POST-TRUTH IN THE PUBLIC SPHERE IN EUROPE:

A Content Analysis of User-Driven Comments on COVID-19 Vaccination on Facebook

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Abstract

This thesis aims to analyse the presence of post-truth characteristics in the public sphere, using the case study of the highly debated COVID-19 vaccines in Europe. Since 2016, the concept of post-truth has received increased attention in academia, particularly around the intense polarization of issues such as partisan voting, climate change, and vaccination. While prior studies have focused significantly on the impacts and emergence conditions of the post-truth phenomenon, empirical studies on the prevalence of post-truth in everyday public activities have yet to be written. In response, this thesis conceptualises post-truth into five characteristics that are described in the existing literature: (i) disagreement about fact, (ii) personal experience and emotion, (iii) neglect of fact, (iv) truth-seeking, and (v) discredit of and distrust in experts. Based on these characteristics, this thesis qualitatively analyses the content of the comments on the European Commission's Facebook posts concerning the COVID-19 vaccine.

Descriptive analysis of 362 user-generated comments shows that groups with varying attitudes toward vaccination display most of the post-truth characteristics described in the existing literature. The results suggest that the group of people who are influenced by the post-truth culture is wider than anticipated. Furthermore, this thesis alters prior understandings of post-truth culture by showing that the opponents of vaccines do not display strong emotions or use personal experiences when discussing vaccination with the others. Public health authorities therefore might take these results into consideration for future vaccination campaigns. Lastly, this study posits some associations between post-truth characteristics and calls for further qualitative research on the matter.

Keywords: Post-truth, Vaccination, COVID-19, Truth Bubbles

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1. Introduction

In 2016, the U.S. presidential election campaign and U.K. Brexit referendum created enormous concern about the dissemination of misinformation, fake news, and alternative facts in the public sphere. These concerns led the Oxford Dictionary to name "post-truth" the word of the year in 2016. Post-truth could become "one of the defining words of our time," the president of Oxford Dictionaries, Casper Grathwohl said. In Europe, the narratives of "democracies worldwide are facing a deep-seated crisis, as fake news, alternative facts and misinformation have come to dominate public spheres" is gaining popularity (Farkas and Schou 2020, 1). It has been claimed that the world has entered a so-called "post-truth era" ushering in a new epistemic culture (Farkas and Schou 2020, 5).

Recent studies have started to explore the potential influence of post-truth in society (e.g., McIntyre 2018; Rider and Peters 2018; Cosentino 2020). A common portrayal of the impact of the post-truth era is that "evidence, objectivity and facts" encounter resistance in society (Fridlund 2020, 218) and are replaced by populist and irrational thought and the denial of science (Galanopoulos and Stavrakakis 2019, 6). The rise of post-truth has been discussed as the erosion of the stability of democracy and long-standing institutional bulwarks (Farkas and Schou 2020, 146) or even the end of the Enlightenment (Kalpokas 2019, 2). These portrayals, as Farkas and Schou (2020, 30) highlight, not only reflect the struggle of contemporary politics, but also frame "contemporary democratic problems in specific ways" (87). For example, emphasising the need to reduce the negative impact of post-truth, Lewandowsky, Ecker, and Cook (2017, 365) called the post-truth phenomenon "a crisis for power and over the nature of Western democracies" which undermines the democratic quality of society.

Many studies have also focused on explaining the occurrence of the post-truth phenomenon. Scepticism concerning vaccination and climate change denial are consistently connected to the post-truth paradigm (e.g., Lewandowsky, Ecker, and Cook 2017). Post-truth culture is considered to intensify the polarization of these issues (Lockie 2017, 3; Numerato et al. 2019). Scientific data is doubted by the vaccine sceptics or deniers of climate change, who are said to be "exposed to misinformation and fake news" (Farkas and Schou 2020, 96). Indeed, social media, journalism, and the masses have commonly been considered villains in post-truth studies (Farkas and Schou 2020, 63). As Marshall and Drieschova (2018, 91) suggest, "the increased use of social media for news acquisition, and an increasing distrust in political elites and scientific expertise create the conditions of possibility for post-truth politics."

While previous studies are informative because they examine the impact and occurrence of the post-truth phenomenon, there is a lack of empirical studies identifying the prevalence of post-truth culture in everyday public activities. To address this lacuna in the literature, this thesis aims to

analyse the presence of post-truth characteristics in the public sphere using the highly debated case of vaccination. Accordingly, the main research question of this thesis is

RQ1. What kind of post-truth characteristics can be identified in the vaccination debate in Europe?

Due to its enormous impact on public health, the case of vaccination is significant and has been a subject of increasing interest in the study of the post-truth phenomenon. The debate around vaccination hesitancy has also garnered much attention over the years in Europe. Vaccination hesitancy refers to a "delay in acceptance or refusal of vaccination despite availability of vaccination services" (MacDonald 2015). Vaccination hesitancy is considered to be a potential threat to the public health goals of the state or health authorities since it decreases the chances that a population will achieve herd immunity (Kieslich 2018, 31; Jenkins and Moreno 2020, 232). Accordingly, scholars from various disciplines have invested significant effort in identifying the key contributors of vaccine hesitancy (e.g., Lee and Sibley 2020; Kieslich 2018) or understanding vaccine sceptics' information-sharing patterns (Jenkins and Moreno 2020).

Vaccination scepticism is often cast as a typical example of the post-truth phenomenon; nevertheless, little has been done to investigate whether post-truth characteristics are also found in the pro-vaccination group. In order to examine the prevalence of post-truth characteristics among groups with different attitudes toward vaccination, this thesis asks the following question:

RQ2. What post-truth characteristics do the different attitude groups display when discussing vaccines?

In light of the coronavirus (COVID-19) pandemic in 2020, the topic of vaccination has received much attention. In particular, several survey studies have reported relatively low rates of COVID-19 vaccine acceptance in European countries such as Poland, Italy, and France (Lazarus et al. 2020; Sallam 2021, 160). Promoting a new vaccination campaign during a public health crisis thus has become unprecedentedly challenging, particularly in the times of the so-called post-truth era. In this sense, the timely context of the COVID-19 vaccination efforts in Europe is ideal for conducting an empirical investigation on the prevalence of post-truth characteristics in the public discussion surrounding vaccination. Accordingly, using the case study of the COVID-19 vaccination debate, this thesis examines and compares the prevalence of post-truth characteristics in groups with different attitudes towards vaccination in Europe.

Overview of Chapters

This thesis is composed of five chapters. Followed by this introductory chapter, Chapter 2 presents the conceptual resources that inform the current study. It underlines the most common characteristics of post-truth identified in the literature that guides this thesis. Chapter 3 presents the methodology. It starts with an overview of qualitative content analysis, then outlines the data

collection process, the sampling strategy, and the coding scheme. Chapter 4 presents the results of this study and describes the prevalence of post-truth characteristics among groups with differing attitudes toward vaccination. Chapter 5 concludes the thesis by discussing the major findings and the limitations of the study.

2. Previous Research and Conceptual Framework

Study of Post-truth

The concept of post-truth has received increased attention in the recent scholarly literature; however, there is little consensus on its definition due to varying academic treatments of the concept. The first use of the word post-truth can be traced back to an article written by the playwright Steve Tesich in 1992 to describe a situation that truth itself becomes unimportant (Oxford Dictionaries 2016). In the midst of the anxiety surrounding the emergence of falsehood in the U.S. presidential election and the Brexit referendum campaign, the term "post-truth" has increased in popularity and was selected as the 2016 word of the year by the Oxford Dictionary. Post-truth is defined as "relating to or denoting circumstances in which objective facts are less influential in shaping public opinion than appeals to emotion and personal belief" (Oxford Dictionaries 2016). This general definition is frequently adopted in the literature (e.g., Lewandowsky, Ecker, and Cook 2017; Jandrić 2018), but several scholars find it problematic.

According to Harsin (2018), the concept of post-truth shares a similar definitional problem with other periodizing concepts such as modernism and post-modernism, industrial and post-industrial, traditional and post-traditional. The prefix *post-* is used to describe the time following a specific situation or event, such as post-war. In the contemporary context, the meaning of the prefix *post-* has evolved and usually refers to "belonging to a time in which the specified concept has become unimportant or irrelevant" (Oxford Dictionaries 2016). Different academic treatments of post-truth have resulted in inconsistent definitions of the term in the literature, in which the concept can be interpreted as a time "beyond," "after" or "without" the truth (Harsin 2018). This varying interpretation causes the discussion of whether post-truth represents "a new epistemic low in human history" (Legg 2018, 43) or a very old problem since the "suppression of inconvenience facts have been around as long as politics has existed" (Blackburn 2018, 5).

