



Utrecht University

The anti-vaccination discourse on Twitter

Insight into what role in-group favouritism and out-group degrading play among the anti-vaccination discourse

Course: Master's Project Social Policy and Public Health
Course code: Thesis on Existing Data (201800155)
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Date: 28-06-2021
Wordcount: 7849

Abstract

Background: By providing insight into the different types of arguments used by anti-vaccination proponents on Twitter, this study aims to contribute towards the development of an effective method that also considers the anti-vaccination discourse. Insights from the Social Identity Theory and the Identity Based Motivation Theory were used as theoretical lenses to understand the role of in-group favouritism and out-group degrading within the anti-vaccination discourse.

Methods: The analysis of this research was based on an iterative process. A total of 2000 tweets were randomly selected out of 85000 tweets for further manual coding. Once the 2000 tweets were categorised and analysed for content, all the anti-tweets were selected for further analysis. This subset contained 58 tweets which were categorised under eleven different content codes.

Results: This study showed that the in-group members, who refer to those against vaccinations will degrade the out-group members as a way of enhancing the in-group. Almost half of all anti-tweets contained out-group degrading (48%). In addition to this the in-group favours their group-members and regard their in-group highly. However, they are not present in large numbers (19%). This study also showed that different types of arguments are used by anti-vaccination proponents and there are differences in the type of arguments and the use of in-group favouritism and out-group degrading.

Conclusions: Only a small body of work has examined whether Social Identity Theory and the Identity Based Motivation Theory are implicated in anti-vaccination tweets on Twitter and to what extent they play a role. Therefore, it is extremely important to conduct further research to develop an effective method that incorporates the anti-vaccination discourse.

Keywords: Twitter, In-group favouritism, Out-group degrading, Content codes, Anti-vaccination discourse

Introduction

Vaccinations are one of the most important measures of preventive medicine to protect the population from diseases and infections (Hussain et al., 2018). The Dutch government aims to protect children from the effects of the infectious diseases in the best and most reliable way. Cervical cancer, mumps, diphtheria, hepatitis B, HIB diseases, whooping cough, measles, meningococcus ACWY, pneumococcus, polio, rubella, and tetanus are the 12 infectious diseases that children are vaccinated against and that are part of the National Vaccination Programme, which has been in place since 1957. Children are vaccinated at the age of 0 to 14 months and when they reach the age of 4 and 9. Girls are also vaccinated in the year they turn 13 against cervical cancer (World Health Organization, 2018).

Nowadays infectious diseases are rare in the Netherlands. Nevertheless, vaccinating children remains very important. Some infectious diseases can lead to serious consequences, such as death (RIVM, 2021). Group immunity is needed to reduce the risk of spreading for many infectious diseases, because children who have not been vaccinated (yet) are then at less risk of contracting the infectious diseases. They are, as it were, protected by the group of vaccinated children (RIVM, 2021). In order to create and maintain this group immunity, it is important that as many children as possible are vaccinated (RIVM, 2021). The importance of vaccination is therefore not only at individual level but also at group level. To illustrate the importance of group immunity, figures from a recent measles outbreak are described.

Measles is one of the most contagious diseases and can spread if more than 5% of the people are not immune (RIVM, 2014). Under-vaccinated areas, such as the Bible Belt had to deal with a measles epidemic from May 2013 to March 2014. An estimated 30.000 people were infected, 180 of whom were hospitalised, and one child died from the complications of measles. The measles vaccination coverage was below the 90% at the time. The impact of a low vaccination coverage is mainly linked to the fact that many people in this region belong to the Reformed denomination, they do not get vaccinated for religious reasons (RIVM, 2014).

Besides the group that does not vaccinate for religious reasons, there has been a recent rise in anti-vaccination sentiments surrounding beliefs that vaccines cause more harm than benefits to the health of the children who receive them (Hussain et.al., 2018). There is currently no simple strategy that can address all of the barriers to become pro vaccinations. In order to prevent other major outbreaks in the future, it is important to first investigate this group in more detail.

In the Netherlands, there are the websites of VaccinVrij, the Dutch Association for Critical Vaccination and the Vaccination Council where vaccinations are described as dangerous (Rijksvaccinatieprogramma, 2020). Much of the information on these websites is not based on scientific findings. In addition to these websites, there are many other social media platforms where everyone can share their unsubstantiated arguments (Bean, 2011). Online spaces like Twitter, is a

popular medium where people can put unsubstantiated information online. Social media fosters online space to strengthen and popularise anti-vaccination discourses. Many scholars identify the internet and social media as important vectors for the spread of information questioning vaccines, citing webpages (Guess et al., 2020).

