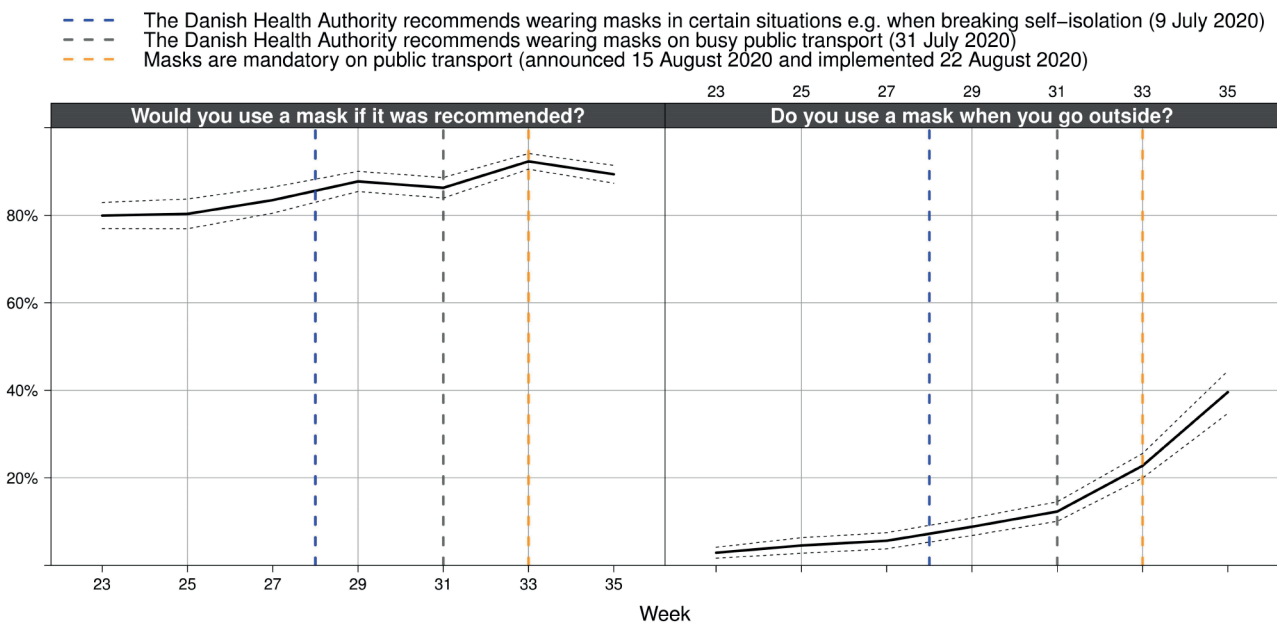
Figure 4 reports on citizens’ willingness to wear (non-surgical) face masks if this were to be generally recommended, as well as their actual self-reported mask wearing. Although the vast majority of participants reported to be willing to wear a face mask if it were to be generally recommended, only few people actually wore a face mask always or sometimes. Yet, mask wearing increased strongly over time, particularly after week 31, when mask wearing was recommended and later even mandated on public transport by the Danish health authorities.

Figure 3. Variables related to citizens' psychological well-being (scale: 1 = "not at all" to 5 = "extremely") during the COVID-19 outbreak in Denmark.



Note. Solid horizontal lines show mean values and dashed horizontal lines indicate 95% confidence intervals. Dashed vertical lines indicate important policy changes in Denmark.

Figure 4. Share of citizens who intend to wear a face mask (binary variable: yes vs. no) when it would be recommended (left panel) and their actual self-reported mask wearing (binary variable: "always"/"sometimes" vs. "never"; right panel).



Note. Solid horizontal lines show mean values and dashed horizontal lines indicate 95% confidence intervals. Dashed vertical lines indicate important policy changes in Denmark.

Finally, we conducted three ordinary least squares (OLS) regression analyses to predict support for different policy measures in response to COVID-19. We focused on three particularly prominent measures: limiting social gatherings to a maximum of 10 people, closing restaurants, and closing schools.

As predictors we used several variables assessed in the COSMO surveys, i.e., demographics (age, gender, children yes/no), basic personality traits (from the HEXACO personality model, e.g., Zettler et al., 2020: Honesty-Humility, Emotionality, Extraversion, Agreeableness, Conscientiousness, and Openness to Experience), perceived risk of COVID-19, as well as general risk preferences, trust in governmental institutions/individuals, empathy towards vulnerable others, and perceived social cohesion in society (for further information, see online supplementary materials). We also considered the time of the survey as a continuous predictor.