The Oxford Dictionary's definition of post-truth leads to two contested interpretations. The first interpretation is in relation to the view of the prefix *post-* as meaning "after" or "without," suggesting that the world has entered a post-truth era. This view implies that an "era of truth" existed and society has entered an era without truth (Hyvönen 2018, 121; Legg 2018, 43). Second, the Oxford Dictionary definition implies a dichotomous relationship between "objective facts" and "emotion and personal belief" and assumes that "there are something as objective facts" (Blackburn 2018, 9). These interpretations add to the complexity, ambiguity, and controversy of the understanding of post-truth in academia. The former interpretation relates to the discussion of whether post-truth is a novel phenomenon and, if so, what the tendencies and impacts of the post-truth phenomenon are. The latter

interpretation points to epistemological quarrels such as how to define truth, what counts as facts and truth, or whether a single truth exists.

Indeed, multifaceted discussions on post-truth have emerged among scholars from different fields. This study acknowledges that post-truth is a complicated phenomenon that involves "the problem of the complex relationship between truth, politics, media, social and cultural life, scientific practice, professional norms and ethical values" (Rider and Peters 2018, 6). However, this study does not intend to enter this epistemological discussion or debate whether the world has entered a post-truth era. Instead, it seeks to understand the characteristics of post-truth described in the complex discussion among scholars in various disciplines. By making sense of the academic discussion of the concept, this chapter formulates a conceptual framework needed to understand whether these characteristics could be identified in everyday public activities. Post-truth is a much popularized but little theorized concept. There is no established map that can help navigate the so-called post-truth world. To conceptualise post-truth, this chapter reviews and summarises how the concept of post-truth is understood and interpreted in the literature.

Characteristics of Post-truth

Reviewing the discussion in the scholarly works, five major characteristics of the post-truth phenomenon have been identified. In this conceptualisation process, it is important to highlight that not all characteristics are accepted by scholars in different disciplines to the same degree and they may even contradict each other. This is mainly because these characteristics are drawn from various disciplines and the concept itself is still contested. Nonetheless, post-truth can be conceptualised as having five main aspects: (i) disagreement about fact, (ii) personal experience and emotion, (iii) neglect of fact, (iv) truth-seeking, and (v) discredit of and distrust in experts.

The first characteristic of post-truth described in the literature is a growing *disagreement about fact* among citizens. Specifically, Kavanagh and Rich (2018, 21) suggest that disagreement occurs over both objective facts and the well-established analytical interpretations of facts and data. An objective fact can be defined as a type of information that is observably consistent and verifiable, such as the number of students in a classroom, while the interpretation of objective fact often includes uncertainty due to "scientific or human error or some other limitation" (21). According to Kavanagh and Rich, some interpretations are more established and widely accepted, such as the link between smoking and cancer. However, some are highly uncertain and contested, such as findings on the benefits of new cancer treatments (22).

Most of the literature discussing the post-truth phenomenon expresses concern for the increasing disagreement not only surrounding objective facts but also the well-established interpretations of fact. The conflicting interpretations of fact create a scenario in which there are "only

binaries to choose between – my science versus yours," which is a result of "a failure of collective political judgment in situations of epistemic ambiguity and deep political cleavage" (Jasanoff and Simmet 2017, 760). Furthermore, this binary relationship caused by disagreement about fact and data can be commonly observed in the debate surrounding various polarized issues. For example, proponents and opponents of climate change make opposite scientific claims based on the same empirical datasets (Jandrić 2018, 105). There are several explanations for the increasing disagreement surrounding fact and data among citizens, including the expanding role of personal experience and emotions in the information selection process, the rise of distrust in information providers, and neglect of fact. In the following, these areas are further explored and elaborated.

Prioritisation of *personal experience and emotion* are other characteristics of the post-truth phenomenon that are commonly described in the literature. Scholars suggest that facts and evidence are superseded by personal experience and feelings when someone is forming their "truth belief" (Dahlgren 2018, 26; Kavanagh and Rich 2018, 3). In other words, "what we feel" becomes dominant when determining what the truth is (Dahlgren 2018, 20). Dahlgren argues that individuals rely on emotions as shortcuts to select the information that they want to hear so that they can avoid handling "the massive amounts of information that confront them" (26). Kalpokas (2019) also reached a similar conclusion, although from different angles. He agrees that personal experience and emotion play a key role in the creation of the post-truth world. Specifically, individuals cocreate their social world with an emotional connection to their "pre-known interests, wishes, and preconceptions" to maximise their pleasure instead of verifying uninteresting or unrelated information (Kalpokas 2019, 34). Kalpokas calls this process an "affective decision-making process." Involving emotions in the decision-making process is often associated with the concerns on whether rationality is being overridden.

It is not uncommon for scholars to emphasise the dichotomy between emotion and rationality when discussing post-truth. For instance, Jandrić (2018, 106) writes that "Post-truth does not care about truth, because it is emotional. Post-truth is non-predictable, because it is not rational." This type of notion of post-truth assumes that emotion and rationality are mutually exclusive: if an individual is emotionally driven, then this person is irrational and does not care about truth.

Neglect of fact is another common post-truth characteristic discussed by scholars. For example, Lockie (2017, 1) describes that individuals tend to neglect knowledge or scientific evidence when making political judgments in the post-truth era. In their discourse analysis, Farkas and Schou (2020, 61) find that scholars commonly claim that "people have abandoned conventional criteria of evidence and rationality" in the post-truth era. Moreover, due to the increasing neglect of science and evidence, the post-truth trend has been proclaimed as the death of the Enlightenment, commonly considered an era where modernity and science's spirit were born (Kalpokas 2019, 2). Accordingly,

post-truth is no longer only a problem of people disagreeing with each other, but an abandonment of rationality and disconnection from the truth.

However, neglect of fact is a contested notion in the post-truth discussion. In contrast to the literature proclaiming that post-truth is a neglect of the truth, some scholars argue that individuals' search for different versions of truth is a sign that the truth still matters. Indeed, *truth-seeking* is another characteristic that is discussed in scholarly work. For example, Kalpokas (2019, 13) considers the post-truth culture is characterised by an individual choosing the reality that they are willing to live in and believe in. Therefore, using Kalpokas's perspective, one could conclude that in the post-truth era, truth still matters but people are simply choosing different versions of truth based on their affections.

Likewise, Fuller (2018) makes a similar argument but using a different perspective. He suggests that a "'post-truther' does not deny the existence of facts…. [But] simply wishes to dispel the mystery in which the creation and maintenance of facts tend to be shrouded" (19). From a science and technology studies perspective, Fuller (2016) describes the post-truth phenomena as an 'inevitable outcome of greater epistemic democracy' where the epistemic distance between knowledge producers and receivers has been shortened.[1] He argues that since the tools of knowledge production are available and accessible to the general public, "the relatively esoteric and hierarchical basis on which knowledge has traditionally acted as a force for stability and often domination" is removed. In this sense, 'post-truthers', as Fuller terms them, are seeking other truth or knowledge that is not produced by traditional knowledge producers such as scientists, intellectuals, or policymakers.

The post-truth phenomenon can be also connected to the increasing trend of *losing trust in experts*, including policymakers, traditional media, intellectuals, and scientists. These experts used to function as well-established and reliable sources of information (Kavanagh and Rich 2018, 3; Farkas and Schou 2020, 93), but now they are facing "the crisis of trust" and "the loss of authority" (McNair 2018, 51). The lack of confidence in experts translates to a lack of confidence in the knowledge they produce, such as scientific knowledge produced by scientists or scientific research organizations. Kavanagh and Rich (2018, 26) explain that even well-proven and well-established scientific findings are doubted due to "past errors and outcomes or concerns over conflicts of interest." The loss of trust not only results in a rejection of the information and knowledge provided by these experts but also

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[1] Using Machiavelli's metaphor of the fox and the lion, Fuller (2016) suggests that the post-truth phenomenon destroys the social order, where the producer of truth (i.e., the lion) attempts to "create as much moral and epistemic distance as possible from whatever facsimile of the truth the fox might be peddling" and its counterpart (i.e., the fox) is "distorting the facts and appealing to emotion."

drives people to "rely on alternative sources of information and to emotionally charged and value-laden decision-making" (Marshall and Drieschova 2018, 92).

In the discussion of the post-truth phenomenon, the trend of distrusting experts is often connected to concerns about *discrediting experts*. Using the concept of echo chambers, Nguyen (2020, 141) argues that members of echo chambers often discredit all external sources, which is a main cause of the occurrence of post-truth. According to Nguyen, an echo chamber can be seen as an epistemic structure that is created through the manipulation of the individual's trust, and it poses a crucial threat to a healthy epistemic network:

> A healthy epistemic network will supply a steady stream of contrary evidence and counterarguments; thus, no single individual or group will ever go unchallenged…. But when an echo chamber is in place and all outside sources have been effectively discredited, that ceiling disappears categorically. Echo chambers can create runaway credence levels for approved individuals. By removing disconfirmations and discorroboration from the system through the systematic discrediting of outsiders, echo chambers can create exceptionally high – one is tempted to say unnaturally high – levels of trust. (142)

Nguyen demonstrates how the credibility of insiders is increased by discrediting the outsider in the echo chamber, where "the usual arrangements of trust" are broken (151). Accordingly, scientific knowledge or the traditional producers of this knowledge are not trusted, rejected and discredited.

