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# COVID-19 Vaccine Hesitancy in Denmark and Russia: A qualitative typology at the nexus of agency and health capital



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## ARTICLE INFO

### Keywords:

COVID-19  
Vaccination programs  
Vaccine hesitancy  
Ethnography  
Netnography  
Long interviews

## ABSTRACT

Vaccination of the world population is being embraced by 184 countries as the main strategy to end the COVID-19 pandemic; vaccination rates are stalling even in countries with high vaccine availability, though. This article investigates the phenomenon of vaccine hesitancy in two such countries, the Kingdom of Denmark and the Russian Federation, through a qualitative study of the different types of hesitancy to COVID-19 vaccination programs and their underlying mechanisms. The analysis reveals a typology along the dimensions of agency and health capital: resisting hesitancy based on mistrust of authority, paralyzed hesitancy based on personal fear, informed hesitancy based on informed choice, and empowered hesitancy based on empowered choice. While the mechanisms underlying vaccine hesitancy are to a great extent comparable between the two countries, differences in population size, societal cohesion, and political culture seem to impact the prevalence and severity of types and, thereby, the outcomes of national COVID-19 vaccination programs and national campaigns for mitigating COVID-19 vaccine hesitancy. The implications of these findings extend beyond the particular context of COVID-19 and the countries studied, supporting and nuancing existing models for vaccine hesitancy, as well as providing a starting point for tailored campaigns for mitigating vaccine hesitancy.

## 1. Introduction

In absence of effective and available treatment, vaccinating the vast majority of the world population is being embraced by 184 countries as the main strategy to end the COVID-19 pandemic. As of September 30, 2021, 6.25 billion vaccine doses have been administered, corresponding to 40.7% of the world population (Bloomberg, 2021). While the least wealthy countries struggle with vaccine availability and ensuing very low vaccination rates, the vaccination rate is stalling also in relatively wealthier countries with sufficient vaccine supplies due to citizens hesitating to participate in COVID-19 vaccination programs (Machingaidze & Wiysonge, 2021). In spite of systematic reviews finding COVID-19 vaccines to generally be highly effective and safe (Kwok, 2021), a systematic review of large-scale representative national surveys indicates that as the pandemic is progressing, the number of citizens intending to vaccinate decreases while the number of those intending to refuse vaccination offers increases (Lazarus, Ratzan, et al., 2021).

### 1.1. Vaccine hesitancy

The phenomenon of vaccine hesitancy has been studied in the context

of other vaccination programs long before the emergence of the COVID-19 pandemic (Larson et al., 2014). MacDonald (2015) argues that vaccine hesitancy exists on a continuum and comprises three aspects: complacency (not perceiving the disease as high risk); convenience (barriers to accessing the vaccine); and confidence (trust in the vaccine and its delivery). Various extensions to such models have been proposed, including Betsch et al.'s (2018) work that extends the 3Cs–5Cs by generalizing convenience to constraints (including psychological barriers) and adding calculation (extensive information searching) and collective responsibility (willingness to protect others).

Confidence as trust in the safety and effectiveness of the vaccine, in particular, and the healthcare system, in general, arguably continues to remain an essential aspect of vaccine hesitancy (Mesch & Schwirian, 2019). Given the complex relation between the rate of adverse events of the vaccine and the rate of background events when vaccination programs are targeting entire populations (Black et al., 2021), citizens often derive their confidence from pre-existing trust relationships, including their social network, healthcare professionals, and public institutions (Larson et al., 2018). In previous pandemics, trust in medical organizations has been identified as a predictor of vaccination behavior (Gilles et al., 2011).

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<https://doi.org/10.1016/j.ssmqr.2022.100116>

Received 23 December 2021; Received in revised form 8 April 2022; Accepted 10 June 2022

Available online 13 June 2022

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## 1.2. COVID-19 vaccine hesitancy

The immediacy and scope of the ongoing COVID-19 pandemic have boosted the interest in vaccine hesitancy, with studies on intention to vaccinate and potential vaccine hesitancy commencing well before the start of all vaccination programs (Robinson et al., 2021). COVID-19 vaccine hesitancy has been studied prospectively through multi-country surveys, finding an intention to vaccinate in 10 low- and middle-income countries (Solís Arce et al., 2021) and China (Lazarus, Ratzan, et al., 2021) that matches or exceeds minimum recommendations, with high-income countries lagging significantly behind. Russia as an upper-middle-income country comes in lowest with only 30.4% intending to get vaccinated in the immediate future (Solís Arce et al., 2021) while 40.9% outright refuse to do so (Lazarus, Ratzan, et al., 2021).

COVID-19 vaccine hesitancy has been studied in more detail in single-country studies or studies of neighboring countries. A study of vaccination intentions in the US and Canada found vaccine hesitancy to be most strongly correlated with mistrust of vaccine benefits, with vaccine safety and considerations of natural immunity playing important secondary roles (Taylor et al., 2020). Another study in the US has found notable demographic and geographical disparities, indicating a role for among others educational background and employment status (Malik et al., 2020).

In Ireland and the UK, economic capital measured by the proxy of household income was identified as a statistically significant factor for the willingness to get vaccinated (Murphy et al., 2021). A further study in the United Kingdom posited an important role for beliefs and attitudes pertaining to COVID-19 vaccination such as recommendations from authorities, social norms about vaccination, and perceptions of effectiveness, risk, and ease (Sherman et al., 2021).

A study in Germany identified demographic and political factors, with male left-wing voters who trust authorities, consume public media, and perceive COVID-19 as a significant health risk displaying the highest intention to vaccinate (El-Far Cardo et al., 2021). Other studies of the Germany context establish links between vaccine hesitancy and conspiracy mindedness (Jensen, Pflieger, et al., 2021) and between favorability of countries and foreign vaccines (Jensen, Wagoner, et al., 2021).

