



The COVID-19 Vaccine Discussion on Twitter: Arguments of Sceptics and Supporters

Downloaded from: <https://research.chalmers.se>, 2025-12-05 00:12 UTC

Citation for the original published paper (version of record):

Sverdljuk, J., Bruinsma, S. (2024). The COVID-19 Vaccine Discussion on Twitter: Arguments of Sceptics and Supporters. Vaccine Hesitancy in the Nordic Countries: Trust and Distrust during the COVID-19 Pandemic: 185-204. <http://dx.doi.org/10.4324/9781003305859-14>

N.B. When citing this work, cite the original published paper.

11 The COVID-19 vaccine discussion on Twitter

Arguments of sceptics and supporters

Jana Sverdljuk and Bastiaan Bruinsma

Introduction: social polarisation during the COVID-19 pandemic

In many countries, COVID-19 vaccine discussions have been sharply divided across ideological and partisan lines and have exacerbated social polarisation (Mønsted & Lehmann 2022). Algorithm-assisted studies of the COVID-19 vaccine sentiment present on Twitter show that a positive psychological mood around the vaccine has been a prevailing one. Trust and anticipation slightly dominated over neutral and negative sentiments (Greyling & Rossouw 2022). Negative emotions had to do with fear of side effects, rollout plans, lockdowns, and other preventive measures (Lyu et al. 2021). Social tension was especially noticeable in the United States, where adherents of far-right ideologies, gathered around the Twitter (now known as X) account @realDonaldTrump, capitalised on the COVID-19 crisis in their fight against political opponents.

The Nordic countries are known for having a highly developed welfare state model: a system sometimes called “democratic socialism” that combines democratic culture, individual freedom, and comprehensive systems of social security (Koivunen et al. 2021). The region is on top of world rankings for quality of life, individual prosperity, and equality. All these factors result in a prominent level of social trust. At the same time, due to conditions of digitisation, globalisation, and challenges to democracy, signs of social disintegration, political polarisation, and diminished interpersonal and general trust have emerged (Koivunen et al. 2021). During the pandemic, there was a high level of COVID-19 vaccine acceptance. At the same time, studies conducted in Sweden show that vaccine hesitancy was found among rural women and men who vote for Sweden Democrats, a right-wing populist party and the second-largest party in the Riksdag (Swedish Parliament). This group has “little faith in Sweden’s democratic system” (Lindvall & Rönnerstrand 2022). Young adults who reside in big cities and who do not consume high-quality media expressed disagreement with the vaccination policy as well (Lindvall & Rönnerstrand 2022). In this context, we need to gain knowledge about the dynamics of social relations in the Nordic countries, and the impact of global media trends on these dynamics. We ask, what were the main discussion topics in the Twitter) vaccine corpus, and how did

those with opposing views argue in favour or against vaccination? How did they treat each other? Did they act within the frameworks of social trust?

Theory: generalised trust and attitudes to special groups

We define trust, after Lucy Gilson, as a relational notion that lies: between people, between people and organisations, between people and events (Gilson 2003: 1454). On an interpersonal level, it can be described as the subjective willingness to become vulnerable to a trustee believing that the latter will act to the subject's benefit (Schilke et al. 2021). Morals and altruism are involved in the relation or feeling of trust (Coulson 1998; Lahno 2001). Solidarity, truthfulness, a belief in fairness, and spontaneous altruism are decisive common principles which underpin this feeling (Ulsaner 2008). When built into the functioning of social institutions and accepted by society, these common principles form a basis for social capital, or generalised trust (Honneth 2007; Rothstein 2005; Rothstein & Stolle 2008; Ulsaner 2008).

Community members who do not share the values and norms of the larger group tend to trust only people with similar mindsets, which can lead them to form subcultures or even criminal gangs, "with goals that are opposed to the broader public interest" (Gilson 2003). These groups can experience negative feelings, and their mistrust of others can lead to conflictual action that, as Gilson (2003: 1459) points out: "clearly brings limited benefits to the wider community and may even initiate a vicious cycle of dis-trust leading people to withdraw from civil life". Another case of conflictual relations might involve groups that have different religious, cultural, and political beliefs. In this context, the question arises of how to treat people who do not share the same values as the rest of the community; e.g., should medical institutions or other members of society stop trusting them? In this context, Gilson points to the problem of healthcare providers demonstrating "different levels of trust towards different groups of patients", showing cases of problematic treatment of members of low-income families or people thought to be using medical services in the wrong way.

To explore the manifestations of trust or mistrust in our research material, study how various groups relate to each other, and especially ask whether the majority acts within the frameworks of social trust and exercises a respectful attitude toward special groups, we deploy ideas about othering and disrespect. The concept of "othering" has been elaborated in philosophy and social sciences. According to Jensen (2011), othering is a discursive process in which powerful groups ascribe problematic and/or inferior characteristics to the subordinate groups to affirm their superiority. Similarly, Honneth (1992) states that disrespectful behaviour is injurious because it impairs the insulted persons in their positive understanding of themselves. In addition, it might be useful to introduce the concept of hate speech, after Brison (1998: 313), here:

speech that vilifies individuals or groups on the basis of such characteristics as race, sex, ethnicity, religion, and sexual orientation, which (1)

constitutes face-to-face vilification, (2) creates a hostile or intimidating environment, or (3) is a kind of group libel.

The Internet and especially social media have become places where participants do not spare strong words in relation to their interlocutors, allowing themselves expressions from which they would refrain in real life (Gagliardone et al. 2015). As a result, participants have become warier of each other and, in some cases, have stopped respecting those who have different opinions. This situation can produce a negative impact on generalised trust.

Data: Twitter utterances about vaccines

To retrieve the tweets that we needed for our analysis, we deployed the Snscape library for Python. We then used the search term “vaccin*”¹ and selected only those tweets that were in English. Specifying the algorithm to search among tweets in the period of 1 January 2020 to 1 September 2021 leads to a corpus containing 48,334,908 tweets. Apart from the text of the tweets themselves, we also get information on the hashtags used in them, and about the users who wrote them. For further analysis, we then clean the text of each tweet using the steps suggested by Grimmer et al. (2022). Also, we test for any effects these steps (and their order) might have had on our data by using the preText package by Denny and Spirling (2018). It was necessary to clean our data, given the often-messy nature of Twitter data. As such, we choose to perform the following steps: (a) use of lowercase words, (b) removal of stop words, (c) removal of numbers and punctuation, (d) removal of hashtags and mentions, and (e) application of stemming.² While the exact order and choice of steps automatically influence our outcomes (Denny & Spirling 2018), we choose here to follow these steps to both make the data easier to interpret and lighten the work for the algorithm by reducing the total number of terms.