These are the five main characteristics emphasised in the complex discussion of post-truth in the existing literature. Vaccine scepticism is often connected to these characteristics in the literature to provide an example of the post-truth era (e.g., McNair 2018, 24). For example, Kavanagh and Rich (2018, 23) suggest that scepticism surrounding the safety of vaccines is an example of the increasing disagreement concerning facts, data and analysis. Even though no new evidence and data would change the accepted knowledge concerning a widely used vaccine, the vaccine sceptics distrust the science surrounding vaccines (24). Moreover, the negative attitude towards vaccines have been said to be an outcome of the over-exposure to misinformation and fake news in the post-truth era (Lewandowsky, Ecker, and Cook 2017, 355). Indeed, plenty of studies has focused on vaccination sceptics to illustrate how post-truth culture operates. However, few empirical studies have considered the characteristics as they apply to groups with different attitudes.

This chapter has laid out a road map of the literature on the complex discussion surrounding the post-truth concept. Using these post-truth characteristics and the research gap as a background, the next chapter presents the qualitative content analysis method used to identify the prevalence of these characteristics in the public debate surrounding COVID-19 vaccination in Europe.

3. Method and Material

Qualitative Content Analysis

This study employs qualitative content analysis as its methodological approach to identify and categorize the instances of the post-truth phenomenon in the European public sphere by analysing text data from social media. Qualitative research aims to enhance the understanding of the human condition in various contexts and situation (Bengtsson 2016, 8). Content analysis is one of the qualitative methods that that has been commonly used by researchers in social research (e.g., Thoren et al. 2013; Foley et al. 2015; Jong, Dückers, and Velden 2016), in particular for analysing text data (Hsieh and Shannon 2005, 1278). Content analysis can be done using a quantitative or qualitative approach. According to Bengtsson (2016, 10), quantitative content analysis presents the findings in the form of frequencies such as percentages or actual numbers, while qualitative content analysis presents data in the form of words and themes, which allows a subjective interpretation of the results. Qualitative content analysis provides a systematic and objective classification approach to understanding, describing, and identifying themes or patterns of a specific phenomenon (Elo et al. 2014, 1; Hsieh and Shannon 2005, 1278). Three different approaches can be employed in qualitative content analysis to interpret meaning from the content of text data: conventional, directed, or summative (Hsieh and Shannon 2005, 1277). Directed content analysis is a deductive strategy in which predetermined coding categories are determined using the findings of previous research (1281). Since this research has identified five characteristics of post-truth phenomenon based on prior research, a directed qualitative content analysis research method was deemed most appropriate.

Moreover, for qualitative content analysis, it is important to ensure the trustworthiness – including credibility, dependability, conformability, transferability, and authenticity – of the study and results (Bengtsson 2016; Elo et al. 2014). According to Elo et al. (2014), the overall trustworthiness of a content analysis study can be ensured through three main phases in the research process: preparation, organization, and reporting of results. Therefore, the present study followed the steps suggested by Elo et al. (2014) to conduct a directed qualitative content analysis on the comments made by Facebook users on COVID-19 vaccine posts published by the European Union (EU).

Preparation Phase

Data Collection

In the preparation phase, the researcher must choose a data collection method and sampling strategy and select of a suitable unit of analysis (Elo et al. 2014, 3). Selecting an appropriate data collection method to answer the research questions is key to ensuring the trustworthiness of content analysis (3). In this study, data were retrieved from the user-generated comments on COVID-19

vaccine-related posts published on the European Commission (EC)'s Facebook page between December 1, 2020 and January 31, 2021.

Both Facebook and Twitter have dominated much digital public communication. These social media giants do not only offer a widely accessible digital public sphere for public discussion and the exchange of ideas between users but also a platform for engaged citizens to respond to the government's policy. Indeed, the EU often communicates with the public through the social media accounts of the EC on both Twitter and Facebook. However, this study only focuses on examining the user-driven conversations on Facebook. This is mainly because Twitter limits posts to 140 characters, while Facebook allows comments to have 8,000 characters, giving users more space when expressing their opinion and exchanging ideas.

Furthermore, as one of the most popular social media platforms, Facebook has over 2.7 billion monthly active users worldwide in 2020 (Clement 2020). In Europe, about 305 million people use Facebook on a daily basis (Tankovska 2021). Moreover, as of January 2020, the EC had around 1.1 million followers on its Facebook page. This indicates that their posts can potentially reach a significant number of Facebook users. While not all users who engage with EC posts are necessarily citizens of EU countries, this study considers that users who leave comments and engage in targeted post are interested in the EU vaccination debate. During the COVID-19 pandemic, the EC has regularly provided the latest policy updates, developments, and recommendations on its Facebook page. Since this study intends to examine the prevalence of post-truth in the public debate on the COVID-19 vaccination in the European context, the comments on the EC's Facebook page provide rich data to address the research questions.

Data was collected on an ongoing basis from December 2020 to January 2021. Since November 2020, the EC has been providing regular news updates news related to the EU vaccination programme on Facebook, and these have attracted significant public attention and discussion. During the selected period, the EC announced the approval of the COVID-19 vaccines developed by BioNTech and Pfizer on 21 December, Moderna on 6 January, and AstraZeneca on 29 January (European Commission 2021). Therefore, the selected timeframe captures how the public responded to the newly introduced vaccine in the initial stages of the rollout.

This study adopted an iterative data collection approach that involved three stages. In the first stage, posts related to COVID-19 vaccine were retrieved from Facebook on a daily basis; data including publication time and dates, URLs and contents were archived. During the targeted period, 65 posts related to COVID-19 vaccine were published by the EC. Since the Facebook algorithm decides which posts users see when they check their Facebook newsfeed, the reaching rate and numbers of comments on the targeted posts continue to increase as the day passes. In the second stage of the data collection process, targeted posts and comments were retrieved from Facebook in March 2021 by

using the data fetching tool Facepager (Jünger and Keyling 2020). In total, 65 relevant posts with 14,227 comments were archived. The number of comments per post ranged from 35 to 651, with an average of 219. Based on the first two stages of the data collection, a sampling strategy was further developed in the next stage.

Sampling Strategy

In the third stage, a purposive sampling technique was applied for sample selection. Purposive sampling is the most common sampling method in qualitative content analysis (Elo et al. 2014, 4). It is a non-random sampling technique in which researchers make a deliberate decision when selecting the informative samples to use from the targeted population (Etikan, Musa, and Alkassim 2015, 2). There is no agreed sample size in qualitative research; instead, sample size is determined by data saturation (Elo et al. 2014, 4). To ensure the data collection is comprehensible and complete, data saturation was used in the purposive sampling, in which the sampling process continues until no additional information is obtained (Etikan, Musa, and Alkassim 2015, 2; Elo et al. 2014, 4). Due to the aforementioned reasons, purposive sampling was used in this study to select the samples with high relevance and rich information that were best suited to address the research question.

To obtain information-rich data, samples were selected from the popular threaded comments. There are two types of comments on Facebook: *post comments* and *comment replies*. Post comments are direct responses to a post, whereas comment replies are the responses to the post comments. A post comment and its comment replies form a comment thread. Within the data archive, there are 588 comment threads with 4,863 replies in total. All these comment threads consist of more than one comment reply, ranging from 2 to 73 replies. Comment threads with more replies signal that there are active conversations, discussions, and interactions between users.

To purposely select the sample from the most popular comment thread, several steps were applied in the sampling process. First, all comment threads were sorted in descending order based on their total comment replies. Next, to ensure the chronological sequence of the comments was maintained, each comment in the threads was assigned a sequential number starting at 1. Coding the comments in chronological order allowed for a deeper understanding of the conversation flow and dialog context between users in the same comment thread. Then, comments were excluded if they were duplicates, posted by the social media team of the EC, deleted by users or admins in the data collection period, or ambiguous (i.e., having insufficient text for evaluation; Sak et al. 2016). Moreover, inclusion criteria were applied in the sampling strategy: comments had to be (1) directly related to the COVID-19 vaccination and (2) written in English, the main language used by both the EC and its audience for communication on Facebook. The unit of analysis is one comment. Data analysis was conducted in sequential order (i.e., starting from the most popular threaded comments) until no new substantive information was obtained.

