

COVID-19 AND THE GLOBAL HEALTH THREAT OF “VACCINE HESITANCY” Analyzing Anti-vax Discourses in Brazilian Portuguese and in German on Twitter

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Abstract – On March 11, 2020, the WHO declared the Novel Coronavirus Disease (COVID-19) outbreak as a pandemic. Along with that, discussions regarding vaccination have revived anti-vaccine movements around the globe. Social media play a key role in the spread of disinformation and conspiracy narratives (Maci 2019). Having that in mind, this study’s objective is to describe discursive patterns and arguments of *anti-vax* campaigns posted on Twitter in Brazilian Portuguese and in German in January 2021 under the hashtags #vacina and #impfung. This piece of research relies on Social Media Critical Discourse Studies (KhosraviNik 2018) and made use of a software-based corpus linguistic approach to identify recurrent themes and textual patterns in *anti-vax* campaigns. Linguistic resources were examined with a focus on the Transitivity System proposed by Halliday and Matthiessen (2004, 2014). The comparative analysis has shown that the socio-political context in which the users formulate the Tweets clearly shapes the German and Brazilian Portuguese *anti-vax* Tweets. At the same time, similarities were found in terms of the discursive patterns of *anti-vax* arguments. These include a strong focus on interrogative statements and a de- and recontextualization of discourses originally put forward by (historically) marginalized groups to construct *anti-vax* activists as victims of a “dictatorship of pro-vaccine policies”. To address issues such as “vaccine hesitancy”, it is necessary to understand arguments and ideologies that support and are spread through *anti-vax* movements. Analyzing *anti-vax* discourses in Brazilian Portuguese and German has been a first step to provide new insights from a context-sensitive and language-comparative perspective.

Keywords: Anti-vax discourse; Social Media Critical Discourse Studies; Transitivity Analysis; Brazilian Portuguese; German.

1. Introduction

The COVID-19 pandemic has accelerated the spread of disinformation and conspiracy narratives and has further revived anti-vaccine movements around the globe. The World Health Organization (WHO) calls “vaccine hesitancy” a leading global health threat and defines it as “the reluctance or refusal to vaccinate despite the availability of vaccines” (World Health Organization

n.d.).

Within an era marked by “the postmodern medical paradigm” (Kata 2012), people increasingly challenge the legitimacy of science and authority and seek health-related information online. Given the affordances of Web 2.0, the online realm offers a wide range of user-generated content published by (self-declared) health experts (Kata 2012, p. 3779). This is particularly true for social media platforms, where so-called “alternative discourses” marked by specific “anti-languages” (Halliday 1976) of health communication have emerged. These discourses use fake news and misinformation to oppose “official” media and science and have gotten the attention of researchers, given their key role in accelerating “vaccine hesitancy” (see also Meyer *et al.* 2019; Zimmerman *et al.* 2005). Indeed, a crucial first step to address issues such as “vaccine hesitancy” is to understand these “alternative discourses”, its “anti-languages” as well as related ideologies that drive these online anti-vaccination movements on a global scale.

The exploration of anti-vaccine discourses has recently also joined the research agenda of linguists and critical discourse analysts (see for example Maci 2019). Researchers have started to describe elements of a distinct anti-vaccine rhetoric (Ruiz *et al.* 2014) and have identified textual patterns to enable automated methods of fake news identification (see for example Moraes *et al.* 2019). Studies have also focused on specific discursive strategies and ideological dynamics in relation to *anti-vax* campaigns, for example on Twitter (Maci 2019). However, with a few exceptions most studies have focused on English (Kata 2010; 2012; Maci 2019; Gunaratne *et al.* 2019; Ma *et al.* 2017).

To the best knowledge of the authors, no empirical research has so far studied discursive patterns in fake-news circulated by anti-vaccine activists from a language-comparative perspective. Research does suggest, however, that “fake news” and *anti-vax* discourses differ across countries and languages (e.g., Humprecht 2019; Zuk *et al.* 2019; Becker *et al.* 2016). Consequently, this study wants to analyze *anti-vax* Tweets posted during the COVID-19 crisis in German and Portuguese from a context-sensitive and language-comparative perspective.

In line with KhosraviNik (2018), a Social Media Critical Discourse Studies (SM-CDS) approach will be used to shed light on context-specific differences of *anti-vax* discourses. The study uses a software-assisted mixed-methods design and draws on a multidisciplinary critical discourse analysis framework (Fairclough 2003, 2010) to contribute to a better understanding of *anti-vax* discourses. The study is centered on the following research question: How do *anti-vax* Tweets in Brazilian Portuguese and German differ or coincide in their experiential and representational meaning and/or mirror the

specific socio-political context in which the users have formulated them?

To answer this research question, a corpus encompassing Tweets posted in January 2021 under the general hashtags #vacina and #impfung in Brazilian Portuguese and German was compiled and subsequently coded. The focus on January 2021 was motivated by the period in which the first COVID-19 vaccines were authorized by the European Commission (on 21st December 2020) and the Brazilian government (on 17th January 2021). Studies have shown that it is specifically around the time of a vaccination program's introduction in which public discussions reach their peak (Becker *et al.* 2016, p. 6166).

After embedding this comparative analysis as well as the phenomenon of vaccine hesitancy in the respective context, we will explain the research objective and its broader theoretical-methodological framework. The two language-specific subcorpora including #impfung and #vacina Tweets will then be contextualized with a focus on the main identified topics and arguments as well as the dominating attitudes towards vaccination, followed by a description and comparative discussion of experiential and representational meanings identified in *anti-vax and vax-skeptical* Tweets. A final section will include concluding remarks.

2. Vaccine hesitancy & anti-vax rhetoric in Brazilian Portuguese and German

The *infodemic* “an overabundance of information, both online and offline [...] [including] deliberate attempts to disseminate wrong information to undermine the public health response and advance alternative agendas of groups or individuals” (World Health Organization 2020) is a worldwide phenomenon and lies at the roots of vaccine hesitancy. Studies have shown a strong relation between conspiracy endorsement and compliance with infection-reducing, containment-related behavior (Imhoff *et al.* 2020), which speaks for the need to study *anti-vax* rhetoric and conspiracy narratives that reflect and uphold what has been labelled *conspiracy mentality*. Imhoff, Social Psychologist at the Gutenberg University Mainz, defines *conspiracy mentality* as “a generalized belief that powerful forces operate in secret to rule the world” (Imhoff *et al.* 2020, p. 1111).

In both contexts under scrutiny here, Brazil and the German-speaking region, the phenomenon of vaccine hesitancy is driven by a high level of *conspiracy mentality* and the resistance to the COVID-19 vaccine is strikingly high. German-speaking countries have been characterized as particularly strong in *conspiracy mentality* (Manakas 2021). The COVID-19 crisis and insecurities that came along with it, have also led to a dramatic

increase in racist, discriminatory, and anti-Semitic behavior. A recently published report on the effect of the pandemic on German-speaking extremist communities shows how these try to benefit from the pandemic through their interpretations of the crisis (Guhl *et al.* 2020). The ZARA report on racism also shows that the effect of extremist COVID-19 related discourse is not restricted to the digital domain but results in racist, discriminatory and anti-Semitic behavior on- and offline (Verein ZARA Zivilcourage & Anti-Rassismus-Arbeit 2021). As an example, between March 17 and the end of 2020 a total of 284 gatherings were documented in which anti-COVID measures were accompanied by anti-Semitic statements such as the equation of the Nazi persecution of Jews with anti-COVID measures (Federal Association RIAS e.V. 2021, p. 7).

The *conspiracy mentality* seems to be similarly high in Brazil. Indeed, the Brazilian fact checking services have recorded enormously high numbers of false or distorted statements on the pandemic. An extensive amount of misinformation about the coronavirus disease was spread on social networks and alternative media, counting with the support of doctors, journalists, and politicians (Silva 2021). *Aos Fatos* found in a period of six months (March to September 2020) more than 600 of Brazilian extreme right wing President Jair Bolsonaro's statements on COVID-19 to be false or distorted (Ribeiro *et al.* 2020). When the WHO announced COVID-19 a pandemic on March 11, 2020, Bolsonaro kept calling the disease also weeks later "uma gripezinha ou resfriadinho" (a little cold) and disregarded recommendations by health experts regarding distancing and hygiene when attending demonstrations and protesting crowds (Leschzyk 2020, p.110). The political scientist Guilherme Casarões refers to the Brazilian president's actions towards the COVID pandemic as "sanitary populism" or "medical populism". This creates a division of opinions regarding mass vaccination and distracts the population and thereby spreads and perpetuates "a situation of moral panic" (Gragnani 2021). A strong scientific denialism combined with the political context seem to be the relevant factors for the growing *anti-vax* movement in Brazil (Lucia *et al.* 2021). According to the scholar Glícia Grino, this misinformation campaign against the vaccines explains the considerable amount of Brazilian citizens who do not want to get vaccinated (Lucia *et al.* 2021).

While a similarly high level of *conspiracy mentality* and vaccine hesitancy is evident in both contexts, the governments in the German-speaking countries and in Brazil deal with the pandemic situation very differently. Various social actors drive the *infodemic* with distinct discursive strategies, as for example analyzed by Leschzyk (2021) with a focus on Germany and Brazil. This makes the contexts particularly interesting for an analysis of *anti-vax* Tweets from a comparative perspective.

