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COMPUTING SCIENCE



RADBOUD UNIVERSITY

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# Biased Perceptions of Media Sources

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## **Abstract**

In this thesis, we explore the relation between bias perceptions and the source of a message, as well as the content of that message. To do so, we perform an experiment in which different participants are shown the same message as originating from different sources. In contrast to expectations based on the literature, we did not find differences in perceived bias between sources. Also unexpectedly, familiarity with sources did not influence perceived bias. However, participants were able to recognise a difference in bias across different topics.

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# Chapter 1

## Introduction

Media are often accused of being biased. By favouring a particular opinion, or by selecting facts, they can paint a narrative that does not always match reality. Bias has many definitions. A statistical sample is said to be biased when it does not represent the population. However, we're particularly interested in bias in the media, as defined in the Oxford Learner's Dictionary: "a strong feeling in favour of or against one group of people, or one side in an argument, often not based on fair judgement"<sup>1</sup>.

The term "Bias" has become politically charged over the past few years, and is used as a way to dismiss arguments. For the purposes of this research, we define bias as "Deliberate or accidental slant by the journalist, editor or publication to distort reality", as defined by Spillane et al. [19] in their work. Immediately, we must thus note that by this definition, *all* media are inherently biased. While we commonly think of messaging containing "just the facts" to be unbiased, this is not accurate. Even facts – or the context in which they are placed – can be biased.

In an article discussing the role of bias and objectivity in media, The Conversation writes: "Today, crying bias is the go-to tactic for neutralizing critical reporting and eroding trust in competitors. A search on Fox News' platform produces over 18,000 articles and videos about media bias." [10] The latter sentence is an objective truth, which can easily be verified on Fox News' website – although the number has gone up to 19,000 since the article was published. However, it is also biased. Why did the author feel the need to call out Fox News, specifically? Why not CNN or the BBC? While the choice makes sense within the context of the article – that of Republicans decrying "bias" to deflect arguments – it is biased nonetheless. These decisions, deciding which facts to include and which to omit, are also subject to bias. There is no way to write reporting that is purely objective.

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<sup>1</sup><https://www.oxfordlearnersdictionaries.com/>

Nevertheless, that is not to say that all media content is equal, and that everything is merely a matter of perspective or opinion. The fact that the Earth is round is an objective, empirically verifiable fact. A publication claiming that the Earth is flat is not merely biased. Such a statement is simply incorrect. Such “fake news” is outside the scope of this thesis. In this work, we concern ourselves with bias only, which arises from a difference in framing, not a difference in facts.

Furthermore, even if an objective perspective is possible, that might not be desirable. In 2004, Boykoff & Boykoff found that over half of US prestige press coverage on climate change gave balanced accounts of anthropogenic contributions to global warming. In other words, half of the stories gave equal value to those who claimed that humanity has an effect on global warming and those who claim humanity has no such effect. Even in 2004, it was already well-known among the scientific community that such an effect existed. However, under 6 percent of stories gave exclusive coverage of anthropogenic warming [3]. In cases like these, journalists might feel tempted to give equal value to “both sides” in the name of balance and objectivity – while in reality no such balance exists.

A case like this shows a failure of media to fulfil its role as gatekeeper. Traditionally, journalists are responsible for investigating a topic and uncovering the truth. The journalist then writes about their findings and publishes it. The public can then assume that the information they receive is truthful and honest. However, for a variety of reasons, this role as gatekeeper has been diminishing. On social media, the public itself is responsible for gatekeeping the content it spreads because no journalistic authority exists there [14]. Historically, journalism has served as a challenge to authority – the so called fourth estate – and the notion of an objective, opinionless journalist is a relatively new one [9]. With the prevalence of social media, and the shift in traditional media, it is important that we investigate how the public evaluates and judges bias of the media they consume.

Further complicating the issue is the fact that different people perceive bias differently. For example, Vallone et al. demonstrated that two opposing groups perceived relatively neutral coverage of the Beirut massacre to be biased against “their side” [22]. This *biased perception of bias* has since been extensively investigated. Various mechanisms have been identified that lead to these biased perceptions. However, little is known about the effects of a message’s source on these perceptions.

Simply put, suppose we take a news article. We show it to one group with the logo of the BBC and to another group with the logo of Fox News. We might assume that most people will expect a difference in perspective

between these two sources. Will they perceive the article to be more or less biased, simply due to a difference in branding? That is what we investigate in this thesis.

**RQ1:** What are the effects of a message’s source on the perceived bias of that message?

**H1:** A message will be perceived to be more or less biased based on the message’s source

**H2:** A source that a consumer is more familiar with will be perceived as less biased than a source that someone is less familiar with.

**H3:** A message will be perceived to be more or less biased based on the message’s content

There are several aspects of this question that remain unanswered. Though source perceptions have been studied previously, it has largely been in the context of credibility. Little literature exists on the effects of source on perceptions of bias. Furthermore, a lot of research on perceptions of bias investigates the US media. American media, like its political landscape, is hyper-partisan [15]. We might find different results for media in a representative, parliamentary democracy.

In this thesis, we propose an experiment that seeks to answer this question. In particular, we investigate sources that are part of Dutch media. In the experiment, participants are shown six news messages from six different sources. Different participants are shown the same messages as originating from a different source. They rate these messages on bias. We can then compare the same messages across different sources, and see if there indeed is a difference in bias rating when a message comes from a different sources.

The rest of the thesis is structured as follows.

In **Chapter 2**, we provide a brief background to bias and bias perceptions as investigated by other researchers.

In **Chapter 3**, we detail the method of our experiment

In **Chapter 4**, we showcase our findings and results

In **Chapter 5**, we finalise our conclusions and discuss our results.

In **Chapter 6**, we conclude our research and give a brief summary of our findings

## Chapter 2

# Related Work

### 2.1 Perceptions of Bias

The perception of bias in media has been well-studied. Baum & Gussin [2] researched “whether varying the information that identifies specific media outlets influences consumers’ perceptions of literally identical substantive news content.” To do so, they let participants read (part of) a transcript of a news broadcast. The authors do not indicate the origin on this transcript. The transcript featured the logo of either CNN, FOX News, or a fictional broadcaster. The names of journalists were changed to match those of real CNN and FOX journalists, using made-up names for the fictional source. The participants were then asked to rate on 6-point Likert scale whether they believed that the coverage was favorable or unfavorable towards President Bush and Senator Kerry. As expected, those who identified as Conservative thought the transcript was biased towards Liberals, and vice versa.