Organization Phase

Coding Procedures

In the organization phase, a coding scheme must be developed and researchers must determine how to categorize and interpret the data (Elo et al. 2014, 6). In this study, an initial coding scheme was developed to categorize user-generated comments on social media by following the directed content analysis strategy suggested by Hsieh and Shannon (2005, 1281). First, an initial set of codes with operational definitions was generated from the existing literature on post-truth and vaccination hesitancy discussed in Chapter 2. Next, 53 samples were used in the trial coding phase, where all text that displayed post-truth characteristics were highlighted. Then, all highlighted texts were manually coded using predetermined codes. During the coding process, a deductive category approach was adopted to capture emergent categories (Hsieh and Shannon 2005, 1281). Subsequently, "any text that could not be categorized with the initial coding scheme" was given a new code and the coding scheme was revised for the final analysis (Hsieh and Shannon 2005, 1281).

The coding scheme encompasses four domains: (a) users' attitudes toward vaccination, (b) post-truth characteristics, (c) sub-category of distrust in experts or vaccine-specific issue, and (d) claim of fact. First, to find out whether post-truth tendencies exist in all groups or only in a specific group, all comments were categorized into four groups: positive, negative, neutral, ambiguous or mixed, and not indicated (Tustin et al. 2018, 4). Prior studies on online discussions of vaccination often classify people's stances on vaccination as pro-vaccine or anti-vaccine (e.g., Kata 2010; Sak et al. 2016; Jenkins and Moreno 2020). However, since COVID-19 vaccine sceptics may not necessarily reject other vaccines, this study classified the comments based on users' attitudes: (1) positive attitude if the main message agreed, supported, or accepted vaccination, (2) negative attitude if the main message opposed or criticized vaccination or showed a low intention to vaccinate, (3) neutral, ambiguous or mixed attitude if the central message expressed neither support nor scepticism of vaccination; and (4) not indicated if no stance or attitude on vaccination was expressed.

In the second domain, the codes for post-truth characteristics were developed from the literature on the post-truth phenomenon in Chapter 2. The codes include (1) disagreement about fact and data, (2) personal experience, (3) emotionalization, (4) distrust in experts or vaccine-specific issues, (5) Discredit of experts, and (6) truth-seeking. Furthermore, the additional code (7) attack another fact claim was created during the content analysis process. This refers to comments that put down or contain scathing remarks against another fact claim (Jenkins and Moreno 2020, 237). Since a single comment may contain more than one characteristic, multiple codes may be applied to one comment.

Third, to capture what specific issues or group the user distrusted, comments with the characteristic of distrust in experts or vaccine-specific issues were further categorized based on the

vaccine hesitancy determinants matrix developed by MacDonald and the SAGE Working Group on Vaccine Hesitancy (2015). This matrix outlines the potential factors influencing the decision to vaccinate. Based on the factors identified in the matrix, comments coded as showing a distrust in experts or a vaccine-specific issues were further classified as containing a distrust of the (1) governing body or policy makers, (2) pharmaceutical industry, (3) news media, (4) vaccination policy, and (5) vaccination schedule. Since the matrix does not cover some specific issues or groups that appeared to be distrusted in the samples, three additional codes were created during the coding process: (6) scientific research on COVID-19 vaccine, (7) safety and effectiveness of vaccine, and (8) measure of COVID-19 pandemic. A single comment may display distrust in more than one group and/or issue; therefore, multiple codes may be applied to one comment.

Next, to understand whether facts are no longer important in the post-truth era, an additional category was created to detect whether users made a claim based on "fact." This study does not intend to identify the correctness or validity of a claim but to capture how often people make a fact claim and what kind of supporting evidence they provide. Accordingly, comments were coded as "claim of fact" if they claimed certain facts about the topic (Hara and Sanfilippo 2016); the fact might be presented with or without evidence and the evidence provided might be debatable. With a reference to the coding scheme developed by Tustin et al. (2018), the coded comments were further classified as (1) having a verifiable source if they make a fact claim and provide supporting information from established sources such as news outlets and/or health care providers, (2) having an unverifiable source if the claimed fact is presented with evidence that is not from established sources such as untraceable video or text, or (3) having no source for the evidence presented (i.e., making a claim based on own knowledge). In this domain, codes were mutually exclusive so one code was applied per comment.

Finally, the study compared the frequencies and the percentage of total comments in each category and sub-category across attitude groups to answer the research question. The complete coding scheme, definitions, and examples can be found in the appendix.

Ethical Considerations

When conducting a study using social media platforms, several ethical issues, such as confidentiality, consent, privacy, and potential harm to target participants, need to be addressed (Roth and Unger 2018). The entire data collection in this study was conducted anonymous and any identifying information of the Facebook users was not captured. To ensure the data used in this study were not personally identifiable, this study only collected anonymous data (i.e., textual comments made by Facebook users). No personal data, for example the username or profile picture, were collected. Therefore, the risk of negatively impacting the users is low. Another crucial question is whether informed consent is needed in this research. The comments on the Facebook page are publicly

accessible even without a Facebook account, and only publicly available data collected from Facebook were analysed. Accordingly, the ethical concern is low in this case and informed consent was not necessary in this study.

Analysis Method

Descriptive statistics were used to describe attitudes toward vaccination and post-truth characteristics across different attitude groups. Qualitative data were analysed using ATLAS.ti version 9. Using a qualitative data analysis software program can make "content analysis more manageable and ordered, and may facilitate new levels of analysis" (Gerbic and Stacey 2005, 48). Furthermore, both latent (the underlying meaning of the content) and manifest (components that are directly seen) content was analysed (Graneheim and Lundman 2004, 106). Descriptive statistics were computed using Microsoft Excel 365.

4. Results

Descriptive Analysis

Based on the aforementioned sampling method, a total of 362 comments from 10 comment threads were analysed. Figure 1 illustrates the entire sample selection process. All the comment threads were retrieved from different posts between December 21, 2020 and January 26, 2021 in the data archive. In total, the 10 comment threads contain 525 comment replies. However, 163 replies were excluded, most commonly because they were not relevant to vaccination or lacked information for analysis. The most popular threaded comment has 74 comment replies, while, on average, each comment threads contains 53 comments.

Figure 1. Sample selection process

65 vaccine related posts identified, with 14,227 comments
588 comment threads identified, with 4,863 comments
10 comment threads analysed, with 362 comments (163 comments excluded)
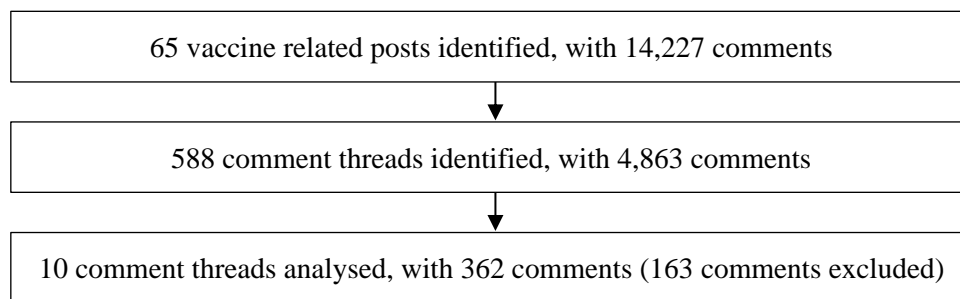
Of the final sample of 362 comments, 36.2 percent explicitly expressed support the COVID-19 vaccine, 34.3 percent criticized or rejected the vaccine, and 17.1 percent were neutral or expressed an ambiguous attitude toward vaccination. The remaining 12.4 percent did not express a preference. Table 1 depicts the summary statistics for the users' attitudes toward vaccination.

Table 1. Attitude toward vaccination

Users' attitude	Number (%) of comments (n = 362)
Positive	131 (36.2)
Negative	124 (34.3)
Neutral, ambiguous or mixed	62 (17.1)
Not indicated	45 (12.4)

Post-Truth Characteristics

Table 2 shows the total frequency of post-truth characteristics in all comments and compares the frequency in each attitude group. Of all comments, disagreement about fact and data was the most common post-truth characteristic (32.6 percent, 118/362), followed by distrust in experts or vaccine-specific issues at 24.6 percent (89/362) and truth-seeking at 22.7 percent (78/362). The two least common characteristics were personal experience (9.7 percent, 35/362) and emotionalization (3.9 percent, 14/362).

Table 2. The frequency of post-truth characteristics in each attitude group

Category of post-truth characteristic	Total number of comments n (%) of 362	Number of comments by users' attitude*			
		Positive n (%) of 131	Negative n (%) of 124	Neutral n (%) of 62	Not indicated n (%) of 45
Disagreement about fact	**118 (32.6)**	**47 (35.9)**	45 (36.3)	11 (17.7)	15 (33.3)
Distrust in experts or vaccine specific issues	**89 (24.6)**	13 (9.9)	**62 (50)**	7 (11.3)	7 (15.6)
Truth-seeking	**78 (22.7)**	11 (9.9)	36 (29.8)	20 (32.3)	12 (26.7)
Discredit of experts	51 (14.1)	0 (0)	46 (37.1)	3 (4.8)	2 (4.4)
Attack another fact claim	44 (12.2)	26 (19.8)	12 (9.7)	2 (3.2)	4 (8.9)
Personal experience	35 (9.7)	12 (9.2)	13 (10.5)	7 (11.3)	3 (6.7)
Emotionalization	14 (3.9)	6 (4.6)	7 (5.6)	1 (1.6)	0 (0)

* Frequency percentages may be greater than 100 percent because the post-truth characteristics were not mutually exclusive and a single comment may include more than one characteristic.