These proponents of the anti-vaccination movement share a strong sense of in-group identity (Attwell & Smith, 2017). With members from the in-group who develop favourable biases and beliefs of their in-group. Which can lead to certain behaviour in which people may engage with the proponents of the anti-vaccination movement, not based on their behaviour or personal opinion, but rather because it is viewed favourable (Oyserman et al., 2007).

To reduce the likelihood of large outbreak, a high vaccination rate is needed. It is therefore important to gain insight into the vaccination discourse of the anti-vaccination proponents on Twitter. By providing insight into the different types of arguments used by anti-vaccination proponents, this study aims to contribute some insights towards the development of an effective method that also considers the anti-vaccination discourse.

Theoretical Framework

Research has shown that people exposed to anti-vaccination information showed less intention to vaccinate (Jolley & Douglas, 2014). This finding points out the potential role of the anti-vaccination discourse on Twitter in shaping the health-related behaviour. Many interventions are based on the science that anti-vaxxers lack the ability to access or understand evidence. However, research has shown that interventions focussing on providing evidence and refuting vaccine-related myths have proven to be non-productive (Hornsey et al., 2018). Hornsey and colleagues conducted a research with more than 5,000 participants, in 24 countries, and measured their anti-vaccination attitude. Results show that there is a psychological root that may motivate and sustain anti-vaxxers. This could explain why repetition of evidence can be non-productive and they suggest communication solutions to that problem. Research has shown that anti-vaxxers spend a relatively large amount of time seeking information on the internet about vaccinations (Jones et al., 2012). Information about vaccinations, which shapes people's attitude towards this subject. Research has shown that people are then motivated to search for further information to support their attitude (Slovic et al., 2004).

In research by Kata (2010) possible arguments were outlined that are used on anti-vaccination websites. Kata analysed the arguments that are being presented on the internet around the themes of safety and effectiveness, alternative medicine, civil liberties, conspiracy theories, morality, and misinformation (Kata, 2010). In line with the study by Hornsey et al., (2018) this study also showed that counteracting misinformation – which is the most commonly proposed method – has proven to be ineffective. This method doesn't consider the anti-vaccination discourse, who for instance, reject scientific “facts” in favour of their own interpretations (Kata, 2010). Research has shown that the

anti-vaccination beliefs are distinguished from other forms of beliefs, which can be categorized into two groups.

Other scholars have identified that decisions around vaccination are not purely individual ones but can be seen as social ones. Social context matters greatly in making this decision, and so does their understanding within the broader society (Sobo, 2016). Applying these insights to anti-vaxxers, results made it clear that parents boost their own sense of identity and self-belief by a discourse that projects the people who vaccinate as 'The Unhealthy Other'. Another study showed that anti-vaxxers, which in this study refer to vaccine rejecting parents, have the perception that their caregiving practices are superior to those of others. Which explains that us-against-them thinking is a powerful driver of human behaviour (Tajfel, 1974). In addition, there are anti-vaxxers who believe that vaccinations are profit driven, developmentally inappropriate or even toxic (Sobo, 2015).

Sobo (2016) explains the following: 'opting out' of vaccination may be first and foremost an act of 'opting in' to a particular community (Sobo, 2016). Research has shown that anti-vaxxers see themselves as part of a healthy, enlightened group, and offer a theoretical basis for how this may reinforce their decisions not to vaccinate (Attwell et al., 2018). This 'theoretical base' could lead to people opting into this community, not because of their behaviour or personal opinion, but rather because it is viewed favourable (Oyserman et al., 2007).

In sum, the psychological perspectives to what extent this could lead to barriers to uptake vaccinations has been researched. However, there is only a small body of work that has examined whether these insights are implicated in the anti-vaccination discourse on Twitter and to what extent they play a role.

By providing insight into arguments used in the anti-vaccination discourse, this study aims to contribute towards some insights in the development of an effective method that also considers the anti-vaccination discourse.

Social Identity Theory

When applying core concepts of the SIT theory to this study, the in- group refers to the people on Twitter who reject vaccinations and who try to persuade others not to vaccinate (sometimes referred to as 'anti-vax' activist) (Attwell & Smith, 2017). The out groups refers to those who are pro vaccinations, also referred to as the vaccinating mainstream (Attwell et al., 2018). Distinguishing anti-vaccination beliefs from other forms of beliefs, can be categorized into two groups, matching the Social Identity Theory (SIT). A theory with a strong focus on how the social context affects intergroup relations. In addition, the mere process of making salient 'us and them' distinctions changes the way people see each other (Hornsey, 2008). These in- and out-groups become psychologically real in comparison to other groups. These so-called group members are motivated to achieve or maintain a positive distinctiveness between their own group and relevant outgroups.