In addition to prospective studies, first retrospective studies are surfacing, often based on the perspective of frontline recipients of vaccinations. A study of vaccination behavior among healthcare professionals in Egypt found that professionals displayed greater perceived severity of and perceived susceptibility to COVID-19 compared to the general population and that vaccination behavior was significantly correlated with perceived barriers and benefits, subjective norms, and general attitudes to vaccination (Al-Metwali et al., 2021). Studies performed on particular societal subgroups such as healthcare professionals are, of course, inherently limited with regard to generalizability to the general population.

## 1.3. Aim of the study

There is an increasing recognition that extant insights into vaccine hesitancy need to be adapted to the peculiarities of the COVID-19 context described above, and that targeted strategies for mitigating hesitancy require insights into the socio-cultural and political circumstances of the country (Machingaidze & Wiysonge, 2021; Skjefte et al., 2021). This article investigates the phenomenon of vaccine hesitancy in two countries with high vaccine availability but otherwise disparate characteristics, the *Kingdom of Denmark* (DK) with its rather monocultural population of less than 6 million and a high achieved vaccination rate and the *Russian Federation* (RU) with its highly multicultural population of more than 140 million citizens and a low achieved vaccination rate to date. The investigation is rooted in a qualitative study of the portrayal and perception of COVID-19 vaccination programs and their coverage in mass and social media. The aim is to explore and uncover the

mechanisms underlying COVID-19 vaccine hesitancy and, thereby, to nuance our understanding of how individuals rationalize their decision to not get vaccinated.

## 2. Material and methods

This section first describes relevant aspects of the two countries constituting the context of the study before detailing the methods used for the study reported on.

### 2.1. Context

One part of the context studied is the Danish egalitarian welfare state, where welfare benefits and services are primarily financed through taxes (Christiansen & Markkola, 2006). The Danish healthcare system is built around the right for free treatment by general practitioners and hospitals in the case of illness. This solidarity approach in Denmark is rooted in a socio-culturally and socio-historically perpetuated normative system founded on “egalitarian individualism”, which cultivates strong social connections of distinctive individuals under the universal concept of *fællesskab* (community/social fellowship/relatedness), applicable to the micro-level (friends and families), the meso-level (clubs and associations), and the macro-level (i.e., Danish society at a whole) (Bruun, 2011).

The other part of the context studied is the Russian welfare state with free access to healthcare guaranteed by the federal constitution and implemented through public mandatory health insurance. While this type of universal healthcare aims to bridge the large social, economic, and health inequalities in the culturally diverse and geographically dispersed Russian population, its implementation is challenged by underfinancing and strong demand for supplementary private health insurances, effectively excluding many vulnerable and marginalized groups (Cook, 2017).

In spite of both states providing free access to healthcare, there are pronounced differences regarding life expectancy (Oksuzyan et al., 2014) and other prime measures of population health. Furthermore, social cohesion and trust are significantly lower in Russia than in Denmark: only 22.9% of Russians answered that “Most people can be trusted” in the most recent World Value Survey (Haerpfer et al., 2020) compared to 73.9% of Danes. The difference in trust levels is less pronounced but still shows the same pattern on the micro- and meso-levels. Trust in government and (health) authorities is significantly lower in Russia than in Denmark (Denemark, 2012).

In 2018, i.e., before the COVID-19 pandemic, public opinions regarding vaccine safety and effectivity were evenly split between positive and neutral in Denmark, while only one third were positive and two thirds neutral in Russia (Figueiredo et al., 2020). Regarding COVID-19 vaccination, public polls in Denmark have remained stable at least between September 2020 (Epinion, 2020) and May 2021 (European Commission, 2021), with approx. 7 out of 10 adults in favor of getting vaccinated and 1 out of 10 against. In Russia, a slight majority (approx. 55%) in favor of getting vaccinated has likewise been reported to have remained stable from June 2020 (Lazarus, Wyka, et al., 2021) to November 2021 (VCIOM (Russian Public Opinion Research Center) (2021).

As of July 31, 2021, 71.8% of the population in Denmark had received at least one COVID-19 vaccine dose, with 54.5% having received two doses. At the same time, in Russia, only 25.4% had received at least one dose, with only 17.5% having received two doses (Mathieu et al., 2021). Notably, the mass-rollout of Sputnik V in Russia started on December 5, 2020, 22 days before the first Dane got vaccinated with BNT162b2/Pfizer on December 27, 2020. The Russian health authorities have attempted to address the vaccine hesitancy with a range of measures, from automatic participation in high-stakes lotteries for those vaccinated to mandatory vaccination of preschool and school teachers, healthcare professionals, care providers, and other frontline professionals such as public transport conductors.

## 2.2. Methods

To study different types of COVID-19 vaccine hesitancy and their underlying mechanisms, a qualitative approach is chosen as it allows to explore and identify the subjective experiences and perspectives involved (Balfe et al., 2010). Qualitative methods are common in the study of underlying factors impacting vaccine hesitancy, as evidenced by Dubé et al.'s (2018) review of qualitative work in the field. The two countries chosen as context can be seen as instances of extreme cases and jointly as a maximum variation case (Flyvbjerg, 2016) with respect to social trust and trust in public institutions. Considering both the case of Denmark, which scores very high in these dimensions (Larsen, 2013), and the one of Russia, which scores quite low (Haerper et al., 2020), allows "to obtain information about the significance of various circumstances for case process and outcome" (Flyvbjerg, 2016).

The qualitative data were collected through a combination of ethnographic and netnographic (Kozinets, 2015; Markham, 2013) methods, where the netnographic part informed the ethnographic part of the data collection by integrating social media as a source of information on social discourse (Branthwaite & Patterson, 2011).

The researcher performed netnographic fieldwork from August 2020, when the first vaccination programs were announced, to July 2021, when vaccination programs started to stall in many countries despite a high availability of vaccines doses. The focus was on observational methods relying on archival data, though data was also elicited in some instances through the posting of open questions as part of an ongoing debate. The observations were mostly from a non-participant role and involved the daily monitoring of 5 relevant Facebook groups (2 from DK, 3 from RU), which ranged from more general groups discussing COVID-19 related topics to groups focused on activism against COVID-19 vaccination. The characteristics of these groups are detailed in Table 1, with the actual group names replaced by focus areas in order to aid the deidentification of the informants recruited from and through these groups. To avoid potential violations of expectations of privacy and any issues regarding informed consent (Lavorgna & Sugiura, 2020), this article refrains from reproducing any excerpts from the data collected from these groups. Descriptive and reflective fieldnotes provided further detail on the netnographic observations.