Among the comments that displayed disagreement about fact and data, users often debated the effectiveness and safety of COVID-19 vaccine. For example, several comments showed a varying interpretation of the cause of death in the pandemic:

Comment A: What about old folks in Norway dying from vaccine?????

Comment B: *[referring to comment A]* no, they are dying because they have not had the vaccine!

Comment C: *[referring to comment A]* They had very poor chance of survival with or without covid, yet the vaccine lends them more life.

Comment D: *[referring to comment C]* If they were terminally ill then they needed no vaccine whatsoever. What are the chances for an old man who is agonizing on an asylum bed to be contaminated with Covid if he has no social contacts? And where do you find written in medicine books that the side effect of a vaccine is DEATH?

Furthermore, disagreement not only occurred on the interpretation of fact but also on the COVID-19 data. Commenting on the death rate due to COVID-19, two users disagreed on the data as follows:

Comment E: death rate from covid 1% max 2%

Comment F: *[referring to comment E]* It's around 2.5% and morbidity is up to 10%.

The most frequent post-truth characteristic varied for each attitude group. Of the 124 comments displaying negative attitudes toward vaccines, the most frequent post-truth characteristic was distrust in experts or vaccine-specific issues (50 percent, 62/124), followed by discrediting experts (37.1 percent, 46/124) and disagreement about fact and data (36.3 percent, 45/124). Of the comments displaying a positive attitude toward the vaccine, the most common characteristic was disagreement about fact and data (35.9 percent, 47/131). The second highest post-truth characteristic in the positive

attitude group was attack another fact claim (19.8 percent, 26/131). An example of attacking another comment is

> **Comment G:** Do you speak Norwegian? Do you read Norwegian? Do you know anything about the country beyond the headlines you read? I do. Therefore, I know that your conspiracy conclusions are incorrect. Wildly wrong.

In the samples, the negative comments were more likely to be attacked by the opposite side. The commentators with ambiguous attitudes toward vaccines often emphasized that they were not anti-vaccination when criticizing the safety of the new vaccine. An example is shown below:

> **Comment H:** A vaccine MUST BE safe. When they insist on it ('safe vaccines'), makes me wonder if they are trying to convince me of it. Maybe cause there was not time enough to see the long-term effects, as the word 'long-term' suggests? (and please, don't label me, I'm no negationist or antivaxx, I do trust science and medicine, but all investigation and development processes take their time).

Table 3 presents the distribution of post-truth characteristics identified in the comments sorted by attitude group. The positive attitude group was responsible for a large majority of the comments that attack another fact claim, at 59.1 percent (26/44). Furthermore, it also was responsible for a slightly higher proportion of comments in the category of disagreement about fact and data at 39.8 percent (47/118) when compared to the negative attitude group, which stands at 38.1 percent (45/118).

Table 3. The distribution of attitude group in each post-truth characteristic

Category of post-truth characteristic	Number of comments by users' attitude*			
	Positive	*Negative*	*Neutral*	*Not indicated*
Disagreement about fact *n (%) of 118*	**47 (39.8)**	45 (38.1)	11 (9.3)	15 (12.7)
Distrust in experts or vaccine specific issues *n (%) of 89*	13 (14.6)	**62 (69.7)**	7 (7.9)	7 (7.9)
Truth-seeking *n (%) of 82*	13 (15.9)	**37 (45.1)**	20 (24.4)	12 (14.6)
Discredit of experts *n (%) of 51*	0 (0)	**46 (90.2)**	3 (5.9)	2 (3.9)
Attack another fact claim *n (%) of 44*	**26 (59.1)**	12 (27.3)	2 (4.5)	4 (9.1)
Personal experience *n (%) of 35*	12 (34.3)	13 (37.1)	7 (20)	3 (8.6)
Emotionalization *n (%) of 14*	6 (42.9)	7 (50)	1 (7.1)	0 (0)

*Total percentage may not equal 100 percent due to rounding.

In contrast, the negative attitude group was responsible for a larger proportion of comments in most of the post-truth characteristic categories, including discrediting experts, distrusting in experts, and truth-seeking. While a substantial portion of comments discrediting experts were written by the

negative attitude group (90.2 percent, 46/51), none of them were written by the positive attitude group. The comments displaying negative attitudes towards vaccinations that discredited experts were often related to a pharmaceutical company; one of these comments reads:

> **Comment I:** I'll wait...btw Pfizer has a dark history paying billions on lost suits for their shady medicines. And we won't mention how many approved medicines get recalled after being on the market a short time. Sorry but reality facts and data are not on your side but the side of big pharma. Every. Single. Time.

Furthermore, the negative attitude group showed a large share of truth-seeking characteristics at 45.1 percent (37/82), while the neutral attitude group was the second-highest in this category at 24.4 percent (20/82). The concerns most often voiced in the comments related to the result of the clinical trials, the side effects, and the effectiveness of the COVID-19 vaccine. These information-seeking comments were often addressed to the EC and asked for clarification. The comments from the neutral attitude group, one of which is shown below, illustrate a desire to gain more information on the lethal side effects of the vaccine:

> **Comment J:** European Commission how many people have died so far after taking the vaccine? There's been at least 3 reported, do you have the figures??

Feature of Distrust

As shown in Table 3, a considerable proportion (69.7 percent, 62/89) of the 89 comments that expressed distrust in experts or a vaccine specific issues were written by the negative attitude group; in comparison, 14.6 percent (13/89) of these comments were written by the positive attitude group. Comments containing a distrust feature were further categorized into sub-categories.

Table 4 presents the distribution of each sub-category of distrust in experts or a vaccine-specific issue sorted by attitude group. Of the 89 comments that featured distrust, a large majority expressed distrust of the governing body or policy makers (75.3 percent, 67/89), followed by distrust in the safety and effectiveness of vaccines as well as the vaccination policy, both at 50.6 percent (45/89). Among the comments displaying a distrust in the governing body or policy makers, distrust in the EU's competence when tackling the pandemic and its gatekeeper role of monitoring the safety of the COVD-19 vaccine were recurrent features of the comments. For instance, one comment stated that

> **Comment K:** If the EU handles things it will be done in 2221. People are dying because you useless timewasters are too greedy and too stupid to see this…… Countries should go back and do their own thing. Germany has wasted and burned it's money and wealth for a bunch of useless politicians that were no longer acceptable in their countries and yes Ursula von der Leyen or how we call her Ursula the lier is one of them. The damage you have done is not repairable. The people have learned from the crisis, NO MORE EU.

Table 4. The distribution of attitude group in each sub-category of distrust in experts or vaccine-specific issue

| Sub-category of distrust in experts or vaccine specific issues | Number of comments by users' attitude^ | | | | Percentage of total frequency* (%) |
	Positive	Negative	Neutral	Not indicated	n=89
Governing body or policy makers n (%) of 67	13 (19.4)	42 (62.7)	5 (7.5)	7 (10.4)	**(75.3)**
Pharmaceutical industry n (%) of 25	0 (0)	**23 (92)**	2 (8)	0 (0)	(28.1)
Scientific research on COVID-19 vaccine n (%) of 19	0 (0)	**18 (94.7)**	1 (5.3)	0 (0)	(21.3)
News media n (%) of 2	0 (0)	**2 (100)**	0 (0)	0 (0)	(2.2)
Safety and effectiveness of vaccine n (%) of 45	2 (4.4)	39 (86.7)	3 (6.7)	1 (2.2)	**(50.6)**
Vaccination policy n (%) of 45	6 (13.3)	36 (80)	3 (6.7)	0 (0)	**(50.6)**
Vaccination schedule n (%) of 8	5 (62.5)	2 (25)	1 (12.5)	0 (0)	(9)
Measure of COVID-19 pandemic n (%) of 8	0 (0)	1 (12.5)	3 (37.5)	4 (50)	(5.6)

^ The percentages of users' attitude are across sub-categories and calculated by row.

* Frequency percentages do not equal to 100 percent because sub-categories are not mutually exclusive and a single comment may fall into more than one sub-category of distrust in experts or vaccine-specific issues.

The most striking observation from the above results is that in several sub-categories, a high proportion of comments were written by the negative attitude group, including distrust of the pharmaceutical industry (92 percent), scientific research on the COVID-19 vaccine (94.7 percent), and news media (100 percent). In contrast, none of the comments written by the positive attitude group displayed a distrust toward these categories.