Central to SIT is the individual drive for self-esteem. By associating themselves with highly valued groups, individuals enhance their own self-esteem. Which in turn motivates them to regard their own in-group highly and favour other members of that group (hereafter referred to as: in-group favouritism). Besides that, degradation of the out-group members may be a way of enhancing the in-group (Attwell & Smith, 2017). SIT emphasises on the link between the individual and the individual being part of a group (group esteem). Which refers to the individual who seek assurance of their own decisions and aspiration to belong to a valued group.

Research has shown that ‘people endorse whichever position reinforces their connection to others with whom they share important commitments’ (Kahan, 2010). To understand how this works, the Identity-Based Motivation will be discussed.

Identity-Based Motivation

Identity-Based Motivation Theory (IBM) provides insights into the process by which content of social identities influences beliefs about in-groups’ goals and strategies (Oyserman et al., 2007). IBM can be used to explain why people may engage in the anti-vaccination discourse on Twitter. IBM argues that when behaviour is identity infused, it carries a positive tone of inclusion in the in-group. Identity infused behaviour can have either positive or negative health consequences. As described in the SIT theory the in-group is identified as the ‘anti-vaxxers’. Which means that the anti-vaxxers on Twitter who engage in this discourse can have negative health consequences. Even though these tweets can have important consequences on health, identity-infused behaviour is less engaged for health consequences, than they are for their identity consequences. Health promotion activities like vaccinations, are not personal choices that are made in the moment. They are social identity-infused habits, meaning that people see the world from the perspective of fellow in-group members (Haslam & Reicher, 2006). People want to engage in certain behaviour, because these choices are corresponding with their in-group’s choices (Oyserman et al., 2007).

Combining the insights from SIT and IBM, it can be argued that the people on Twitter differentiate themselves between either the in-group or the out-group. When being part of this group they seek assurance of their anti-vaccination beliefs and degrade the out-group. With the Identity-Based Motivation this behaviour can be reinforced because people engaging in the anti-vaccination discourse could be identity-infused behaviour, instead of isolated personal opinions.

Research question

To gain more insight into the anti-vaccination discourse on Twitter, the following research question with the corresponding sub-question has been formulated:

What role do in-group favouritism and out-group degrading play among the anti-vaccination discourse on Twitter?

- *Is there a relation between the different types of arguments used within the anti-vaccination discourse and the use of in-group favouritism and out-group degrading?*
- 1) Based on the Social Identity Theory, I expect that anti-vaxxers on Twitter who refer to the in-group favour their group-members and regard their in-group highly. Besides that, I expect that the in-group will degrade the out-group members as a way of enhancing the in-group.
 - 2) Based on the Social Identity Theory and Identity Based Motivation, I expect that different types of arguments are used by anti-vaccination proponents, and I expect there to be differences in the type of arguments and the use of in-group favouritism and out-group degrading.

Methods

Design

This study is part of a larger study on the online vaccination discourse. The data for that larger study has been collected and multiple analyses were conducted with that dataset. This study only presents the information that was relevant to the current study. In order to find out to what extent in-group favouritism played a role among the anti-vaccination discourse on Twitter, a qualitative analysis was conducted of anti-vaccination tweets. Public tweets were used to create a database of existing online vaccination discourse.

Study population

This study analysed tweets from public twitter accounts in the Netherlands. Twitter is a 13+ platform, as a result of which there is no guarantee the study population only consist of adults. However, considering this topic – which seemed to attract mainly adults – it is expected that most of the tweets are posted by adults.

Data collection procedures

Around 85.000 tweets have been collected, starting from 2012 until June 2019. The techniques and methods that are used for data processing were a combination of webscrawling and Twitter Application Programming Interface (API). The tweets were collected through hashtags and keywords in a raw data base. The search terms that were used were: #vaccineren, #ikvacineer, #ikvacineerniet, #vaccinatiegraad, #vaccinatieschade, #antivaxx, #provaxx, #antivax, #provax, #antivaxxer, #provaxxer. The following keywords were used: *vaccineren, vaccineer, vaccinatie, vaccinatietwijfel, antivaxx, provaxx, antivax, provax, antivaxxer, provaxxer.*

Data analysis

The analysis of this research was based on an iterative process. In order to analyse the data properly, the data was first cleaned by, switching all upper cases to lower case, removing URLs, removing numbers, removing punctuations, removing extra spaces between words and by removing very short words (1 character long). As a first step for this research before future follow-up research applies algorithm coding on the 85000 tweets, a feasible number of tweets was chosen for manual coding. A total of 2000 tweets were randomly selected out of 85000 tweets for further analysis. In order to achieve valid coding and inter-rater reliability, frequent consultation took place in which the same sample was coded by different people into; pro, anti, hesitant, relevant but neutral, irrelevant, relevant but unclear to create structure. It was an iterative process until all the 2000 tweets had been coded into previously mentioned categories. Tweets in which there was doubt about the categorisation were always discussed together.