Three works by Spillane et al. investigated which elements of webpage design and layout impact perceived bias. In their 2017 work [18], they researched the effects of various web elements on the perception of bias. They did so in a two-dimensional study. First, they took 9 major British news sites. Then, they removed features across all of those for their experimental conditions. In total, there were thus 9 news sites. 8 variables, as well as a control, were identified. Among those were the removal of banner ads, or the removal of a comment section. If the news site had such a feature, a version of the webpage without that feature would be included in the experimental conditions. Not all sites had all features, and so some combinations of features and sites were not included. Participants were shown 9 of these web pages, and asked to rate the positive or negative bias of each. In addition,

some demographic information about participants, such as political leaning, education level and income, was collected. Though there were several pages that showed significant differences in their ratings of bias, there were no features that had a consistent and significant effect regardless of source. This indicates that the effect of source or other features of the design had a larger impact than the experimental variables.

Their 2018 work [19] investigated the effects of visual presentation on perceived bias. To do so, 9 articles ranging from little to large amounts of bias were each assigned to one of nine news websites. For each article, four versions were created. One was plain html; another was the original news website layout. A third version was created with improved, high visual quality. Advertising was largely removed, and emphasis was placed on the news article and author bio. A fourth version had poor visual quality, through advertisements for low-quality products or services, and by displacing news content or navigation. Participants were then asked to rate the content's bias on a scale from 0 (no bias) to 100 (extremely biased). Unfortunately, results were mixed and the authors were not able to show that a reduction of visual quality consistently led to an increased perception of bias, and vice versa.

Finally, they most recently studied the effect of professionalism on bias perceptions [20]. To do so, they took web pages of 9 major news sites, and filled them with content. This content had different levels of bias. For each of the 9 sites, they created 7 conditions, ranging from an intact website (high professionalism) to plain HTML with only `<p>` and `<h1>` tags remaining (low professionalism). In between, features like images, HTML5, CSS2 and CSS3 were stripped. Participants were then shown each condition once and asked to rate the content's bias on a scale from 0 (no bias) to 100 (extremely biased). The results showed that generally, a high level of professionalism led to a perceived decrease in bias, and a low level of professionalism led to a perceived increase in bias. Furthermore, the impact of professionalism was consistent, regardless of the actual bias of the article.

Work by Stroud et al. [21] consisted of two studies. In the first, the group sought to analyze "the existence of outgroup homogeneity based on perceptions of media bias across sources". Outgroup homogeneity is the theory that the outgroup (groups to which an individual does not belong, e.g. Conservatives) are seen as more homogenous or less variable than the ingroup (groups to which an individual does belong, e.g. Liberals). To do so, participants were given a questionnaire where they were asked to identify and rate the bias of several different conservative and liberal media on a 5-point Likert scale (from 'strong liberal bias' to 'strong conservative bias'). When controlling for political leaning, results showed that liberals saw a larger



range of biases in liberal media than in conservative media, and vice versa for conservatives.

The second half of the study investigated whether familiarity with the media moderates the effect between partisanship and perceptions of variability. The study also sought to find a clear definition of ‘familiarity’ with media. Three possible measures were identified: familiarity as media use (consuming media), as dependence (depending on media for information), and as knowledge (recognizing media). To test these hypotheses, respondents were asked to rate several media sources on their bias on 5-point Likert scales. Unlike the first study, there were now 3 questions on bias (favoring liberals/conservatives, favoring democrats/republicans, favoring/opposing Pres. Obama). Furthermore, respondents were asked which media of those media they consumed, on which they relied for information, and whether they could recognize news and talk show hosts, as well as identify front pages of newspapers. Results were in line with those of the first study, confirming the perceptions of outgroup homogeneity. Furthermore, familiarity did account for outgroup homogeneity. Interestingly, dependence was a more accurate measure for bias perceptions among right-leaning sources, whereas use accounted for bias perceptions among left-leaning sources.

## 2.2 Perceptions of Credibility

Closely related to perceived bias is the perceived credibility of a source or message. This too has been extensively investigated. Fogg et al. [8] were one of the first to investigate credibility on websites. Participants in the survey were given a 51-item questionnaire with statements about various web attributes, and asked to rate them on a 7-point Likert scale, indicating whether the attribute made a site feel more or less believable. The study was able to identify 5 aspects of web design that led to an increased sense of credibility: real-world feel (“The site lists the organization’s physical address.”), ease of use (“The site looks professionally designed.”), expertise (“The site lists authors’ credentials for each article.”), trustworthiness (“The site links to outside materials and sources.”) and tailoring (“The site selects news stories according to your preferences.”). In addition, two aspects were identified that led to a decreased sense of credibility, namely commercial implications (“The site makes it hard to distinguish ads from content.”) and amateurism (“The site is rarely updated with new content.”).

Similarly, Flanagin & Metzger [7] found some general aspects that influenced web credibility. To do so, they created 8 different websites, combining real and fake brands with 4 types of websites (news, e-commerce, organization

and personal blog). Participants were shown one of these 8 sites and asked questions on sponsor, message and site credibility. Generally, the study found that the genre of site is important when assessing perceived credibility.

Robins & Holmes [16] sought to analyze the effects of site aesthetics on credibility judgements. To do so, they showed participants 42 different sites, and they were asked to rate the sites credibility by turning a dial between -7 (non-credible) and 7 (credible). These 42 sites were obtained by collecting 21 search results on google for the topic ‘web accessibility’. These 21 sites were then largely stripped of their layout and general appearance. For each site, there existed thus a high-aesthetic and a low-aesthetic version. The results showed that, in general, the higher the aesthetic quality of a site, the higher the ranking of credibility.

Wobbrock et al. [24] similarly investigated whether “the mere appearance of an online news source—isolated from any particular content—might contribute to its perceived credibility.” They copied the layout of the top 20 most visited US news sites and filled them with Lorem Ipsum dummy text. Participants were then asked to rate on a 7-point Likert scale whether “[they] would believe an article that looks like this” if it had real content. The researchers identified several aspects which led to an increased sense of credibility, such as the presence of a video.