Claim of Fact

Table 5 aggregates the frequency of claim of fact comments and the distribution of sub-category present in each attitude group's comments. Over half of the comments (51.1 percent, 185/362) made a claim of fact. Of the 185 claims, 160 claims (86.5 percent) were made without providing a source for the evidence. While 10.8 percent (20/185) of claims were made using a verifiable source as evidence, the residual 2.7 percent (5/185) were claims with an unverifiable source. Furthermore, both the positive attitude group and negative attitude group accounted for a similar percentage of comments making a fact claim, at 38.9 percent (72/185) and 39.5 percent (73/185) respectively. Compared to the positive attitude group, the negative attitude group was more likely to make a claim using supplemental information, both from a verifiable source (6.5 percent, 12/185) and an unverifiable source (2.2 percent, 4/185), as evidence to support their claims.

Table 5. Claim of fact in each attitude group

Category of claim of fact	Number of comments _n (%) of 362_	Number of comments in sub-category _n (%) of 185_	Number of comments by users' attitude _n (%) of 185_			
			Positive	_Negative_	_Neutral_	_Not indicated_
Claim of fact	**185 (51.1)**		**72 (38.9)**	**73 (39.5)**	22 (11.9)	18 (9.7)
With verifiable source		20 (10.8)	5 (2.7)	**12 (6.5)**	1 (0.5)	2 (1.1)
With unverifiable source		5 (2.7)	1 (0.5)	**4 (2.2)**	0 (0)	0 (0)
Without source of evidence		160 (86.5)	66 (35.7)	57 (30.8)	21 (11.4)	16 (8.6)

Overall, the results presented in this chapter provide several insights needed to answer the research question of this thesis concerning the prevalence of post-truth characteristics in the COVID-19 vaccine debate. First, these results show that groups with varying attitudes toward vaccination display most of the post-truth characteristics described in the existing literature, however, the occurrences of post-truth characteristics varied according to the different attitude groups. Second, disagreement about fact and data, distrusting in experts or vaccine specific issues, and truth-seeking are the three most common post-truth characteristics. Third, personal experience and emotionalization appeared infrequently in the samples. Fourth, the comments with distrust features most commonly show a distrust of the governing body or policy makers. Lastly, over half of the comments consist of a claim of fact in which most of the claims are made without a source for the evidence. The next chapter moves on to discuss these findings.

5. Discussion

This thesis addresses the research questions "What kind of post-truth characteristics can be identified in the vaccination debate in Europe?" and "What post-truth characteristics do the different attitude groups display when discussing vaccines?" Although the post-truth phenomenon has been discussed in the prior literature, it remains empirically underdetermined. To my knowledge, this is the first study to report on the prevalence of post-truth characteristics observed in a public online setting. A major contribution of this study is that it has articulated the characteristics of post-truth based on the literature, where five major post-truth characteristics were identified: (i) disagreement about fact, (ii) personal experience and emotion, (iii) neglect of fact, (iv) truth-seeking, and (v) discredit of and distrust in experts.

Overall, most of the post-truth characteristics described in the existing literature can be detected in the samples, yet their prevalence was varied. Furthermore, when examining the post-truth characteristics in each attitude group separately, there were several differences between the groups. One of the unexpected results is that all attitude groups showed a certain extent of post-truth characteristics. These results may alter the prior findings in post-truth studies and suggest that the group of people who are influenced by the post-truth culture is wider than anticipated.

Prevalence of Post-truth Characteristics

Disagreement about fact and data

This study finds that the most common post-truth characteristic is disagreement about fact and data, which accounts for one-third of the comments. A prior study proposed that there was an increasing disagreement over facts and the interpretation of facts and data among the public (Kavanagh and Rich 2018, 25). This is consistent with the present study but with a nuance. In the samples, it appears that there is a strong presence of disagreement among users, mostly concerning the interpretation of fact rather than the objective fact. For example, users argued about the death of a patient but interpreted the cause of death differently. Some attributed the death to the virus while others stated it was due to vaccination. Contentious debate over the interpretation of fact often leads to stalemate.

As Kavanagh and Rich (2018, 25) point out, interpretations can be made based on either highly uncertain or more well-established fact and scientific data. However, in the context of the COVID-19 pandemic, the facts and scientific data presented falls somewhat in between. On the one hand, the facts and data surrounding human vaccines are well-established and have been widely accepted since the mass smallpox immunisation of the 19th century (Lombard, Pastoret, and Moulin 2007, 31). However, the information, facts, or data on the coronavirus and related issues such as

treatment and vaccines have been rapidly developing during the pandemic. The ongoing pandemic has created significant uncertainty which may intensify the disagreement among the public on how to interpret the facts and data surrounding the new vaccine.

Apart from the uncertainty that emerged due to this pandemic, another explanation for the disagreements surrounding the facts is that both opponents and proponents of vaccination think the claims presented by the opposite side are unscientific or invalid. The present study found that over half of the comments consist of a claim of fact, in which 86.5 percent of the claims were made without a source for the evidence. This also accords with a previous study by Tustin et al. (2018) in which a content analysis was conducted on the comments made by Canadian parents on an advertisement related to immunization. Tustin et al. (2018, 7) report that 88 percent of their samples were comments without other sources of reference. In the present study, the data also indicates that only a small portion of users include verifiable sources as evidence to support their claims. These findings imply that most of the users tend to solely present their claims rather than providing strong evidence to persuade the opposite side. A possible explanation for the lack of supportive evidence in a claim can be found in a recent study on vaccination discussions on social media. In their content analysis of comments on parenting blogs, Jenkins and Moreno (2020, 239) find that both opponents and proponents of vaccination often use a scientifically driven approach when making claims online. Since each group uses their own scientifically grounded claim of facts, the opposite viewpoints are often dismissed or neglected (239). This may also explain the high proportion of disagreement over the interpretation of fact between groups.

Attacking, Emotionalization and Personal Experience

The disagreement surrounding facts and data also leads to fighting between groups. This study finds that the positive attitude group disproportionately attacked the opposition's claims. This implies that if an opponent of the vaccine criticises vaccination, they are more likely to be attacked in an online discussion. This result is in accordance with a prior study which has shown that proponents of vaccination frequently attack critics (Jenkins and Moreno 2020, 239). In the samples of the present study, users who had a neutral stance toward the new vaccine occasionally worried about being labelled anti-vaxxers when they presented their viewpoints. It is possible that if users emphasise that they are not anti-vaxxers or anti-science, they may be able to avoid being attacked by other users. These avoidance behaviours should be interpreted together with other post-truth characteristics examined in this study, including the abovementioned high prevalence of fact-making claims as well as the low frequency of emotionalization and discussion of personal experience.

Existing literature on the post-truth phenomenon suggests that emotional appeal and personal experience outweigh the influence of facts in a decision-making process (Kavanagh and Rich 2018, 86; Kalpokas 2019, 2). Opponents of vaccination are often associated with spreading false information

or being excessively emotional and irrational (Faasse, Chatman, and Martin 2016, 5811; Tustin et al. 2018, 7). One may assume that comments expressing a negative attitude toward vaccines would be more emotional and use more personal stories to support their claims (Kata 2010, 1714). Surprisingly, in contrast to the findings in the literature about post-truth, this study shows that personal experience and emotionalization appeared infrequently in the samples, which implies that users tend to not include personal stories or do not appear to be emotionally driven when they discuss vaccination with the others. Similar findings have also been reported by previous research focusing on the use of argument rhetoric in the vaccine discussion. Instead of being emotionally driven, the arguments from both opponents and proponents of vaccination often appear to be based on evidence and fact (Faasse, Chatman, and Martin 2016, 5811).

The simplest explanation for the low frequency of emotional appeal and use of personal experience is that users seldom become emotional or use personal stories when they participate in vaccine discussions. However, another possible explanation is that users want to avoid appearing emotional and attempt to be more factual when making claims. This may also explain why users tend to avoid being associated with anti-vaxxers or an anti-science stance. Accordingly, they may avoid emotionality and display rationality to reduce the chance of being attacked by the opposite group.

However, one should note that this study only captures that personal experiences and emotionalization are rarely used by different attitude groups when discussing the vaccine. This result does not imply that emotions and personal experience do not play a role in the decision-making or information-selection processes.

Truth-seeking and Distrust

Another interesting finding of this analysis is that the negative attitude group contributes a larger proportion of comment not only in the category of truth-seeking but also in that of distrust in experts when compared to the other group. Prior literature often differs in whether truth is still important in the so-called post-truth era. While some academics state that people tend to neglect fact and data and no longer consider the truth to be important (e.g., Hyvönen 2018, 121; Legg 2018, 43), some argue that truth still matters (e.g., Kalpokas 2019). This study finds that truth-seeking is the third-most common characteristic of the samples, which implies that users have a strong desire to know the truth. Particularly, a truth-seeking tendency was notable in the comments made by the negative attitude group. The findings are in line with previous findings that vaccine sceptics tend to search for validated sources and evaluate the validity of the opposite side's argument (Jenkins and Moreno 2020, 239). In the current study, the negative attitude group often shows a strong desire to know the scientific support for the new vaccine or criticizes the scientific finding's validity and asks for clarification about the trial results.