3. Theoretical framework and methodological approach

This research relies on Social Media Critical Discourse Studies (SM-CDS), which is a “socially committed, problem-oriented, textually based, critical analysis of discourse” (KhosraviNik, 2018, p. 586) and uses evidence from two language-specific corpora based on the German #impfung and the Portuguese #vacina to investigate sites of meaning-making within *anti-vax* Tweets. In the following subsections the corpus-based multidisciplinary SM-CDS framework will be introduced and key concepts that are at its core will be described. Further, the process of data collection and methods of data analysis will be detailed.

3.1. Corpus-based multidisciplinary SM-CDS framework

As proposed by KhosraviNik’s (2018) SM-CDS model, this analysis tries to link the discursive practices, that is, the micro-features of the textual analysis as well as the vertical context substantiation to the societal discourses-in-place (KhosraviNik, p. 585). Therefore, the “thick” context (Couldry 2012) as represented in the processes and meanings of the text itself is in the spotlight of this analysis. The aim is to interpret the language of the *anti-vax* Tweets within a wider socio-political context of two distinct language communities. A Systemic Functional Linguistics’ (SFL) approach is employed for the textual analysis to identify and describe the micro-features of the *anti-vax* Tweets.

As previously mentioned, the theoretical approach of language which this study draws on is SFL, developed by Halliday (Halliday *et al.* 2004, 2014). The study further builds on the language-specific descriptions of the Transitivity system with regard to German (Steiner *et al.* 2014) and Brazilian Portuguese (Fuzer *et al.* 2014). According to SFL, language functions as a meaning-making resource with the purpose of accomplishing communicative goals, and it is inextricably connected to its social and cultural contexts. The notion of ‘systemic’ refers to language as a network of interconnected systems. In this sense, language works as any other semiotic mode whose produced meanings are made of choices within the available possibilities (Fuzer *et al.* 2014). In addition, Halliday and Matthiessen (2014) state that language enacts three metafunctions working simultaneously at the semantic level: Ideational, Interpersonal, and Textual meanings. The first metafunction is related to the construction of human experience, the second refers to the use of language in interaction, and finally, the last one has to do with the organization of the information in texts.

Having in mind the objectives of this study, our analysis focuses on the ideational metafunction of the Tweets, specifically on the experiential

meanings realized through the Transitivity System, hence on the lexico-grammatical level of meaning-making. This system is related to “the choice of process types and participant roles seen as realizing interactants’ encoding of their experiential reality: the world of actions, relations, participants and circumstances that give content” to any text (Eggins 2004, p. 208). The world of actions characterizes the “ongoings” of the event - depictions of happening, going, saying, sensing, being or having - and they are represented by processes (verbs). For a summary of the main process types and participants involved in each process, see Halliday (2014, p. 311).

3.2. Methods of data collection and analysis

Hashtags are used in microblogging services such as Twitter to label the topic of microposts; in this sense, they are forms of metadata which constitutes an integral part of Tweets (Zappavigna 2012). In order to collect discourses related to vaccine hesitancy and COVID-19 in Portuguese and German, this analysis used the affordances provided by what has been labeled “searchable talk” (Zappavigna 2012, 2015). A corpus of 15,398 Portuguese Tweets and 15,722 German Tweets was built based on the discourse tags #impfung and #vacina. Only posts published during January 2021 in German and Portuguese including the hashtags #impfung and #vacina within the microposts have been included in the corpus. Tweets posted in this period and languages, excluding retweets, were purchased by Vicinitas and imported into Maxqda, a software for qualitative content analysis. The two experiential hashtags #vacina and #impfung have been selected given their popularity, their relevance to a broader audience as well as due to the pertinence to the problem at hand “vaccine hesitancy”. In contrast to other types of hashtags, for example, interpersonal hashtags such as #retweet, experiential tags relate to the “aboutness” of a post (Kehoe *et al.* 2011) and have a classificatory function of indicating the topic of microblogs.

In order to gain a good overview of the data and the unfolding of meaning within the Tweets, the language-specific sub corpora were analyzed by means of AntConc in a first step of analysis. A specific focus was given to frequent content words.

In a second step, a randomized cross-section considering a wide variety of posting times of 100 German data segments and around 75 Portuguese data segments per day of January 2021 were manually coded in Maxqda. This amounts to a total of 2,762 coded German and 2,116 coded Portuguese verbal segments including intertextual elements and another 338 visual elements illustrating the German Tweets and 410 visual elements illustrating the Portuguese Tweets. A total of 3,100 verbal and visual data segments related to the German Tweets and a total of 2,526 verbal and visual data segments

related to the Portuguese Tweets form a smaller subcorpus that was in the spotlight of this analysis. Focusing on a randomized smaller subcorpus for the qualitative analysis allowed us to guarantee an in-depth, manual analysis of the Tweets and to accompany the development of *anti-vax* narratives over a comparatively long period of one month in both languages.

Verbal and visual elements of the randomized cross-section were qualitatively coded based on the identified message tone and a common codebook as *pro-vax*, *anti-vax*, *vax-skeptical*, *neutral*, *unclear* and *not-covid-related*. A Tweet was coded as *pro-vax* if it contained a clear positioning in favor of the COVID-19 vaccine (e.g., clear reference to a wish of getting vaccinated, testimonials about a past COVID-19 vaccine and similar). A Tweet was coded as *anti-vax* if it contained a clear positioning against the COVID-19 vaccine e.g., information to convince others that the vaccination is dangerous and harmful e.g., based on fake news. A Tweet was coded as *vax-skeptical* if it did not have a clear positioning in favor or against of the COVID-19 vaccine but referred to possible side effects, risks, dangers or casualties possibly related to the vaccination. Tweets which aimed at sharing informative content regarding vax-related topics, opinions around different vaccine types or comments on the national vaccination policies not including any positioning regarding the vaccination per se, were coded as *neutral*. Tweets whose message tone could not be identified due to a lack of context, missing intertextuality or suspended links were coded as *unclear*. Tweets not referring to the COVID-19 vaccination but to other types of vaccination were coded as *not-covid-related*.

In a third fine-grained coding step, Tweets were further coded based on their main arguments and topics. In order to identify the Tweets message tone as well as recurrent themes, intertextual elements explicitly referred to in the Tweets via hyperlinks, such as YouTube videos, newspaper articles, related Tweets and similar were consulted and separately coded. Based on the message tone and the topic analysis the coded elements were merged and attributed to six distinctive code sets: ‘*anti-vax or vax-skeptical*’, ‘*pro-vax*’, ‘*neutral*’, ‘*intertextual elements*’, ‘*visuals*’ and ‘*unclear or not-covid-related*’.

In a fourth step, the qualitatively coded verbal and visual elements pertaining to the cumulative code set ‘*anti-vax or vax-skeptical*’ were further examined with a focus on the Transitivity System proposed by Halliday and Matthiessen (2004, 2014). Textual elements on visuals were considered within the analysis. Due to the huge amount of German *anti-vax and vax-skeptical* data, for the Transitivity analysis, the coded segments of the cumulative code set ‘*anti-vax or vax-skeptical*’ were exported from Maxqda to AntConc and the wordlist was screened for the main verbal processes. The concordance lines of the top 10 most frequent verbal processes were then

analyzed for participants and circumstances. Concordance lines are particularly useful for analyzing microblogs along both syntagmatic and paradigmatic axes (Zappavigna 2012, p. 45). Given the low amount of Portuguese *anti-vax* and *vax-skeptical* data, all coded 71 Tweets were considered within the Transitivity analysis. For an overview of the steps of analysis, see Table 1.

Step 1:	Analysis in AntConc of frequent content words within the complete, language-specific corpora #impfung and #vacina to gain insight in the unfolding of meaning in the Tweets
Step 2:	Qualitative coding of message tone of a randomized language-specific cross-section of #vax Tweets based on identified attitude and a common codebook (<i>pro-vax</i> , <i>anti-vax</i> , <i>vax-skeptical</i> , <i>neutral</i> or <i>unclear</i>) including the consultation of intertextual elements (hyperlinks, etc.) for the disambiguation of the Tweets' message tone
Step 3:	Fine-grained qualitative coding based on the main arguments and topics of the cross-section of #vax Tweets
Step 4:	Transitivity analysis of verbal data (including those on visuals) of Tweets pertaining to the cumulative code set ' <i>antivax</i> or <i>vax-skeptical</i> '
Step 5:	Interpretation, discussion and comparison of results within a SM-CDS framework

Table 1
Overview of steps of analysis.

3.3. Limitations of this study

Due to the intention to perform a manual Transitivity Analysis, the authors limited the close analysis to a randomly sampled smaller corpus including 70-100 Tweets posted in each language on each day in January 2021. The intent of this was to allow for a close reading with a focus on experiential meaning for the purposes of trying to understand tendencies of re-interpretation and local adaptations of *anti-vax* and *vax-skeptical* narratives. The authors hope that the results of this rather small qualitative analysis can provide first insights and hypotheses for further research.

4. Results and Discussion

This section describes the results of the analysis and will focus on both the main results for each language-specific subcorpus and a comparison of the two sub corpora so as to highlight context-specific peculiarities regarding topics and experiential meaning.