## 2.3 Factors Driving Media Selection

There are several key mechanisms to explaining the (mis)perception of bias. Selective exposure is one of those mechanisms. Selective exposure generally refers to the personalisation of media diets, where different consumers in the same media landscape mainly consume different news sources. Selective exposure generally refers to the situations where people make a deliberate choice to favour like-minded opinions. It is distinct from *pre-selected personalisation*, where the content a consumer is exposed to is driven by websites or advertisers, often without the user’s input (e.g. the Facebook News Feed) [25].

The mechanisms behind selective exposure have been extensively covered within the literature. Confirmation bias, the tendency to consume messages that align with existing beliefs, is generally thought to be the main driver behind selective exposure. Source bias, the tendency to avoid engaging in active news selection, and negativity bias, the tendency to favour negative over positive news, are also factors in explaining selective exposure [5].

Barnidge et al. [1] found that the presence of (extreme) partisan opinions in an individual was correlated to the degree of selective exposure that individual enjoyed. In that sense, selective exposure has a mediating effect between partisan opinion and the perception of bias. Barnidge et al. also found a distinct contrast between bias perceptions in general media and in the self-selected media. In other words, those who held more strong partisan opinions and thus enjoyed more selective exposure tended to perceive the general media as more biased than more moderate individuals. On the other hand, those same partisan individuals tended to view the media they favoured as *less* biased than others.

## 2.4 Hostile Media

This effect, where partisans perceive relatively neutral reporting to be biased against their side, is known as the Hostile Media Phenomenon. The first to describe this effect were Vallone et al., who showed that pro-Isreali and pro-Arab participants saw ostensibly neutral coverage of the Beirut massacre as being biased against “their side” [22].

It was further studied by Kim [12], who found that reporting focusing on the outcomes of a particular issue or policy tends to be perceived as less hostile than reporting that focuses on the values (e.g. pro-choice vs pro-life) underlying that debate.

Work by Kelly [11] confirmed some of these findings. Partisans tended to find messaging that was consistent with their beliefs to be more believable, informative, and less biased. If the messaging was dissonant to their beliefs, they found the exact opposite. Kelly further made the distinction between bias from source and bias from message or content. Even if the source was the same, and only the message differed, these biased perceptions still existed.

Similarly, Blom (2018) researched the relationship between trust in news sources and news content expectancy. The experiment consisted of 6 conditions, created by combining 2 news sources (CNN and FOX News) with 3 headlines (Illegal immigration at the end of Obama’s term was higher/the same/lower as at the end of Bush’s term). Each participant was shown one of these conditions. Participants were then asked about several aspects of the message. There were 5 items on source credibility and trust, as well as a 5-item scale on news believability. Both of these scales were based on prior research. Finally, participants were asked whether they were surprised or unsurprised that the news source claimed the headline was

true. In general, the results showed that highly expected news content from trusted news sources was more believable than highly expected news content from distrusted sources. In addition, highly unexpected news content from distrusted news sources was more believable than highly unexpected news content from trusted news sources.

One of the criticisms levelled at much of the research of bias perception and selective exposure is that it largely explored the American media landscape, which is highly partisan and divided due to the political ecosystem of the United States. Soontjes & van Erkel [17] found that even in the comparatively nonpartisan media system of Belgium, “two out of three citizens believe there is some partisan bias (that is, bias toward any party) in the news outlet they most often consult, with 10 percent even stating that this outlet is extremely slanted”. This indicates a high likelihood that a similar effect exists in the Dutch media system.

## Chapter 3

# Methodology

To answer the research questions, we propose a between-group experiment. To test the effect of a message’s source on bias, participants in the experiment are shown several news articles. Each article comes from a different source, and they are asked to rate each article on its bias.

### 3.1 Experimental Conditions

We select six sources than span the spectrum of the Dutch media landscape. When selecting these sources, it’s important to consider the familiarity of the average individual with each source. To test whether there is a relation between perceived bias and source, a participant must have some preconceived notion of a source’s general bias. From each source, we select one article that represents the bias commonly found within that source. We then essentially have six sources, and six topics. We strip the webpage of each source of superfluous functionality. We remove recommended articles, comment sections, advertising, etc. Only two elements remain, the article’s content, and the site’s logo, along with general layout, branding – the corporate identity.

We then edit the content of the webpage, and create 5 versions of each, where the content is replaced by the content from other sources. We do this for each source, and thus end up with 36 experimental conditions. We have six pieces of content, all appearing in six webpages of six sources.

In figure 3.1 we see what changes have been made to the webpages in each step of the process. The left-most image is the article from NU.nl directly

