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Two Different Debates? Investigating the Relationship Between a Political Debate on TV and Simultaneous Comments on Twitter

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Abstract

While watching television, more and more citizens comment the program live on social media. This is especially interesting in the case of political debates, as viewers' comments might not only allow us to tap into public opinion, but they can also be an influential factor of their own and contribute to public discourse. This article analyzes how the TV debate between the candidates for chancellor during the German election campaign 2013 was discussed on Twitter. To do so, the transcript of the debate is linked to a set of $N = 120,557$ tweets containing the hashtag #tvduell. The results indicate that the candidates were only to a minor degree successful in getting their topics to the Twitter debate. An optimistic reading of the results suggests that Twitter serves as a complement to draw attention to topics neglected in the official debate. A more pessimistic reading would point to the fact that the discourse on Twitter seems to be dominated by sarcastic or funny rather than by substantial content.

Keywords

twitter, second screen, political debate, election campaign, German elections, #tvduell

Introduction

Broadcasting events on TV is not as one directional as it used to be. Sure, there have always been different feedback channels, but they were limited to telephone calls and letters—and, most importantly, the TV station, not the user, was in control. This has changed: In the last years, it has become quite normal to sit with a smartphone or tablet on the sofa, watch TV, and simultaneously voice one's opinion on Twitter or Facebook (Courtois & d'Heer, 2012). This commenting on the

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so-called second screen happens with a wide range of programs, ranging from soap operas to sports events or talk shows. In this article, the phenomenon is discussed in the context of political debates. Stimulating political discussion is usually seen as something valuable, and one can easily argue that the vanishing spatial and time constraints make deliberation in the Habermasian sense finally possible: an open, unconstrained discussion of all citizens. This could especially happen in a medium where anyone can join the discussion, the prime example of which is currently Twitter. Notwithstanding these arguments, there are some who argue that online media are not used this way. People would rather connect with people who share their ideology, and consequently, voicing political opinions online would be preaching to the choir (Conover, Gonçalves, Flammini, & Menczer, 2012; Pariser, 2011; Plotkowiak & Stanoevska-Slabeva, 2013; Sunstein, 2007). But practices have emerged that suggest the discourse is more diverse. For example, on Twitter, discussions are often organized around key words, the so-called hashtags. In the context of a political debate, then, supporters of *all* candidates are likely to use the same hashtag, thereby getting exposed to each other's arguments.

Observing the online discussion of a live event can give us some valuable insights into how the public perceives the event. In the case of a political debate, we can tap into how the public perceives the debate, the performance of the candidates, and also the quality of specific arguments. Focusing on the medium that is currently most widely used for this purpose, Twitter, this article addresses the following question: *To which extent are the statements politicians make during a TV debate reflected in online live discussions of the debate?*

Theoretical Background and Related Research

Twitter as a Space for Political Discourse

In recent years, Twitter's popularity among actors in the political arena has rapidly increased. Great numbers of politicians in many countries use Twitter, and researchers (e.g., Ausserhofer & Maireder, 2013) have started mapping political Twitterspheres (for a comprehensive literature review on the use of Twitter in a political context, see Jungherr, 2014). But what political function can Twitter serve in society? For the sake of the argument, let us distinguish two perspectives on Twitter in political communication: (1) Twitter as a tool for persuasion and mobilization and (2) Twitter as a tool for a deliberative discourse. An example for the first perspective would be the legitimate attempt of political actors to convince possible voters. Or, arguing from the point of view of a "participatory liberal theory of democracy" (Ferree, Gamson, Gerhards, & Rucht, 2002, p. 317), one could argue that Twitter leads to *empowerment* of those who are not in power and point to the role of social media in uprisings like the Arab Spring (see, e.g., Sayed, 2011). The second perspective would also support the idea that inclusion of nonelite actors is an important goal that social media can help to achieve. But in contrast to the first perspective, it stresses the notions of *dialogue* and *consensus* (see Ferree et al., 2002) rather than the notion of empowerment.