4.1. Contextualizing the data

An analysis of the language specific word lists of both sub corpora covering 15,398 Portuguese Tweets and 15,722 German Tweets in AntConc shows similar results for the first most frequent 50 words. This speaks for the systematizing function of the selected parallel hashtags #impfung and #vacina as links to thematic timelines as opposed to ad-hoc hashtags or only locally significant ones (Dayter 2016, p. 85).

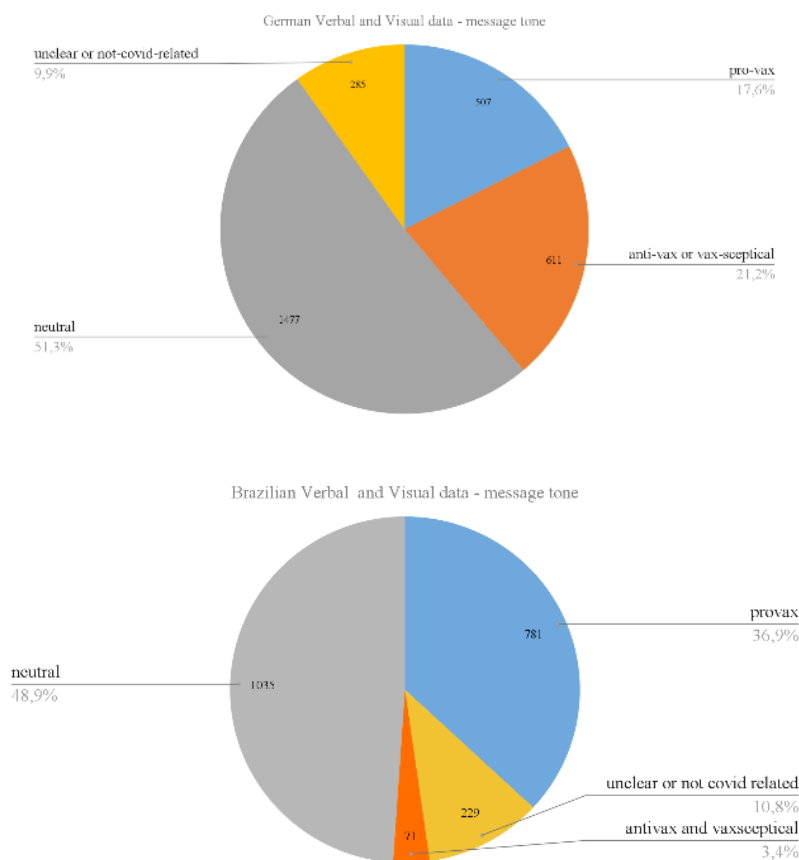
The most frequent non-content words include items that can be related back to typical characteristics of the language of microblogs, as outlined by Crystal (2011). This regards the top 10 items in the word list such as “nbsp” “https” “www” or “co” which relate to the format of the Tweets as messages embedded in a matrix of support information referenced via hyperlinks and short links.

Content nouns among the Top 50 German words, excluding those that can be related back to distinctive elements of Tweets per se (such as for example “android” or “iphone”) are 1.*impfung* (vaccination), 2.*corona*, 3.*covid*, 4.*impfstoff* (vaccine), 5.*coronavirus* and 6.*menschen* (people). Content nouns among the Top 50 Portuguese words are 1.*vacina* (vaccine), 2.*covid*, 3.*brasil*, 4.*coronavac*, 5.*bolsonaro*, 6.*coronavirus*, 7.*vacinação* (vaccination), 8.*vacinas*, 9.*doses* (shots), 10.*saúde* (health), 11.*pandemia*, 12.*anvisa* (Brazilian Health Regulatory Agency) and 13.*butantan*. Given these frequencies, the Portuguese data seem to be more heterogeneous with regard to the participants and circumstances in the verbal processes as compared to the rather non-specific participants, such as *menschen* (people) in the German data. The comparatively stronger focus on abstract and implicit actors within the German data as opposed to the Brazilian Portuguese data was also confirmed by the results of the Transitivity analysis.

Given that, generally speaking, Tweets do not include complete geotagged information, also not geotagged Tweets posted in the selected languages were considered for the corpus and the analysis. However, 5,155 hits for *Brazil* and 1,275 hits for *Deutschland* (Germany) point towards a tendency of German Tweets relating mostly to the socio-political context of Germany and Portuguese Tweets relating mostly to the Brazilian context. This is further confirmed by high frequent words such as *Bolsonaro* (2585

hits, position 32), a reference to the Brazilian President and *Anvisa* (1365, position 46), a reference to the Brazilian Health Regulatory Agency and *Spahn* (630 hits, position 109), a reference to the German Minister of Health.

The word list also points to key issues that have been identified, as can also be seen in the qualitative analysis of the smaller subcorpora. These relate for the German corpus to discussions of a possible mandatory vaccination (615 hits for *Impfpflicht*, position 111) and discussions of vaccination policies and involved political actors in general (712 hits for *Politik*, position 99), which are two of the most common topics referred to within the German Tweets coded as *neutral* in their message tone. Similarly, in the Brazilian Portuguese data, frequent content words point to discussions around vaccination policies and key political actors, as well as central agencies involved in the production of the vaccine (*Butantan*). The high frequency of *Coronavac* can be related to discussions around this vaccine and acknowledgments of Brazilian scientists as well as discussions regarding the process of negotiation of the raw material for the *Coronavac* vaccine and its production in Brazil, which involved serious political tensions.



Graphs 1-2
 Overview of message tone in verbal and visual data
 (left: German data, right: Portuguese data).

The qualitative coding of the message tone shows for the German data a majority of Tweets coded as *neutral* (51%). A similar amount of data has been coded as *pro-vax* (18%) or either *anti-vax or vax-skeptical* (21%). Around 10% of the data were coded as *unclear* due to lacking intertextual elements or suspended links. Data coded as *unclear* have not been further considered for the fine-grained qualitative coding. Similarly to German data, the majority of Portuguese Tweets analyzed were identified as *neutral* (49%). *Pro-vax* Portuguese Tweets are 37% of the coded data, while only 3% represents *anti-vax* and *vax-skeptical* Tweets. A rather small number of Tweets was identified as *unclear* or *not covid related* (11%). See also Graphs 1 and 2 above for an overview of the distribution in message tone identified for the German and Portuguese data.

4.2. Trending topics

After the message tone analysis, we moved to the analysis of *trending* topics. *Trending* hereby refers to topics that re-occurred within the German and Brazilian Portuguese data within the respective code sets. Firstly, we looked at the main topics within the neutral Tweets.

A large majority of German *neutral* Tweets (68%) are comments on national vaccination policies in German-speaking countries with a strong focus on Germany and discussions around the prioritization of professional categories in the respective vaccination plans. Several Tweets also refer to the purchase of vaccinations on the European level and related issues. A significant number of *neutral* Tweets also discusses privileges that vaccinated people should or will have as well as a possible mandatory vaccination policy (e.g. care personnel). A smaller number of *neutral* Tweets (20%) focuses on displaying how many people have been vaccinated around the world and in German-speaking countries. Strong focus is also put on Israel and its vaccination progress. Another rather heterogeneous category of *neutral* Tweets includes discussions regarding the choice of vaccines as well as general vaccine-related comments and questions (12%).

Concerning neutral Tweets from Brazil, most of them (89%) are updates related to the procedures of acquiring the vaccine and negotiations, including measures coming from federal institutions such as the Ministry of Health and the State governors. Several *neutral* Tweets also have an informative purpose and tell people where they could get vaccinated. Such informative Tweets increased in frequency after the first administration of the vaccine in São Paulo (after 17th January). Additionally, some Tweets display the number of people who have been vaccinated nationally and around the world, including politicians and celebrities. A small number of neutral Tweets (7%) are comments on national vaccination policies in Brazil; the

comments include criticism against the government's non-strategic measures for the purchase of the vaccine. An even smaller number of neutral Tweets (4%) discusses vaccine types.

A fine-grained coding of trending topics in the 507 German *pro-vax* elements shows that these are mostly reactive. Interestingly a majority of Tweets (42%) directly refers to *anti-vax* narratives. Three reactions are most common: 1. making fun of *anti-vax* activists and their narratives, 2. trying to convince *anti-vax* activists by an appeal to reason and the sharing of scientific articles or by contradicting *anti-vax* narratives by means of scientific articles and 3. attacking *anti-vax* activists (e.g., by calling them names).

Frequent hashtags employed with the aim to attack and insult *anti-vax* activists are #Covidioten (compound of *COVID-19* and *Idiot*), #Impfchwurbler (compound of *Impfung* (vaccine) and *Schwurbler*, a pejorative personal noun referring to people talking nonsense, (Duden n.d.) and #Querdenker. The latter one being a denomination for sympathizers of a political movement referred to as *Querdenken* that has emerged during the COVID-19 pandemic and is amongst others against the COVID-19 vaccination (see also Acevedo *et al.* 2021). *Pro-vax* Tweeters frequently refer to themselves by means of #Impfluencer, compound of *Impfung* and *Influencer*. A further 13% of Tweets include informative narratives and share data and statistics on the vaccination's safety and effectiveness, without a direct reference to *anti-vax* narratives.