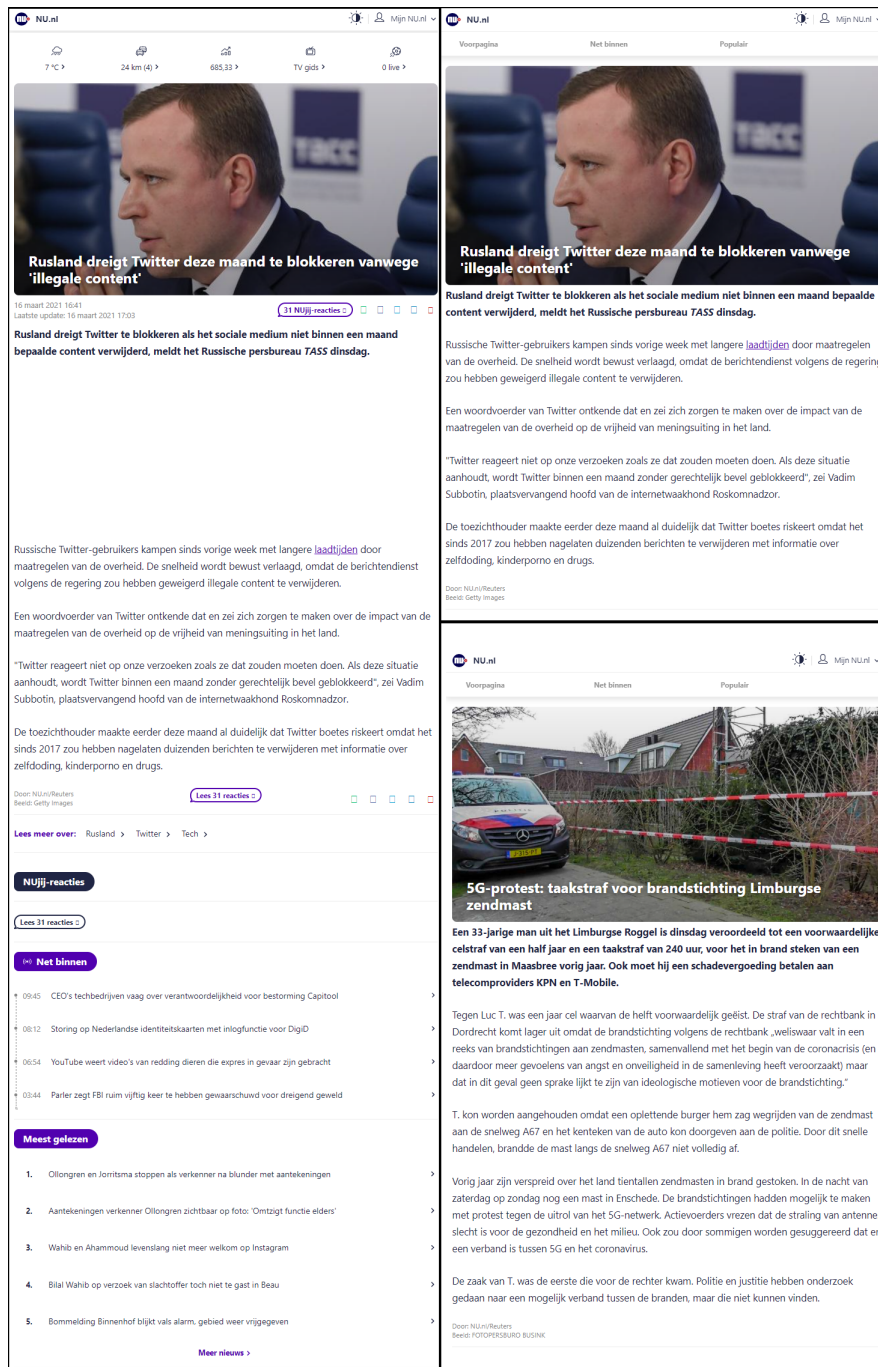


Figure 3.1: A webpage in three stages of the process

after it had been downloaded. Note the large amounts of whitespace where advertising used to be. There is also a comment section, as well as a recommended articles section at the bottom. In the image on the top-right, we see that most of this has been removed. Only branding, an image, and text remain. This is a finalised condition. We also see another condition in the bottom-right, where the text of the article has been replaced by content from De Telegraaf.

### 3.2 Source and Content Selection

When selecting sources, we considered a large spectrum of the Dutch media landscape. Furthermore, it is important that most participants were familiar with most of the sources. Ultimately, we are investigating whether a person's preconceived idea of a source's bias has an impact on the perception of bias. If a person has no notion of a source's bias, then likely it will not have an impact on perceived bias of the article. Ultimately, we selected the following six sources:

**NU.nl** is a commercial online newspaper. It favours factual reporting which is relatively balanced, with little opinion or background.

**De Volkskrant** is a traditional newspaper who also publish articles digitally. Though it was traditionally a left-wing newspaper, in more recent years it took a more centrist approach to reporting. It is one of the three Dutch *kwaliteitskranten*, favouring diverse views and high-quality reporting.

**De Telegraaf** is similarly a traditional newspaper who now also publish articles online. Of the traditional Dutch newspapers, it is the most right-leaning. It's reporting is a mix of factual news and sensational and entertainment focused content.

**Joop** is a left-leaning opinion and news site, owned by public broadcaster BNNVARA. A large portion of its content are opinions or columns, which have a clear left-wing bias. News articles make up a smaller portion of its content. These articles also tend to lean left in writing and story selection, but not as much as other content.

**WNL** is a Dutch public broadcaster who also publish articles on their website. It is a relatively new broadcaster, and its goal is to serve as a right-wing conservative alternative to a perceived left-wing bias among other broadcasters. Story selection tends to favor the right.

**De Dagelijkse Standaard** is a (far) right news site. Content and headlines often use loaded or emotional language. Story selection exclusively favours the right, and they have been accused of spreading misinformation and conspiracy theories. Since this is a very polarizing source, we hope to see a distinct difference in bias perceptions for this source.

From each source, we selected one article that represents their editorial biases in both writing and story selection. We also filtered on brevity, to ensure that participants would not have to read large amounts of text. Articles were selected from archives roughly two to three weeks before the start of the experiment. This ensured that topics were still relevant, but participants who had already read the article had likely forgotten about the exact content, and so would not recognise an article directly. Furthermore, we aimed to select writing that was relatively neutral and non-polarising. We hope that this reduces the effect the actual message might have on bias perceptions, leaving a larger role for its source. We selected the following topics:

**NU.nl:** Russia threatening to ban Twitter due to illegal content<sup>1</sup>

**De Volkskrant:** Electricity grids approaching capacity due to an increase in solar and wind power<sup>2</sup>.

**De Telegraaf:** Community service for arsonist who burnt down radio tower<sup>3</sup>.

**Joop:** People are doubtful of using the AstraZeneca vaccine after stop due to complications<sup>4</sup>

**WNL:** People are afraid of tracking in corona-apps<sup>5</sup>

For **De Dagelijkse Standaard**, we did not select an article. Its editorial and writing style is severely distinct from any other source. An attentive participant would notice immediately if they were shown a DDS article as if were written by NU.nl. However, we did want to include this source because people who are familiar with it, will likely have a visceral reaction to it due to its controversies mentioned earlier. So instead, we selected an article from NOS, the Dutch national

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<sup>1</sup>Rusland dreigt Twitter deze maand te blokkeren vanwege ‘illegale content’ – NU.nl

<sup>2</sup>Door toename zon- en windenergie dreigt stroomnet overvol te raken. Netbeheerder bepleit maatregelen – De Volkskrant

<sup>3</sup>5G-protest: taakstraf voor brandstichting Limburgse zendmast – De Telegraaf

<sup>4</sup>Er wordt weer gevaccineerd met AstraZeneca, maar men wil niet meer – Joop

<sup>5</sup>Huivering voor apps en trackingsystemen: ‘Kennelijk valt het kwartje nu pas’ – WNL



broadcaster. The article covered a suspicious package which had been found near the MPO - the military postal service<sup>6</sup>.

