False Information about COVID-19 Vaccination in Turkey: Analysis of Twitter Posts

COVID-19 Aşılaması İle İlgili Türkiye'de Yanlış Enformasyon: Twitter Paylaşımları Üzerine Analiz

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Abstract

The COVID-19 pandemic has affected the world socially, culturally, economically, and politically. Struggling with the COVID-19 virus has become the focal point of the countries. As many studies are being conducted, and new treatment methods are being discussed, the vaccination process continues worldwide. According to the current statistics, 63% of the world population has been already fully vaccinated. During this period, along with the true information, many false information facts and materials proliferated which lead to the reluctance of individuals to be vaccinated. As a result of it, the virus exposes to mutation and more serious cases emerge worldwide. In this context, this study aims to analyze false information Tweets regarding vaccination in Turkey. As Turkey is one of the top countries with the highest cases and the medium-scaled (68%) level of vaccination worldwide, the study findings will help to understand the main motives of anti-vaccination by focusing on false facts. A two-step methodology was followed in the research. First, data collection was done through Twitter API and then, the analysis was conducted using the Orange Data Mining Program and content analysis. Propaganda is one of the interesting results as the most-shared false information type. On the other hand, while "the denial of the epidemic" was the most-focused theme, "stop insisting on PCR" and "pandemic is over" were the most-emphasized discourses in the Tweets.

Keywords: False information, COVID-19, Vaccination, Turkey, Twitter.

Öz

COVID-19 pandemisi tüm dünyayı toplumsal, kültürel, ekonomik ve siyasal olarak derinden etkilemiştir. Pandeminin etkileri ve sonuçları ile mücadele ülkelerin odak noktası haline gelmiştir. Süreç içinde farklı tedavi yöntemleri ve çalışmalar yürütülüyorken, mevcut aşılanma ile ilgili tartışmalar da devam etmektedir. Son istatistik bilgilere göre dünya nüfusunun 63%'ü iki doz aşılanmış durumdadır. Özellikle aşılarla ile ilgili bilgi kirliliği bu sürecin yavaşlamasına neden olmakta ve daha önemlisi aşılanmamadan dolayı virüsün çeşitli mutasyonlarının da ortaya çıkmasına neden olmaktadır. Bu anlamda bu çalışma dünyadan en fazla vaka sayısında ve orta ölçekli aşılanma düzeyine sahip Türkiye'de aşılanmama ile ilgili Twitter'da yayınlanan yanlış bilgileri incelemeyi amaçlamaktadır. Çalışmada iki aşamalı yöntem izlenilmiştir. Öncelikle aşılarla ilgili paylaşımlar Twitter API aracılığıyla veri toplanılmış, Orange Data Mining Programı ile analiz gerçekleştirilmiş, sonra ise içerik analizi uygulanmıştır. Bulgulara göre propaganda en fazla öne çıkan yanlış enformasyon türü olurken, "pandeminin varlığının inkârı" en fazla değinilen konu olmuştur. Diğer taraftan "PCR testlerini durdurun" ve "pandemi bitti" en çok vurgulanan diğer söylemler olmuştur.

Anahtar Kelimeler: Yanlış enformasyon, Covid-19, Aşılanma, Türkiye, Twitter.

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Introduction

With the emergence of digital media tools and technological advancement, it is now simple to spread information around the globe. The abundance of information and extensive use of big data has also led to the emergence of false information and widespread use. It has become difficult to understand the falseness of information. Due to the nature of social media tools and other digital communication platforms, disinformation can be produced, shared, and reached by users without any filters or regulations. False information is frequently produced, especially during times of crisis or disaster, because there is a demand for information. One of the best-known examples of the extensive production and dissemination of false information is the COVID-19 period.

The COVID-19 pandemic has led to serious societal, political, and economic problems throughout the world. Although there are various assumptions about the origin of the virus, the first COVID-19 case was reported in Wuhan, China, in December 2019. Since many cases were reported also in other countries in January 2020, WHO (World Health Organization) declared a high-risk assessment of the disease at the global level (WHO, 2020). The alarming levels of spread and severity made WHO characterize COVID-19 as a pandemic in March 2020. In parallel to struggling with the societal, political, and economic effects of the pandemic, vaccination studies were initiated to be prepared and tested in different regions of the world. Vaccination programs have been widely conducted in developed and developing countries from the beginning of 2021. On the other hand, many speculations and conspiracy theories have been produced about the harmful effects of vaccination. As a result, the rise of anti-vaccination has led to the increased spread of the virus (CDC, 2022).