While the Internet in general has been welcomed as a tool to facilitate such a discourse (e.g., Dahlberg, 2001), it remained unclear what kind of online tool would be most likely to host such a discourse. Twitter, by design, seems to be a social medium where a deliberative discourse could take place. It is inherently open: In contrast to media like Facebook,¹ messages are meant to be viewed by anyone, and anyone can interact with whomsoever. While it is technically possible to protect a Twitter account, this is hardly ever done and considered to be in conflict with the purpose of tweeting. Reciprocity is neither technically nor socially expected: Unlike "friending" on Facebook, following on Twitter is not a reciprocal act. And, in fact, it is not even necessary to be connected at all to react on someone else's messages. Rather than viewing a person's messages, one can choose to view all messages related to a topic (a #hashtag) and also reply to any of them. These characteristics

fit an important requirement of a public sphere, as envisioned by Habermas (1962): Power constraints vanish, because anyone, independent of his or her status or power, can interact with anyone else.

There are, of course, also doubts about the extent to which such a deliberative discourse can take place on Twitter. First of all, the majority of people still do not take part in it, and those who do so, are not necessarily representative for the rest (Bakker, 2013). Especially in Germany, only a tiny share of the population uses Twitter at all—some estimate the penetration as low as 1% (PeerReach, 2013). And even those who do use Twitter for political purposes do not automatically engage in a deliberative discourse, exchanging rational arguments in order to achieve consensus. Building on the idea of online communication taking place in an “echo chamber” (e.g., Sunstein, 2007) or “filter bubble” (Pariser, 2011), some have argued that the political content people engage with on Twitter mostly stems from like-minded people (e.g., Conover et al., 2012) and that therefore, Twitter is not a space of vibrant discussion of political topics by a wide range of citizens. Others have doubted this and argue that exposure to crosscutting opinions actually does take place on Twitter (Morgan, Shafiq, & Lampe, 2013). More in general, Larsson and Moe (2011) point to several studies that suggest that Twitter is more often used for disseminating information than for real discussion.

However imperfect the political discourse on Twitter may be, it undoubtedly is taken serious by media and politics. For example, journalists often comment on “what people say on Twitter” when a political event is analyzed on TV, and using tweets as an illustration along all types of news is becoming common. Such ad hoc attempts to tap into public opinion, while undoubtedly interesting, of course lack any systematic approach and therefore are of questionable validity. It is tempting to try and apply an algorithm to this end. A popular branch is the attempt to replace traditional public opinion polls and predict election outcomes. An illustration of the hopes associated with this technique and the questionable outcomes is the example of a study by Tumasjan, Sprenger, Sandner, and Welp (2010), who claimed to have predicted the German election outcome, and the heavy criticism of that article by Jungherr, Jürgens, and Schoen (2011). An extensive review (Gayo-Avello, 2013) summarizes the problems and shortcomings of Twitter studies that aim to predict election outcomes, employing various methods, reaching from mere tweet counts to sentiment analysis. While most of these approaches perform rather unsatisfactorily when compared to sensible baselines or traditional public opinion polls, Gayo-Avello (2013) recognizes some potential and advocates further development of Twitter-based predictions, which he advises to combine with traditional methods like public opinion polls.

While it has sufficiently been demonstrated that public opinion can manifest itself on Twitter, the question how this manifestation takes form in the context of a specific political event is not fully answered yet. In this article, I am interested in the political use of Twitter during an election debate and in the question how these two debates—the one on TV and the one on Twitter—are linked and intertwined. Although analyzing tweets probably is not a good way to predict votes and to give an accurate estimate of proportions of the population that support a specific policy, it can offer in-depth insight into how the public (or, at least, the part of the public that is using Twitter) perceives the debate. In former times, commenting on and analyzing the debate was something that happened in the newspapers the morning after (and, more recently, using instant polls of the public to determine a “winner” of the debate). But nowadays, by having a look at social media, it is possible to get a much deeper understanding of *what* it actually is that these people communicate about as a result of the debate they have watched. This is especially interesting as these tweets also influence journalistic coverage: For instance, the day after the German election debate, many media wrote about how the candidates performed according to Internet users (e.g., “Der Sieger im Netz: Auf Twitter interessiert anderes als im Studio,” 2013)—which can lead to cascade effects on public opinion.