### 3.3 Experiment Setup

Participants in the experiment were directed to visit a questionnaire hosted by LimeSurvey<sup>7</sup>. Here they were explained the supposed purpose of the study. Since the study concerns the Dutch media, the entire questionnaire was in Dutch. A brief English message at the top of the landing page explained that those who did not speak Dutch were not allowed to participate. The remainder of the instructions were in Dutch.

Because the experiment is sensitive to priming, we instead explained that we are studying bias in media, and did not mention source at all. We explain briefly how biased reporting works, and emphasised that participation was anonymous. We also recommended that participants take the questionnaire on a laptop or desktop, and not on a mobile device. Participants could continue to the next page for instructions.

We explained to participants that they were about to be shown six articles, and that they had to rate them on bias. We defined bias as "deviating from a neutral perspective, to favour a particular opinion or perspective". We further explained that they had to rate each article on a scale from 1 (unbiased) to 5 (very biased). We also emphasised that this was not a test, that there were no right or wrong answers, and that we were interested in the individual's impressions. They were then asked to confirm that they consented to participate in the study, and that they had understood the instructions.

At the same time, we assigned each person a random number between 1 and 6. This number dictates the experimental conditions they saw, corresponding to the diagonals of our square of conditions. This ensures that each participant sees each piece of content and each source once.

If participants consented to participate, they were shown six articles. Each of the articles was shown on an individual webpage, and the articles were shown in a random order. Articles were presented as screenshots of a webpage. Above each screenshot was the instruction to look at the article below. Below each screenshot was the question to rate the article's bias.

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<sup>6</sup>Verdacht pakketje met poeder bij Militaire Post Organisatie in Utrecht – NOS

<sup>7</sup><https://www.limesurvey.org/>

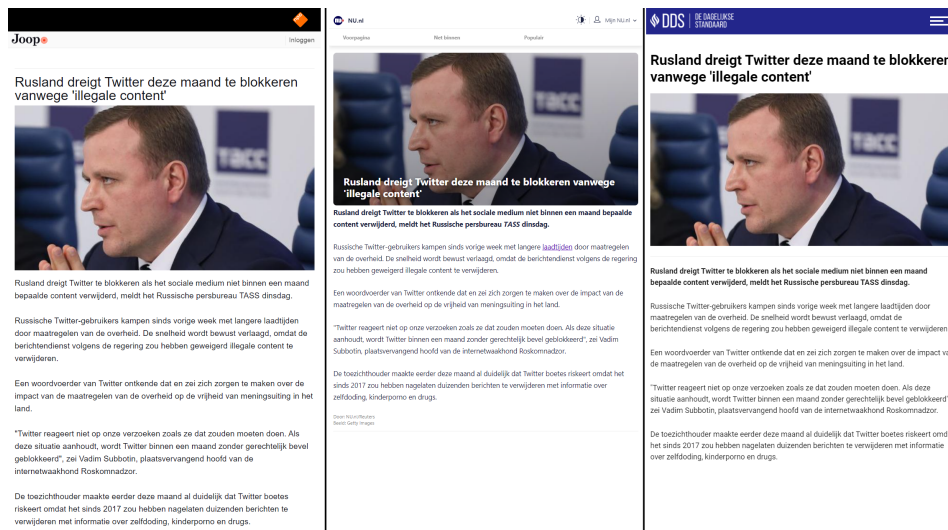


Figure 3.2: One article, different sources. The center article is the original.

Once participants had been shown their six articles, we asked about source familiarity. On a scale from 1 (never heard of it) to 5 (a faithful reader), participants indicated for each source how familiar they were with it. Finally, we collected basic demographic data: age and gender.



Figure 3.3: Revealing the original message source

At this point, we reveal to the participants the true purpose of the study: to research whether a message's source impacts its perceived bias. We explained that different participants saw the same message as coming from different sources. We included graphics that showed the title of each article they read, what source it appeared from and the source it originally came from. See figure 3.3 for an example.

Each graphic could be clicked for a link to the original source. We emphasised once more that this was not a quiz, and that responses were anonymous. We also asked participants to reconfirm that they wished to participate in the study. They were given the option to leave comments or remarks about

the study. After this, the study ended and participants were thanked for their time.

### 3.4 Operationalisation

Bias is measured on a 5 point Likert scale ranging from Unbiased to Biased, as is common in the literature (e.g. [6],[7],[13]). When measuring hostile bias perceptions, a bi-directional scale is also common, with a neutral option at the centre (e.g. favouring Republicans or favouring Democrats) [11][22]. However, the articles presented in this experiment do not always have obvious “sides”, and neither does the Dutch media/political landscape, so such a scale would be inadequate. To measure source familiarity, we also use a 5 point Likert scale. It ranges from 1 (‘Never heard of it’) to 5 (‘I am a faithful reader’).

### 3.5 Sampling

To gather participants for our experiment, we used a convenience sample. Our friends and acquaintances were approached and asked to participate. Furthermore, they were encouraged to share the questionnaire with their friends and family, creating a snowball sample. By revealing the true purpose of our research at the end, we hoped to encourage discussion, which in turn would lead to a larger snowball.

### 3.6 Data Collection

Beyond the answers to the questions laid out above, few data was gathered from the participants. Collection was anonymised through LimeSurvey, which means that data like IP addresses or submission dates were not gathered. We did enable the option to record timings for each question. This allows us to see how long each participant spent on each question, as well as the entire questionnaire.

LimeSurvey also gave us the option to set a cookie to prevent repeated participation. Ultimately, we decided against doing this. It would mean that participants that select incorrectly on either consent question, or those that change their mind, cannot participate in the experiment. Furthermore, this guarantees that multiple participants can all take the survey on the same device.

## Chapter 4

# Results

The experiment ran for a little over five weeks, from April 6th to May 16th. During that time, the survey was available to participants. 134 participants started the survey by continuing to the instructions. Of those, 82 reached the end. A large portion of the remaining group quit before consenting to the instructions. 7 participants withdrew their consent at the end, leaving 75 participants whose responses we now analyse. Statistical analysis was done in Python with the Pandas<sup>1</sup> and Pyplot<sup>2</sup> packages.