Another 27% of the analyzed *pro-vax* German Tweets can be described as *vax*-related testimonials. These Tweets include reports on the physical well-being after a concluded COVID-19 vaccination with a focus on light side-effects and no side-effects as experienced by the Tweeter or their relatives. These testimonials also frequently refer back to common *anti-vax* narratives and ironize them. One of the ironic Tweets states for example *Zweiter Chip erfolgreich implantiert! #impfung* (The second chip has been successfully implanted #vaccine).

Another related group of testimonials includes "celebrity testimonials" with a focus on showcasing that role models got vaccinated. Further testimonials include reports on a successful registration for the vaccination. Another group of *pro-vax* data can be described as rather proactive and focuses on convincing and informing others that the vaccination is useful by means of an appeal to reason and the sharing of scientific articles, informative threads, videos, diagrams and similar. Within these Tweets the vaccination is presented as the best solution to the pandemic. Related to this group of data a smaller category of around 7% of *pro-vax* Tweets specifically includes calls to action to get vaccinated or to get registered for the vaccination programs. Another category of around 11% of the analyzed *pro-*

vax Tweets refers to the wish and desire of getting vaccinated soon.

Compared to the *pro-vax* German Tweets, a larger number of Brazilian Portuguese Tweets are narratives in favor of vaccination (50%). Among them, several Tweeters inform on the importance and safety of the vaccination and reinforce that the vaccination is a safe procedure. Several arguments present informative content, such as study results published in the general media, explanatory videos and diagrams from official health institutions (such as World Health Organization, for instance) to fight fake news about the vaccines.

The second most recurrent *pro-vax* narratives are related to *anti-vax* discourse (20%). As occurs in German Tweets, these narratives represent reactions towards *anti-vax* narratives; among the Brazilian Portuguese Tweets the tone of making fun of people's arguments against vaccination is predominant. The presence of a large amount of comic strips in which vaccinationists make fun of or criticize anti-vaccinationists is noticeable. These comic strips also refer to politicians such as the Brazilian president.

Other *pro-vax* Tweets display arguments to convince *anti-vax* activists by an appeal to reason and the sharing of information based on studies and official institutions. *Pro-vax* testimonials represent 13% of *pro-vax* narratives; these Tweets are in favor of vaccination and report on and describe a concluded vaccination. During the month of January in Brazil, only health professionals could get vaccinated, therefore most of the Tweets or pictures were related to these professionals.

Finally, the last type of *pro-vax* narrative is related to the wish of getting vaccinated soon. Similar to the German data, in the Brazilian Portuguese Tweets people express their desire to get vaccinated by sharing illustrations of how they would feel or how they would be after the immunization. Some of them are mockeries of *anti-vax* narratives, as for instance, a meme with illustrations of alligators. These alligators are pictured as the result of a transformation after getting vaccinated. These memes are related to an event held in Bahia in which the Brazilian president Bolsonaro mentioned that the government was not responsible for the side effects of the vaccine Pfizer, and if people would become alligators once they got vaccinated, they would be on their own. This joke is also present in several *pro-vax* narratives and testimonials.

A detailed analysis of the main arguments mentioned in the 611 *anti-vax* or *vax-skeptical* German visual and verbal data shows a clear majority of *vax-skeptical* data (59%) compared to the *anti-vax* narratives (41%). The main distinguishing factor between those two categories is that *vax-skeptical* data are rather doubt-driven and mainly raise skeptical questions or comments while *anti-vax* data seem to be rather purpose-driven and focused on calling the audience to “wake up”. The main topics identified within the

vax-skeptical messages are 1. possible future side effects that cannot yet be foreseen due to the short testing period, 2. reference to other alternative solutions to the vaccine that seem to be less risk-intense (e.g. “natural infection”) and/or more efficient (e.g. #nocovid) and 3. an articulated skepticism and the sowing of doubt around the vaccination and its aims or implications due to a felt lack of transparency regarding information on deaths induced by the vaccination or lack of transparency on vaccination contracts and regarding strategies of administration. Further, reference is also made to other scandals related to pharmaceuticals such as for example the Contergan Scandal, one of the major drug scandals in German history, that led to congenital malformations and was uncovered in the 1960s.

The *anti-vax* data include a very small amount of reactions to *pro-vax* narratives. Specific reference is made to *pro-vax* “celebrity testimonials”. These are Tweets typically including pictures of celebrities or well-known people accompanied by a short text on a successfully concluded vaccination. These “celebrity testimonials” are classified within *anti-vax* Tweets as “fake news” and “lie”. Further, reference is made to *pro-vax* supporters mainly in three ways: 1. to attack them as brainwashed and stupid, 2. to defend themselves and state that *pro-vax* supporters are vilifying them groundlessly and 3. to offer them help. Particularly when defending themselves from *pro-vax* supporters, *anti-vax* supporters frequently recur to analogies of the persecution of Jews during National Socialism in Germany.

Anti-vax narratives not reacting directly to *pro-vax* supporters are mainly centered on side effects of the vaccination. Several narratives report on cases of death as a result of the vaccination. These are also based on fake news articles, which are referenced in short links. Moreover, *anti-vax* Tweeters establish that the vaccination is killing people on purpose and making the COVID-19 crisis worse. They relate the vaccine, amongst others, to several not further defined physical reactions such as *Zytokinsturm* (cytokine storm), *Immuneescape*, an increased risk of HIV and similar issues which are mainly framed as deadly and described by means of heavy medical terminology.

A similarly large number of Tweets focuses on informing about what is called within the *anti-vax* Tweets the “plandemic”. The (mainstream) media, Big Pharma, politicians as well as public people such as Bill Gates are defined as key actors in the planning of this pandemic. Mainly, Tweets refer to one of the subsequent three goals of the “plandemic”: 1. making profit, 2. establishing a dictatorship or new order, 3. provide a solution for an ‘ongoing problem’, such as the high number of elderly people. The first goal is mainly related to actors such as Big Pharma and Bill Gates, while the second one is commonly related to the German green party and left parties as well as rich elites. Again, Nazism is referred to very frequently and *anti-vax* Tweeters are

identifying themselves as new victims of a new fascist and a *pro-vax* regime that have the aim to subjugate and to silence them. On several occasions reference is made to censorship and the mainstream media that would support this newly established *pro-vax* regime.

Another issue frequently referred to in the *anti-vax* data regards liability issues around the administration of the vaccine stating that doctors administering the vaccine will face prison sentences in the future and similar. Also “celebrity testimonials” against the vaccination are common within the Tweets. Reference is made to courageous doctors speaking the truth against the vaccine as well as other countries, such as Tunisia and Argentina, or former employees of Pharma companies such as Pfizer who all warn against the vaccination.

Anti-vax and *vax-skeptical* Tweets from Brazil represent the smallest number of the analyzed data (3,4%). Only 71 Tweets were found, including visuals. Among these 71 Tweets, 62% belong to *anti-vax* narratives, while 38% are *vax-skeptical*. Hence, most of the Tweets are narratives against vaccination which have the aim to convince others that vaccines are not safe due to its side effects or to question the emergency approval of vaccine use that were still in the phase of ongoing studies. As also occurring within the German data, these questions mainly relate to the possible side effects that cannot yet be foreseen due to the short period of testing - people who are getting vaccinated are for example called experimental “guinea pigs”.

Pro-vax supporters are also insulted and called names, such as “stupid”. Visuals and other references among the *anti-vax and vax-skeptical* Tweets are mainly related to the side effects of the vaccine after someone is vaccinated, and they serve as a resource to give support for their *anti-vax* arguments. Similar to the German Tweets, the Brazilian Tweets also strongly rely on interdiscursivity and medical terminology. Some of the side effects reported in these references were facial paralysis, erectile dysfunction, and cases of deaths supposedly because of the vaccination.

Narratives regarding the freedom of choice or the freedom to not get vaccinated are also present in the data along with warnings that vaccine policies harm the individual rights of free choice. In addition, some narratives argue for an “early treatment” of COVID-19 with Hydroxychloroquine, as proposed by the Brazilian president Bolsonaro; several *anti-vax* Tweets also show support of the president's actions to face the pandemic. Among the trending narratives in the Brazilian *anti-vax* data, one is calling the vaccine a Chinese strategy to devour people and to dominate the world.

Finally, some Tweets also report that evangelical pastors were intervening in the process of indigenous people taking the vaccine, pushing them away to not get immunized. Differently from German Tweets, none of the Brazilian ones refer to Big Pharma. *Vax-skeptical* Tweets in both the

Brazilian Portuguese data and the German data also have a pattern of referring to news, which present side-effects and deaths around the vaccination. Interestingly, these Tweets tend to be posted in a question mode, asking the reader to interact with the doubt proposed and find the answer on the visual aids and references. In these cases, some of them present an ironic tone (almost as a rhetorical mode), in the sense of questioning the vaccine's effectiveness.

4.3. Transitivity patterns

535 German verbal segments and 76 visual elements were coded as either *vax-skeptical* or *anti-vax* in their message tone. The top 10 most frequent verbs among the verbal segments are *ist* (freq. 176), *werden* (freq. 61), *hat* (freq.50), *wird* (freq.48), *sind* (freq.47), *impfen* (freq.40), *haben* (freq.38), *gibt* (freq.26), *kann* (freq.23) and *war* (freq.23). Repetitive concordance lines as well as hyperlinks were excluded within the analysis.