As part of our analysis focuses on the geographical location of the user, and as we study in detail utterances from the Nordic countries, we then sub-set this corpus further based on this. We can do so in two ways. The most obvious is to use the user-defined “location”. Yet, while more than 80% of the tweets mention a location, they are often fanciful descriptions (such as “in hell” or “anywhere you like”). As such, we opt to use the geographical location data that Twitter stores if users agree to use this option. While this method does provide us with very precise locations, it comes at the price of reducing our corpus to 1,046,683 tweets, or 2.16% of the full data set. While this is a considerable reduction, a quick comparison between the full and reduced corpora shows that STM creates related topics.

We reduced this number further when we generated a Nordic sub-corpus, which contains 3,401 tweets. It would not be correct to say that the English-language data would be fully representative of the realities in the Nordic countries (since people naturally also write tweets in their native languages – in our case, in Danish, Finnish, Icelandic, Norwegian, and Swedish, as well as in Faroese, Greenlandic, and Sami). Nevertheless, using this data set still makes

sense if one perceives voices from the Nordic countries as an inseparable part of the global, or transnational exchange of opinions (and X [formerly Twitter] certainly enables this). These tweets can be statements meant for perception from the outside, reactions to events and agendas of worldwide significance. One may also be aware of the research limitation, that the demographic expressing themselves in English would be different from those posting in the national languages, and that vaccine hesitancy would be more typical for the latter category.

Table 11.1 shows what our reduced corpus looks like, with the frequencies of the tweets arranged per continent. For each continent, we also show the three countries with the highest number of tweets. From this, we see that the

Table 11.1 Frequencies of tweets, per country and continent

<i>Continent</i>	<i>Country</i>	<i>Frequency</i>
Africa	South Africa	23,894
	Nigeria	8,596
	Kenya	4,696
	Others	11,979
Europe	United Kingdom	158,638
	Ireland	20,370
	Germany	4,091
	Nordic countries	
	Sweden	1,207
	Norway	809
	Denmark	795
	Finland	468
	Iceland	122
	Others	24,357
Latin America	Mexico	2,014
	Brazil	1,766
	Others	7,599
North America	United States	532,340
	Canada	74,121
	Jamaica	3,145
	Bermuda	188
	Others	3
Oceania	Australia	30,398
	New Zealand	3,640
	Fiji	431
	Others	285
South and South-eastern Asia	India	87,155
	Philippines	9,743
	Malaysia	8,293
	Others	18,971
Western Asia	United Arab Emirates	2,750
	Saudi Arabia	1,883
	Israel	1,313
	Others	4,024
Total		1,046,683

United States is good for around half of the tweets in our dataset, followed by the United Kingdom (around 15%) and India (around 8%). These numbers are as expected given that we restricted ourselves to English-language tweets. For the Nordic countries, a consequence of this is that their numbers place them behind the United Kingdom, Ireland, and Germany.

Methodology: structural topic modelling and thematic analysis

To process a large corpus of Twitter utterances, and to answer the research questions as to the main topics, arguments, and involved relations of trust/mistrust, we combined quantitative (structural topic model or STM) and qualitative (thematic analysis) techniques. Doing so allowed us to overcome some of the major drawbacks that tend to plague both types of methods (Jacobs & Tschötschel 2019). That is, while the STM provides the precision that qualitative themes often lack, the qualitative thematic analysis explains the topics' various meanings. Our procedure involves the following steps, alternating between quantitative and qualitative methods.

First, for the quantitative part, to get a general sense of the dominant attitudes regarding the COVID-19 vaccine and the character of social relations (especially the relation of trust) implied in the discussions, we generate a word cloud containing the most frequent words (what we call keywords) that represent the main corpus (see Figure 11.1). Keywords provide insight into what the corpus is all about. This initial knowledge serves as guidance for asking further questions and making more advanced inquiries.

Second, to generate our topics, we use a structural topic model or STM (Roberts et al. 2014). The STM method allows analysts to gain insight into how different texts (in our case, tweets) might talk about the same underlying topic using different word choices. This method provides a structure to our data by dividing it into chunks, which we can identify by looking at the relevant words and the most representative tweets that were characteristic of each of them. Belonging to the wider family of topic models based on latent Dirichlet allocation, or LDA (Blei et al. 2003), STM finds its topics by looking at the relations between the words. The more often words appear together in a text, the more likely it is that they belong to the same topic. As an unsupervised model, STM requires no monitoring apart from the setting of the initial parameters. These initial parameters include the number of topics and any information that can help the algorithm to find the topics. In this study, we provided the date of publication of the tweet as extra information, as we suspected that the topics might vary over time.

As for the number of topics, we followed the advice by Roberts et al. (2019) to run multiple STM models, ranging from 2 to 20 topics. We then used a combination of quantitative and qualitative methods to decide on the final numbers of topics. On the quantitative side, we looked at the *exclusivity* and *semantic coherence* of each of the topic constellations. These measure to what degree topics may contain many overlapping words, and to what degree words