### 4.1 Demographics

We collected basic demographic data, age and gender. Men were about twice as common as women. One participant answered 'Other' without specifying. Instead of asking for a specific date of birth, we asked participants to place themselves in one of four categories based on year of birth. The full results can be seen in table 4.1

### 4.2 Group Assignment

Each participant was assigned randomly to one group, belonging to one of the six diagonals on our square of conditions. Because this assignment was done randomly, not all groups had the same amount of participants. The number of participants can be seen in table 4.2

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<sup>1</sup><https://pandas.pydata.org/>

<sup>2</sup><https://matplotlib.org/>

<b>Year of Birth</b>	<b>Occurrence</b>	<b>Gender</b>	<b>Occurrence</b>
1985 to 2004	25	Male	48
1965 to 1984	19	Female	26
1945 to 1964	28	Other	1
1944 or earlier	3		
Total	75	Total	75

Table 4.1: Demographic data of participants

<b>Group No.</b>	<b>Count</b>
1	10
2	13
3	13
4	10
5	15
6	14

Table 4.2: Number of participants of each groups

In table 4.3 we see the conditions that each group was exposed to. The top row represents the six sources, and the contents of the cell represent the topic that was shown as belonging to that source. For example, group 1 saw the article about Russia and Twitter as originating from *De Volkskrant*.

	<b>Telegraaf</b>	<b>WNL</b>	<b>NU</b>	<b>Volkskrant</b>	<b>Joop</b>	<b>DDS</b>
Group 1	5G	Apps	Package	Russia	Power	Vaccine
Group 2	Apps	Package	Russia	Power	Vaccine	5G
Group 3	Package	Russia	Power	Vaccine	5G	Apps
Group 4	Russia	Power	Vaccine	5G	Apps	Package
Group 5	Power	Vaccine	5G	Apps	Package	Russia
Group 6	Vaccine	5G	Apps	Package	Russia	Power

Table 4.3: Assignment of source and topic to groups

### 4.3 Bias Ratings

Now, let us look at the ratings of each individual conditions. In figure 4.1 we can see a boxplot for each topic. Since we are primarily interested in the

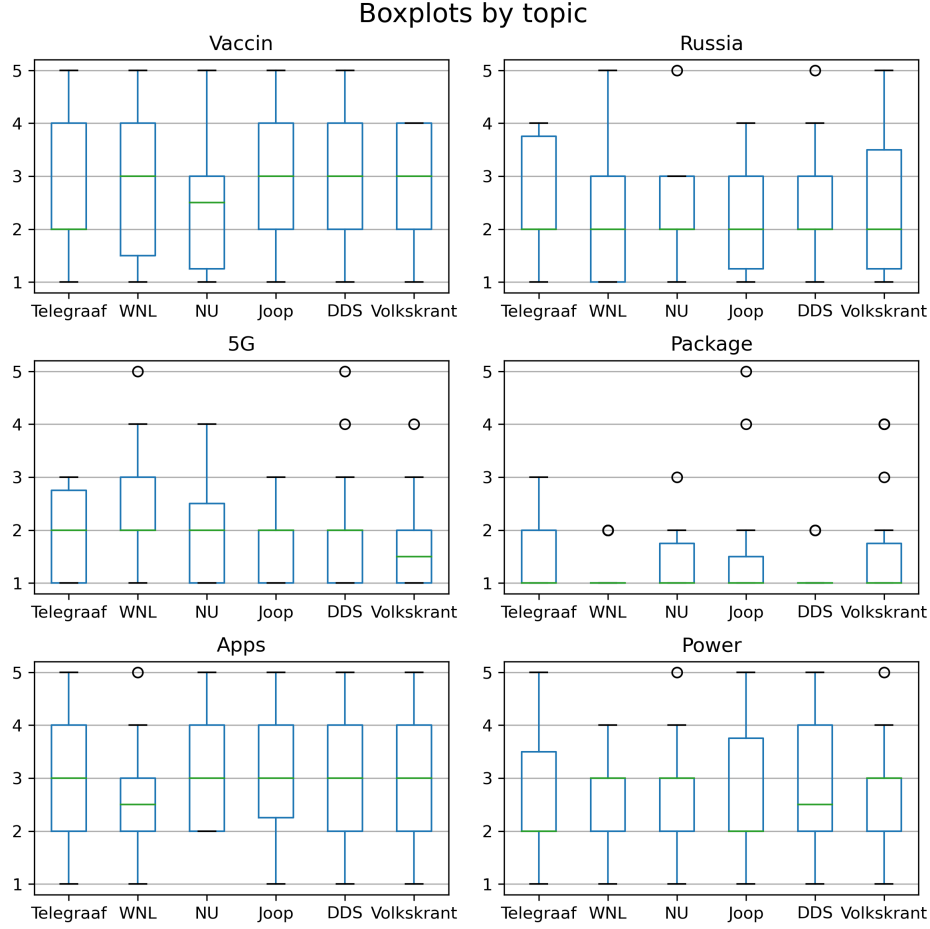


Figure 4.1: Bias ratings for each topic, by source

results for each individual topic across different sources, we need to compare the contents of each chart - not the results between charts. When we do, we can see that results are largely inconclusive and differences between sources are minimal. Consider the ratings of the ‘Package’ condition. The mean is the same for each source. The only real difference we can see is in the outliers. Much the same can be said for the other topics. The means all lie roughly around the same value. However, we can also tell that there are significant differences *between* topics. Note that the mean for the ‘Package’ conditions lies around 1, whereas the mean for the ‘Apps’ condition approaches 3. We can aggregate the data presented here to get a better understanding of potential differences between sources and across topics. We can see this data presented in 4.2 and 4.3. In figure 4.2, we combine all datapoints from a particular topic into one set and present that as a column of the boxplot. For example, the ‘Russia’ column combines data from the conditions about

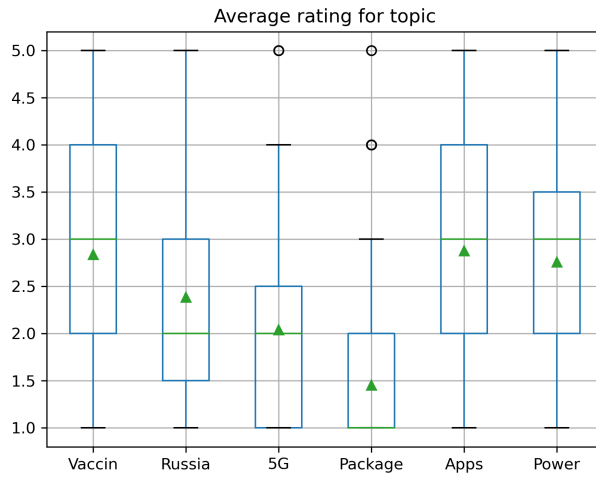


Figure 4.2: Rating for individual topics

Russia from all six sources. In figure 4.3, we see the same, except we consider the sources. So the ‘Telegraaf’ column contains data for all conditions with the Telegraaf as source, regardless of topic.