A majority of processes with *ist* and *sind*, the singular and plural 3rd person of “to be” in the present, are relational. This is also the case for *war*, which is employed to construct relational processes with “to be” in the past. In a smaller number of clauses, *ist* also serves as auxiliary in material processes realized in the past. Similar to *ist* also *hat* serves as auxiliary in material processes realized in the past and figures as well in possessive relational processes. The processes with *werden* and *wird* are mainly material and the verbs function as auxiliaries for the passive voice or future tense. *Impfen* mainly appears in the infinite mode together with a finite modal verb and *lassen* or is simply employed as a *#Impfen* attached to the Tweet. *Gibt* figures almost exclusively in existential processes, while *kann* mainly appears as modulation in material clauses. Accordingly, the top 10 verbs point towards a clear majority of relational and material processes within the German *anti-vax* and *vax-skeptical* data.

<p>Die #Impfung ist sicher PUNKT</p> <p>Wenn Tod nach Impfung, dann hat das nichts mit dem #Impfstoff zu tun PUNKT</p> <p>Fragen unerwünscht PUNKT</p> <p>#COVID19 #lockdown2021 https://t.co/vmztOhrf98</p> <p>https://twitter.com/LeiAlexe/status/1351820093714554881</p> <p>♡ 5 🗨️ 2 📄 0 🗳️ 0</p> <p>📱 Twitter Web App 🕒 Jan 20, 2021 09:39:05 🌐</p>	<div style="border: 1px solid black; padding: 5px;"> <p style="text-align: center;">Weltweit. Überall da wo aktuell geimpft wird - ist es zeitlich zufällig.</p> <p>+++ 14:14 Wahrscheinlich "zeitlich zufällig": Zehn Schwerkranke sterben kurz nach Impfung +++</p> <p>Das Paul-Ehrlich-Institut prüft bislang zehn Todesfälle kurz nach einer Corona-Impfung - ein Zusammenhang gilt den Experten zufolge aber als eher unwahrscheinlich. In diesen Fällen waren schwer kranke Menschen innerhalb von vier Tagen nach der Immunisierung gestorben, berichtete das für Impfstoffe und biomedizinische Arzneimittel zuständige Bundesinstitut im hessischen Langen.</p> <p>"Aufgrund der Daten, die wir haben, gehen wir davon aus, dass die Patienten an ihrer Grunderkrankung gestorben sind - in zeitlich zufälligem Zusammenhang mit der Impfung", sagte Brigitte Keller-Stanislawski, die zuständige Abteilungsleiterin für die Sicherheit von Arzneimitteln und Medizinprodukten. Über Einzelfälle könne sie aus Gründen des Personenschutzes nichts sagen, "aber es handelt sich um sehr schwer kranke Patienten mit vielen Grunderkrankungen". Manche seien palliativ behandelt worden.</p> </div>
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<p>The #vaccination is safe FULL STOP If dead after vaccination, then this is not related to the #vaccine FULL STOP Questions unacceptable FULL STOP #COVID 19 #lockdown2021 [link]</p>	<p>[in white letters on black background] Worldwide. Wherever people are currently getting vaccinated - it is a mere chance. [picture of article regarding cases of death after vaccination]</p>
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Example 1.

Interestingly, the narrative of censorship and the idea that a *pro-vax* regime aims at subjugating and silencing anti-vaccinationists mentioned in 4.2 is strongly conveyed by means of sarcastic relational clauses in which *#impfung* appears as Carrier. These relational clauses define the vaccine as completely safe and free of side effects. By means of graphic elements such as capitals, emoticons, onomatopoeic elements or through repeated negation the relational clauses construct the Carrier as the opposite of what the Attribute explicitly refers to.

The example 1 above on the left-hand side shows how the Tweeter renders the idea of sarcasm and of an ongoing censorship by writing in full and in capital letters *PUNKT* instead of using the punctuation mark of a full stop. Similarly, in visuals, comments are included on top of visuals emphasizing “how true” these newspaper articles are (compare example 1 on the right). Thereby the Tweeter conveys the idea “this is what mass media wants us to believe”. It can be assumed that these strategies are employed for two-fold reasons. Firstly, to illustrate the idea of an ongoing censorship and secondly to successfully circumvent automatic fake-news checkers that have been introduced on Twitter already in December 2020 (Twitter 2021).

We have already mentioned in section 4.2. that the *anti-vax* data seem to be rather purpose-driven and focused on calling the audience to “wake up”. This “wake up call” is realized by means of an excessive number of questions rather than declarative statements. This regards both relational processes and material processes. Within relational processes the Attributes of the Carrier *#vaccine* are questioned, such as in *Ist die #Impfung die Rettung?* (Is the #vaccination the salvation?) or *#COVID19: Was, wenn die #Impfung wirkungslos ist?* (*#COVID19: What if the #vaccination is useless?*). Partially, the hashtags following the main text of the Tweet give the answer to these rhetorical questions such as in *Wie sicher ist die #Corona #Impfung? #todsicher* (How safe is the #corona-#vaccination? #deadcertain). Further, questions are used to juxtapose two seemingly unrelated bits of information and to thereby sow doubt. This same strategy is also pursued within the visuals, in which different newspaper articles, such as a picture of a person getting vaccinated and their death notice, are juxtaposed to provide evidence for death cases after the vaccination.

<p>Es stärkt meinen Verdacht, dass die Schwächsten in unserer Gesellschaft als Testpersonen für #Corona #Impfung missbraucht werden Nicht nur in Altersheimen, jetzt auch die Sterbenden Das ist #Faschismus</p> <p>@rki_de @DasErste @BMI_Bund Bin so fassungslos, dass mir die Worte fehlen !!! Translate Tweet</p> <p>pmq @qupama · Jan 4 Musste soeben erfahren, dass in einigen deutschen #Hospizen gegen #COVID #geimpft wird! An einem Ort, der nur zum Sterben da ist. Für nichts anderes. Ich bin fassungslos. #panicdemia #VaccineStrategy #Unbelievable @QuakDr</p> <p>1:05 AM · Jan 5, 2021 · Twitter Web App</p>	<p>Wer #Covid19 infiziert ist stirbt ausschließlich AN #Corona. Wer geimpft wurde und verstirbt, stirbt NACH der #Impfung. Natürlich gar kein Zusammenhang! 🙄 Und warum werden überhaupt schwerkranke Menschen geimpft? Das ist ja schon fahrlässige Tötung! 🙄</p> <p>Translate Tweet</p> <p>Boris Reitschuster @reitschuster · Jan 29 69 Menschen sind nach der Impfung verstorben, so PEI-Chef Dichtek auf der #BPK. Allerdings habe es sich um Menschen mit schweren Grunderkrankungen gehandelt. Es gebe keine Anzeichen für Zusammenhänge mit Impfung. Also anders als bei Covid-19-Toten mit Grunderkrankungen.</p>  <p>1:10 PM · Jan 29, 2021 · Twitter for iPhone</p>
<p><i>It strengthens my suspicion that the weakest in our society are abused as test subjects for #Corona #vaccination</i></p> <p><i>Not only in retirement homes, now dying people too</i></p> <p><i>This is #facism [...]</i></p>	<p><i>Those infected with #Covid19 die exclusively BECAUSE OF #Corona. Those who have been vaccinated and die, die AFTER #vaccination. Of course no connection at all! [eye-rolling emoticon]</i></p> <p><i>And why are seriously ill people vaccinated at all?</i></p> <p><i>This is negligent homicide! [...]</i></p>

Example 2.

When analyzing the relational clauses in more detail, a significant amount of circumstantial relational clauses can be identified, in which the circumstantial element is realized by a hyperlink and then taken up in the relational clause as Carrier by means of *das* (this). The information within the hyperlink element is established within the main Tweet body as a fact and then defined by the relational clause as e.g. [#Faschismus](#) (fascism) (compare example 2 on the left), [#Gehirnwäsche](#) (brainwashing), *der Plan* (the plan), *Mord* (murder), *fahrlässige Tötung* (negligent homicide) (compare example 2 on the right), *Körperverletzung* (bodily harm). See examples above.

Further, the vaccination as Carrier is defined within relational clauses as *Gift* (poison); *gefährlich* (dangerous); *COVID21*; *unerforscht* (unexplored); *das einzige Ziel* (the only aim); etc. and similarly the virus as Carrier is defined as *Hirngespinnst* (fantasy); *Perpetuum Mobile des Notstands* (a perpetuum mobile to uphold a state of emergency); etc. Several future-oriented relational clauses further give an idea of how life would be if we were to get vaccinated. Future-oriented material clauses give insight into the main goals that dominate this future scenario. Both relational and material clauses strongly relate the future scenario to the National Socialist *Third Reich* of the German and Austrian past. See example 3 and 4 below.

#2021makeawish wird genauso beginnen wie #2020Ends:
Neue #Nazis, getarnt als #Antifa, werden berechtigte Kritik am #Corona -Wahnsinn mundtot machen.
Zusammen mit #ARD #ZDF und dem @derspiegel werden diese neuen Lügen-Verbreiter ihre ungetestete #Impfung als Allheilmittel feiern.

#2021makeawish will begin just like #2020Ends: New #Nazis disguised as #Antifa will silence legitimate criticism of the #Corona madness. Together with #ARD #ZDF and @derspiegel, these spreaders of lies will celebrate their untested #vaccination as a panacea.