However, multiple studies have reported that the opponents of vaccines often lack confidence in experts, including pharmaceutical companies, the government and the health system (Kata 2010, 1715; Tustin et al. 2018, 7). Consistent with the literature, this study also finds that the negative comments that display distrust most commonly show a lack of confidence in the governing body or policy makers. For example, in the present study's sample, the competence of the EU is often criticized in the negative comments.

These results show that the negative attitude group significantly displays both truth-seeking and distrust in the governing body characteristics. A potential explanation is that people who tend to distrust in experts are more likely to seek the truth. During the pandemic, governing bodies, for example the EU, have become one of the main sources of vaccine information. Through Facebook, they inform the public about the latest vaccine-related information and policies such as the approval of vaccines. If the governing body is distrusted by people, the distrust may be extended to the information that they provide. As Kavanagh and Rich propose (2018, 26), people may be critical of facts, data, and the bodies providing this information due to "risk aversion," meaning that people worry about the potential dangers of the vaccine when faced with the uncertainty surrounding its rollout. Together with the lack of confidence in the information given by the governing body, this uncertainty may motivate the negative attitude group to ask for more "truthful" information.

Unexpected Result

An unexpected result of this study is that all attitude groups display post-truth characteristics. Previous studies have not fully explored whether different attitude groups discussing vaccines show signs of post-truth culture. Vaccination sceptics are often assumed to strongly present post-truth characteristics – according to the results of this study, this assumption is partially correct. While most of the post-truth characteristics are displayed by the negative attitude groups, the other attitude groups also possess characteristics such as disagreement about fact, distrusting experts, and truth-seeking. These findings suggest that individuals who possess these post-truth characteristics may not be limited to the opponents of vaccination but also those with different attitudes toward vaccines. It implies that the three most common post-truth characteristics (i.e., disagreement over fact, distrust in experts, and truth-seeking) might also exist in other types of vaccination debates. Therefore, public health authorities might take these aspects into account when designing future vaccination campaigns.

Rethinking Post-truth

Prior studies on post-truth have argued about whether the truth still matters. While some scholars find that individuals tend to neglect knowledge or scientific evidence under the influence of the post-truth culture (Lockie 2017, 1), others argue that individuals still think the truth is important

(Kalpokas 2019, 2). The strong presence of disagreement about fact and claims of fact in both positive and negative attitude groups provides some insights on this debate in the post-truth literature. In this study, on the one hand, users tend to make claims of fact that appear to be based on evidence and fact. On the other hand, they show a strong disagreement over these claims of fact. Two totally different implications can be drawn from this. First, it may imply that users do not abandon evidence, fact, or science and truth still matters because users attempt to make claims with a scientifically driven approach.

However, the second implication could be that the truth does not matter because users only care about their own version of the truth: "my claim is fact-based, yours is not." This implication is more significant than the previous one because it indicates that both positive and negative attitude groups only stay in their *truth bubble*, as I would call it. In the truth bubble, truth is important, but it is only limited to the truth that one believes in. The "truth" outside the bubble is not deemed to be the truth, and, as a result, it is difficult to counter the polarization between bubbles. Accordingly, the truth bubble represents a status in between the "truth still matters" and the "truth does not matter." Disagreement about the truth is created among the bubble and the citizens inside. In this sense, this interpretation offers a new perspective to understand the post-truth phenomenon, where those post-truth characteristics can be considered as a manifestation of people being in their truth bubble.

This study set to understand the post-truth phenomenon during the roll-out of the COVID-19 vaccine in Europe. One could argue that the prevalence of post-truth characteristics could vary across context, time, and place. However, if one considers that these characteristics are the outcomes of the truth bubbles, instead of the drivers, then similar results could be expected in the other vaccine-related debates or polarized topics such as climate change or partisan voting. Indeed, the truth bubbles pose challenges relating to how to deal with discrepant attitudes toward the vaccine in the time of a public health emergency. At the same time, it is also important that citizens take the chance to rethink how they formulate their own truth.

Limitations

The present study has some limitations. First, the qualitative content analysis was independently conducted by one researcher, which may limit the trustworthiness of the study. Existing literature recommends employing at least two or more researchers to individually code a set of sample data to assure the reliability of qualitative content analysis (Elo et al. 2014, 5). During the coding scheme development, having two researchers could resolve discrepancies through discussion and repeating the coding until a high intercoder reliability level is reached (e.g., a reliability coefficient of .60 or .80 for Cohen's kappa; Given 2008; Stemler 2019). The advantage of using this double code approach is to reduce the risk of over-interpretation of the data of an independent researcher (Elo et al.

2014, 5). As a result, the trustworthiness and reliability of the qualitative content analysis research could be established.

However, since this thesis is an individual research project, only one researcher coded the data and there was no intercoder agreement. This limitation may affect the classification of post-truth characteristics in the samples. For example, the researcher's subjective interpretation of the content may influence the outcome of the categorisation of a sample. As a result, the validity of these findings is limited.

Second, the results of this study may not be generalizable to a larger population because there are several limitations. The samples of this study were drawn from the popular comment threads that contained large volumes of user-generated comments. It was not uncommon that only few engaged users actively debated an issue under the same comment threads. Since the unit of analysis of this study was a comment, some comments in the sample may have been from the same user. Accordingly, this may lower the validity of the sample size. This limitation is also reported in a prior content analysis study of online discussion. For example, Tustin et al. (2018, 9) indicate that the same individual may have multiple accounts under different usernames. This means that it is difficult to verify if a comment is posted by a different or the same individual. This limitation seems unavoidable in online comments' content analysis, since the comments analysed might only be from a few engaged users. The samples used in this study thus cannot be generalised to the whole population. Furthermore, the present study only focuses on the users who post comments on Facebook posts. These users represent a part of the population that is engaged in discussions on vaccination, is willing to participate in online discussion and is more likely to do their own research on vaccination. There may be important differences between engaged citizens and those who are not engaged in online discussions. Therefore, the sampling strategy may affect the generalisability of the study.

Finally, this qualitative study is unable to draw causal conclusions. The scope of this descriptive research is limited to giving an overall sense of the determinants of the post-truth phenomenon. Investigating the causality of each characteristic is beyond the scope of this thesis. This study suggests that there is some association between characteristics such as emotional appeal and the attack of opposing claims or truth-seeking and distrust in experts. However, no conclusion can be drawn on their causal relationship.

Further Research

Based on the abovementioned limitations, some future research directions are proposed. The results suggest there is some association among different post-truth characteristics and lay the groundwork for future study. Further research should be undertaken to investigate the causal relationship between several post-truth characteristics. First, the causal relationship between emotion,

personal experience, and disagreement about fact and data should be further examined. Specifically, more attention should be paid to the role of sharing personal stories or using emotional appeals in the communication process: does this bring people to disagree about fact and data? Furthermore, this study posits that people may avoid using emotional appeals or personal experience in vaccine discussions. Such avoidance could potentially impact the emergence of the post-truth phenomenon. Therefore, more research should be undertaken to understand whether people avoid using emotional appeals or personal experiences when discussing polarized topics.

This study also proposes that there is a potential association between truth-seeking and distrust in governing bodies and policy making. However, it did not investigate whether people only distrust the institutions or the information that they provide. Therefore, more research in this area is needed. Moreover, the present study only further classifies the distrust sample into different sub-categories. Future studies on post-truth characteristics can be expanded to examine the characteristics in more detail. Sub-categories of each post-truth characteristic should be created to give a fuller understanding of the phenomenon. For example, the category of disagreement about fact and data could be further classified into dispute of objective fact or interpretation of fact.

Furthermore, this study offers a preliminary framework for assessing characteristics of the post-truth phenomenon. The post-truth phenomenon could be context specific, and its characteristics may therefore be varied. Future research could use this preliminary framework to replicate this study in different contexts so as to enhance the understanding of the post-truth phenomenon. For example, the results could be analysed and compared in relation to other types of vaccination debates (e.g., paediatric vaccination), other polarized topics (e.g., climate change and migration issues), or other types of crises (e.g., disaster crises). Furthermore, future research could also focus on public discussion settings other than Facebook. For instance, the prevalence of post-truth characteristics could be evaluated in in-person group discussions. Lastly, this study does not cover all important events or other stages of the implementation of the COVID-19 vaccine. Thus, a further study could focus on different periods of controversy so as to reveal the longitudinal patterns of post-truth characteristics over time.

Conclusions

This thesis set out to examine the prevalence of post-truth characteristics in everyday public activities. Analysing the online debate surrounding the COVID-19 vaccine in Europe, this thesis makes three important contributions to the growing body of theory and empirical analysis in post-truth studies. First, by synthesising the post-truth characteristics described in the existing literature, this thesis has developed a conceptual framework that can be used to analyse the phenomenon. Five major characteristics were identified: (i) disagreement about fact, (ii) personal experience and emotion, (iii)

neglect of fact, (iv) truth-seeking, and (v) discredit of and distrust in experts. Second, the content analysis is the first to examine these characteristics in detail in empirical settings. The descriptive data of the user-generated comments shed light on the presence of post-truth characteristics in the COVID-19 discussion among different attitude groups in Europe. Third, this study outlines some potential association between the post-truth characteristics that should be tested in future analytical studies.