In addition, during the entire period, the portrayal of vaccination programs in mass media was closely followed to stay aware of the current public debates in both countries. In Denmark, the newspapers followed were Berlingske, Ekstra Bladet, Information, Jyllands-Posten, and Politiken. Out of these five, two – Ekstra Bladet and Information – allow readers to discuss articles in comment sections, providing further insight into the public debate in Denmark. In Russia, the government-controlled newspapers Izvestia and Rossiyskaya Gazeta, as well as the liberally

positioned newspapers Kommersant, RBC Daily, and Rosbalt, were followed. While all but Izvestia allow for public comments, these were disregarded for analysis due to concerns of trustworthiness, as the actual "public" debate in Russia is known to take place in (mostly closed) Facebook groups (Smirnova, 2021).

Face-to-face interviews (online or in person, when and where permitted) were conducted guided by the preliminary analysis of the netnographic data collected. The long in-depth interviews (McCracken, 1988) had a length of 71 min on average, with the shortest interview lasting for 47 and the longest one for 103 min. The interviews were performed unstructured, relying only on a thematic interview guide initially constructed based on topics from the public debates on vaccine hesitancy and themes emerging from the preliminary analysis of the netnographic data and augmented on the fly as needed.

Informants for the interviews were recruited through purposive network sampling based on the snowball method (Bernard, 2011), with the initial pool of informants recruited through the network of the members of the social media groups observed. At most two referrals per informant were considered. The sampling criteria were that informants should be able to understand the purpose of the study and their participation, had been offered to participate in a COVID-19 vaccination program, had chosen to delay or abstain from participation, and had no current intention to get vaccinated. These criteria were assessed through short (10–15 min) online screening interviews, where the purpose of the study was explained and eligibility for participation was checked.

The actually recruited sample consists of 18 informants (10 from RU, 8 from DK), with whom a total of 34 interviews were performed: 18 long in-depth interviews and 16 shorter follow-up interviews with 15 of them. The data collection through interviews was stopped after 18 informants, as the additional data collected supported rather than extended existing categorizations. This sample size is well-aligned with expectations for reaching theoretical saturation and high confidence in the categorization results (Rowlands et al., 2016) and the expected number of long interviews considered sufficient in qualitative inquiry (McCracken, 1988). During the iterative screening and recruitment process, a total of 25 screening interviews were performed, with 2 potential informants excluded as they seemed unable to grasp the purpose of the study and 5 excluded as they were considering getting vaccinated within the next month.

In addition to the interviews with these 18 informants, two expert interviews with national-level experts on the COVID-19 pandemic and COVID-19 vaccine hesitancy were conducted in August and September 2021. Both experts opted to appear anonymously in the study to avoid potential repercussions of freely voicing their opinions.

All informants consented to the publication of non-identifiable translated direct quotes from the interview transcriptions, with access to the full qualitative data restricted due to the inherent inability to truly anonymize such in-depth qualitative data. Best practices for informant anonymity were applied to ensure the deidentification of the quotes, including the splitting of unrelated accounts and the merging of related accounts (Saunders, 1995).

The analysis proceeded in two stages. First, the data were coded inductively, ultimately yielding four categories of mechanisms underlying vaccine hesitancy. Second, a deductive element was introduced to the analysis in the theorization phase by dissecting the categories through the dimensions of agency and health capital. Here, agency refers to individual autonomous action guided by risk factors, self-efficacy, and self-management, while health capital refers to the aggregate of the actual or potential economic, social, and cultural resources possessed by a given agent that have the capacity to affect the position of agents in the social field of health (Schneider-Kamp, 2021).

The following section presents quotes that have been selected as being central and, thereby, representative for the four vaccine hesitancy types and underlying mechanisms, paying attention to representing informants from both countries comprising the context of this study.

**Table 1**  
Overview over social media groups where netnography was performed.

Focus of the group	Country	#members	#posts/ mth.	Period observed
information on covid19 disease and vaccination	Denmark	≈35.000	371	08/ 2020–07/ 2021
activism and resistance to covid19 vaccination	Denmark	≈2.000	580	01/ 2021–07/ 2021
support with covid19 disease and vaccination	Russia	≈56.000	867	08/ 2020–07/ 2021
information on covid19 disease and vaccination	Russia	≈7.000	1075	11/ 2020–07/ 2021
international experience with covid19 vaccination	Russia	≈11.000	106	02/ 2021–07/ 2021

### 3. Results

The analysis of the mechanisms underlying vaccine hesitancy reveals a spectrum of four types of COVID-19 vaccine hesitancy: resisting hesitancy based on mistrust of authority, paralyzed hesitancy based on personal fear, informed hesitancy based on informed choice, and empowered hesitancy based on empowered choice. The following four subsections illustrate and discuss one mechanism at a time. The final subsection theorizes the results and introduces a two-dimensional typology of vaccine hesitancy.

#### 3.1. Between mistrust and skepticism: “Stay away with your poison!”

A common pattern of vaccine hesitancy is found in the interplay of powerful beliefs in the potential of vaccines to cause long-term side effects and the mistrust of authorities who created and evaluated the safety of those vaccines. Lene, a 43-years old entrepreneur, living in a rural area (DK), lower-middle-income, married with 4 children, voices such a belief in long-term effects:

“No way I am going to get vaccinated. Neither am I going to let them vaccinate my family. We have no idea what kind of long-term consequences it [the vaccine] has. What if my kids all become infertile? I want to become a grandmother someday!”