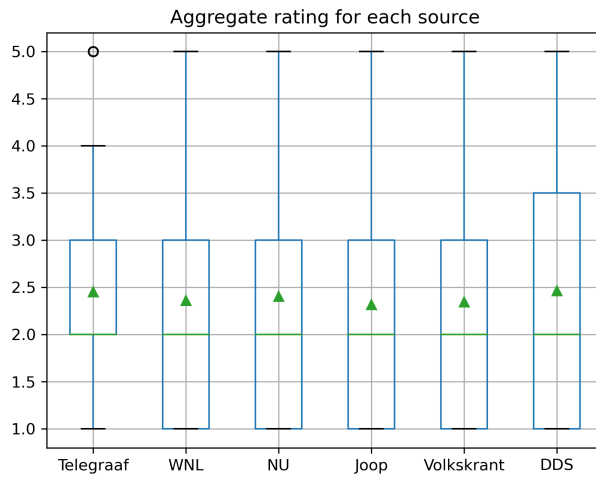


Figure 4.3: Rating for individual sources

First, we will discuss figure 4.3. We can see that when we disregard specific topics, most sources were rated roughly the same. The means of each rating are 2, and the confidence intervals are all roughly equivalent. However, when

we look at 4.2 we can see significant differences between each topic. We see that the 'Package' article was seen as least biased. The articles on vaccines, apps and power were all rated much higher, with a mean of 3.

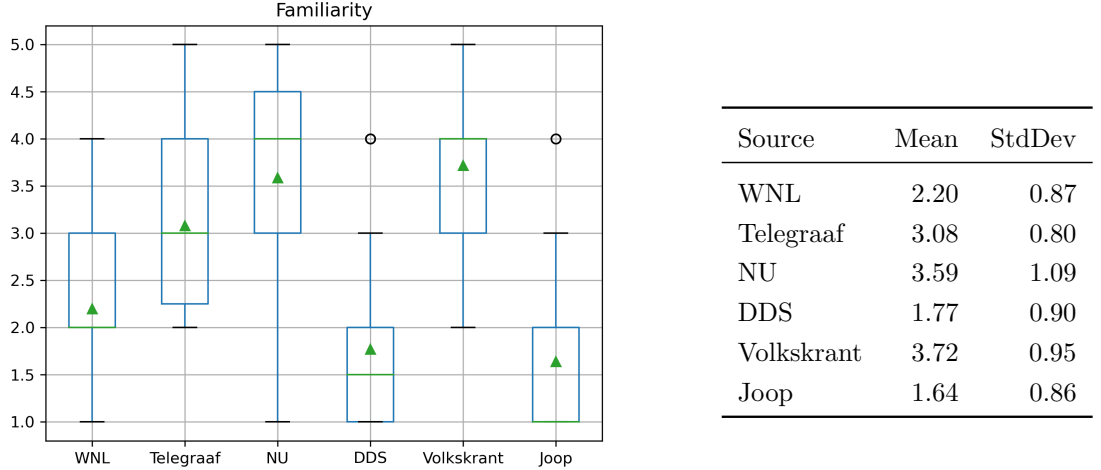


Figure 4.4: Familiarity by source

## 4.4 Familiarity

In section 3.3 we explained how we measured familiarity with a source - through a 5-point likert scale. We can see the results of this in figure 4.4. Notably, we can see that most people were rather familiar with 'De Telegraaf', 'NU.nl' and 'De Volkskrant'. 'WNL' ranked slightly lower, and 'De Dagelijkse Standaard' and 'Joop' were largely unheard of

As hypothesised in the introduction, we might expect there to be a correlation between the perceived bias of a source and the familiarity with that source. To investigate this hypothesis, we calculate the Pearson correlation coefficient. We find the results in table 4.4, where a value of  $-1$  indicates a negative linear correlation, a value of  $1$  indicates a positive linear correlation, and a value of  $0$  indicates no correlation. We can see here that most values are very close to  $0$ . However, when we compare the rating of bias between two sources, e.g. the correlation between a rating for De Volkskrant

Source	Pearson
WNL	0.139
Telegraaf	-0.065
NU	-0.117
DDS	0.116
Volkskrant	0.105
Joop	-0.054
All Sources	0.016

Table 4.4: Pearson Correlation for Familiarity



and De Telegraaf, we do find a significant correlation. For example, Pearson's coefficient for (Volkskrant,Telegraaf) is 0.36, for (Volkskrant,DDS) it is 0.25, and for (Telegraaf,WNL) it is 0.24. So, a participant who gave a higher bias rating for De Volkskrant is more likely to also give a high rating for De Telegraaf, DDS, or WNL. We will discuss the implications of this in chapter 5

## Chapter 5

# Discussion

Now that we have completed our research and processed the results, we will compare this to other works. We will discuss our three hypotheses in detail, and close with some general remarks about the setup of the research.

### 5.1 Bias and Source

Primarily, we were interested in the relation between bias and source. In chapter 1 we hypothesised that the *same* message, shown from *different* sources would be perceived differently based on its source. Based on our findings in chapter 4 we can conclude that this is not the case, and so we must reject *H1*. Namely, we see in figure 4.3 that each source scores roughly the same in regards to average bias rating. Furthermore, there are very few topics (figure 4.1) for which there is a significant difference in bias ratings across sources.

This contradicts the findings of Soontjes & Van Erkel [17], who found a significant difference between the bias ratings of various left and right leaning sources. The most obvious explanation is that the actual message plays a far greater role in bias perceptions than source. To confirm this hypothesis, in future research we might ask about the perceived bias of a source outside of the context of a news article.