As a second step, only the tweets that were relevant were included for further analysis. These were tweets in the categories, pro, anti and hesitant. To analyse the pro, anti and hesitant tweets for content, an existing coding scheme from Kata (2010) was used. In addition to this existing coding scheme data-driven content codes were added. Again, this was done in consultation and iteratively. A total of 22 content codes were used to code the tweets for content. Once the 2000 tweets were categorised and analysed for content, all the anti-tweets were selected for further analysis. This subset contained 58 tweets which were categorised under eleven different content codes. The overview of the eleven codes with a short annotation for each code can be found in Table 1 under Annex one. Out of the remaining tweets in the dataset, 67 were categorised as hesitant, 354 as pro and the remaining tweets were categorised as either not relevant, relevant but neutral or relevant but unclear. The 58 tweets were analysed through a qualitative manual analysis using Excel. First, by reading through all the tweets. For each tweet, it was checked whether there were relevant phrases and words about in-group favoritism and out-group degrading. In-group favoritism was coded as yellow, out-group degrading was coded as green and if both occurred in a tweet they were coded as orange. Subsequently, all the in-group favoritism phrases and/or words and out-group degrading phrases and/or words were selected. This was done in order to categorise all the forms of in-group favouritism and forms of out-group degrading. Then, the data was checked whether those relevant phrases and/or words occurred more often within one or more content codes. In doing so, the tweets that contained in-group favouritism, out-group degrading, or both were examined for their frequency of occurrence within the eleven content codes. To examine if there was a relation between the different types of arguments used within the anti-vaccination discourse and in-group favouritism and out-group degrading. In order to compare the content codes as accurately as possible, only the content codes that contained more than four tweets were included in the schematic overview.

Ethics and data management

All tweets over the mentioned time period have been stored securely as a raw data set. People were able to tweet under their personal name or under anonymity if preferred. For the analysis an anonymised version was used, where people's Twitter handle (i.e., someone's username) were removed to ensure anonymity. Within this research there were multiple precautions taken in order to minimise the harm for the people involved. The first precaution being that the data was stored at a secure location with limited access. In addition, it was not possible to make local copies. With an unlikely event of a data leak, no data would become public that isn't already public. The data that was used has been collected from Twitter, which is a publicly available platform. The tweets were part of the public discourse. To avoid the potential risks and protect anonymity and privacy of tweets that can be traced back to individuals, only fully anonymous tweets were analysed. This also meant that it was too risky to use quotes, because using the search engine in Twitter could lead to tracing back the original tweet with username.

This research cannot guarantee that the people participating in the online vaccination discourse were at least eighteen years old. After all, Twitter is a platform that provides access to people from the age of 13. It could be therefore possible that among those 85.000 tweets there were tweets from minors. In addition, it could also be possible that vulnerable persons contributed to the Twitter discourse. To ensure anonymity of this (possible) vulnerable group of people as well we used an anonymised data set. For this research it was not possible to obtain informed consent from the people involved in the data collection process. The people involved in this research couldn't expect that when engaging in this Twitter anti-vaccination discourse that their tweets could be used for research purposes. They were unable to refrain from providing consent and/or unable to even provide informed consent. Informing the people who were involved in this research could affect the results. By taking precautions to ensure minimal risks and protect anonymity and privacy of the people involved, this research makes sure that it doesn't outweigh the reason for doing this research.

The Faculty Ethics Review Board of the Faculty of Social and Behavioural Sciences has granted permission for the research (20-693). Furthermore, a Data Protection Impact Assessment (DPIA) has been written with Research Data Management Support of the UU and has been coordinated with the privacy contact person of the Faculty of Social and Behavioural Sciences, after which it has been submitted to the Data Protection Officer of the UU.

Results

The role of in-group favouritism and out-group degrading among the anti-vaccination discourse

In-group favouritism

Out of the 58 anti-vaccination tweets, that were analysed, a total of eleven tweets involved in-group favouritism (19%). In those tweets, those against vaccinations refer to the in-group.

In the theory the in-group refers to people who reject vaccinations and who try to persuade others not to vaccinate (sometimes referred to as ‘anti-vaxx’ activists) (Attwell & Smith, 2017). Within this anti-vaccination discourse when users referred to the ‘in-group’, they often distinguished themselves by conversing in such terms as ‘us’ and ‘them’. The Social Identity Theory explains that within this process in which obvious ‘us and them’ distinctions are made, the group members are motivated to achieve or maintain distinctiveness between their own anti-vaxx group and the vaccinating mainstream. In line with this theory, users talked positively about those who do not vaccinate. In the tweets involving in-group favouritism, a user called the people who do not allow themselves to be used in a vaccination experiment; smart. Also, several users gave themselves or someone in their surroundings as an illustration, with whom things are going perfectly well, because they are not vaccinated. Another user indicated that they have been properly informed (by whom remains unclear) and therefore consciously decided not to vaccinate. Corresponding to the argument in that tweet, another user said she/he qualifies as anti-vaxx because he/she had read a lot for itself rather than parroting others. An overview of all the sub-forms of in-group favouritism that were mentioned in the tweets are shown in Table 2 of this document. A total of four different forms of in-group favouritism were identified out of eleven.