Such beliefs are not only held in relation to family members but also to one's own risks. Marina, a 49-years old proofreader, living in a rural area (RU), lower-middle-class-income, married with 2 children, expresses fears related to the perceived quality of the COVID-19 vaccine:

“I do not want to get vaccinated, because I do not believe in the quality of Russian vaccines – they were all created in a rush. What's in this slurry? This is known only to those who developed these drugs in some underground laboratories. Where is the guarantee that a year – or three, or ten years – after the vaccination, I would not develop cancer due to changes to the cells caused by these drugs? Stay away with your poison!”

Independent of the cultural context, both informants demonstrated a high level of mistrust of the positive effects of the vaccine, focusing on potential hypothetical long-term consequences for themselves or their family members. This type of skepticism seems to be less grounded in critical appraisal of the evidence and rather fueled by high levels of uncertainty, low levels of trust in authorities, and the desire to avoid real or imaginary risks. While this mechanism is prevalent both in Denmark and Russia, the particular focus of informants aligned with this mechanism differs between the two countries. In Denmark, the focus is on possible future side effects for the long-term health of children, while in Russia the quality of the vaccine and mistrust of its development process, production, and safety testing are clearly the most dominating aspects, also in the public debate.

Mistrust of the vaccination program seems to be deeply ingrained into the minds of many Russian citizens. Ilya, a 29-years old dentist, living in a major city (RU), upper-middle-income, married, and expecting his first child, relates a situation in his family:

“I had to get vaccinated as it is mandatory for any health-related jobs. I tried to convince my wife [27-years old], her mother [61-years old], and her grandmother [79-years old] to also get vaccinated, but they were rejecting it outright. I told them getting vaccinated is the safe choice, but they didn't believe me. They thought it was more harmful than getting COVID-19. And my wife was convinced the vaccine would for sure hurt our unborn child.”

Here, the mistrust regarding the safety and benefits of the Sputnik vaccine trumps even personal trust to a close family member, who even happens to be medically educated. This mistrust resulted in the three women experiencing COVID-19 first-hand, as related further by Ilya:

“Turns out they all three got infected. My grandmother-in-law had only mild influenza-like symptoms. My mother-in-law did not do so well – she was in the intensive care unit of the hospital and intubated for several weeks. My wife was tested positive and hospitalized, too. The obstetricians were insisting on her delivering the child prematurely, but we chose to wait for the regular due date. Luckily, she is much better now, and the baby seems to be fine! Only after this, they [the three women] are now finally considering getting vaccinated.”

In this case, only the personal experience of COVID-19 illness seems to have the educational potential to overcome the mistrust of the Russian vaccination program. This is confirmed by the Russian national-level expert interviewed:

“Yes, we see this pattern a lot. Many people do not take the risks seriously before someone close to them falls seriously ill with COVID-19. And let me underline, it has to be serious. Only when close friends or family members are hospitalized, vaccination is re-evaluated as a viable option. More mild cases only reinforce beliefs that it is not worse than having a bad cold.”

#### 3.2. Paralyzed by personal fear: “It scares the life out of me!”

Lack of confidence in the safety of the vaccines is aggravated in the case of vulnerable citizens. Gitte, a 47-years old cleaning assistant, living in a major city (DK), lower-income, 3 children:

“I have a lot of issues with my stomach. I am not going to get vaccinated and risk that it gets anyhow worse. And I have heard of people who had no problems with their stomachs before the vaccine. And then, after, they were really bad. How bad would I be?”

Suffering from Crohn's disease, Gitte believes that her already poorly managed chronic inflammation would become worse. The fieldnotes reflect on that this is in spite of her general practitioner pointing out the lack of evidence for such an effect, as well as that Crohn's disease does not seem to increase her risk of serious COVID-19 illness.

Likewise, Yuri, a 56-year old early retiree due to ill health, living in a major city (RU), lower-income, is actively consulting expert opinions regarding the risks and benefits of COVID-19 vaccination in his particular case. His concern for side effects and perceived lack of support is preventing him from getting vaccinated:

“I have so many chronic illnesses that I am officially classified as partially disabled. I am very afraid of being infected. Not a single doctor in the clinic could definitely tell me whether it is absolutely necessary for me to get vaccinated. Everyone says that you need to get vaccinated in order not to die from COVID-19 if you are chronically ill. But at the same time, the doctors always add: This is your personal decision and your personal responsibility. Can someone, please, explain to me the risks and the benefits of the vaccination in my particular case? I am afraid to die from COVID-19. But I am also afraid to die from the vaccine.”

Fear and a rather low level of health literacy are preventing Yuri from making an informed decision. From one side, he is concerned about possible side effects. On the other side, he is very much scared of being infected with a potentially life-threatening outcome due to his pre-existing multimorbidity in the form of several chronic illnesses. The fears are fueled by social media, where there is no shortage of drastic COVID-19-related myths, claiming, for instance, that “*the second vaccination is literally going to kill you if you had any problems with the first one*” and “*getting vaccinated if you are chronically ill equals a death sentence*”. Yuri relies on information from several social media groups relating to COVID-19 and to his chronic illnesses in an attempt to offset the perceived lack of support from healthcare professionals and the perceived lack of personally relevant information.

The perceived lack of support from healthcare professionals, a low level of health literacy, and striving for obtaining personally relevant information also fuel personal fears of Svetlana, a 62-years old retiree, living in a rural area (RU), lower-income, who has recently been treated for aggressive breast cancer:

“I had cancer, and now I’m in remission. After consulting with my doctor, I am so confused. He told me that I am now a ‘conditionally healthy person’ – whatever that means – and that I could now get vaccinated. But he said it was up to me, and that no one in their medical team had any ulterior motive to vaccinate me. But if I should fall ill with COVID-19, I could die. I was left alone with my decision, and I don’t know what to do. Therefore, I try to avoid leaving the house as much as possible in order not to catch the virus. And I am still not sure regarding the vaccination.”

The perception of the information regarding the vaccination of chronically ill people is quite different between Denmark and Russia. On one hand, the perceived lack of a clear policy by Russian health authorities, the perceived lack of information about the vaccination of vulnerable citizens, and the generally lower levels of social and institutional trust together with low health literacy seem to play a key role in COVID-19 vaccine hesitancy in Russia.