TV Debates in Election Campaigns

In many democratic societies, TV debates play an important role in election campaigns. They receive a huge amount of media attention and are traditionally seen as pivotal moments. The format of these debates differs widely, although one can observe a general tendency toward more strictly regulated formats where the candidates have to comply with strict time frames and other restrictions imposed by the planners of the debate and the interviewers (cf. Brants & Van Praag, 2006; Trent & Friedenberg, 2008).

Although some therefore regard TV debates as no real debates but rather as a “dual press conference” (Bishop & Hillygus, 2011, p. 212), TV debates can have important effects. For example, McKinney and Warner (2013) show in a series of experiments that TV debates affect vote intentions. Furthermore, there are many real-world examples of indirect but powerful effects: During the last national election campaign in the Netherlands, the perceived performance of the candidates during such a debate led to a shift in news coverage. In hindsight, this is considered a turning point in the campaign, as it has resulted in a steady decline in the polls for one of the candidates (e.g., Van de Linde, 2012).

It should be noted, however, that the importance of televised political debates during campaigns varies between countries, depending on their political culture and political system. Germany, for instance, has not broadcasted such debates for decennia. Its electoral system is, in essence, proportional rather than majoritarian. The emphasis thus lies on votes for parties, not votes for people. Neither the head of state nor the head of the government is elected directly. Strictly speaking, terms like “presidential debate” or “chancellor debate” are inappropriate for the German case. Nevertheless, although the two candidates in the debate under study, Angela Merkel and Peer Steinbrück, are elected by the parliament and not directly by the voter, one could argue that already at the time of the debate, it was indeed extremely likely that one of them would become chancellor of the Federal Republic of Germany. After all, the voters decide on the composition of the parliament, and as voting for the Christian Democrats (Christian Democratic Union [CDU]), the party of Angela Merkel, very likely leads to Angela Merkel becoming chancellor, one could assume that the structure of the debate largely parallels presidential debates in other countries. In line with this, there is some valid criticism on the setup of the debate itself: By restricting the debate to the two candidates of the two largest parties, it emphasizes the impression of a personalized presidential election—which is not the case—and disadvantages smaller parties, although they form coalitions with the major parties and end up in government very frequently. A similar discussion took place in the Netherlands, where in the beginning of the campaign, people were looking forward to a debate between two candidates (Van den Dool, 2012), while the party of a third candidate in the end became much stronger than one of those two who were believed to become minister-president.

Commenting the TV Debate on Twitter

For a growing number of users of tablet computers, commenting television programs on social network sites or second-screen apps has become a regular pattern of behavior (Courtois & d’Heer, 2012). When they comment on political debates, their comments have shown to reflect the structure of the debate (Shamma, Churchill, & Kennedy, 2010; Shamma, Kennedy, & Churchill, 2009)—which is why Shamma and colleagues speak about “implicit community annotation” of the debate. But what are the Twitter users annotating? An analysis of the tweets during Obama’s Nobel Prize speech found a strong focus on subjective and emotional messages, less on information—a pattern that in fact is not too different from the tweets about the entertainment show *So You Think You Can Dance* (Wohn & Na, 2011). Another reason why the term “annotating” might be a good description of the phenomenon is that one can doubt that real discussion emerges: Among those using a second-

screen hashtag, there is a low reciprocity. If people discuss at all, it seems to be with their friends (Doughty, Rowland, & Lawson, 2012). But if they discuss, what is it that they talk about?

For the German election debates, it has been found that especially the issues discussed influenced how viewers perceived the debate (Nagel, Maurer, & Reinemann, 2012). Those authors gave people a device with which they could continuously indicate their impression of one of the two candidates while watching the debate. Their second-by-second analysis revealed that turning the handle on the device toward one candidate depended mainly on the subject discussed and much less on aspects like the rhetorical skills or the tone employed by the candidates. A more sophisticated analysis of these real-time responses to German election debates by De Nooy and Maier (2014) even revealed that among all effects, the strongest influence on candidate evaluations can be ascribed to a speaker effect: The mere fact that someone is speaking influences his or her evaluation positively. If people would consistently use a tag like “+” or “-” connected to a candidate’s or party’s name to indicate their approval in a tweet, a study like the one by Nagel, Maurer, and Reinemann (2012) could be replicated on Twitter—which actually has been suggested by some (Jungherr, 2013) and even has been implemented under the URL <http://twitterbarometer.de>. Nevertheless, very little is known about the size and composition of the group that followed this suggestion, which makes it difficult to generalize the results presented on that website.