Table 2

Overview of all sub-forms of in-group favouritism in percentages

Having courage (9%)
Being smart (18%)
Success story of someone who is doing perfectly well (36%)
Being properly informed (36%)

In relation to the research question and expectations, it can be concluded that the expectation that was based on the Social Identity Theory, in which I expected that anti-vaxxers on Twitter who refer to the in-group favour their group-members and regard their in-group highly has been reflected in the tweets, however they are not present in large numbers (19%).

Out-group degrading

Out of the 58 anti-vaccination tweets, that were analysed, a total of 28 tweets were involved in out-group degrading (48%). A total of 10 different sub-forms of out-group degrading were identified out of the 28 tweets. The sub-forms identified within the anti-vaccination tweets that contained out-group derogations are displayed in Table 3 of this document. Comparing in-group favouritism and out-group degrading within the anti-vaccination discourse, by far the most common tweets were out-group derogations. In-group favouritism was used less often compared to out-group derogations. Unlike the

in-group, the tweets showed that the out-group does not focus on one and the same group. In-group favouritism seemed only applicable to the people who are also against vaccinations. However, the out-group derogations are aimed at different group in society. In line with the theory, the out-group includes all those who are pro-vaccinations. The theory describes the out group as to those who are pro vaccinations, also referred to as the vaccinating mainstream (Attwell et al., 2018). A user called the pharmaceutical world; mafia practices that must be stopped. Another user called the government a disgrace in how they scare children. One user called it a right-wing hysteria where narrow-minded people are pro-vaccine. In addition, in some of the out-group derogations tweets, links were shared and accompanied by words such as ‘stupid’ and ‘fucking...’ (followed by the name of a political party). Another user made it clear that he or she believes that there is corruption and bribery behind the vaccines. He or she called it scandalous and says that this is how the pharma works. It was noticeable that out-group derogations generally go along with abusive language and/or strong qualifications towards the out-group. If there was not an abusive word in the tweet that involves out-group derogation, then users referred to them as: people who sacrifice their children, false prophets, weak, cowardly or ignorant. Overall, the out-group looked inferior to the in-group. Most users used various negative or disparaging names to describe that group. Users described the vaccinating mainstream as, pharmaceutical mafia activities, criminal and vaccine cult uttering nonsense. Several users also referred to them as people who put others at risk, they believe that they are the ones who are dangerous, and they think vaccinating is a satanic ritual. Another user called the vaccine industry a sick world. Corresponding to the SIT theory the in-group – which are the anti-vaxxers – have the perception that their caregiving practices are superior to those of others. In the tweets, this is also demonstrated by the fact that users refer to the out-group as a bunch of retards who don’t know that a vaccine is full of poison, leaving children with vaccine damage. Another user believed that children get sick from vaccinations. Another user pointed out that only stupid people get vaccinated.

In relation to the research question and expectations, it can be concluded that I expected that the in-group will degrade the out-group members as a way of enhancing the in-group. This expectation proved to be correct. Almost half of all the anti-tweets contained out-group degrading. Various forms of out-group degrading became visible.

Table 3

Overview of all sub-forms of out-group degrading in percentages

Mafia practices (4%)
Right-wing propaganda (7%)
Attack on mental condition (stupid and/or ignorant and/or narrow minded/ retard) (18%)
Attack on attitude (weak and/or cowardly, disgrace) (7%)

A sick world (4%)
Criminal / satanic ritual (7%)
Nonsense (7%)
Dangerous/ garbage (32%)
Sacrificing/ scaring children (11%)
Earning model (7%)