On the other hand, in Denmark, despite singular cases such as Gitte’s, vulnerable patients with chronic illnesses have generally embraced the COVID-19 vaccination program. The Danish national-level expert elucidates this aspect:

“Chronically ill citizens with a high risk of serious COVID-19 illness were offered vaccination in the first priority, with clearly communicated governmental information campaigns regarding patients’ vulnerability and well-explained policies on the national level regarding the order in which the vaccination of the population would happen. There has been broad support among the population for prioritizing chronically ill citizens, with 85% of Danes backing the government on this policy.”

### 3.3. *Informed choice: “I need to understand why!”*

COVID-19 vaccine hesitancy can also be fueled by a lack of understanding of the peculiarities of the policies enacted by the health authorities. Pernille, a 29-years old nurse, living in a major city (DK), middle-income, married, 2 children, has a critical attitude to the possibility of making vaccination mandatory for healthcare professionals:

“It’s our bodies, it’s a choice that we should be allowed to make for ourselves. You do know that fully-vaccinated people also can transmit COVID-19?! A safer way [than mandatory vaccination] would be to continue to constantly test everyone.”

Here, the Danish policy of free and frequent COVID-19 testing on a massive population-level scale (up to 3.5% of the population per day during March 2021) is perceived as a viable and potentially preferable alternative to mandatory vaccination. That said, in a short follow-up interview, Pernille reported that she eventually decided to get vaccinated as recommended by the Danish health authorities, but only after she felt that the information provided on the vaccination program were clear and non-contradictory and had, thus, reached a sufficient level for her to be able to make an informed choice.

In Russia, the situation is perceived quite differently. On one hand, purely preventive COVID-19 testing is not free and, thus, not perceived as a viable alternative to vaccination. On the other hand, the information campaigns accompanying the vaccination program seem to lack the clarity of their Danish counterparts. Ekaterina, a 51-years old civil servant, living in a rural area (RU), middle-income, divorced, 2 children, feels confused:

“The main reason [for waiting to get vaccinated] is the confusing, inconsistent, non-transparent government policy regarding Russian vaccines. Today one expert tells us one thing, and tomorrow his second colleague will tell us something completely different. The opinions of medical practitioners also vary greatly, and recently it was found that about 20 percent of doctors do not recommend people to get vaccinated at all. Whom to believe is unclear!”

The issue with information on COVID-19 vaccination does not only regard its quality but also the multiplicity of its sources and the ensuing contradictory nature of the information gathered. While social trust is relatively low in Russia, medical experts are perceived as reliable and trustworthy sources of information. In a situation, where a sizable proportion of healthcare professionals demonstrate skeptical attitudes toward COVID-19 vaccination, vaccine hesitancy among those who revere expert authority is furthered.

The perception of trustworthiness does not extend to expert authority on the federal level. Olga, a 54-years old lawyer, living in a major city (RU), upper-middle-income, married, 1 child, reflects on which national and international sources might be trustworthy:

“The whole problem is that people do not trust the government. What does the Ministry of Health tell us? That vaccination is needed every six months. What did they say before? That it will be needed every two years. And the WHO says that vaccination is needed no more often than once a year. I have been ill [with COVID-19]. Whom to believe? When to get vaccinated? What vaccine to choose? Doctors are not providing enough information. So, you have to surf the Internet and independently search for scientific articles on these topics. And then, in the same way, independently decide on that basis, whether to get vaccinated or not. There is still no unified state policy on this issue.”

Eventually, Olga concludes that gathering the necessary information for an informed choice has become her responsibility and that she currently does not have sufficient information for making a choice, thus delaying her decision to get vaccinated or not. It is remarkable that her trust in information provided on the federal level is so low that more or less random Internet sources seem to be a viable alternative. The Russian national-level expert experiences that citizens are desperate for information on and hesitant to make decisions regarding vaccination:

“For more than 1 year, I have been on radio or TV shows regarding COVID-19 most days of any week. Here, listeners and viewers can typically send questions regarding matters of personal interest. In the last six months, every time, half or more of the questions are on whether it is safe, beneficial, and advisable to get vaccinated. People are actively searching for any type of expertise in order to understand how to position themselves with regard to this aspect of pandemic mitigation. This hesitancy is mirrored closely in our vaccination rate, which, as I am sure you are aware of, is quite low compared to other European countries.”

### 3.4. *Empowered choice: “Give it to someone else – it’s not for me!”*

While the perceived overload of potentially contradictive information on COVID-19 vaccination paralyzes some citizens, others feel empowered to base their decision on selected pieces of information. Dmitry, a 43-years old entrepreneur, living in a major city (RU), upper-middle-income, 2 children, has kept himself well-updated on the different vaccines available in and outside of Russia:

“My family is my responsibility. I know what is good for us. I don’t want to get us Sputnik – V, light, or whatever variant. Same with Epivac/Corona and Covivac – it’s anyway all the same. Stay away with your poison! I don’t care how many cars I might win in your lotteries –

that's just pure manipulation of people. Pfizer or Moderna, I would get us vaccinated with any day."

As further unfolded during the interview, Dmitry's skepticism is rooted in his perception of the Russian vaccines having been fast-tracked with little or no regard for safety. This perception is supported by what many well-educated Russian citizens perceive as unreflective information about the vaccine in connection with state propaganda regarding the superiority of Russian vaccine development compared to the rest of the world, and it further undermines already low levels of trust in the government. Interestingly, the fact that other vaccines such as BNT162b2/Pfizer and Moderna also underwent fast-tracked development and approval does not seem to be a concern of equal magnitude, implying a higher trust to foreign multinational companies than to one's government.