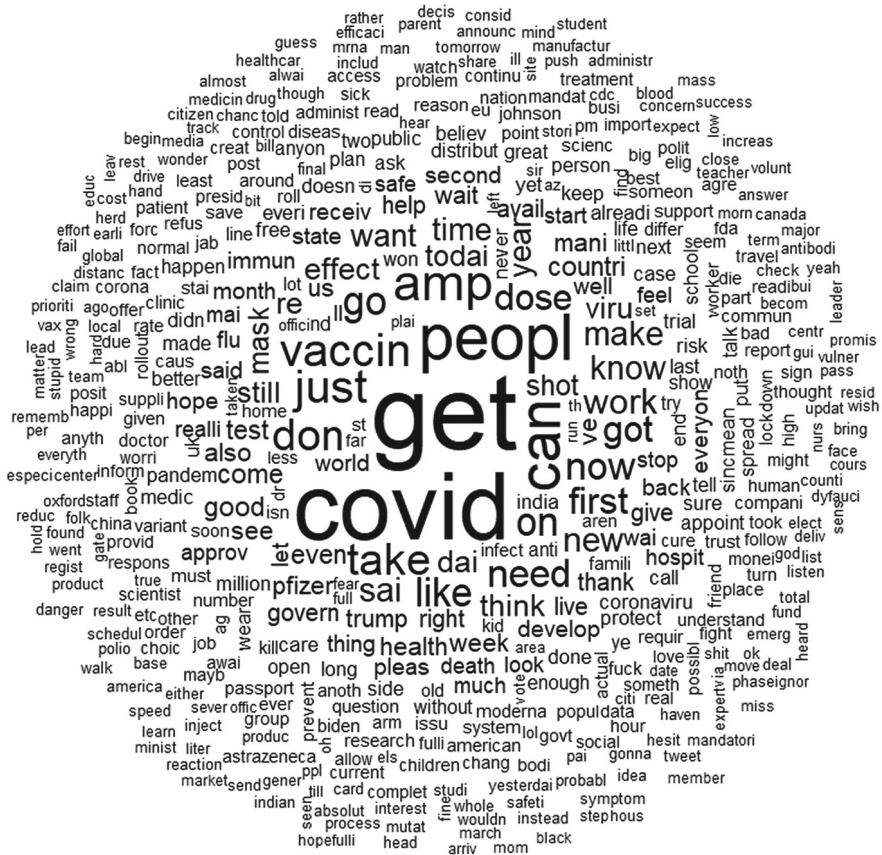


Figure 11.1 Word cloud with the most frequent words in the main corpus.

that occur in the same topic also occur in the same context. Both are good indicators of what human coders would consider valid topics. The result of this is a model containing either six, seven, or eight topics. We then looked at each of these constellations qualitatively to judge the usefulness of each constellation. Based on this, we decided on a model using six topics.

We extracted a list of relevant words for each that have the highest association with that certain topic. For this association, we base ourselves on the FREX (frequency and exclusive) value of each word. This value combines the exclusivity of each word (meaning that a word occurs more often in that topic than in others) while also correcting for its overall frequency (Airoldi & Bischof 2016). To understand our topics better and to label them, we also extracted the 50 most representative tweets for each topic. Doing so for each of the six topics gives us 300 tweets for the main corpus and another 300 tweets for the Nordic sub-corpus. Given the way STM works, each word and each tweet are part of

each topic. Unlike clustering methods, in topic models, there is no real “classification” but more of a degree of belonging. Thus, a tweet can belong 99% to Topic 1, but still 0.1% to Topic 2.

At this stage, we defined the common issue that tweets sharing the same topic take up. The algorithm provides a researcher with a transformation of a large corpus, upon which the researcher releases the analysis itself. The researcher’s task is to make sense of what the topic model shows when it comes to semantic relations and meaning-making processes in the corpus. The researcher’s agency is important to consider while defining the meaning of the topics defined with the help of LDA. While defining the issues central to each topic, one must make a reverse procedure and try to understand why the algorithm united the items under the same topic. According to Jacobs and Tschötschel (2019: 3–4), a piece of text

can be represented as the outcome of first selecting subjects, then selecting ways of speaking about them, and finally selecting some words associated with that manner of speaking. Topic modelling can be understood as a reversal of this process in which the algorithms use the observed distributions of words across texts in the corpus to infer non-exclusive clusters typically used in common – each representing a mode of speech about a specific subject.

While doing so, we kept the question in mind: “What experiences related to the vaccine did people encounter when writing their tweets?” Taking into consideration that we also related the text to the major events (development, distribution, and the actual vaccination), one can define our methodology as contextualist and characterised by the critical realism theory, which, according to Braun and Clarke (2006: 81), acknowledges “the ways individuals make meaning of their experience, and in turn, the ways the broader social context impinges on those meanings, while retaining focus on the material and other limits of ‘reality’”. We related the data to concrete events, stories, cases, and actors (politicians, scientists, officials) who might have led the public discussion. In addition, we used elements of applied linguistics, which links linguistic expressions to deliberations, reflections, and actions of the producers of the speech acts, as well as to the social relations in which they are involved (Mills 2004). Thus, the topics in our analysis can be defined as issues, which are common for the utterances placed in the same “basket” by the algorithm and which relate to some aspect of experiences with the general subject of the entire corpus (“vaccines”). Topics in our analysis should not be confused with the themes, as the latter are the results of further qualitative analysis and can go through several topics.

Third, we then studied the behaviour of our topics over time. As we included the day of publication of the tweet in our model, we can plot the prevalence of our topics on each day. This allows us to see if a topic became more prevalent because of certain time-related events.

Fourth, we continued with a qualitative enquiry, choosing a thematic analysis (Braun & Clarke 2006) to present the defined topics (with the help of LDA) as close to the data as possible, while also providing essential background information and identifying the main themes, which go through various LDA-defined topics. The method of thematic analysis presents the data in its richness or broadness, and at the same time allows for simple manipulations, such as coding. While using coding of the most representative tweets within each topic, we separated between various branches of discussions (sub-topics). Further, we divided the items (tweets) between those in favour of and those opposing the COVID-19 vaccine. This latter step was done to establish what topics caused the most controversies or to see which topics contained a large number of utterances against vaccination. This made it possible to analyse the manner of communication of the two groups (proponents and opponents of vaccination), and detect cases of “othering” and hate speech directed towards the “other camp”. Finally, we identified common themes, i.e., important persistent concepts and meanings underlying the data set that help answer the main research question (about the implied justifications for vaccine acceptance or scepticism). In the presentation of our analysis, we describe in detail the discussion within the three topics (out of the six LDA-defined topics) by tracing certain variations in the reasoning in favour or against vaccines and paying special attention to the agonistic spirit entailed in various positions. In this way, we concentrate on only a representative fragment of our data, being driven by the theoretical interest, in showing the assumptions behind, and the ways of people’s reasoning, rather than by the interest to describe the entirety of the data.

Mistrust between advocates and opponents of vaccination

A qualitative analysis of the selected tweets from the Nordic countries shows that people mostly expressed positive attitudes towards the COVID-19 vaccine and trusted the authorities. The word cloud³ that represents the main corpus shows that words such as “get” and “covid” appear most frequently. Often, these words are part of utterances about the experiences of getting vaccinated or calls to do so. At the same time, we observed a prominent level of tension in the COVID-19 vaccine discussion, and many of the pro-vaccine statements were built as objections to a real or imaginary opponent. The questions on how to deal with the COVID-19 pandemic, or even whether to acknowledge it as a real health threat, split Twitter users, even though opponents of vaccination represented a clear minority. In their criticism of one another, the pro-vaccine and the anti-vaccine constituencies used sharp tones, mutual accusations of incompetence, ridicule, and obscene language. Often, the pro-vaccine group was appealing to ideals, principles, and established doctrines of left-wing political parties, while the most outspoken opponents of vaccination adhered to right-wing radical views.