Many studies (Gottlieb & Dyer, 2020; Tagliabue, Galassi & Mariani, 2020; Nguyen & Catalan, 2020; Galhardi et al., 2021) showed that the production of disinformation has increased during the COVID-19 Pandemic. Many false facts that impact vaccination have been widely produced. As Wilson and Wiysonge (2020) stated, vaccine hesitancy is not a new phenomenon, people have been most anxious about being vaccinated. However, during the COVID-19 pandemic, anti-vaccination mis/disinformation facts and materials have proliferated rapidly via social media platforms. Recent studies (Kadenko et al., 2021; Petit et al., 2021; Montagni et al., 2021; Dib et al., 2021) analyzed the effect of disinformation on people's attitudes toward COVID-19 vaccination. The significance and necessity of media literacy and e-health were made clear by those studies.

A new concept "plandemic" has also become popular on social media due to the viral conspiracy theory video "Plandemic" at the beginning of the pandemic (Moran, 2020). The video includes an interview with consipracy theorist Judy Mikovits, a former virology researcher, who is a kind of fiction that aims to gain profit by selling vaccinations (Cook et al., 2020). The concept of "plandemic" is associated with several popular conspiracy theories, such as that the pandemic was fake or human-made. The documantary and the concept of "Plandemic" used in the documantary served to capitalize on anti-containment sentiments and COVID-19 beliefs that were already prevalent, diverting people towards anti-vaccine behaviours and general concerns about how the pandemic would affect our rights and freedoms (Kearney, Chiang & Massey, 2020, p. 2). Being used as hashtag, it becomes one of the essential keywords of disinformation campaigns shared on social media, in particular Twitter.

This research focuses on the analysis of the Tweets under the twelve most-used hashtags within the

three months (between 28.07.2021 and 28.10.2021) which are *#asivepcrdurdurulsun* (stop vaccination and PCR), *#asidegilbiyolojiksilah* (it is not a vaccine it is a biological weapon), *"#denekolmaturkiye* (do not be experiment Turkey), *#kobaydeğiliz* (we aren't subject), *#asızorbalığınadiren* (resist to vaccination bullying), *#coronatiyatrosu* (Corona theater), *#salgınyokyalanvar* (no pandemic yes lie), *#sahtesalgınaboyuneğmiyoruz* (we do not surrender to fake pandemic), *#maskeyehayır* (no mask), *#pandemibitti* (a pandemic is over), *#maskesağlığazararlıdır* (mask is unhealthy) and *#asiolmayacagim* (I will not be vaccinated), in Turkey. Turkey is one of the top ten countries with the highest number of COVID-19 cases worldwide (Worldometers, 2022). However, despite being one of the top ten countries with the highest COVID-19 cases, it is in the 20th spot in the "share of people vaccine against COVID-19" on 18 November 2021(Our World in Data, 2022). Therefore, the Minister of Health often makes statements reminding the importance of the vaccine, and the government conducts communication campaigns to increase vaccination rates.

Therefore, Turkey can be considered as one of the country samplings to analyze the general structure and effect of false information on COVID-19 vaccination. Although there are some studies (Aydin, 2020; Akyüz, 2020; Porsuk & Cerit, 2021; Topsakal, 2021; Karakaş & Doğru, 2021) analyzed fake news and mis/disinformation related to the COVID-19 pandemic within Post-Truth understanding, none of them focused on anti-vaccination hashtags and posts of Twitter by the users. The main focus on Post-Truth understanding is related to the vast attention that false information (particularly fake news) impacts on individuals in a way that blurs the difference between the real and the fake (Sismondo, 2017). However, those studies didn't focus on the typology and sentimental structure of the false information materials. In this study, instead of focusing on the disinformation or misinformation within the Post-Truth discussion, in general, false information examples' both the qualitative and quantitative aspects were examined and mapped out.