This thesis enriches previous understandings of the post-truth phenomenon in an empirical manner. Prior studies on post-truth have mostly focused on explaining the impact and occurrence of the post-truth culture, while few empirical studies have been done to identify the prevalence of the post-truth culture in everyday public activities. This thesis shows that most of the post-truth characteristics can be found in all groups with differing attitudes toward vaccines. This result fills the gap left by previous studies that only focused on studying vaccination sceptics in the context of post-truth.

In addition, the results show that personal experience and emotion are not significantly prevalent in the comments that display a negative attitude toward vaccines, which counters previous understandings of the post-truth culture. Furthermore, a strong presence of disagreement about fact and claims of fact among all attitude groups may mean that truth bubbles create discrepancies of truth and polarization among citizens. Overall, the results of the qualitative content analysis lay the groundwork for a more complete research study in the future that would lead to a better understanding of the post-truth phenomenon.

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Appendix : Coding Scheme of Content Analysis

Samples: open-ended comments posted by Facebook users on COVID-19 related posts on the page of the European Commission from December 2020 to January 2021

Category	Code	Definition	Example
Attitude toward vaccination	Positive	Agreeing, supporting, or accepting the need for vaccination, such as describing the benefits or safety of vaccination, promoting vaccinations, describing the risks of not vaccinating or the low risk of vaccinating (Tustin et al. 2018, 4).	*The vaccines stop you getting it so severe that you end up in hospital and hopefully not on a ventilator, you still have to be careful for a time, but hopefully vaccines will slow all the deaths.*
	Negative	Disagreeing or criticizing the need for vaccination, such as emphasizing the risk of vaccination, opposing vaccination, making allegations of or promoting distrust in a vaccine-specific issue or showing a low intention to vaccinate (Tustin et al. 2018, 4).	*Blind obsession with 5 ml of pharmaceutical brew is very middle ages.*
	Neutral, ambiguous or mixed	Expressing that they are neither anti- or pro-vaccine; alternatively, providing both anti- and pro- vaccine arguments (Jenkins and Moreno 2020, 235).	*A vaccine MUST BE safe. When they insist on it ('safe vaccines'), makes me wonder if they are trying to convince me of it (and please, don't label me, I'm no negationist or antivaxx, I do trust science and medicine, but all investigation and development processes take their time).*
	Not indicated	Not expressing any specific stance or attitude on vaccination	*Why? What is it that you think will happen?*
Post-truth characteristic	Disagreement about fact	Disagreeing with or disputing fact, data, evidence or information related to vaccination; and/or presenting different versions of fact, data, evidence or information.	*You don't even get the fact straight on the vaccination passport! Geez, woman, get some facts straight. Educate yourself about the whole process of testing medication, please. What you are doing here is absolutely horrifying misinformation.*
	Personal experience	Presenting individual experiences, anecdotes, or stories in the context of vaccination. These are something a person has directly encountered or lived through which might be facts but are not generalizable (Kavanagh and Rich 2018).	*So, for those us who remain stranded in a foreign country, some now illegal aliens, I can't see how we're ever going to get the vaccine.*

Category	Code	Definition	Example
	Emotionalization (Jenkins and Moreno 2020)	Strongly displaying of feelings related to the impact of vaccination, often concerning death, disease, and vulnerability. (Jenkins and Moreno 2020).	*Have you seen convulsions, and have you heard babies screaming after shots? Because their brain gets swollen. No? You are blessed you did not.*
	Distrust in experts or vaccine specific issues (Farkas and Schou 2020, 93)	Containing scathing remarks expressing a lack of trust or confidence in experts (e.g., scientists, journalists, or politicians) and/or in vaccine-related issues such as vaccine policies or vaccination schedule	*European Commission UK steals the EU vaccines and you DO NOTHING. How many people will die from your incompetence?*
	Discredit of experts (Nguyen 2020)	Harming or downgrading the reputation of experts, including scientists, journalists, or politicians.	*There is no legal defense against another version that is not the official version sold to the pharmafia companies and the oligarchies, as happened with the bird flu. They are totalitarian and hegemonic acts against human rights, as happened in the Second World War.*
	Truth-seeking (Kalpokas 2019)	Yearning for truth, fact, data, and evidence (no matter which versions of the information they yearn for) and/or asking for clarification of ambiguous information or content.	*What would happen to those people that don't want to get vaccinated? Will we be allowed to travel inside/outside Europe?* *But was it not so that also vaccinated people can still transmit?*
	Attack another fact claim	Containing scathing remarks against an opposite fact claim such as using a negative or aggressive tone to call it wrong; putting down another fact claim using exaggerated or hateful descriptions of the implications of another fact claim (Jenkins and Moreno 2020).	*Do you speak Norwegian? Do you read Norwegian? Do you know anything about the country beyond the headlines you read? I do. Therefore, I know that your conspiracy conclusions are incorrect. Wildly wrong.*
Sub-category of distrust in experts or vaccine specific issues	Governing body or policy makers	Expressing a lack of confidence in the competence of a governing body, vaccination policy makers and/or gatekeepers (e.g., the EU, World Health Organization, national government).	*I'm sure in the struggle with AstraZeneca it will come out as well, that it was the EU Commission herself who screwed it once again. Keeping everything hidden, even to the EU Parliament speaks volumes……An apprentice could have done better!*
	Pharmaceutical industry	Expressing a lack of confidence in the vaccine manufacturer who is responsible for research, development, production, and distribution of the vaccine.	*Why biontech-pfizer doesn't take responsibility for the side effects of the vaccine. Is European union ready to take responsibility if the vaccine causes problem to people.*

Category	Code	Definition	Example
	News media	Expressing a lack of confidence in traditional news media outlets, including established newspapers, television, or radio.	*A mainstream media that can think and understand for us. So when the media and the science is controlled through a bottleneck - the mainstream medias - that has the same owners as the big pharma.. is it not hard to understand how science is controlled. ??*
	Vaccination policy	Expressing a lack of confidence in the COVID-19 vaccination policy.	*I am not an anti-vaccination but am against vaccination passport/certificate for intra-EU travel.*
	Vaccination schedule	Expressing a lack of confidence in the vaccination schedule.	*It is a never ending story! The virus has started to mutate! A new vaccine will be needed. We have been framed for a few solid years.*
	Scientific research on COVID-19 vaccine	Expressing a lack of confidence in current scientific research about the COVID-19 vaccine.	*...now they consider to force us to take this experimental vaccine, even if we are terrified of the possible side effects. It has NOT gone through 10 year testing programs, like the normal vaccines. Nobody knows the long term effects. This mRNA technology for vaccines have never been tested before. They don't know if you still can carry the virus as vaccinated, and infect other people or not...*
	Safety and effectiveness of vaccine	Expressing a lack of confidence in the safety and effectiveness of the COVID-19 vaccine.	*Yet the manufacturers demanded total indemnity from any vaccine damage that may occur. That doesn't inspire any confidence at all. If the vaccine is so safe as you claim make the pharma corporations stand over it.*
	Measure of COVID-19 pandemic	Expressing a lack of confidence in the preventive measure and/or restrictions imposed due to the COVID-19 pandemic.	*If ANY of these worked, then the pandemic would've already ended. Instead we hear about the third wave and new mutations. So what are all those restrictions for...?*
Additional category	Claim of fact	Claiming facts about the topic (Hara and Sanfilippo 2016); the fact might be presented with or without evidence, and the evidence provided might be debatable.	*...firstly corona don't take like 30-50% of the whole people infected, as did Black death. Secondly, viruses and contagion can not be controlled on who spreads and how successful it gets, like it did not with Black death.*
Sub-category of claim of fact	With verifiable source	Making a claim of fact with supporting information from established sources such as news outlets and/or health care providers (Tustin et al. 2018).	*It's around 2.5% and morbidity is up to 10%. https://coronavirus.jhu.edu/data/mortality*

Category	Code	Definition	Example
	With unverifiable source	Making a claim of fact with supporting information that is not from established sources such as news outlets and/or health care providers (Tustin et al. 2018).	*"Moderna was started as a chemotherapy company for cancer, not a vaccine manufacturer for SARSCOV2." - Dr. David Martin, Jan 5th 2021.*
	Without source of evidence	Making a claim of fact or providing information without a source of evidence and based on one's knowledge or research for particular positions articulated within the discussion (Tustin et al. 2018).	*In the longer term if the virus is not dealt with on a timely manner it could either become a less strong re occurring virus like a flu or cold, or it could become more deadly and vaccine resistant.*