The abundance of information campaigns and high-stake lotteries among those willing to get vaccinated in Russia is often perceived as an attempt to manipulate public opinion in favor of vaccination programs. The Russian national-level expert points out the detrimental rather than beneficial effect of these campaigns:

"I cannot provide you any hard statistics on this, but it is my perception and clear conviction that these campaigns do not have the desired effect. Quite to the contrary, they seem to increase frustrations and resistance among those already hesitant to get vaccinated."

Distributing vaccines, which are perceived to be potentially unsafe, to an entire population is also viewed critically by Anton, a 38-years old engineer, middle-class-income, living in a major city (RU), no children:

"I do not want to be a guinea pig in those satanic experiments that are now being carried out on people in Russia and around the world. This whole story is just a criminal conspiracy of big pharma because huge money flows into their pockets for vaccines, masks, gloves, sanitizers, and drugs. And now mandatory vaccination will be eternal – after all, greed never ends!"

Anton gives voice to a topic that is quite prevalent in the public debate in Russia: Whether Russian citizens just are a part of a money-making scheme of the pharmaceutical industry, which aims to create a self-sustaining profit generation through massive and recurring vaccination campaigns at the population level.

Another type of empowered choice against getting vaccinated is explained by Per, a 39-years old IT professional, living in a major city (DK), middle-income, cohabitating with 2 children:

"Why should I get vaccinated now? There are not enough vaccines in India. They [Danish state] should give my dose to someone else. Someone who needs it more than I do. I will be fine without!"

On one hand, the motivation for making an empowered choice could be seen as emanating from an altruistic mindset, where Per places his family's and his own needs behind the needs of others whom he perceives to be more vulnerable. On the other hand, his account mirrors aspects of the ones of Sergey, a 32-years old accountant, living in a major city (RU), upper-middle-income, single with no children, who explains his hesitancy to get vaccinated in similar terms:

"I'm a strong and healthy man! I don't think I will get sick at all. But even if I would, I would surely survive. Rather give it [his vaccine dose] to my mother – or some other frail old woman."

Given Sergey's emphasis on being a "strong and healthy man" provides an opportunity to reflect on whether these empowered choices should be viewed as based on altruism or rather as an expression of an explicitly or implicitly proclaimed masculinity. Independent of the underlying reasons, the Danish national-level expert sheds some light on the remaining groups of vaccine-hesitant Danes:

"The vaccination rate is really stalling a lot. Just a few months ago we were administering more than 80,000 vaccines doses per day. Now,

we are down to less than 10% of that. Those who made up their mind to get vaccinated have been vaccinated. As far as we can see, there are two big groups left: those who do not believe that the benefits of the vaccine outweigh its risks, and young people who decide that they are not at sufficient risk to care about getting vaccinated. We are addressing the latter by offering vaccination at the premises of educational institutions. We don't really know what to do about the former group."

### 3.5. Typology of COVID-19 vaccine hesitancy

Based on the analysis of the collected data, this article introduces a typology of vaccine hesitancy taking its onset in the four underlying mechanisms from the previous four subsections: "mistrust of authority", "personal fear", "informed choice", and "empowered choice".

The first two types are "resisting hesitancy" based on mistrust of authority and "paralyzed hesitancy" based on personal fear. These two types differ with regard to the level of agency in the sense of individual autonomous action (Armstrong, 2014) displayed by the informants aligned with them. On one hand, informants driven by personal fear display low levels of agency as they to a large degree remain passive and delay getting vaccinated. On the other hand, informants with high levels of mistrust of authority display high levels of agency as they actively resist the suggestion to get vaccinated and own the choice to not follow the official COVID-19 vaccination program as laid out by their respective health authorities.

The second two types are "informed hesitancy" based on informed choice and "empowered hesitancy" based on empowered choice. As with the previous two types, differences in the displayed levels of agency are the dividing line between informed and empowered hesitancy. Informants relying on informed choice delay their decisions whether to get vaccinated or not until they have been provided with sufficient information, thereby assigning themselves the role of passive recipients of information and displaying low levels of agency by placing responsibility externally. In contrast, informants relying on empowered choice actively select and procure the information, which they then base their decision to get vaccinated or not on, thereby exhibiting high levels of agency.

Both informed and empowered hesitancy can be distinguished from paralyzed and resisting hesitancy by observing that the informants have access to widely different economic resources, social networks, and health literacy. In other words, the dividing line between those two sets of types is health capital (Schneider-Kamp, 2021). The importance of economic, social, and cultural factors for attitudes toward vaccines and intention to vaccinate against COVID-19 has been emphasized in several European contexts such as the UK (Paul et al., 2021) and Germany (Patzina & Dietrich, 2022).

Informants displaying patterns of paralyzed hesitancy often lack both the social capital and the economic capital to access or procure trustworthy advice from experts pertaining to their personal situation. Even when they do receive such advice, they typically lack the cultural capital in the form of basic health literacy to understand and evaluate the risks and benefits of getting vaccinated against COVID-19. The informants displaying patterns of resisting hesitancy often make use of their social network to inform themselves, build health beliefs, and legitimate their decisions. They do, however also lack the cultural capital in the form of basic health literacy to reliably evaluate the trustworthiness of their sources, as well as how to resolve dissonances in the information obtained.

In contrast, informants displaying patterns of informed and empowered choice to a large degree rely on their health-related cultural, social, and economic capitals, e.g., in the form of general health literacy, specific understanding of risks and benefits of different COVID-19 vaccines, contact to healthcare professionals, or even exposure to international perspectives. Notably, these high levels of health capital typically leave such informants with a generally positive attitude to COVID-19

vaccination. Rather than a general vaccine hesitancy, they rationally legitimate their decisions for currently delaying or abstaining from concrete vaccination programs.

The distinctions according to levels of agency and health capital yield a two-dimensional layout of the four types of vaccine hesitancy as illustrated in the matrix typology shown in Fig. 1. Here, the horizontal dimension ranges from low levels of agency on the left to high levels on the right, while the vertical dimension similarly ranges from low levels of health capital on the bottom to high levels on the top.