Example 3.

Wann wohl der erste Politiker die Grenze überschreitet und Impfunwillige weg sperren will?
Weit ist das nicht mehr hin...
Man könnte an die Lager ja „Impfen macht frei!“ schreiben!
Spätestens dann ist aber wohl alles zu spät...
[#Lockdown3 #lockdown2021 #Impfung #Impfpflicht](#)
Translate Tweet
11:50 PM · Jan 11, 2021 · Twitter for iPhone

When will the first politician cross the line and lock up those not willing to get vaccinated?
It is no longer far until then...
One could write on the camp “Vaccinating makes free!”
At the latest then everything is probably too late...
[#Lockdown3 #lockdown2021 #Vaccination #Mandatory Vaccination](#)

Example 4.

In example 4 above the Tweeter asks in a future-related material clause “when will the first politician cross the line and lock up those not willing to get vaccinated?” answering that it is no longer far until then. In an impersonal verbal clause the obscured impersonal Sayer “one” is constructed as the one who will “write” the Verbiage “Vaccinating makes free” on future camps where anti-vaccinationists will be locked up. “Vaccinating makes free” is a clear analogy to the lettering "Arbeit macht frei" appearing on the entrance of Auschwitz and other Nazi concentration camps.

Moreover, it is interesting to look into the relational clauses that construct a self-definition of those who do not believe in the vaccination program. The self-definition focuses on reactive definitions and on a correction of labels given to anti-vaccinationists by others. Self-definitions include *nicht generell gegen Impfungen* (not against vaccines in general) or *keine Verschwörungstheoretiker* (not conspiracy theorists). At the same time Attributes such as *mutig* (courageous) are used to define the group of anti-vaccinationists. Further, a large number of relational clauses also establishes those not believing in the vaccination program as the clear majority, who are

however silenced by a powerful elite. Pie charts and diagrams also illustrate this idea of majority in the *anti-vax* visuals.

In contrast, relational clauses constructing an anti-vaccinationists' definition of vaccinationists focus on Attributes such as *verloren* (lost), *blind* (blind), *dumm* (stupid) and *tot* (dead), thereby constructing *pro-vax* people mainly as victims who are already lost and dead. Several material processes also focus on how vaccinationists have died or gotten sick. This is also in the spotlight of visuals and intertextual elements, in which the vaccination is related to death and devastating side effects. This might also explain the rather small number of Tweets that explicitly refer to *pro-vax* narratives. Vaccinationists are not constructed as opponents of anti-vaccinationists but rather as already lost victims of those in charge of the "plandemic".

The ones enforcing the "plandemic" on both anti-vaccinationists and vaccinationists remain largely abstract and obscured in material processes realized either in the passive or constructed in the active by means of an impersonal and/or abstract Actor. In the few material processes where Actors are explicitly referred to, these are commonly known actors appearing in conspiracy narratives such as *die #WHO* (the World Health Organization), *#BillGates*, along with pharmaceutical industries. Also, (local) politicians in charge of vaccination strategies and the mass media are constructed as Actors, who give energy input to the "plandemic". Further actors explicitly named are *neue #nazis getarnt als #antifa* (new #nazis disguised as #antifa, see example 3 above). Again, reference is made to the Nazi period employed also here as a dystopia scenario towards which "plandemic" leads and that the readers should be worried about.

The strong focus on the passive and abstract and or impersonal Actors also shows how the orientation of the *anti-vax and vax-skeptical* narratives are focused on the Goals of some unknown and obscure entity. The vaccination as well as the COVID-19 crisis itself are frequently realized as Goal in material processes, along with other Goals such as killing, the creation of new virus variations or features for the discrimination of people. See the Tweets in example 5 below.

Existential processes further strongly focus on what is not existent such as *keine Immunantwort* (no immune response), *keine einzige (!) zugelassene #mRNA-Impfung außer Corona Impfung* (not a single (!) approved #mRNA vaccination except for Corona vaccination), *keine medizinische Grundlage* (no medical basis), *keine Langzeitstudien* (no long-term studies), *keine erworbene Herden-Immunität* (no acquired herd immunity), *keine veganen Impfstoffe* (no vegan vaccines), *keine guten Sender* (no good media stations). Together with the strong focus on negative self-definitions, this focus on what is not existent can be related to Halliday's description of the characteristics of *anti-languages* (Halliday 1976, p. 576). Self-attributes in

relational processes and existential processes construct an anti-reality defined by what anti-vaccinationists are *not* and what there is *not* within a *pro-vax* reality. The alternative reality of *anti-vax* activists is therefore constructed through language in strong opposition to *pro-vax* ideas.

<p>Das #coronavirus ist das Perpetuum Mobile des Notstands: Um den Notstand zu beenden, soll geimpft werden, doch durch die #impfung werden neue Varianten erzeugt, gegen die Impfung nicht hilft. #LockdownForever</p> <p><small>Translate Tweet</small></p> <p>„Je mehr wir impfen, desto mehr Varianten werden auftreten“</p> <p>RKI-Chef Lothar Wieler zeigt sich wegen der neuen, wohl ansteckenderen Corona-Varianten besorgt. Unklar sei, ob sich zuvor Infizierte oder Geimpfte damit erneut anstecken können. Die Verbreitung würde die Lage in kurzer Zeit deutlich verschlimmern.</p> <p><small>1:27 PM · Jan 29, 2021 · Twitter Web App</small></p>	<p>Das tödliche Versagen der #Merkel-Regierung in der #Corona-Krise und der #Impfung kann kaum noch vom politisch-medialen Komplex vertuscht werden, auch wenn der Eindruck entsteht, dass keine Meldung mehr ohne #Zensur durch das #Kanzleramt veröffentlicht wird. #RKI #Neuinfektionen</p> <p><small>Translate Tweet</small></p> <p><small>7:20 AM · Jan 8, 2021 · Twitter Web App</small></p>
<p>The #coronavirus is the perpetuum mobile of the emergency: to end the emergency, vaccination is supposed to be used, but the #vaccination creates <u>new variants</u> against which vaccination does not help.</p> <p>#LockdownForever</p>	<p>The <u>deadly failure</u> of the #Merkel government in the #Corona crisis and #vaccination can hardly be covered up by the political-media complex anymore, even if the impression is created that no news is published anymore without #censorship by the #Chancellor's Office.</p> <p>#RKI #new infections</p>

Example 5.

Due to the small amount of *anti-vax* narratives of Brazilian Tweets, the Transitivity analysis was conducted for all Tweets, and the number of each processes' occurrences were counted. In this sense, we found that the Transitivity patterns in the 71 *anti-vax* and *vax-skeptical* Brazilian Tweets present predominantly material processes (68 occurrences), which means that, in the world of representations, people or things are engaged in concrete actions.

The second most recurrent process is the relational one (41 occurrences), which represents how people or things are being described, characterized or classified. Although the relational process is the second most recurrent type of process, the process *ter* (to have/to be - in some cases) is the process which appears more in terms of frequency. It means that, although things are being described through different concrete events (material

process), people are constantly relating things and people to Carriers and Possessions.

Mental processes are the third most recurrent one (24 occurrences). Among them we found perceptive processes, such as *ver* (to see), *perceber* (to perceive), cognitive ones, such as *acreditar* (believe), *achar* (to think), and processes expressing desire, such as *querer* (to want). Different from the German Tweets, mental processes in the Brazilian Portuguese Tweets play a key role. This can be related to the fact that people are being involved with the vaccination in an affective/desiring tone (not wanting to).

Verbal processes are also present in the narratives (15 occurrences). Verbal processes report on what people said, like *relatar* (to report), *dizer* (to say), *chamar* (to name), and in other verbal processes Tweeters engage in the action of affirming and speaking. Existential and behavioral processes occur just once in the narratives. The examples provided here will focus on the relational and mental processes due to the fact that they depict characterizations, people's feelings and ideas about the vaccine.

In terms of participants, the ones found in the narratives are the pronoun “you” as the active social actor of the sentences (sometimes elliptical in an imperative mode), which presents a strategy of interaction, whereby Tweeters address the readers by means of orders, questions or make them part of the narratives through their identification of the ideas or situations exposed. Some other participants are identified as “I”; these participants are predominantly engaged in mental processes of wanting and thinking (guessing), which shows that some writers are exposing their desire or ideas directly related to the vaccine as individual statements. Other active social actors include: the Brazilian President (*Bolsonaro*); the federal government; the now former-Minister of Health (*Pazuello*); the governor of São Paulo state (*João Doria*); vaccine companies, such as *Pfizer*, *vaccine*; family members such as *grandfather*, *uncle*; and *evangelical pastors*.

Regarding the social actor “Bolsonaro”, it is important to mention that he appears predominantly as someone who the Tweeters give support to. According to Fetter (2020), the anti-scientific movements in Brazil have increased in the last two years, and the President has been the personification of such movements, especially due to his discourse, in which he clearly states that he is against safe measures to combat the COVID-19 crisis and discredits the discoveries of science. Therefore, Brazilian Portuguese Tweets differ from the German ones in the sense that social actors, such as authorities, are more explicitly mentioned.