In-group favouritism and out-group degrading combined

Out of the 58 anti-vaccination tweets, that were analysed, a total of six tweets involved both in-group favouritism and out-group degrading (10%). In these tweets, both concepts are clearly present. For instance, a user indicated that he/she was not as retarded as most pro-vaccination people because he/she has informed itself. A different user indicated that the more people would think about it, the more people would be likely to reject the vaccine madness. Another user indicated that many people really have no idea about the disadvantages of vaccinations. The anti-vaxxers refer to the in-group and the out-group refers to those who are pro vaccinations, also known as the vaccinating mainstream (Attwell et al., 2018). When users referred to the ‘in-group’, they often distinguished themselves by conversing in such terms as ‘us’ and ‘them’. The Social Identity Theory explains that within this process in which obvious ‘us and them’ distinctions are made, the group members are motivated to achieve or maintain distinctiveness between their own anti-vaccination group and the vaccinating mainstream. In line with this theory, users talked positively about those who do not vaccinate. A user, for example, said that ‘his group’ read up on it and therefore deliberately refrains from vaccinating. At the same time, the same user also derogated the out-group by saying that many people have no idea about the disadvantages of these vaccinations. They are just frightened and go along with the flow to vaccinate their little ones. Degrading this out- group may be a way of enhancing the in-group (Attwell & Smith, 2017). This user clearly made a difference in his tweet by talking about two groups, a group that in his or her opinion has educated itself well and therefore does not vaccinate and a group that allegedly has no idea, goes with the flow and is frightened. This reflected what is described in the theory as well, namely regarding their own in-group highly, and favouring another member of that in-group. In addition to the sub-forms found within in-group favouritism and out-group degrading, out of the six combined tweets no new sub-forms were identified. All identified sub-forms have been displayed in Table 2 and Table 3.

Relation between the different types of arguments used within the anti-vaccination discourse and in-group favouritism and out-group degrading

Table 4 provides an overview of the relevant content codes and the corresponding percentages of all the tweets concerning in-group favouritism, out-group degrading and the two combined.

Table 4

Overview relation between content codes and in-group favouritism, out-group degrading and combined in percentages

Content code	Out-group degrading	In-group favouritism	Combined
Anti-safety and effectiveness	31%	10%	8%
Anti-conspiracy theories / search for truth.	62%	8%	8%
Anti-misinformation and falsehoods	42%	5%	26%
Attacking another group; dismissing the group as stupid /dangerous	73%	7%	20%
Anecdotal proof	25%	25%	8%

Anti-safety and effectiveness. With a total of 39 out of the 58 tweets the content code; anti-safety and effectiveness was the most present in the anti-vaccination discourse (67%). Tweets claiming vaccines are deadly, full of garbage, sickening, full of poison and life-threatening.

A total of four tweets involved in-group favouritism in association with the anti-safety and effectiveness content code. Twelve tweets involved out-group degrading and in three other tweets it concerned both in-group favouritism and out-group degrading. The content code anti-safety and effectiveness also contained slightly more tweets than the content code ‘attacking another group’ with a small difference of 4%.

Anti-conspiracy theories / search for truth. Out of the 58 anti vaccination tweets, thirteen tweets were related to anti-conspiracy theories / search for truth (22%). Tweets claiming that vaccinations make people sick and that it is a profit model, also a user claims that DNA is altered by vaccinations without the vaccinated knowing it.

A total of eight tweets were involved in out-group degrading in combination with the anti-conspiracy theories / search for truth. For both in-group favouritism as well as the tweets with a combination of out-group degrading and in-group favouritism, it concerned one tweet. There seemed to be a relationship between content code; anti-conspiracy theories and out-group degrading with a percentage of 62%. A reasonable explanation for this could be that anti-vaxxers often share the belief that vaccinations are profit driven, developmentally inappropriate and are looking for the ‘truth’ (Sobo, 2015). Other research has shown that people exposed to anti-vaccination conspiracy theories showed less intentions to vaccinate (Jolley & Douglas, 2014).

Anti-misinformation and falsehoods. Out of the 58 anti vaccination tweets, nineteen tweets were related to anti-misinformation and falsehoods (33%). Tweets claiming that the same people who approved ‘the poison’, also want to vaccinate people on a mandatory basis. A user states that every vaccination is full of poison and that we should look at children with the vaccination damage. A

total of eight tweets involved out-group degrading in association with anti-misinformation and falsehoods. Five tweets involved a combination of both in-group favouritism as out-group degrading and one tweet concerned in-group favouritism. Most tweets with a combination of both in-group favouritism as out-group degrading were covered within this content code (26%).

Attacking another group; dismissing the group as stupid / dangerous. Out of the 58 anti vaccination tweets, fifteen tweets were related to the content code: attacking another group; dismissing the group as stupid or dangerous (26%). Tweets referring to the out-group as false prophets, stupid, uniformed, scary people, weak, cowardly and ignorant.

A total of eleven tweets involved out-group degrading, three tweets involved a combination of both in-group favouritism and out-group degrading and one tweet involved in-group favouritism. In this content code there is a clear categorization (us vs. them). This could possible explain why this content code contained the most tweets with out-group derogations (73%). Contrary to what I expected this content code did not contain the most tweets about in-group favouritism.