Results are reported in Table 1. The regression models for all policy measures explain a considerable amount of variance between 19% and 22%. The significant coefficient of time across measures indicates that support generally decreased during the pandemic. Older participants were more likely to support limited social gatherings and the closing of restaurants. The same applies to female (vs. male) participants, who were also more likely to support school closings. Regarding personality traits, we found some evidence that higher levels of Honesty-Humility as well as lower levels of Extraversion increased the support for limited social gatherings and closing of restaurants. Moreover, higher levels of Emotionality increased the support for school closings and higher levels of Openness to Experience increased the support for limited social gatherings. Further, participants with a higher perception of risk from COVID-19 and people with lower general risk preferences, that is, those who have a lower tolerance towards risk, were more likely to support all measures. Finally, greater trust in governmental institutions/individuals, greater empathy towards vulnerable others, and greater perceptions of social cohesion were all predictive of increased support for all measures.

Table 1. OLS linear regressions predicting support for different policy measures in response to COVID-19

	Support for...		
	Banning gatherings of more than 10 people	Closing restaurants	Closing schools
(Intercept)	0.08 * (0.04)	0.11 * (0.04)	0.12 * (0.05)
Time	-0.24 *** (0.02)	-0.23 *** (0.02)	-0.35 *** (0.02)
Age	0.05 ** (0.02)	0.05 ** (0.02)	0.00 (0.03)
Gender (base: female)	-0.08 * (0.03)	-0.10 * (0.04)	-0.10 * (0.05)
Children (base: no)	-0.06 (0.04)	-0.09 (0.05)	-0.10 (0.06)
Honesty-Humility	0.05 ** (0.02)	0.04 * (0.02)	0.01 (0.02)
Emotionality	0.02 (0.02)	0.02 (0.02)	0.05 * (0.02)
Extraversion	-0.05 ** (0.02)	-0.06 ** (0.02)	-0.02 (0.02)

Agreeableness	0.02 (0.02)	0.02 (0.02)	-0.03 (0.02)
Conscientiousness	0.01 (0.02)	0.01 (0.02)	0.01 (0.02)
Openness to Experience	0.04 * (0.02)	0.01 (0.02)	0.01 (0.02)
Perceived risk	0.08 *** (0.02)	0.05 ** (0.02)	0.05 * (0.02)
General risk preference	-0.08 *** (0.02)	-0.06 *** (0.02)	-0.05 * (0.02)
Trust	0.18 *** (0.02)	0.18 *** (0.02)	0.10 *** (0.02)
Empathy	0.17 *** (0.02)	0.15 *** (0.02)	0.14 *** (0.02)
Social cohesion	0.04 * (0.02)	0.05 * (0.02)	0.08 ** (0.03)
<i>N</i>	3,277	2,746	1,730
<i>R</i> ²	0.21	0.19	0.22

Sample sizes vary depending on the weeks in which the outcome measures were assessed (see online supplementary materials). Further information on the predictor variables are provided in the online supplementary materials. Continuous predictors were mean-centered and scaled by 1 standard deviation. *** $p < .001$; ** $p < .01$; * $p < .05$. Standard errors in parentheses. Bold coefficients indicate significant effects at $p < .05$.

Discussion

The aim of this contribution was to provide an overview of the methods and some stylised results from the COVID-19 Snapshot Monitoring (COSMO) in Denmark. We highlighted several interesting patterns regarding Danish citizens' perceptions and behavioural responses to the COVID-19 pandemic. The results mirror Denmark's comparatively successful response strategy at the beginning of the pandemic. People largely reported adherence to the behavioural guidelines and had high levels of trust in the political and health system, despite some indications of decreasing support and trust during the pandemic. Most recently, changes in the policy regarding face masks were associated with steep increases in mask wearing.

The results suggest that various aspects rooted in individuals' demographics and personalities as well as further social perceptions are related to their support for policy measures. Interestingly, the positive effects of Honesty-Humility and Empathy underline that people do before but also not only adhere to protective measures for the sake of protecting themselves, but also to protect others.

Limitations and outlook

It should be noted that responses could partly be affected by self-selection bias (e.g., greater motivation to participate in the survey by people with more extreme attitudes) and social desirability bias (e.g., greater self-reported adherence to behavioural recommendations). Therefore, combining high-frequency survey data as the one presented here with other data sources (e.g.,

mobility data, infection numbers) may be of particular value to overcome the disadvantages of each data source alone, particularly when it comes to the prediction of future infection numbers (e.g., Jirsa et al., 2020).