A close reading of the phrases with another frequent word – “people” – shows that the use of the word often held negative connotations and denoted

various kinds of “others” who appear to be wrong, incompetent, or immoral. For example, those criticising vaccine refusers use such expressions such as: “people I know not getting it [the COVID-19 vaccine] are just scared”; “lots of people have misinformation regarding [the] vaccine”. Apart from these kinds of neutral sentences, we also observed harsher expressions, especially when Twitter users sought to punish vaccine refusers, such as: “People who don’t want the vaccines should not be treated in a hospital”.

Conversely, Twitter users who were vaccine sceptics often took a defensive position trying to protect themselves from all the “people” who allegedly wanted to restrict their freedom. Thus, a Twitter user notes that the majority, that is, those who got vaccinated, treated him dismissively and spoke harshly to him: “people are telling me to die”. Others complained about being pressured and angered by society: “people want me to get a vaccine”; “people angrily screaming at people to get vaccinated”. Another Twitter user compares COVID-19 vaccine proponents with dictators who deprive others of freedom: “you people are worse than people forcing political thought control” cf. Hammarlin et al. 2024, chapter 10, this volume. Thus, a preliminary analysis of the use of the most frequent words invites a closer look at the general tone and the main pro and con arguments within the vaccine discussion.

Topics retrieved with the help of structural topic modelling

After getting a general sense of the expressed attitudes and social relations involved in the COVID-19 vaccine Twitter discussions, we may want to know what issues or topics caused these disputes. We found six meaningful topics based on our STM analysis of the main corpus. Table 11.2 represents the most relevant words for each of them.⁴

The next step was to define what each topic was about, proceeding from a qualitative reading of the 300 most-representative tweets from the main corpus, and 300 tweets from the Nordic sub-corpus, and paying attention to the relevant words. Overall, these were the topics:

- “Herd immunity”: as a way of combating the virus in the absence of a vaccine, or as an outcome of vaccination
- “Approval”: official reports about approval and readiness to administer various vaccine types
- “Getting vaccinated”: information from vaccination stations about vaccine availability and people’s reports about getting first and second doses
- “Reasons”: people’s reflections around the meaning of getting vaccinated; “Should I – or should I not?”
- “Restrictions”: discussions about rules of conduct in public places, such as showing vaccine passports in airports and bars, and on vaccine requirements to attend schools
- “Politicians”: reflecting on the roles of various politicians in solving the pandemic crisis

Table 11.2 Top 15 terms most associated with each of the topics, based on their FREX-value

<i>Getting vaccinated</i>	<i>Politicians</i>	<i>Approval</i>	<i>Restrictions</i>	<i>Reasons</i>	<i>Herd immunity</i>
covid	sai*	covid	go	get	need
dose	trump	new	re*	people	make
first	govern	health	effect	can	viru
got	plan	state	mask	don*	mani*
dai*	world	develop	see	just	wai*
get	country	us	ve*	like	immune
today	medic	amp*	good	on	flu
shot	save	approv	back	know	also
vaccin	try	million	let	work	stop
week	must	coronavirus	test	want	death
thank	noth	trial	thing	vaccin	much
receiv	biden	india	realli*	think	protect
second	trust	country	keep	still	never
next	support	pfizer	long	even	sure
feel	american	uk	side	covid	case

Notes:

- 1 Note that all the terms are stemmed.
- 2 The derivations for the stems with an asterisk (*) are explained in note 1.

Table 11.3 Percentages of topic prevalence for the five Nordic countries

	<i>Approval</i>	<i>Reasons</i>	<i>Getting vaccinated</i>	<i>Restrictions</i>	<i>Politicians</i>	<i>Herd immunity</i>
Denmark	14.5	11.0	21.7	10.8	15.9	17.0
Finland	15.1	10.6	22.0	10.6	15.6	17.5
Iceland	16.6	9.5	17.2	12.3	18.1	17.0
Norway	13.2	11.2	20.6	11.0	16.4	18.6
Sweden	14.5	10.8	18.0	12.0	17.6	17.7

Table 11.3 shows topic prevalence for the Nordic countries. The percentages for each cell represented how prominent that topic was on average over all texts in that country. Thus, in the case of Denmark, a little over a fifth of the tweets concerned themselves with “Getting vaccinated”, while for Iceland, only 17% of the tweets were about this topic. Overall, we find that while there were slight variations between the countries, the overall numbers are close to each other, with “Getting vaccinated” being the most popular topic and “Reasons” and “Restrictions” being the least popular. There is no statistical test for the differences, as we wished to focus on an overall idea of the numbers of topics per country and not the differences between countries. When adding the results from the qualitative tweet analysis, we observed that in the Nordic countries, most represented were the topics that involved fewer controversies (such as

“Getting vaccinated”), whereas the topics that contained hot discussions (“Reasons” and “Restrictions”) received less attention. This result may indicate a less intense discussion in the Nordic region compared to the rest of the world.

Time graph: Prevalence of topics over time in the Nordic countries

A careful study of the graph (seen in Figure 11.2) showing the prevalence of topics over time confirms our previous conclusions, namely, that herd immunity, experiences of vaccination, as well as, later, the issues related to the COVID-19 vaccine approval and administration, were most frequently occurring throughout the whole studied period. The level of the topic’s popularity was tightly knit with the real events, including the approval of the Pfizer-BioNTech COVID-19 vaccine in the UK (and EU) in November 2020, as well as the start of mass vaccination in the summer of 2021 in Europe. Herd immunity as a “natural” way of combating the virus was actively discussed before the vaccine became available. Starting from late autumn and winter 2020 until summer 2021, reports on vaccine approval and administration took off. People described their vaccination experiences even before the COVID-19 vaccine came into play, and since autumn 2020, these reports have been dealing with getting the first and second doses of the COVID-19 vaccine. The role of politicians in solving the COVID-19 crisis was actively discussed during the whole