Anecdotal proof. The content code; anecdotal proof was associated fifteen times with the anti-vaccination discourse (26%). Tweets that provided anecdotes, talking about people in their surroundings or themselves who are super healthy without being vaccinated. It is evident that most of the tweets that mentioned in-group favouritism were covered by the content code; anecdotal proof. Anti-vaxxers who share stories about people who are doing well because they have not been vaccinated. Success stories that go together with in-group favouritism, which is also consistent with the IBM theory when behaviour is identity infused, it carries a positive tone of inclusion in the in-group. Identity infused behaviour can have either positive or negative health consequences. In this case, an unvaccinated person may be a danger to unvaccinated children and/or themselves by being not vaccinated, which can lead to adverse health consequences (RIVM, 2021). A total of three tweet involved out-group degrading, one tweet contained a combination of both in-group favouritism as out-group degrading and three tweets involved in-group favouritism. Most in-group favouritism tweets were covered by the content code anecdotal proof (25%),

Other content codes. The other content codes were significantly less likely – compared to the content codes presented above – to be associated within the anti-vaccination discourse. The other six content codes did not contain more than four tweets in total in the anti-vaccination discourse. Anti-alternative medicine (2%), anti-civil liberties (2%), anti-morality, religion and ideology (5%), inconsistency / hypocrisy (3%), call for action (7%) and altruism (2%).

As expected, there are different types of arguments used by anti-vaccination proponents, and as expected there were differences in the type of arguments and the use of in-group favouritism and out-group degrading.

Discussion

Several studies have shown that there is currently no effective method that incorporates the anti-vaccination discourse. The most commonly proposed method, which is counteracting misinformation, has proven to be ineffective (Horsney et. al., 2018; Kata, 2010). By providing insight into the different types of arguments used by anti-vaccination proponents, this study aims to contribute some insights towards the development of an effective method that also considers the anti-vaccination discourse.

This study showed that the in-group members, who refer to those against vaccinations will degrade the out-group members as a way of enhancing the in-group. Almost half of all anti-tweets contained out-group degrading (48%). In addition to this the in-group favours their group-members and regard their in-group highly. Which is reflected in the tweets, however they are not present in large numbers (19%). Additionally, this study showed that there are different types of arguments used by anti-vaccination proponents, and there are differences in the type of arguments and the use of in-group favouritism and out-group degrading.

This study demonstrated that insights from the SIT and IBM are valuable to understand important components in the anti-vaccination discourse. In line with the SIT, this study demonstrated that when users referred to the 'in-group', they often distinguished themselves by conversing in such terms as 'us' and 'them' (Attwell & Smith, 2017). Users used several insults and abusive words to express their feelings towards the out-group. In line with the SIT theory, degrading the out-group members may be a way of enhancing the in-group. The findings of this study revealed that out-group derogation occurs more often than in-group favouritism.

Strengths and limitations

The limitations of this study must be considered when interpreting the results. First, the tweets analysed were collected in the period starting from 2012 until 2019. As a result, this study is not up-to date with the latest findings and may not show new important developments that are currently taking place within the anti-vaccination discourse. Another limitation within this research has to do with the research group. A limitation because Twitter offers a platform for everyone from the age of 13. It is therefore impossible to draw conclusions about the demographics of the users.

The final limitation of this study is the limited number of tweets. This study started with 2000 tweets, which seemed more than enough, except that in only 58 of them was there an obvious anti-tweet, which led to an unexpectedly small dataset. In future study, it would be advisable to use a larger number of tweets to obtain more reliable results. However, it is also notable that out of 2000 tweets, only 58 tweets are coded as anti. Therefore, it is recommended that future research examines how large (or small) the group within the anti-vaccination discourse is out of all 85.000 collected tweets.

A strength of this study is that the chances of socially desirable responses within this study is minimal. Users did not know that their tweets would be used for research purposes. Therefore, there is

a high probability that what users have shared is genuinely their opinion. Another strength of this study is that it has focused solely on the anti-vaxxers, in doing so, this study hopes to contribute into the small body of work that is currently available into the arguments that are being used by anti-vaccination proponents. Another strength of this study is that tweets have been collected over a longer period, namely seven years. This considerably reduces the risks of a ‘‘snapshot’’ interpretation of the results.

Implications and recommendations

The findings of this study have important societal implications. Research has shown that the anti-vaccination discourse is a complex topic. In order to develop an effective method, it is therefore recommended to analyse the anti-vaccination discourse from multiple angles, e.g. social, medical and psychological (Bazzarri et al., 2021).

Research has shown that reducing contact with anti-vaxxers could be counterproductive, from an anti-vaxxer's perspective as well as the society as a whole because it could slow down the dynamics of a disease (e.g. COVID vaccine) to its steady state, when there is an outbreak (Bazzarri et al., 2021).

In addition to the arguments that are used by the anti-vaccination proponents, other research showed that anti-vaxxers are not limited to the group who believe vaccinations are poison, it also highlights a group who give other reasons for not vaccinating. These reasons range from individual non-attendance due to work, study, or difficulties with the accessibility of facilities, to refusal based on previously adverse effects (Streefland et al., 1999). This underlines the importance of further extensive research into the group that doesn't vaccinate in which an understanding of social and political context is required to comprehend this complex discourse.