1. False Information and Social Media

False information is not a new phenomenon. It has been made up and used for many reasons since Ancient times. The emergence of digital communication and social media tools has eased the production and spread of false information. There is an abundance of false information on the Web where fact is fabricated and mispresented on purpose or not. Recent studies revealed that the spread of false information can lead to far-reaching impacts in terms of user engagement metrics. Those can be listed as the number of likes, reshares, hoaxes, fake news, and rumors. To be more precise, the most liked, shared/reshared, and commented posts survive for a long time and spread across the Web that allows users to expose to false information (Kumar, West & Leskovec, 2016; Kumar & Shah, 2018).

Information is not the only concept that is related to knowledge informing on learning, but also a social process including differences for the observer. The informative characteristic of any information stemmed from background, previous knowledge, and biases. Those elements generate the level of attention and change in the receiver (Giglietto et al., 2019, p.627). For Floridi (2010) false information can't be considered as information due to the narrated things do not exist in reality. On the opposite, for Scarantino and Piccinini (2010) it is not always easy or possible to evaluate the truthfulness of the information. Therefore, the information cannot be either true or false. In this vein, Giglietto et al. (2016) underlined the challenge of understanding and evaluating the truthfulness of the information in the current media ecosystem. However, three main tools were suggested as the determinants of

truthfulness which are the source, story, and context. While the source is related to the reputation of the media organization, the story and context are about the individual tendencies of the users or personal beliefs.

Kumar and Shah (2018) classified false information into two major categories: misinformation and disinformation. While misinformation is a kind of false information that is formed during event evaluation on the knowledge updating that has no purpose to mislead, disinformation refers to false information which aims to mislead individuals intentionally. More clearly, in misinformation the inaccuracy of the information is unintentional, however; in disinformation, it is deliberatively false or misleading (Jack, 2021). In other words, disinformation can be understood as "misinformation with an attitude" that includes intentional, deliberative, and purposeful effects to mislead, deceive and confuse (Fetzer, 2004, p.231). For Fallis (2009), accuracy is essential for the quality of information which can impact the formation of false beliefs and misleading information. In addition, the intention of the source is also important for understanding inaccurate and misleading information. As the conceptualization and analysis of false information are still problematic and controversial, as Floridi (1996, p.510) stated, each form or type of false information doesn't need to be intentional. Therefore, the analysis of the false information should be done comprehensively. In the false information literature, rumors and fake news are the other popular terms used in the studies. Rumor is a type of false information that is not verified by a reliable source. Fake news refers to news articles that are intentionally and verifiably false on account of serving specific purposes (Zubiaga et al., 2018). For Sharma et al. (2019, p. 4) fake news can be also defined as "a news article or message published or propagated through media, carrying false information regardless of the means and motives behind it".

Within the framework of the typology of false information on the Web, Zannettou et al. (2019) put forward eight main categories which are; *fabricated* (completely fictional stories devoid of real facts), *propaganda* (a sort of a fabricated story that is utilized in a political context to mislead people), *conspiracy theories* (the stories which aim to explain a situation or an event by resorting to conspiracy without proof), *hoaxes* (the half-true or factoid stories that are either false or inaccurate due to being presented as legitimate facts), *biased or one-sided* (these extremely one-sided stories are also known as hyperpartisan stories in a political context), *rumors* (the stories that their truthfulness is never confirmed), *clickbait* (the deliberate use of misleading headlines and thumbnails of content on the Web), satire news (the stories that are based on irony or humor). Similar to this typology, Pierri and Ceri (2019) varied false information as fake news, hoaxes, satirical news, propaganda, clickbait, rumor, and junk news. Junk news is a generic term that includes several types of information, from propaganda to hyper-partisan news. On the other hand, although the concept fake news is analyzed as also a specific phenomenon in the literature, in fact, it is contested term that can be included in within the understanding of both misinformation and disinformation circulation online (Marwick & Lewis, 2017). In this study, this concept it is dealt within the framework of false information based on the typologies done by Pierri and Ceri (2019), Zubiaga et al. (2018), and Zannettou et al. (2019).