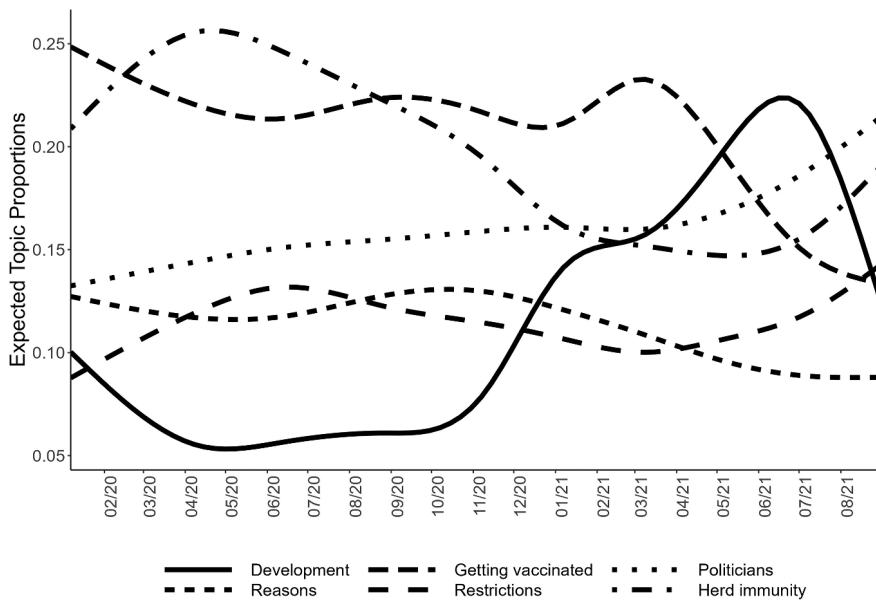


Figure 11.2 Prevalence of the topics over time: Nordic countries (Expected Topic Proportion refers to the expected number of tweets containing a particular topic at any given moment).

period. The same can be said about discussions around reasons for getting vaccinated, and rules of conduct in public places.

Thematic analysis: arguments behind vaccine acceptance or scepticism

A thematic analysis has shown that there was a constant theme of solidarity among the supporters of vaccination, who underlined that it was important to get a vaccine not only to protect oneself but to successfully cope with the virus spread. At the same time, vaccine opponents were most concerned with freedom of choice and associated vaccination with pressure. We show how these arguments were expressed while the users were discussing three controversial topics: herd immunity, official restrictions, and the role of politicians in solving the COVID-19 crisis. First, we show that when it comes to the topic of herd immunity, the free choice argumentation was expressed in the thesis of the least interference in the personal space of citizens. Within the discussion on mandatory vaccination in schools, free choice was associated with the possibility of leading a natural lifestyle and a philosophy of childcare that takes place in harmony with nature. And finally, when speaking of politicians, the users who were concerned with the issue of freedom said that they felt pressure from certain politicians and from members of governments and various organisations. These actors, as they believed, created various structures of control. In other words, often these were adherents of conspiracy theories, such as “big pharma” and “New World Order”. Second, while discussing herd immunity, supporters of vaccination put forward a thesis that it can be achieved only if everyone gets vaccinated and shows solidarity with others. Solidarity was interpreted as society’s responsibility to end the pandemic. Concerning the issue of mandatory vaccination, solidarity meant ensuring health for all, especially for vulnerable groups, among others, children. When it comes to the discussions on politicians, users emphasised international solidarity and justice and judged various governments and politicians out of their contribution to this. In the following, while describing these several ways of argumentation, we pay attention to the general tone of the discussion and the ways of treating opponents, from both sides. Users’ different interpretations of the themes of solidarity versus freedom of choice within various topics are illustrated in the scheme in Figure 11.3.



Figure 11.3 Scheme showing the different interpretations of the users regarding solidarity versus freedom of choice.

Herd immunity: passivity and non-interference?

The issue of herd immunity caused heated debates between advocates and opponents of the vaccine. In both the main corpus and in the Nordic sub-corpus, we observed a tendency to assert that herd immunity was the only way to limit the viral spread, especially in the period before the approval of the COVID-19 vaccine, “when vaccines were out of the question”. This approach is reminiscent of the point of view that vaccines are not needed at all, and that COVID-19 can be overcome in a natural way: simply by strengthening one’s own immunity (“take vitamin C hourly”, as one user said), and waiting for part of the population to get sick and recover from the disease. In the United States, former president Donald Trump, one of the greatest influencers on Twitter, believed that herd immunity could be the main strategy to deal with the pandemic. A small group of scientists from a libertarian think tank in the United States published the so-called Great Barrington Declaration in an open letter, in which they argued in favour of stopping lockdowns and the natural herd immunity approach. On a global scale, by 2021, around 50,000 protests had been linked to the pandemic, some of which were violent (Newey et al. 2021). Public health experts preferred to avoid talking about herd immunity as a tool in the absence of vaccines (Aschwanden 2020). In an influential publication in *The Lancet*, herd immunity as a natural strategy for overcoming the pandemic was deemed a “dangerous fallacy unsupported by scientific evidence” (Aschwanden 2020).

Within the Nordic countries, herd immunity discourse was especially popular in Sweden, where there were official policies of maintaining an “open society”. Contrary to most of the world, Swedish authorities did not introduce a total lockdown. The country’s own unique way of coping with the pandemic was legitimated by the authorities’ wish to guarantee fundamental constitutional freedoms (such as freedom of movement) and avoid exerting excessive pressure on citizens. We observed a considerable number of tweets supporting this view in the Nordic sub-corpus. Liberal attitudes to precautionary measures sanctioned by the state might have enforced some people’s anti-vaccination stand and caused vaccine hesitancy. Both ways of thinking, about the optionality of lockdown and avoidance of vaccines, presupposes a similar view that the COVID-19 virus is not dangerous, and that it can be fought with natural means, for example through developing “natural herd immunity”. Both ways of thinking imply passivity and avoidance of any pressure from the authorities. For example, a user says: “While testing is needed, herd immunity is the only viable long-term option. Remember this is a coronavirus like the common cold, SARS, and MERS. We overcame them without vaccines. We will need to do the same for this one too. We need to forget that there will ever be a vaccine”. Coronavirus was equated with the common cold, and herd immunity was seen as the only, natural way out. WHO defines vaccine hesitancy as a “delay in acceptance or refusal of vaccines despite availability of vaccination services” (Shen & Dubey 2019). Vaccine hesitancy implies not a complete denial of, but a slightly negative attitude towards vaccines, and is connected

with awareness of own dissimilarity to others and unwillingness to “go with the flow” (Shen & Dubey 2019). It implies a rejection of any pressure from others or authorities. While we do not have any evidence that the Swedish policies of non-interference might have led to more vaccine hesitancy, there are many examples of tweets in which the users who supported authorities and were vaccine sceptics talked about their independence and did not agree to follow the general rules.