## 5.2 Bias and Topic

In figure 4.2 we see a distinct difference for different topics. However, no article was seen as very biased – all averaged a mean below 3. The ‘Package’ article from NOS ranked the lowest, with a mean of 1.45. This is consistent with Kelly’s findings, who found that the content of a message is a primary motivator in assessing its bias [11]. We can thus confirm *H3*.

## 5.3 Bias and Familiarity

Most interestingly, there appeared to be no correlation between the perceived bias of a source and the level of familiarity present in the subject. That means that most participants were able to measure bias ‘objectively’, insofar as that is possible. They were not more favourable towards a source if they were familiar with it, nor more unfavourable if they were largely unfamiliar with it. Thus, we must reject *H2*.

Additionally, we find a *positive* correlation between sources on opposite sites of the political spectrum - participants that rated right-leaning sources such as ‘De Telegraaf’ or ‘De Dagelijkse Standaard’ as biased were also more likely to rate left leaning sources such as ‘Joop’ or ‘De Volkskrant’ as more biased. Again, here we find large contradictions with the existing literature. According to Barnidge et al.[1], we’d expect a certain level of politically motivated selective exposure. In other words, a reader who favours right-leaning sources should shun left-leaning sources. Notably, this is not the case.

Selective exposure has a wealth of literature behind it, and conclusions are generally similar: politically motivated selective exposure leads to an increased perception of bias in hostile sources, and a decreased perception of bias in congenial sources [2][4][11]. The fact our findings contradict these conclusions is interesting to say the least. One explanation is that the media landscape in the Netherlands is less polarised and less divided than that of the US. Of course, many of the works of other authors rely on US demographics, which has a much more fractured and polarised media landscape. We might deduce that, at least in the Netherlands, most people have a trust towards media. While they might find some particular message to be biased, this never reflects on the source as a whole. Of course, without knowing anything about the political leanings of our respondents, this is difficult to confirm. We highlight this as an area for possible research in the future.

Alternatively, the lack of a hostile media effect could be explained due to our choice of topics. In most literature, the hostile media effect is studied when a topic is controversial or divisive. Consider the original work by Vallone et al. [22], where the perception of the Beirut massacre was split between pro-Arab and pro-Israeli. The work of Kelly also relied on such divisiveness, in this case the Republican and Democratic parties [11]. When we selected topics to use as experimental conditions, we explicitly sought out topics that were relatively neutral, to reduce the effect of bias introduced by the article. However, this might have actually been a factor in explaining why we saw little difference in perceived bias. It could well be that we see a stronger relation between source and bias perceptions when the topics at hand are considered controversial – due to the presence of the hostile media effect. We once again leave this to further research.

## 5.4 Experiment Setup & Data Collection

The most obvious explanation for explaining some of these factors is the way our experiment was set up. For one, we had a relatively small, non-representative sample ( $N=75$ ). Furthermore, we knew only basic demographic information, whilst most research of this kind tends to collect more. As an example, we could have asked about general media consumption habits or political leaning. However, we did not do this because our questionnaire was already long, so this in turn might have led to a reduced response rate.

While the choice of using a Likert-scale was easy and obvious, it might have had some limitations. We could have alternatively elected to use a more complete scale, such as the one constructed by Meyer [13] to measure credibility of newspapers. This would have given us the ability to work closer to existing literature, as most research on this topic also considers credibility, of which (perceived) bias is merely a factor.

## 5.5 Participant Comments

At the end of the experiment, we gave each participant an opportunity to leave some final thoughts on the experiment. We’d like to discuss a few of these, as they provide an interesting insight into the way our participants perceived the experiment. All of these citations have been translated from the original Dutch.

“I had the idea that a number of articles were largely unbiased

because they described what happened, and never gave their own opinion. But ultimately all writers (and all media) have some form of bias of course” — Participant 22

One definition of bias is the amount in which the author’s opinion is (obviously) present. Similarly, an article that presents “just the facts” is often seen as unbiased. However, this is not the case, as this participant correctly points out. Dutch philosopher and author Rob Wijnberg describes this: “Why does the evening news never open with a piece about delayed trains in Russia?” [23]. Ultimately, authors and editors are responsible for the content of a piece. That means deciding what articles to publish, which is inherently a subjective decision and thus subject to bias. Furthermore, an author must decide which facts are relevant and which aren’t. Is a politician’s divorce worth mentioning in an article about a scandal they were involved in? There is no way to ‘objectively’ represent reality in media. Journalists must play the role of gatekeeper in deciding what and what not to show us.[3][14]

“I made a promise to myself to only consider the content, and not the source. I even scrolled past the source of the last three articles, so I didn’t have to see it. However, I’m not sure I do this when I consume media normally.” — Participant 51

“I gave answers based on the content of the article” — Participant 30

It seems as though the behaviour of these participants is actually the norm, where there is little consideration for the source of a message in rating its bias. In fact, others too pointed out that they’d ignored the source and only considered the content. This is consistent with our findings, where source had little impact on perceived bias. This participant could very well be correct that this behaviour does not occur in daily media consumption. However, this would be a limitation of *all* perceived bias research, not just ours.

## Chapter 6

# Conclusion

We have had to reject two of our three hypotheses. We expected to find a difference between the perceived bias of varying sources (H1), but this was not the case. Furthermore, we had expected a relationship between familiarity with a source and the level of perceived bias (H2), but we could not find such a relationship. However, we did confirm previous findings that a content's message is a primary aspect of bias judgements (H3).

Our findings have been in stark contrast with much of the existing literature, which provide interesting opportunities for further research. For one, we might investigate perceptions of bias outside the context of an article. In addition, we might repeat this research but modify our selection of articles to include topics that are seen as controversial, in order to emphasise the presence of the hostile media effect.

Based on this research, we see now that we must adjust our knowledge of selective exposure slightly. While consumers do distinctly note biases in messages, those perceived biases rarely stem from the source of the message. Instead, when most people are moderates and the media landscape is large and varied, people tend to trust those media. They are adept at spotting bias present in content, and their judgement is rarely clouded by preconceived notions of media. We are perhaps slightly more rational than we've been led to believe.

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