Social media platforms have enhanced the dissemination mode of information by which the velocity, volume, and variety of information transmission have been developed greatly. This has also led to the spread of false information faster, deeper and wider on social networks. Another point is the multi-modal ecosystem of new media has developed high-quality and manipulative information materials such as images, videos, and audio on a massive scale (Fallis, 2009; Guo et al., 2020). In particular, the algorithm of new media technology is used effectively to improve the decision-

making for individual users (Soe, 2018). Above all, the increase in the number of Web providers and multi-dimensional interactivity should be considered as the main factors that contribute to the development of false information to a large extent on digital platforms (Floridi, 1996).

In this study, we focused on typological and contextual characteristics of false information regarding anti-vaccination posts for COVID-19 on Twitter, in Turkey. In this vein, we did not prefer to separate as disinformation or misinformation due to the complexity and difficulties of exact separation. Furthermore, instead of analyzing the examples within only two major types, we modified different categories of false information based on the literature. In doing so, a total of 748 posts under mostly-used 12 hashtags were reached and analyzed. Based on the dis/misinformation understanding, we aim to find out how the typology of Covid-19 anti-vaccination false information posts, the main themes, the underlined concepts, and their sentimental structure of them. The results can contribute to the related literature as the important sampling of Turkey where is one of the top countries worldwide with the highest number of cases.

2. Methodology

This study seeks to examine false information Tweets about vaccination in Turkey. As Turkey is one of the top countries with the highest cases and the medium-scaled (68%) level of vaccination worldwide (BBC, 2021), the study findings will help to understand the main motives of anti-vaccination by focusing on false facts.

For that purpose, the research aims to find out:

RQ1: Which types of false information were mostly used for anti-vaccination?

RQ2: How anti-vaccination was framed in false information Tweets in Turkey?

RQ3: Which concepts were mainly emphasized?

RQ4: What was the sentiment of the shared Tweets?

Based on four main research questions, a mixed methodology was applied, therefore; both qualitative and quantitative aspects of the posts were taken into account. A two-step research design was followed to analyze and discuss the findings in a more detailed way.

First, the period in which predominantly tweets were about vaccination in Turkey was selected for the analysis. In this context, 748 tweets were collected for around 12 trending hashtags about anti-vaccination by using publicly available Twitter API, which filters data from Twitter based on a hashtag on 28.10.2021. In order to find popular hashtags, a search was carried out on Twitter with the words "Covid-19 vaccine" "vaccine", "anti-vaccine", "plandemi", "I will not be vaccinated", "vaccination victims" and the most used hashtags were determined.

The data set is limited to only three months (between 28.07.2021 and 28.10.2021) because of Twitter's "COVID-19 Misleading Policy" (Twitter, 2021).. Twitter denies access or removes false or misleading information about "COVID-19 vaccines that invoke a deliberate conspiracy by malicious or powerful forces", "adverse impacts or effects of receiving vaccinations, where these claims have been widely debunked", "vaccines and vaccination programs which suggest that COVID-19 vaccinations are part of a deliberate or intentional attempt to cause harm or control populations"

(Twitter, 2021).. Following the data collection, the findings were analyzed by both the Orange Data Mining program and content analysis (manually). Orange is a program for machine learning and data mining (Demšar et al., 2004). Because of the ease of use it provides, the Orange Data Mining program paves the way for researchers working in the field of social science to conduct research with text mining method. In this context, the number of researches (Anggraini & Suroyo, 2019; Bashir et al., 2021; Opesade, 2021; Koca, 2021) using Orange Data Mining is increasing. In this research, Orange is used for word cloud analysis and sentiment analysis by using the steps shown in the chart.
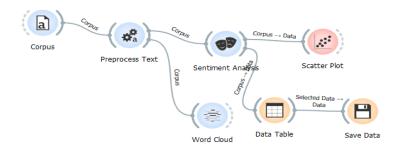

Figure 1. Analysis Steps of Orange Data Mining Program

Overall, 748 tweets were collected by Twitter API and a corpus was created on the program. Then, with the "preprocess text" tool data was cleaned by removing white spaces, links, punctuation, and stop words, and converting to lowercase. Then, a word cloud was created to find out the most used words in the corpus. With the "sentiment analysis" tool "multilingual sentiment analysis" with a Turkish plugin was used and the data was visualized by the "scatter plot" tool. To measure the reliability of sentiment analysis, the researchers manually coded 10% (75) of the sample and compared it with the program.