The introduced matrix typology should not be understood as a means of strictly classifying informants but rather as a set of Weberian “ideal types” (Weber & Henderson, 1947), not necessarily describing any of the informants perfectly, but highlighting different essential patterns of their hesitancy. Informants may display different patterns of hesitancy at different points of time in the face of changing circumstances and even simultaneously when, e.g., dealing with their decision to vaccinate vs decisions on behalf of other family members.

Extant typologies of COVID-19 attitudes postulate a division between three types of citizens: the involved, the cautious, and the indifferent (Boguszewski et al., 2021). Similarly, extant typologies of COVID-19 vaccine hesitancy typically define a triptych of types roughly dividing the continuum of vaccine hesitancy (MacDonald, 2015) into citizens ready to get vaccinated (acceptant), citizens uncertain whether to get vaccinated (hesitant), and citizens determined not to get vaccinated (resistant) (Tavolacci et al., 2021). The typology from Fig. 1 not only subdivides the hesitant and resistant types into four types but also structures them according to the two dimensions of agency and health capital. When compared to a typology of 12 COVID-19 vaccine hesitancy reasons (Liu et al., 2021), the four ideal types proposed in this article are based on more general underlying mechanisms, each of which can be assumed to be driven by one or more of these 12 reasons. Underlying diseases, the possibility of adverse reactions, pregnancy and lactation, fear of needles, and allergies, for example, might to some degree contribute to the mechanism of personal fear.

#### 4. Discussion and conclusion

The four types of COVID-19 vaccine hesitancy emerging from the analysis can be laid out along the continuum of vaccine hesitancy (MacDonald, 2015), which covers all the possible intermediate points between full refusal and full acceptance of all vaccines. While resisting hesitancy encompasses the full refusal of at least all COVID-19 vaccines, paralyzed and informed hesitancy can be found in the middle of the continuum as they are focused on delaying the decisions to get vaccinated or not, be it due to personal fear or the active procurement of an accumulating mountain of information. Finally, empowered hesitancy can be found in the liminal space between delaying decisions and unsure acceptance.

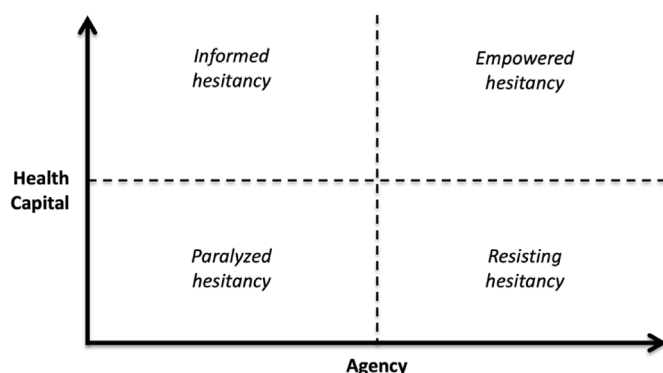


Fig. 1. Typology of vaccine hesitancy according to agency and health capital.

#### 4.1. The four types of vaccine hesitancy in light of the 5C psychological antecedents of vaccination

Confidence in the safety, the benefits, and the delivery of vaccines was likely the first psychological antecedent of vaccination widely discussed (MacDonald, 2015), and confidence (or the lack thereof) is firmly located close to the heart of resisting, paralyzed, and informed hesitancy. Paralyzed hesitancy focuses on the lack of confidence in the safety of vaccines due to a combination of a lack of health literacy and personal health conditions perceived as increasing the risk of adverse reactions. Resisting hesitancy emanates from the mistrust of authority and the ensuing lack of confidence in the recommendations of health authorities and other public institutions promoting the vaccination program. Informed hesitancy is characterized by a lack of confidence due to an overwhelming amount of information with potentially contradictory recommendations regarding COVID-19 vaccination, and it was predominantly found among the Russian informants, likely due to suboptimal coordination of information campaigns and state policies.

Confidence plays a less central role in empowered hesitancy, with confidence levels in the safety and benefits of the vaccines varying significantly among the informants aligned with this ideal type. This type also happens to be the only one where complacency was found to play a notable role, particularly in the form of informants not perceiving a high risk of falling seriously ill with COVID-19 and, thus, no immediate need to get vaccinated. This complacency can be rooted in an empowered choice to pursue vaccination with an alternative vaccine or to prioritize the vaccination of others.

With confidence and complacency covered, the remaining antecedents are constraints, calculation, and collective responsibility (Betsch et al., 2018). Constraints including convenience do not seem to play a significant role in COVID-19 vaccine hesitancy in the context of the two countries studied. This is not entirely surprising, as the vaccines are available without user payments, i.e., without any direct cost to the citizens. Also, the experience of the hassle and costs caused by keeping countries (partially) locked down seems to provide sufficient motivation to overcome concerns of convenience such as finding the time to visit a vaccination center. The only constraints encountered were the psychological barriers of some of the informants aligned with the paralyzed hesitancy ideal type.

Calculation has been found to be important for all four types, with the main difference being in how information is actively procured vs passively consumed. Another aspect that sets informed and empowered hesitancy apart from paralyzed and resisting hesitancy is the tension between cultural health capital in the form of health literacy and the many myths and conspiracy theories surrounding COVID-19 (Duplaga, 2020).

Finally, collective responsibility has only been observed among the empowered hesitancy ideal type and seems to mostly be a Danish phenomenon between the two countries studied. Here, social cohesion and high social trust (Bruun, 2011) seem to beget a culture of both prioritizing vulnerable citizens and getting vaccinated for the benefit of others than oneself. Altruism is together with lack of information being identified as a major driver of vaccine hesitancy (Knight et al., 2021), though with those two drivers being attributed to convenience and complacency. Instead, this article argues that these two drivers draw upon synergies of collective responsibility, calculation, and confidence.

#### 4.2. From size and political system to social cohesion and trust

Systematic reviews of vaccine hesitancy have determined the importance of confidence rooted in social trust and trust in public institutions (Larson et al., 2018), finding that the size of a country's population and its political system play a significant role. This article adds to this debate by arguing that naturally occurring social cohesion and collective responsibility are hard to artificially construct, be it via the promotion of shared values and experiences on national TV in Russia or



digital dialogue interventions in the UK (Knight et al., 2021).