<p>Tirem suas próprias conclusões.</p> <p>Só vai tomar essa porcaria quem é trouxa e alienado.</p> <p>#vacina para o abate! 🤡</p>  <p>5:21 AM · 22 de jan de 2021 · Twitter for Android</p>	<p>Vocês não sabem o que é trauma de #vacinação 🤡</p> <p>#vacina https://t.co/GtQUHMIV6M</p>  <p>Twitter Web App · Jan 16, 2021 15:03:02</p>
<p><i>Draw your own conclusions. Only those who are stupid or alienated will take this crap [...]</i></p>	<p><i>You don't know what vaccination trauma is like [...].</i></p>

Example 6.

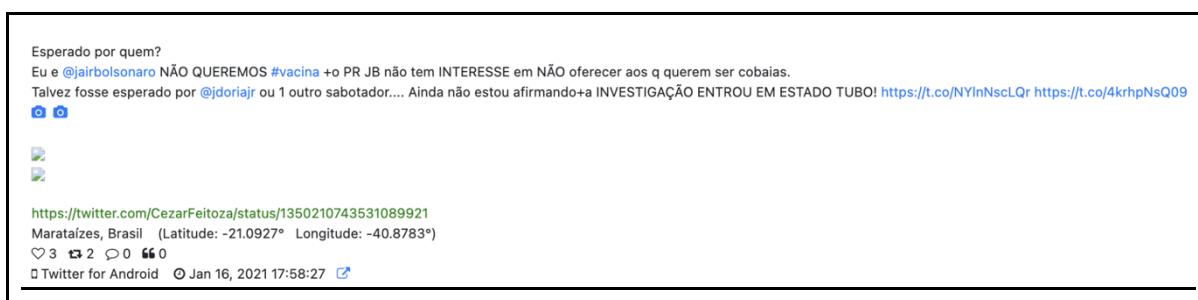
The two Tweets in example 6 illustrate negative Attributes to “vaccine”. In the first Tweet, an imperative sentence was used as a strategy for interaction in order to call people's attention and watch a video, asking them to draw their own conclusions regarding the non-reliability of the vaccine. Here, we find mental, material and relational processes, of “draw” (conclusions), “take” (the vaccine), and “be” (stupid and alienated), respectively. The short video shows closely that the disposable syringe was empty before being administered to an authority. The tone of the video seems to be asking whether syringes were having problems with their sealing protection. After the Tweeter asks people “to draw their own conclusions”, he characterizes the people who take the vaccine as “stupid and alienated” (Attributes). The vaccine itself is named “this crap”. In this sense, both immunized people and the vaccine have negative connotations in the narrative. Finally, in the hashtag of the vaccine, it is compared with the process of “butchering”, that is, to kill animals and prepare their meat to be sold.

The second example represents a similar pattern regarding the use of “you” as a strategy of interaction and a negative connotation approached to vaccination. The pronoun “you” is the Senser of the mental process “to know”, and there is a projected relational clause of “being”, which relates the “trauma of vaccination” to what the Senser does not know. Vaccination is one of the hashtag words, and, in the sentence, it shares a part of the noun phrase with the word “trauma”. It represents that the words have an equal level of meaning, which in this case, expresses a negative idea. The Tweet brings a picture of a child crying and being vaccinated in the 70s or 80s. One

adult, probably the child's parent, is holding the child, while a man is administering the vaccine. This visual aid reinforces the idea that the act of taking a vaccine can traumatize people, taking into consideration that people might have memories of vaccination as a painful procedure and also something that they were obliged to do when they were children.

Regarding the Tweets that present named participants engaged in mental and relational processes, the following narrative depicts the writer “I” and the “Brazilian president” as Sensors of the mental process “not wanting” the Phenomenon “Vaccine” (highlighted in the hashtag). The message starts with the question “expected by whom?”, a passive mental process which refers to the pictures which inform the delay of the airplane coming from India with Pfizer vaccines, and it was expected to arrive on a specific due date. The writer is questioning which people were expecting the vaccine as a way to introduce the message that she was not included in this group. Next, the writer puts herself at the same level of the president, in the sense that both share the same wish. After that, the president is mentioned again and he is negatively related as the Carrier of the Attribute “interested”, which projects a negative material process of “offering” (the vaccine) to people who want to take the vaccine. In this case, these people are called “guinea pigs”, implying that they are being part of an experiment, something that is not considered safe due to an ongoing and unconcluded study. Another participant, the governor of São Paulo state, João Doria, is mentioned as the person that might be expecting the vaccines, and she connects him to “other saboteurs” as a way to criticize the politician.

It is important to contextualize that, due to the several unsuccessful procedures from the national immunization plan to supply the country with vaccines, governors from 15 states in Brazil decided to negotiate their acquisition directly with the laboratories, including the vaccines that were not approved by the national health agencies at that moment. Bolsonaro's supporters, then, criticized these governors, as we can observe in the following Tweet:



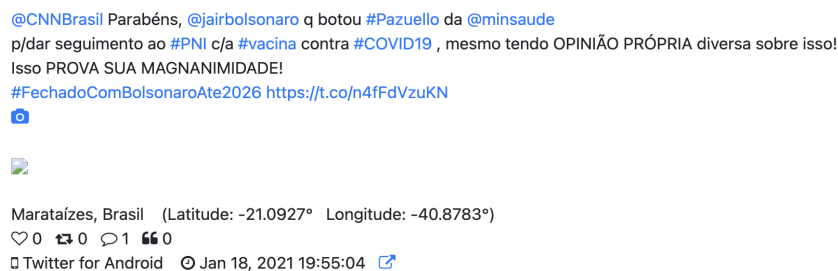
Expected by whom?

I and @jairbolsonaro don't want #vacina + PR JB [president Jair Bolsonaro] is not interested in not offering it to the ones who want to be a laboratory animal (here: guinea pigs). Maybe it would be expected by @jdoria or 1 other saboteur...[...]

Example 7.

Moreover, the following example represents the act of taking the vaccine as a matter of choice, which is based on an individual's opinion. The writer congratulates the president for pursuing the national plan of immunization and acquiring the vaccines, although he is against vaccinations. Regarding the processes and participants, the president is engaged in the material process to “put” the Minister of Health to pursue the National Plan of Immunization.

Interestingly, the choice to put someone to work illustrates the vision of a hierarchical power relation between political positions. In this specific case, the president holds the power to command the Ministers. This perception aligns with the president's authoritative discourse. Later on, this representation is linked with the connector “even though” (expressing an opposite idea), and the president is again connected with a relational process of “having” the Attribute “own different opinion” about the vaccination. The writer finishes the Tweet by stating that the president's action is related to his magnanimity and generosity. These qualities seem to be present in Bolsonaro's supporters’ Tweets, which show that they see him as a heroic figure. The Tweet is presented in the example 8 below:



@CNNBrasil Parabéns, @jairbolsonaro q botou #Pazuello da @minsaude p/dar seguimento ao #PNI c/a #vacina contra #COVID19 , mesmo tendo OPINIÃO PRÓPRIA diversa sobre isso! Isso PROVA SUA MAGNANIMIDADE!
#FechadoComBolsonaroAte2026 <https://t.co/n4fFdVzuKN>

Marataizes, Brasil (Latitude: -21.0927° Longitude: -40.8783°)

♡ 0 🗨️ 0 💬 1 📱 0

Twitter for Android © Jan 18, 2021 19:55:04

Congratulations, @jairbolsonaro that put #Pazuello of @minsaude [Ministry of Health] to follow up the # PNI [Immunization National Plan] related to #vaccine against #COVID19, even having his OWN different OPINION about it! It shows your magnanimity!

Example 8.

Another example on the same topic is a *vax-skeptical* Tweet, which questions the vaccine’s effectiveness and the freedom of choice regarding vaccines.

This Tweet is basically formed by two modularized question mode sentences, expressing meanings of permission (Can (we) have...?). As Fuzer *et al.* (2014) point out, these are called *deontic modalities*, in which modal verbs indicate the level of commitment with what is being said. Although this is part of interpersonal meanings, it is important to be mentioned here because the relational processes (to be; to have) are modularized and this changes the meaning of the clause. In other words, this Tweet is questioning whether people are allowed (by someone more powerful than them) to *be suspicious* and to *have the freedom of choosing* the vaccine or not due to the fact that Twitter removed a Tweet of the supreme leader of Iran stating that foreign vaccines are not trustworthy. The Tweet suggests that this act of removal served the particular interest of not alarming people by stating bad things about the vaccines. Similarly to what has been found in the German Tweets, here the Tweet also renders the idea of an ongoing censorship. Such discourse reflects the socio-political ideology of neoliberalism which has influenced the vaccine hesitancy movements in contemporary societies (Sanders & Burnett, 2019). According to Sanders and Burnett (2019), the neoliberal principles that impact health care practices seem to be incorporated in *anti-vax* discourses, such as a) individualism, b) decentralization and deregulation, and c) free-market solutions via privatization. The claim of freedom of choice to be vaccinated or not is an example of the attempt to preserve individual rights as seen in the following Tweet:

Pode se ter ou não desconfiança? Pode-se ter a liberdade de escolher ou não? Por que tanto medo de que fale mal das #vacina? Afinal o que ela tem e qual o interesse de proibir covid-19: 'Twitter remove tweet do Líder Supremo do Irã chamando vacinas estrangeiras de 'não confiáveis'
<https://t.co/nUvX0oEA5f>

<https://twitter.com/MiddleEastEye/status/1347912668821258241>
 ❤️ 0 🔄 0 💬 0 🍷 0
 📱 Twitter Web App 🕒 Jan 09, 2021 14:35:38 🌐

Can we have distrust or not? Can we have the freedom to choose [the vaccine] or not? Why so much fear of talking badly about the #vaccine? What does it have and what's the interest in prohibiting..?" [reference:] "covid-19: Twitter removed tweet of the Iran Supreme Leader calling the foreign vaccines as "not trustworthy".