The categorization of the false information and main themes of anti-vaccination were examined through content analysis. The study used dual, blinded coding for a 20% sample to find intercoder reliability using the Cohen K statistic. Agreement between coders was 86.8% and intercoder reliability Cohen K=0,8. It shows substantial agreement.

3. Findings and Results

Based on the first research question, the main categories were determined by referring to the related studies (Fallis, 2009; Zubiaga et al., 2018; Zannettou et.al, 2019; Pierri ve Ceri, 2019) in the literature. In this context, we scrutinized all the posts and identified the categories as; fake news (misleading fake news), rumor (the rumors without sources), conspiracy theories, hoax (neither true nor wrong information), propaganda (manipulating information and political context), fabricated (fictional individual stories which are devoid of facts), satirical news/posts (ironic posts), and biased hashtags (one-sided and manipulative hashtags). In addition to those well-known types, we also revealed and identified two different/new categories, which are anti-disinformation posts and irritating news/posts. While anti-disinformation posts include posts that aimed to straighten the false information, irritated news/posts are about cursing the vaccination process. The irrelevant posts were included in the

"other" category.

The exclusion of categories in research is of great importance. The tweets that were thought to fall into more than one category were marked and re-evaluated by the researchers. The tweets on which two researchers could not reach a consensus were evaluated by a third researcher.

Table 1. Typology of False Information about Anti-vaccination

False Information	Number	Percentage
Fake News	59	8%
Rumor	23	3%
Conspiracy theories	73	10%
Propaganda	169	23%
Fabricated	66	9%
Satirical News/Posts	104	14%
Hoax	49	7%
Biased Hashtags	136	18%
Anti-Disinformation Posts	10	1%
Irritating News/Posts	28	4%
Other (Irrelevant)	31	4%
TOTAL	**748**	**100%**

As can be seen in Table 1, propaganda was the most shared (169 posts/23%) false information type by Turkish users. In those posts, they demand the Minister of Health's resignation and criticize both the government and the opposition parties due to vaccination practices and actions. In doing so, they also shared political messages about the forthcoming elections. On the other hand, some of them also proselytize by giving religious examples to show the harmful side effects. The latter high score (18%) is in the category of "biased hashtags". In this category, the users used only manipulative anti-vaccination hashtags about avoiding vaccines, underestimating Covid-19, and criticizing the Minister of Health. Satirical news/posts are the third-highest category with 14%. They mocked and used various ironic words about vaccinated people and the Ministry of Health as the responsible institution. 73 conspiracy theories were detected that mainly blame global powers as if trying to dominate or control the people through "chips" aimed at vaccines. Some of them are also called vaccines as test fluids. In the category of "fabricated" which consists of 7%, the users made up stories about the death and serious side effects of vaccination. Differently from the others, in irritated news/posts (4%) the users cursed all the sides who are in favor of vaccination and challenged them. We also detected 10 posts that aimed to straighten the false information about vaccination by referring to specific examples.

To find out how the anti-vaccination was framed in false information contented Tweets in Turkey, thematic analysis was employed by focusing on each post's content rigorously. As a result, Figure 2 was prepared as below:
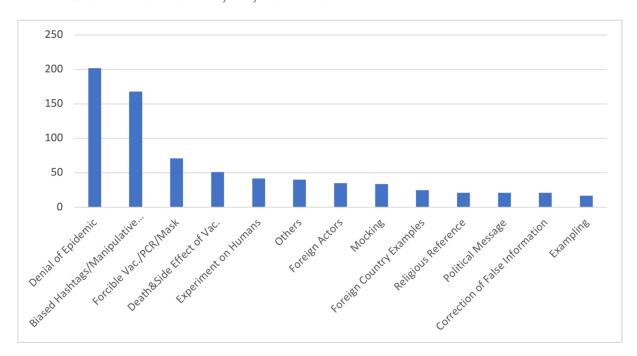
Figure 2. The Main Themes

As illustrated in Figure 2, "denial of the epidemic" was the most preferred theme among the others. While the latter highest score was in "biased/manipulative hashtags", in order, "forcible vaccination/ PCR test/mask", "death & side effects of vaccination", and "experiment on humans" were the other emphasized themes. To comprehend the above-mentioned themes in a detailed way, we also prepared an explanation table as shown below:

Table 2. Explanation of the Main Themes

Main Themes	Statement	Example
Denial of Epidemic	Tweets stating that there is no epidemic, that the vaccine does not have a function to protect from the epidemic, and that people are deceived	"Should we blame the fake epidemic or the neglect of other diseases by the hospital and plandemic doctors? There are many people whose disease stages are severe because of neglect and lack of proper treatment! I told you before #thereisnoepidemicitisalie"
Biased/Manipulative Hashtags	Tweets with only biased/manipulative hashtags without text	"#denekolmatuerkiye #kobaydeğiliz #asızorbalığınadiren #asıolmayacağım #coronatiyatrosu #salgınyokyalanvar #sahtesalgınaboyuneğmiyoruz #maskeyehayır #covid19 #aşımayyakları#maskesağlığazararlıdır"
Forcible Vac./PCR/Mask	Tweets criticizing mandatory vaccination, PCR testing, and mask-wearing	"Pcr test, it's officially trying to pierce the man's brain, it's a disgrace #plandemi"
Death&Side Effect of Vac.	Tweets stating that the vaccine causes death and has fatal side effects such as heart attack and vascular occlusion.	"Vaccines continue to kill. #novaccination"
Experiment on Humans	Tweets stating that the vaccines are an experimental liquid, the results are unknown and they are tested on humans	"Dr. Ruben: we won't know how safe it is until we give this vaccine (to humans).#plandemi"

Others	Tweets are written in different languages, on different topics, meaningless and not relevant to any category	"Kâ bersiv bidin ! qey zanistvan, melle yan jî sîyasetmedar kî bi aqil nemaye ..? êdî bes e ev zordarî #maskeyok bila #plandemi êdî biqede"
Foreign Actors	Tweets expressing that the pandemic and the necessity of vaccination are a game of external forces	"The media sold in America has hypnotized the public with fear. #cabinet meeting #mask #pcrdayatmadurdurulsun"
Mocking	Tweets mocking those who have been vaccinated and the government's policies to deal with the pandemic	"After 12 o'clock, the pumpkin will turn into Covid. The next day, the prince would find the vaccinated girl, and they would live happily ever after. #we're sorry #pandemic #i won't be hanged"
Foreign Country Examples	Tweets using examples from other countries to criticize the necessity of vaccination, mask, and PCR and to question the reality of the pandemic	"In Israel, one of the countries where the most experimental fluids are made and the most cases according to the population, a teenager is taken to the hospital from the "vaccination" center unconsciously... It is not known whether the young person survived... #pandemibitti #pfizerbiontech"
Religious References	Tweets with statements opposing the vaccine using religious references	"Their aim was to alienate even Muslims from Islam and brotherhood, and they succeeded in that too... the afterlife for those who contributed to this is tough... #pcrbitersepandemibiter #asiolbebek #evlânıasıdankoru #pcrdayatmasıdurdurulsun"
Political Messages	Tweets that share political messages over the pandemic and vaccine, expressing that they will vote for parties against the vaccine or not to vote for the parties that support the vaccine	"Yes, there will be an early election, we will send you from the parliament together with the government, while the people are forced to vaccinate for the PCR test, don't think we will vote for those who are not with the people, we are not going to vote #halkncağrını #asıvepcrdurdurulsun #asidegilbiiksilah"
Correction of false information	Tweets that share information about the pandemic and vaccine or seek to correct misinformation	"No, please don't misinform people! Right now, 10% of those who have never been vaccinated are hospitalized and 90% are those who are not fully vaccinated."
Exampling	Tweets with examples from their own lives to explain that the vaccine and the PCR test do not work	"I've never been vaccinated and I've never been sick, fortunately, I haven't been vaccinated"

In relation to the second one, the third research question aimed to reveal the most emphasized words and discourses (which were also used as hashtags) in the Tweets. By using the Orange Data Mining Program, the word cloud was extracted from the analyzed Tweets in Turkish. Figure 3 is as below:

Figure 3. Word Cloud of Tweets

As can be seen above, "asıvepcrdurdurulsun" (stop vaccination and PCR), "pcrdayatmasıdurdurulsun" (stop insisting on PCR test), "pandemibitti" (pandemic is over), "asıdegilbiyolojiksilah" (vaccine is a biological weapon), "kovityalaniyaz" (write a Covid tale), "plandemi" (plandemi), "asıolmayacagım"(I will not be vaccinated), "asımagdurları" (victims of vaccination), "asıolma" (do not be vaccinated), "DrFahrettinKoca" (the Minister of Health of Turkey), "salgınyokyalanvar" (there is no epidemic), and "maskeyok" (no mask) were the most frequently used and underlined concepts in the Tweets. To show the distribution of the most used words and discourses in the Tweets, Table 3 was prepared as below:

Table 3. Mostly Used Concepts and Discourses

Main Concepts and Discourses	Number of use	Percentage
Stop vaccination and PCR	117	16%
Stop insisting on PCR test	130	18%
Pandemic is over	128	17%
Vaccine is a biological weapon	89	12%
Write a Covid tale	112	15%
Plandemi	90	12%
Victims of vaccination	72	10%
TOTAL	738	100%

While preparing Table 3, the concepts and discourses which are above 10% were included. In this context, it was revealed that such discourses "stop insisting on PCR Tests" (18%), "pandemic is over" (17%) and "stop vaccination and PCR" (16%), and "write a Covid tale" (15%) were mostly preferred by the users in the Tweets.

Based on the last research question, we aimed to find out the sentimental reactions to the false information Tweets by the users. In doing so, we used the Orange Data Mining Program and prepared two figures that showed the emotional reactions to the Tweets under the most shared hashtags. Figure 4 and Table 4 show the sentimental structures of the related Tweets:
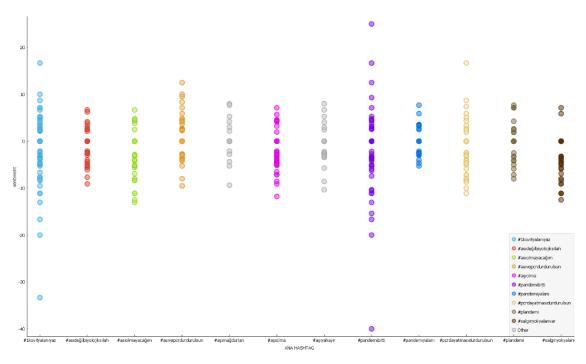
Figure 4. Emotional Reflections on the Tweets

Table 4. Distribution of Sentiment Reactions

Hashtag	N. of Hashtag	Sentiment Score
#1kovityalanıyaz	100	-2.227.562
#asıdeğilbiyolojiksilah	62	-3.233.168
#asıolmayacağım	52	-4.353.699
#asıvepcrdurdurulsun	79	2.174.173
#aşımağdurları	29	503.331
#aşıolma	70	-4.708.839
#aşıyahayır	30	-1.083.665
#pandemibitti	105	-1.493.834
#pandemiyalanı	37	974.328
#pcrdayatmasıdurdurulsun	100	-2.122.321
#plandemi	44	1.442.390
#salgınyokyalanvar	40	-5.503.059
SUM	**748**	**-19.631.925**

As can be seen in Figure 3 and Table 4, when the score of all tweets is evaluated, it is seen that tweets under 12 hashtags reflect predominantly negative emotions. However, there is a difference between hashtags and the reflection of sentiment. It is seen that mostly positive emotions are reflected in the tweets containing the hashtags *#plandemi, #pandemiyalanı, #aşımağdurları* and *#asıvepcrdurdurulsun.* In addition, the most negative emotions were reflected with #salgınyokyalanvar.

Discussion and Conclusion

The history of false information is old as the use of information. Throughout the history of humankind, people used false information for specific purposes, interests, or other reasons. In particular, false information materials proliferated during war and crises. As it has been almost two years since people

are suffered from the COVID-19 virus worldwide, various true and false information are produced extensively. In this context, many studies (Gottlieb & Dyer, 2020; Tagliabue, Galassi & Mariani, 2020; Nguyen & Catalan, 2020; Galhardi et al., 2021) revealed that the production of false information types has increased during the COVID-19 Pandemic. Many false facts that impact vaccination have been also produced widely. On the question of how false information affects people, some studies (Kadenko et al., 2021; Petit et al., 2021; Montagni et al., 2021; Dib et al., 2021) showed the negative impacts of false facts on the vaccination process. As the decrease in vaccination, the mutation and number of severe cases/ deaths increase. Therefore, preventing false information about the COVID-19 virus and vaccination is one of the important parts of struggling with the pandemic.