That said, it would be grossly oversimplifying to reduce the issue of COVID-19 vaccine hesitancy to a matter of population size and ensuing social cohesion. At least one population-wise very large country, China, exhibits high vaccination rates. Attempting to dig deeper into the underlying mechanisms, one is likely to find that social cohesion and collective responsibility are top-down imposed rather than bottom-up emerging characteristics in China and that the role and meaning of choice differ between the Chinese and the Russian-Danish context studied in this article. Drawing on existing work demonstrating the ambivalent role of choice in empowerment as both liberating but also paralyzing (Schneider-Kamp & Askegaard, 2021), one might observe that the often revered kind of consented and informed choice of citizens taken for granted in many developed countries is not necessarily a position of strength in the mitigation of a pandemic crisis through vaccination. In China, with its high levels of conformity and high (at least portrayed) trust in the government, getting vaccinated has been mandatory in several jurisdictions (Global Times, 2021), and general attitudes in the population are strongly supportive of mandatory vaccination (Duch et al., 2021).

While size, of course, matters for vaccine hesitancy between countries with more or less similar availability of vaccines, a universal healthcare system, and voluntary vaccination programs, the importance of cultural and political aspects cannot be overestimated. As an example, consider the rather small but high-income country of New Zealand, which exhibits lower-than-expected vaccination rates in the light of surprisingly high levels of vaccine hesitancy (Thaker & Menon, 2020). While New Zealand is comparable in population size with Denmark, it is significantly more multi-cultural with lower levels of social cohesion, social trust, and trust in the government (Haerpfner et al., 2020).

#### 4.3. Toward increased focus on social and cultural aspects in the mitigation of vaccine hesitancy

A neo-liberal focus on healthcare as composed of individual choice and agentic resistance to social exclusion are being identified as potential pathways for understanding COVID-19 vaccine hesitancy (Wiysonge et al., 2021). Over the last sixty years, the role of citizens has slowly transformed from passive recipients of medical care following medical advice without questioning the underlying rationale to active agents that make decisions out of an understanding of their responsibility for their health (Armstrong, 2014). This agency has been shown to contribute to the deconstruction of expert authority (Schneider-Kamp & Askegaard, 2021) and can be assumed to play an important role in the lack of confidence in the safety and benefits of vaccines, in general, and COVID-19 vaccines, in particular.

Already in 1958, Hochbaum described agentic resistance to medical ordinations as based on beliefs, arguing that it was more important to 'be concerned with what people believe, not with the correctness of these beliefs' (Hochbaum, 1958). This advice seems to be important to keep in mind today when considering the plethora of mythical beliefs and conspiracy theories surrounding COVID-19 vaccination (Duplaga, 2020). Belief in conspiracy theories has been linked to lower levels of cultural health capital in the context of COVID-19 (Kim & Kim, 2021).

While it is safe to assume that feelings of uncertainty pervade the matter of the disease itself, the different types of vaccines, the vaccine policies, trust in authorities, as well as financial and political aspects for citizens of both countries, this article argues that agency and health capital (Schneider-Kamp, 2021) distinguish between types of vaccine hesitancy and possible ways of mitigating this hesitancy. Thus, addressing differing levels of agency and health capital could and should be one of the first steps taken in campaigns aimed at mitigating vaccine hesitancy. Concretely, the matrix typology introduced in this article could function as a starting point for adjusting campaigns for mitigating vaccine hesitancy according to the four quadrants.

When targeting citizens paralyzed by personal fear with low agency and health capital, there is a need for personal support based on clear

health communication (Green et al., 2014) to aid such citizens in processing, appraising, and acting on information about vaccination programs and personal risks. Citizens delaying informed choices due to an overload of (partially contradictory) information should likewise be presented with clear health communication, albeit in the form of streamlined guidelines on how and why to get vaccinated in order to assist them in navigating the abundance of information they already have been exposed to.

Those citizens that make empowered choices from a position of complacency would benefit from information that illustrates the risks of COVID-19 without being perceived as patronizing by this group (Reynolds & Quinn, 2008). There is likely no easy way to reach citizens with resisting hesitancy but understanding the underlying reasons for their resistance might avoid fueling their mistrust even further. Eventually, this could lead the way toward a sustained dialogue of healthcare professionals and medical societies (Yaqub et al., 2014) with these groups and reveal a path toward addressing the underlying reasons.

No matter what, campaigns aiming to mitigate vaccine hesitancy should to a larger degree address social and cultural aspects in addition to economic ones, which policymakers already have paid attention to when offering vaccination without user payments and even offering economic incentives such as high-stake lotteries. The need for a nuanced view of vaccine hesitancy for developing tailored communication and mitigation campaigns is widely recognized in diverse contexts including, but not limited to, Australia (Wang et al., 2021), Italy (Moscardino et al., 2022), and Africa (Mutombo et al., 2022). This notwithstanding, so far, only a few countries have transcended a focus on simple started tailoring their campaigns to specific population segments such as culturally-defined groups (Rosen et al., 2021). A focus on social and cultural health capital not only allows for such inherently context-adjusted and tailored mitigation campaigns, different forms of social and cultural health capital such as social embeddedness and health literacy also have the potential to function as antecedents of increased dialogue and informed and empowered choice to get vaccinated.

Ultimately, distinguishing vaccine hesitancy and its underlying mechanisms along the dimensions of agency and health capital holds the potential to gently steer the public debate on vaccine hesitancy from a focus on ignorance and willful disregard of societal safety toward a more nuanced and balanced understanding of the mechanisms underlying individual decisions to delay or abstain from participation in vaccination programs.

#### Ethical statement

Ethical clearing by the Danish National Committee on Health Research Ethics is not required for research that neither performs medical interventions nor handles biological material.

Informed consent was obtained from all subjects involved in the study.

The study has been registered with the Danish Data Protection Agency through the hosting university.

#### Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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