At the same time, the Swedish philosophy of non-interference in citizens’ behaviour was much criticised as well; Swedish scientists accused the authorities of promoting policies that caused many deaths (Kianzad & Minssen 2020). People criticised the Swedish “special way”, saying that keeping bars and restaurants open was very problematic since this policy “helps to spread the virus”. One of the main arguments in favour of the vaccine was related to the value of solidarity. For example, a user says:

A vaccine is not just to protect yourself. The benefit is also that you stop spreading the virus. Vaccinated people do not get sick and do not spread the virus. Everyone should therefore take the vaccine so we can stop the pandemic by herd immunity.

It is worth paying attention to the use of the word “people” in this quote. It applies to the group of those who have been vaccinated. The latter is endowed with all possible positive qualities: they allegedly cannot even get sick or give the virus to another person.

Restrictions during the pandemic: “natural lifestyle” as an alternative?

Another big issue that caused controversies involved restrictions and requirements of conduct in public places such as schools, restaurants, or bars. In the United States, there were especially heated debates connected to the question of whether the COVID-19 vaccines should be mandatory for children in schools, along the lines of other mandated vaccines against rubella, diphtheria, smallpox, polio, and whooping cough. These debates often boiled down to an intense fight between anti-vaxxers and pro-vaccine people. Opponents of vaccines, who have been active since the 1970s in Europe, Asia, Australia, and North America (and who gather around physicians like Gordon Stewart and Andrew Wakefield), promoted the idea that vaccines contain dangerous ingredients that might cause various side effects, autism, and even death. The anti-vaccination movement has its roots in the religious and political movements of 19th-century England. Its adherents proclaimed personal freedom in response to the requirement of the state for mandatory vaccination. Along these lines, during the 1902 smallpox outbreak in the United States, critics came forward stating that compulsory vaccination violates citizens’ rights to care for their own bodies as they know best.⁵ Parents who decline their children’s vaccines claim to stand for the so-called natural lifestyle. The once-fringe

movement has intensified during the COVID-19 pandemic. Within the main corpus, but also in the Nordic sub-corpus, we found numerous messages confirming this position.

Proponents of vaccines consider compulsory vaccination programmes to be necessary measures of saving lives and associate them with the values of solidarity and care for others, especially children. At the same time, being a proponent of the value of solidarity is sometimes connected with the strategies of othering and exclusion in relation to the so-called anti-vaxxers. For example, a user objected to a person who believes that vaccines lead to autism, assaulting the latter (calling the person a “bitch”) and saying that the latter “wouldn’t be able to walk normally” due to polio, would be “coughing because of pertussis” and would have “probably died due to tetanus”. In another tweet, a user taunts an anti-vaxxer, sarcastically asking if the latter “enjoyed any polio lately”. We noted many other cases of verbal assaults, where anti-vaxxers are called “f*cking idiots”, “stupid”, and “stubborn”, with some Twitter users writing irritated exhortations to vaccinate: “just f*cking do it!” Thus, it is also necessary to take a critical look at the cases of hate speech against vaccine sceptics.

After the vaccine became available, those who were refusing to get vaccinated were accused of being guilty of “potentially prolonging the pandemic” and “contributing to spikes in cases”. One user even posted a video response to a tweet that seemed to endorse forced vaccination. In this video, a healthcare worker suddenly attacks a young guy who is sitting calmly in the gym. A masked nurse knocks the young man to the ground and forcibly makes an injection. Although the message is conveyed humorously, audiences can sense the anger being directed towards an irresponsible young person who is being humiliated and treated with disrespect. In this way, solidarity may border with pressure to take the only right collective action. The circle of deviant, irresponsible “others” is defined, and if someone gets into this circle, they can become an object of coercive measures. Even if all this remains at the level of fantasy and a simple joke, statements of this kind can lead to a decrease in the level of trust in society.

Politicians solving the COVID-19 crisis: between conspiracy theories and international justice

The COVID-19 pandemic and vaccines became an excellent occasion for promoting various political ideologies and views. Trump and his Republican followers produced conspiracy theories, including that the COVID-19 virus and the vaccines were secretly invented either by the Chinese or the Democrats (or both) to seize power and establish a “totalitarian world order”. Tweets propounding this view were found in the main corpus, and we can see that “Trump” and “Biden” were among the most frequent words in the topic covering politicians. While promoting a panoply of conspiracy theories, among them the emergence of the “New World Order” – a society without nations, borders, or distinct cultures that Democrats allegedly sought to establish through the

deployment of secretly toxic COVID-19 vaccines – far-right groups attacked adherents of progressive ideology and their policies, openly proclaiming xenophobia, racism, and sexism. These conservative-leaning members of the Twittersverse embraced what the researcher of the American far-right Camila Liyanage has called “radical traditionalism” (Liyanage 2020: 130). This discourse is characteristic of people who adhered to a popular sort of libertarianism once known as the Tea Party. These people became associated with anti-vaccine movements as the populist Tea Party morphed into pro-Trump libertarian “MAGAs” or “ultra-MAGAs”, finding their voices in criticism of lockdowns and vaccine mandates as assaults on their fundamental freedoms (Butler & Sorell 2022). The “free choice” position began to spread as a response to extensive calls to vaccinate, which these people found to be tiresome, even offensive. From the point of view of those who joined the “free choice” movement, governments put undue pressure on citizens. They perceived themselves as victims of ridicule, social contempt, and even authoritarianism, accusing progressive pro-vax society of being worse than “those who practise political thought control”, thus basically offending and denigrating the authorities and everybody who followed the rules. We find some supporters of the American far-right in both corpora.