This study is different from the above-mentioned studies and the research in Turkey (Aydin, 2020; Akyüz, 2020; Porsuk & Cerit, 2021; Topsakal, 2021; Karakaş & Doğru, 2021) which mostly analyzed fake news and mis/disinformation related to COVID-19 pandemic, we purposed to focus on all the types of false information, and specifically anti-vaccination. Due to the policy and regulations of Twitter, we reached only 748 Tweets posted under 12 mostly-used hashtags in Turkey. A two-step methodology was followed in the research. First, data collection through Twitter API, and the analysis of the posts using both Orange Data Mining Program and content analysis. We identified four main research questions for drawing the general portrait of false information Tweets about anti-vaccination in Turkey.

To answer the first research question, we identified the categories (Table 1) based on the literature (Fallis, 2009; Zubiaga et al, 2018; Zannettou et al., 2019; Pierri ve Ceri, 2019). During the analysis of the findings, we also detected two new categories to include the related Tweets. Those categories are anti-disinformation and irritated news/posts. In the scope of anti-disinformation, we include the Tweets in which the users attempted to straighten the given false information (for example Table 2). On the other hand, the category irritated news/posts contain Tweets that curse the vaccination process and practices in the country. Concerning the most used false information types, propaganda was seen as the most preferred (n=169/23% of all) false information type by Turkish users. This can be considered an interesting finding compared to the similar studies which are mentioned above and put forward fake news, and rumors as the most-known types. In propaganda posts, they blamed the Western countries and the government, thereby demanding the Minister of Health's resignation, criticizing both the government and the opposition politicians due to vaccination practices and actions. In doing so, they shared also political messages about the forthcoming elections or the parties they support.

In the scope of the themes framed in the Tweets, "denial of the epidemic" was revealed as the most preferred theme among the others. This theme includes misleading information (disinformation) about the non-existence of the COVID-19 pandemic and therefore the unimportance of vaccination. While the other highest score was seen in the category of "biased/manipulative hashtags" (these are only one-biased/manipulative hashtags without text), in order, "forcible vaccination/PCR test/ mask" (the users complain about the vaccination practices), "death & side effects of vaccination" (the users mentioned and fabricated about the serious side effects of the vaccination), "experiment on humans" (the users depicted the whole process as if experimenting on humankind) were the other underlined themes framed in the Tweets.

To understand the thematic framing of the Tweets in a more detailed way, we also used the Orange

Data Mining program to extract the word cloud of the Tweets and found out that "stop insisting on PCR test" (18%), "pandemic is over" (17%) and "stop vaccination and PCR" (16%) and "write a Covid tale" (15%) were mostly mentioned by the users.

Based on the final research question, we purposed to detect the sentiment analysis of the Tweets under the 12 hashtags. As also shown in Figure 3 and Figure 4, it has been seen that tweets containing positive emotions are used together with the hashtags *#plandemi, #plandemiyalani, #asimağdurları,* and *#aşıvepctdurdurulsun.* The most important reason for this is that the tweets written with these hashtags present a "positive" world picture that the COVID-19 pandemic is true and the vaccine, the PCR tests, and the mask are unnecessary. On the other hand, the hashtag with the most negative emotions is *#salgınyokyalanvar.* Under this hashtag, while there are statements that there is no epidemic similar to the others, also they blame the government and international actors for the "lying".

Due to the policies and regulations of Twitter that eliminate false information Tweets under specific hashtags, we were able to reach only 748 hashtags to analyze. Therefore, this is one of the limitations of the study. Future studies can focus on a comparative analysis of false information about anti-vaccination to see the differences and propose comprehensive suggestions. The findings of this research will contribute to the related literature by focusing on a relevant country example that is one of the top countries with the highest number of COVID-19 cases and a low level of vaccination worldwide. In particular, the findings which are propaganda as the most-shared false information type, and denial of the epidemic as the main theme preferred by the Turkish users can be considered as directive findings for future studies.

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