Example 9.

Finally, the last Brazilian Portuguese example shows an appropriation of discourse from feminist movements related to sexual and reproductive rights. The processes, such as material, relational and verbal are part of the narration established by the fictional dialogue presented in the Tweet (not want to; put at risk; to be (right); talk about).

In this Tweet, the relational process of “not desiring” the Phenomenon

“vaccine” is present, as is true for other *anti-vax and vax-skeptical* Tweets. The choice of not getting vaccinated is compared to the women's human rights struggle defended by the feminists' movements regarding the right to have body autonomy and access to safe abortion. The rationale of the argument in this Tweet relies on both the sexual reproductive rights and *pro-vax* common statements. A fictional dialogue is created in order to illustrate the author's main point, and it starts stating that person A does not want to take the vaccine because of “my body, my rules” (part of feminist discourse). The fictional participant B states that the fact of not taking the vaccine “puts at risk the lives of other people” (part of *pro-vax* arguments). The fictional participant A answers that participant B is right; later on, participant A asks “now let's talk about abortion?”. In this sense, the appropriation of the discourses found in this Tweet to make up an argument shows that the writer is against the abortion.

Um diálogo qualquer:

- Eu não quero tomar a vacina. Meu corpo, minhas regras!
- Mas isso também coloca em risco a vida de outras pessoas...
- Verdade, você tem razão. Agora vamos falar sobre aborto?

[#vacina](#) [#VacinaParaTodos](#) [#AbortoNAO](#) [#Aborto](#) [#BolsonaroOrgulhoDoBrasil](#)

♡ 0 📧 0 💬 0 📱 0

Twitter for Android · Jan 21, 2021 22:22:20

A random dialogue:

- I don't want to take the vaccine. My body, my rules!
- But this also puts other people's lives at risk...
- True, you're right. Now let's talk about abortion?

[...]

Example 10.

5. Final remarks

The comparative analysis has shown that the socio-political specificities mentioned in section 2 clearly shape the German and Brazilian Portuguese *anti-vax* Tweets. For the German *anti-vax* Tweets, it was particularly striking to notice how the narrative guides the perspective of the readers towards dystopian, *Third Reich*-related Goals pursued by an obscured, abstract entity. The German *anti-vax* Tweets thereby strongly relate to the history of Germany and Austria and mirror the socio-political context in which the users have formulated them. In contrast, there was a much stronger focus on explicit Actors in the Brazilian Portuguese data. The *anti-vax and vax-skeptical* narratives constructed, for example, the Brazilian president Bolsonaro as heroic Actor. Moreover, it was interesting to notice how

discussions in Brazil regarding abortion and women's human rights struggle were de- and re-contextualized to argue against the vaccine in the Brazilian data.

Indeed, in both subcorpora, we found an appropriation and re-contextualization of discourses. More specifically discourses put forward by (historically) marginalized groups are decontextualized and subsequently re-contextualized within the COVID-19 pandemic. They thereby construct *anti-vax* activists as victims of a “dictatorship of pro-vaccine policies”. This is for example the case in the Brazilian Portuguese data in which the pro-abortion discourse defended by feminist movements in Brazil centered around “my body, my rights” is de- and re-contextualized by Brazilian anti-vaccinationists within the COVID-19 pandemic to argue for the right of body autonomy in choosing whether to get a vaccination or not. The Brazilian *anti-vax* data thereby constructs health measures for protection against COVID-19 as imposed measures and as a “dictatorship” of politics and health institutions. As previously stated, such aspects reflect the neoliberalism principles that have been incorporated in *anti-vax* discourse. In this sense, Sanders & Burnett claim that “the undercurrent of neoliberal sensibilities expressed in these stories points to another key factor that must be considered when seeking public health solutions to the growing vaccine hesitancy movement” (Sanders *et al.* 2019, p. 151).

In the German data, *anti-vax and vax-skeptical* Tweeters represent themselves as both figures of resistance and “awake victims” relating themselves to resistance fighters who fought against National Socialism in the Third Reich. *Anti-vax* Tweeters equate themselves with victims of National Socialism, such as Jews, as illustrated in example 4 and equate the treatment of *anti-vax and vax-skeptical* people with conditions in concentration camps. Thereby, *anti-vax* activists and “Querdenker”, commonly characterized as open to right-wing extremism, engage in processes of historical revisionism and construct the COVID-19 vaccination as an attempt to re-install a new dictatorship. The findings, therefore, show that the COVID-19 pandemic is interpreted based on already established ideological patterns. *Anti-vax* discourses build on previous narratives and scapegoats by linking them to the ongoing crisis and use these discourses to mobilize against minorities, representatives of the scientific community and government measures to contain the pandemic, as also found by Guhl *et al* (2020, p.7).

Apart from the socio-political specificities to which the *anti-vax and vax-skeptical* data refers to, another striking difference within the two language-specific datasets was the amount of *anti-vax and vax-skeptical* Tweets posted under the #vacina and #impfung. Based on an analysis of the language specific word lists of the two corpora in AntConc showing similar

frequent content words, it can be argued that the hashtags do have a systematizing function and are locally significant in both the Portuguese and the German-speaking context.

However, only 71 Brazilian verbal and visual segments were coded as *anti-vax or vax-skeptical* opposed to 611 German verbal and visual data segments. In contrast, 507 German verbal and visual data segments were coded as *pro-vax* as opposed to 781 Brazilian verbal and visual data segments. Hence, the Brazilian Portuguese Tweets posted under the #vacina seem to be much more characterized by a *pro-vax* message tone than the German Tweets posted under the #impfung.

It can be assumed that the *pro-vax* orientation of the Austrian and German governments can be related to the larger amount of *anti-vax and vax-skeptical* Tweets. Twitter possibly served more than in Brazil as a valve to express *anti-vax* content and as a platform where activists created a public sphere in which *anti-vax* content could be shared openly. Further, the strategy of employing a sarcastic tone to spread *anti-vax* content - notwithstanding Twitter’s COVID-19 Fake News policy - seemed to be particularly exploited within the German data and less in the Brazilian Portuguese Tweets, which therefore already might have been deleted to a larger extent. The Brazilian Portuguese data further point to the higher importance of other platforms such as WhatsApp for the sharing of *anti-vax* narratives, as mentioned in the *pro-vax* Tweets that had references to *anti-vax* discourse. It means that other platforms of communication - such as WhatsApp - might be the spaces in which Brazilian *anti-vax* supporters communicate more than on Twitter.

At the same time, several similarities were found in terms of discursive patterns of Brazilian and German *anti-vax* arguments. These particularly include a strong focus on interrogative statements e.g. regarding the vaccine’s effectiveness and safety with the aim to call the audience “to wake up”, frequently also accompanied by hyperlinks to videos and newspaper articles. Such interrogative statements also easily succeed in circumventing automatic fake news checks given the focus on questions rather than declarative statements based on fake news. Rather than relating fake Attributes to the Carrier “vaccine” an emphasis is on doubting established Attributes in an interrogative mode. Particularly in the German data several *anti-vax* relational clauses define the vaccine as completely safe and free of side effects in a sarcastic mode and use graphic elements such as capitals, emoticons, onomatopoetic elements and excessive negation to construct the Carrier “vaccine” as the opposite of what the Attribute explicitly refers to. They thereby render the idea of censorship and, possibly circumvent automatic fake news checkers. Further, in both Brazilian Portuguese and German data a strong relationship between the “vaccine” as Carrier and negative Attributes such as poison, COVID-19, danger and similar is

established.

Another common element in both language-specific subcorpora is the strong emphasis on negative polarity and on negative self-definitions, as, for example, in the case of the German existential processes. In the Brazilian Portuguese Tweets this negative polarity was strongly present in mental processes, especially in the ones expressing desire, such as “not wanting”. This can be related to Halliday’s description of the characteristics of anti-languages (Halliday 1976, p. 576). Relational, existential and mental processes within the *anti-vax* data construct an anti-reality defined by what Actors are not or do not believe in, and what is not existent.

The authors hope that the results of this comparative analysis contribute to a better understanding of discourses around the vaccination against COVID-19 on Twitter. Results give insights into local re-interpretations of *anti-vax and vax-skeptical* discourses in the Portuguese speaking and German speaking context. Only very few studies have so far focused on *anti-vax* discourses published in languages other than English. However, our results clearly point towards the importance and significance of analyzing *anti-vax* narratives from a language-comparative perspective, to examine re-interpretations in different languages and countries. To address issues such as “vaccine hesitancy” and to start “a more relevant and less accusatory dialogue on the topic” (Kata 2009, p. 1715), it is necessary to understand the specific arguments and ideologies that support and are spread through *anti-vax* movements and that are shaped by the socio-political context in which the users post and embed them.

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