However, the prevailing number of tweets were criticising Trump’s anti-vaccine and anti-science stance. In the tweets that came from the Nordic region, people paid a lot of attention to American politics. The majority expressed their sympathies with American Democrats. With the coming to power of Joseph Biden in 2021, whose inauguration took place in the middle of the pandemic, many could sigh with relief welcoming an incoming president who had, as one user put it, “faith in science and knowledge-informed politics and administration”. Another user, welcoming Biden to the White House, writes that the latter “re-joined the WHO” (after Trump had withdrawn the United States from the organisation), rapidly distributed millions of doses of vaccines among the American people, donated to international vaccination efforts, and “brought humanity back into the White House”. Users criticised Republicans for their sceptical attitude towards the COVID-19 vaccine and their refusal to wear masks, perceiving these questions to be a part of the whole “package” of political issues: climate legislation, voters’ rights, democracy, and science-based policies.

Many Twitter users from the Nordic countries in particular criticised Trump for pursuing narrow national interests and expressing little solidarity with other countries. In the tweets, Trump is called a “hypocrite and liar”, the very “definition of evil”, or the one who has a “Nazi-style” of governance. Trump’s practising of what was called “vaccine nationalism” – in which he set orders to hoard vaccines without sharing them with the rest of the world – is seen as “scandalous”. In contrast, people from the Nordic countries promote international images of their states as contributors to the research and development of vaccines and as promoters of global justice. For example, we observed a number of tweets in which their authors point out that Norway has played a key role in building the Coalition for Epidemic Preparedness Innovations

(CEPI), a global coalition founded by Bill and Melinda Gates working to prevent epidemics. Vaccine nationalism and the narrow interests of politicians exist elsewhere, but not in the Nordic region, according to these users. At the same time, we saw tweets offering some constructive criticism as well, when people pointed out that Trump himself may positively influence vaccine sceptics, since many of his supporters do not listen to Democrats or liberal media. Authors of utterances like this demonstrate a certain amount of trust toward Trump supporters and may even inspire them to engage in a dialogue.

Conclusion: better inclusion of special groups

By combining quantitative and qualitative methods, we defined the main discussion topics in global and Nordic Twitter vaccine discussions by paying special attention to the core arguments in favour of and against vaccines and the character of the involved social relations. The issues of herd immunity, mandatory vaccination programmes, as well as separate political figures and their agendas aroused great interest among the Twitter public. Although the majority (including those from the Nordic countries) supported vaccination, the debate resulted in sharp political, philosophical, and values-based divisions between defenders and opponents of vaccination. The main problem, in many cases, was in the manner of communication and the inability to adhere to the basic rules of decency. There were instances of hate speech, disrespect, and othering. Especially problematic was the style of radical groups that practises hate speech in relation to vaccine supporters. Referring to Gilson (2003: 1459), one may conclude that the radical groups stood in opposition to the “broader public interest” and tried to “promote conflictual action”. These groups demonstrated mistrust at many levels: towards others, medical institutions, and the whole of society.

At the same time, representatives of the majority, instead of trying to include these groups in a meaningful conversation, made them objects of public ridicule. When using the concept of “othering”, it is possible to conclude that those who have more power (and the vaccine sceptics often belong to low-income groups with few resources), made the extremist groups feel even more inferior. Those who become objects of “othering” might experience a lowering of their self-esteem, as well as feelings of social pressure, and, in the end, become unwilling to listen to points of view that differ from their own. Gilson suggests that instead of various kinds of humiliating attitudes and treating groups differently, communities would be better off if they would include such individuals in policy and decision-making and the public deliberation process. This will promote more trustful behaviour on both sides. Further suggestions include creating opportunities for special groups to improve personal self-esteem and raising a sense of moral worth. One suggestion might even be face-to-face meetings to discuss controversial issues, “to confront the mismatches between our own beliefs and those of others, enabling self-reflection and learning” (Gilson 2003: 1461). Promoting inter-group communication and the ability to engage in a constructive debate would be key to establishing a generalised trust.

Notes

- 1 Note that in the search term, the asterisk (*) represents a wildcard and can stand for any type of character. As such, the term matches not only those tweets with “vaccine”, but also those with “vaccination”, “vaccinated”, and so on.
- 2 During stemming, inflected and derived words are reduced to their “stem”. For example, “says”, “said”, and “saying” are all reduced to the stem “sai”. The idea behind this is twofold: it groups words with a similar meaning together, and reduces the overall number of unique terms, thereby reducing the pressure on the algorithm.
- 3 The reason the word cloud in Figure 11.1 contains items which are not words comes about as the word cloud was generated *after* cleaning the text. In this process, numbers, digits, spaces, and stop words are removed. In addition, strings are lowercased and stemmed. This means, for example, that “people” and “peoples” are stemmed to “people” – these are the terms that occur in the word cloud. Their interpretation is thus not that of actual words, but of the stems of these words as they occur in the text. Their occurrence is based on the frequency in the text. Also, note that not *all* words occur in the word cloud (for reasons of clarity). A word (or its stem) had to occur *at least* 30 times to be included. This number is not set in stone but was simply that number that led to a readable word cloud at this resolution.
- 4 The reason the words such as “get”, “also”, and “much” occur in each of the topics is their overall high frequency. As can be seen in the word cloud in Figure 11.1, these words occur most often in all the texts. While the FREX value tries to correct for this, it can never be perfect. The same would occur if stop words such as *the*, *and*, *our*, etc., would be included. There are various ways to deal with this in topic modelling. Most often, scholars throw them out in order not to let these words “spoil” the topics. As an alternative, one could keep the words and look at the other words in the topic to base their description on them and silently “ignore” those words.
As for the stemming shown in Table 11.2, “dai” derives from “day” or “days”, “sai” derives from “say” or “says”, “amp” represents the ampersand (&), which was not taken out during cleaning, “re” and “ve” stem from combinations such as “I’ve” and “They’re”, where the apostrophe is removed, and are abbreviations of “have” and “are” respectively, “realli” comes from “really”, “don” comes from combinations such as “don’t”, “mani” and “wai” come from words such as “many”, and “way” or “ways”. For precise details on the algorithm, see Porter (1980).
- 5 For more information on this, see College of Physicians of Philadelphia (2022).