The current paper is written in times of increasing infection numbers of COVID-19 in Denmark. It is an open question how the pandemic will develop, what kind of policy measures are needed, and how citizens will react to them. For instance, once a vaccine becomes available, it will be interesting to see how willing Danish citizens will be to get vaccinated, as well as to investigate why some people might choose to abstain from doing so. In any case, results from the continuously updated COSMO survey may help governmental and health officials to better understand Danish citizens' perceptions and behavioural reactions to the crisis, such that policy measures can be adapted accordingly.

Noter

1. Note that there was also an independent panel survey, not reported on in the present contribution.
2. The final sample of participants who actually completed the surveys is roughly representative for the general Danish adult population concerning age and gender distributions.

References

- Betsch, C., Wieler, L.H., & Habersaat, K. (2020). Monitoring behavioural insights related to COVID-19. In *The Lancet* (Vol. 395, Issue 10232, pp. 1255–1256). Lancet Publishing Group. [https://doi.org/10.1016/S0140-6736\(20\)30729-7](https://doi.org/10.1016/S0140-6736(20)30729-7).
- Böhm, R., Lilleholt, L., Zettler, I., & Group, C.D. (2020). *Denmark COVID-19 Snapshot MOnitoring (COSMO Denmark): Monitoring knowledge, risk perceptions, preventive behaviours, and public trust in the current coronavirus outbreak in Denmark* (PsychArchives). <https://doi.org/http://dx.doi.org/10.23668/psycharchives.2795>.
- Cheng, C., Barceló, J., Hartnett, A.S., Kubinec, R., & Messerschmidt, L. (2020). COVID-19 Government Response Event Dataset (CoronaNet v.1.0). *Nature Human Behaviour*, 4(7), 756–768. <https://doi.org/10.1038/s41562-020-0909-7>.
- Habersaat, K.B., Betsch, C., Danchin, M., Sunstein, C.R., Böhm, R., Falk, A., Brewer, N.T., Omer, S.B., Scherzer, M., Sah, S., Fischer, E.F., Scheel, A.E., Fancourt, D., Kitayama, S., Dubé, E., Leask, J., Dutta, M., MacDonald, N.E., Temkina, A., ... Butler, R. (2020). Ten considerations for effectively managing the COVID-19 transition. *Nature Human Behaviour*, 4(7), 677–687. <https://doi.org/10.1038/s41562-020-0906-x>.
- Jirsa, V., Petkoski, S., Wang, H., Woodman, M., Fousek, J., Böhm, R., Lilleholt, L., Zettler, I., Faber, S., Shen, K., & McIntosh, A. (2020). Integrating psychosocial variables and societal diversity in epidemic models for predicting COVID-19 transmission dynamics. *MedRxiv*, 2020.08.12.20173252. <https://doi.org/10.1101/2020.08.12.20173252>.
- Van Bavel, J., Baicker, K., Boggio, P.S., Capraro, V., Cichocka, A., Cikara, M., Crockett, M.J., Crum, A.J., Douglas, K.M., Druckman, J.N., Drury, J., Dube, O., Ellemers, N., Finkel, E.J., Fowler, J.H., Gelfand, M., Han, S., Haslam, S.A., Jetten, J., ... Willer, R. (2020). Using social and behavioural science to support COVID-19 pandemic response. In *Nature Human Behaviour* (Vol. 4, Issue 5, pp. 460–471). Nature Research. <https://doi.org/10.1038/s41562-020-0884-z>.
- WHO. (2020a). *Denmark: WHO Coronavirus Disease (COVID-19) Dashboard | WHO Coronavirus Disease (COVID-19) Dashboard*. <https://covid19.who.int/region/euro/country/dk>.
- WHO. (2020b). *Timeline – WHO's COVID-19 response*. https://www.who.int/emergencies/diseases/novel-coronavirus-2019/interactive-timeline?gclid=Cj0KCQjwv7L6BRDxARIsAGj-34qLCoPgP6TEQPTiUjhTCfoT8tUc17VmFTyEilTsCJDfLSN3Kp2XvFoaAq9uEALw_wcB#!.
- Zettler, I., Thielmann, I., Hilbig, B.E., & Moshagen, M. (2020). The Nomological Net of the HEXACO Model of Personality: A Large-Scale Meta-Analytic Investigation. *Perspectives on Psychological Science*, 15(3), 723–760. <https://doi.org/10.1177/1745691619895036>.