Other research showed that anti-vaxxers who hold negative views toward scientific experts, identify themselves as anti-vaxxers. For this group it was found that the anti-vaccine label is reflective of social identifications with other anti-vaxxers and the anti-vaccine movement. Because a significant proportion of anti-vaxxers embrace the anti-vaccine label – as one of their social identities – it is extremely difficult in health communication and efforts to correct vaccine misinformation (Motta et al., 2021). Health communication strategies could be helpful in order to become vaccine acceptance, if it is grounded on the rejection of science alone. However, changing a social identity dynamic is much more difficult (Kahan, 2017; Motta et al., 2021).

Fortunately, this is not the situation for all anti-vaxxers, and it remains important to monitor this more carefully in the future so an effective method can be used to ensure and maintain a stable vaccination coverage. The results of this paper may be relevant for professionals creating health communications strategies. By understanding that social identification plays a role within the anti-vaccination discourse further consideration can be given to what the most effective method is for this group.

For the first time in its history in the Netherlands, Twitter has marked a politician's tweet¹ as misleading. Anyone who opens the tweet will see Twitter's warning and the possibility of replying to the message or even 'liking' the tweet is blocked, which restricts the spread of the tweet. In addition, Twitter is introducing a point system to determine when users go out of line. Spreading messages that could lead to health damage will receive one point. Serious offences, such as conspiracy theories about vaccinations, will get the user two points. The person must remove the tweet before he or she can post again. Accounts with two or three points are suspended from Twitter for twelve hours. Four offences result in a seven-day suspension and five offences result in the user being permanently banned from Twitter (Twitter, 2021). Conducting a similar study focused on the anti-vaccination discourse could therefore make future research more difficult. This may lead to no clear overview of the anti-vaccination discourse on Twitter because the reach of their messages is limited or deleted by Twitter. IBM argues that when behaviour is identity infused, it carries a positive tone of inclusion in the in-group. Identity infused behaviour can have either positive or negative health consequences. To gain more insight, it is desirable to conduct in-depth interviews in the future to determine whether people want to engage in certain behaviour, because these choices are corresponding with their in-group's choices (Oyserman et al., 2007). Furthermore, this approach is also more desirable in the future due to the restrictions of Twitter.

Recommendation for future research

This study shows insight into the role of in-group favouritism and out-group degrading within the anti-vaccination discourse. However, it remains unclear whether people engage within the anti-vaccination discourse, because these choices are corresponding with their in-group's choices or based on their personal opinion. By conducting in-depth interviews this may provide more insight, including a more detailed analysis into all the arguments within the anti-vaccination discourse.

Conclusion

This study showed that the in-group members, who refer to those against vaccinations will degrade the out-group members as a way of enhancing the in-group. Almost half of all anti-tweets contained out-group degrading (48%). In addition to this the in-group favours their group-members and regard their in-group highly. However, they are not present in large numbers (19%). In addition to this study, it is extremely important to conduct further research to develop an effective method that incorporates the anti-vaccination discourse.

¹ On Sunday, 7 March, Forum for Democracy party leader Thierry Baudet tweeted that he would not be getting vaccinated against the coronavirus because, according to him, the risk of the virus is 'absolutely negligible'. At the same time, the politician claimed that the side effects of the vaccine are severe.

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Appendices

Overview of codes

Table 1

Overview of the eleven codes identified in the anti-vaccination discourse

39x Anti-safety and effectiveness; all tweets concerning health, effectiveness, and safety (code 1)
13x Anti-conspiracy theories / search for truth; tweets indicating that vaccines are used for improper purposes, other than government control (code 4)
19x Anti-misinformation and falsehoods; tweets using questionable knowledge and/or sources (code 6)
15x Attacking another group; dismissing the group as stupid / dangerous; tweets in which the other group is dismissed as stupid, dangerous, etc. Only in those tweets where there is an explicit negative reference to the other group (code 11)
12x Anecdotal proof; tweets containing anecdotal evidence or indicating that someone is not doing something (code 12)
1x Anti-alternative medicine; (code 2)
1x Anti-civil liberties; tweets about making vaccinations mandatory; freedom is restricted by government (code 3)
3x Anti-morality, religion, and ideology; tweets mentioning religion, tweets indicating that non-vaccination as the norm and/or seeing vaccinations as abuse (code 5)
2x Inconsistency / hypocrisy; tweets concerning inconsistency and/or hypocrisy (code 10)
4x Call for action; tweets that clearly contain a call to action (code 13)
1x Altruism; vaccinating is not something you do for yourself but for others (code 14)