References

- Airoidi, Edoardo M. & Jonathan M. Bischof. 2016. Improving and evaluating topic models and other models of text. *Journal of the American Statistical Association* 111(516): 1381–1403.
- Aschwanden, Christie. 2020. The false promise of herd immunity for COVID-19. *Nature* 587: 26–28.
- Blei, David M., Andrew Y. Ng & Michael I. Jordan. 2003. Latent Dirichlet allocation. *Journal of Machine Learning Research* 3: 993–1022.
- Braun, Virginia & Victoria Clarke. 2006. Using thematic analysis in psychology. *Qualitative Research in Psychology* 3(2): 77–101.
- Brison, Susan J. 1998. The autonomy defense of free speech. *Ethics* 108(2): 312–339.
- Butler, Jethro & Tom Sorell. 2022. Does libertarianism provide a justification for vaccine hesitancy? *The Political Quarterly* 93(2): 342–346.
- College of Physicians of Philadelphia. 2022. *History of anti-vaccination movements*. <https://cpp-hov.netlify.app/vaccines-101/misconceptions-about-vaccines/history-anti-vaccination-movements#Source-1> (Accessed 21 February 2023).

- Coulson, Andrew. 1998. Trust: The foundation of public sector management. In Andrew Coulson (ed.), *Trust and contracts: Relationships in local government, health and public services*, 9–34. Bristol: The Policy Press.
- Denny, Matthew J. & Arthur Spirling. 2018. Text preprocessing for unsupervised learning: Why it matters, when it misleads, and what to do about it. *Political Analysis* 26(2): 168–189.
- Gagliardone, Iginio, Gal Danit, Alves Thiago & Gabriela Martinez. 2015. *Countering online hate speech*. Paris: UNESCO Publishing.
- Gilson, Lucy. 2003. Trust and the development of health care as a social institution. *Social Science & Medicine* 56(7): 1453–1468.
- Greyling, Talita & Stephanié Rossouw. 2022. Positive attitudes towards COVID-19 vaccines: A cross-country analysis. *PLoS ONE* 17(3): e0264994.
- Grimmer, Justin, Margaret E. Roberts & Brandon M. Stewart. 2022. *Text as data*. Princeton: Princeton University Press.
- Hammarlin, Mia-Marie, Fredrik Miegel, Dimitrios Kokkinakis & Jullietta Stoencheva. 2024. Fearing mRNA: A mixed methods study of vaccine rumours. In Lars Borin, Mia-Marie Hammarlin, Dimitrios Kokkinakis & Fredrik Miegel (eds.), *Vaccine hesitancy in the Nordic countries: Trust and distrust during the COVID-19 pandemic* (Chapter 10, this volume). London: Routledge.
- Honneth, Axel. 1992. Integrity and disrespect: Principles of a conception of morality based on the theory of recognition. *Political Theory* 20(2): 187–201.
- Honneth, Axel. 2007. *Disrespect: The normative foundations of critical theory*. Cambridge: Polity Press.
- Jacobs, Thomas & Robin Tschötschel. 2019. Topic models meet discourse analysis: A quantitative tool for a qualitative approach. *International Journal of Social Research Methodology* 22(5): 469–485.
- Jensen, Sune Qvotrup. 2011. Othering, identity formation and agency. *Qualitative Studies* 2(2): 63–78.
- Kianzad, Behrang & Tio Minssen. 2020. Sweden’s response to COVID-19: A tale of trust, recommendations, and odorous nudges. <https://blog.petrieflom.law.harvard.edu/2020/05/12/sweden-global-responses-covid19/> (Accessed 21 February 2023).
- Koivunen, Anu, Jari Ojala & Janne Holmén. 2021. Always in crisis, always a solution? The Nordic model as a political and scholarly concept. In Anu Koivunen, Jari Ojala & Janne Holmén (eds.), *The Nordic economic, social and political model: Challenges in the 21st century*, 1–20. London and New York: Routledge.
- Lahno, Bernd. 2001. On the emotional character of trust. *Ethical Theory and Moral Practice* 4(2): 171–189.
- Lindvall, Johannes & Björn Rönnerstrand. 2022. Challenges for public-service delivery: The case of COVID-19 vaccine hesitancy. *Journal of European Public Policy* 30: 2601–2622.
- Liyanage, Chamila. 2020. Apocalypse now: Conspiracy theories of the radical right. In Tamir Bar-On & Bàrbara Molas (eds.), *Responses to the COVID-19 pandemic by the radical right: Scapegoating, conspiracy theories and new narratives*, 129–131. Stuttgart: ibidem Verlag.
- Lyu, Joanne Chen, Eileen Le Han & Garving K. Luli. 2021. COVID-19 vaccine-related discussion on Twitter: Topic modeling and sentiment analysis. *Journal of Medical Internet Research* 23(6): e24435.
- Mills, Sara. 2004. *Discourse*. London and New York: Routledge.
- Mønsted, Bjarle & Sune Lehmann. 2022. Characterizing polarization in online vaccine discourse: A large-scale study. *PLoS ONE* 17(2): e0263746.

- Newey, Sarah, Anne Gulland & Nicola Smith. 2021. Plague and protests: How Covid has sparked a wave of unrest around the world. *The Telegraph*. <https://www.telegraph.co.uk/global-health/terror-and-security/plague-protests-pandemic-has-sparked-wave-unrest-around-world/> (Accessed 21 February 2023).
- Porter, Martin F. 1980. An algorithm for suffix stripping. *Program: Electronic Library and Information Systems* 14(3): 130–137.
- Roberts, Margaret E., Brandon M. Stewart, Dustin Tingley, Christopher Lucas, Jetson Leder-Luis, Shana Kushner Gadarian, Bethany Albertson & David G. Rand. 2014. Structural topic models for open ended survey responses. *American Journal of Political Science* 58(4): 1064–1082.
- Roberts, Margaret, Brandon Stewart & Dustin Tingley. 2019. stm: An R package for structural topic models. *Journal of Statistical Software* 91(2): 1–40.
- Rothstein, Bo. 2005. *Social traps and the problem of trust*. Cambridge: Cambridge University Press.
- Rothstein, Bo & Dietlind Stolle. 2008. The state and social capital: An institutional theory of generalized trust. *Comparative Politics* 40(4): 441–459.
- Schilke, Oliver, Martin Reimann & Karen S. Cook. 2021. Trust in Social Relations. *Annual Review of Sociology* 47(1): 239–259.
- Shen, Shixin Cindy & Vinita Dubey. 2019. Addressing vaccine hesitancy: Clinical guidance for primary care physicians working with parents. *Canadian Family Physician | Le Médecin de famille canadien* 65(3): 175–181.
- Ulsaner, Eric M. 2008. Trust as a moral value. Accessed on February 21, 2023: https://www.researchgate.net/publication/237268768_Trust_as_a_Moral_Value