The issues of the debate are largely set by the interviewers and follow a specific *media logic* beyond the direct control of the candidates (Brants & Van Praag, 2006). Nevertheless, drawing on the large body of research on *agenda setting* (e.g., McCombs & Reynolds, 2009), one can expect that the candidates actively try to highlight the issues they own (i.e., the issues they are associated with and that are perceived as their strong points). The presence of these topics in the media content would then put these topics on the public agenda (a so-called first-level agenda-setting effect)—but also within these topics, the salience of specific aspects of the topic at hand can have an influence on as how important these attributes are perceived (which is called second-level agenda setting). In tweets about a debate, such an effect can be expected to become visible: The aspects highlighted by the candidates will, according to the theory, also dominate the tweets.

Similarly, also based on the concept of *framing*, one can expect that the candidates will try to highlight strategically some aspects of the issue (e.g., Hänggli & Kriesi, 2012). The central question in this regard is in how far this tactic is successful: Do the audience, in this case the Twitter users, *accept* these frames and use them as well, or do they establish their own frames? This is of particular interest for the discourse as a whole: Once established, the frame might subsequently be used by those commenting on the debate (like journalists, politicians, or ordinary citizens) and give an advantage to those who profit from it. While not studied in detail yet, such a link between how something is said on TV and how it is discussed on Twitter has been established before: For example, controversial topics in a political TV debate elicit stronger (i.e., more controversial) reactions on Twitter (Diakopoulos & Shamma, 2010).

If we follow Entman’s definition of framing, we see why measuring frames on Twitter can be difficult. He writes, “To frame is to select some aspects of a perceived reality and make them more salient in a communicating text, in such a way as to promote a particular problem definition, causal interpretation, moral evaluation, and/or treatment recommendation for the item described” (Entman, 1993, p. 52). Applying this to Twitter research, it is important to acknowledge that identifying *all* of these items within the 140 characters of a tweet is pretty much impossible. However, the “and/or” in the definition indicates that not always all of these elements have to be explicitly named.

Summing up the arguments, we can state that while the characteristics of the medium under study may make it difficult to detect fine-grained and subtle differences between frames, at the very least, both agenda setting and framing theory give us reason to expect that there is a link between the words the candidates use on TV and the words Twitter users use when discussing the debate.

Research Questions

Based on the considerations outlined previously, the following research questions are answered, investigating the discussion on Twitter using the hashtag #tvduell during the TV debate between the two main candidates in the German national elections 2013.

The first research question aims at the statements the candidates make during the debate.

Research Question 1: Which topics are emphasized by the candidates?

Then, the focus is shifted toward the statements the Twitter users make:

Research Question 2: Which topics are emphasized by the Twitter users?

In the next step, I will investigate which of the two candidates is more successful in the sense that he or she is also associated with the topics he or she puts forward on TV—and not with other, unfavorable ones.

Research Question 3: With which topics are the two candidates associated on Twitter?

These questions together will provide an answer to the overarching question: To which extent are the statements politicians make during a TV debate reflected in online live discussions of the debate?

Method

Case Under Study

The German national elections were held on September 22, 2013. During the campaign, the first candidate of the two major parties (one of which would most likely become chancellor) was taking part in one TV debate advertised as “TV-Duell,” which took place on Sunday, September 1, at 20.30. The leaders of the other parties were debating a day later.

During 90 min, the two candidates were asked questions by a team of four hosts. The setup differed from the setup in previous years. The hosts—Anne Will, Stefan Raab, Peter Kloeppel, and Maybritt Illner—were journalists and hosts working at different stations, both commercial and public service ones. The debate reflected to a high degree Bishop and Hillygus’ (2011, p. 212) notion of a TV debate as a “dual press conference”: The hosts acted as interviewers and were directly asking specific questions to one of the candidates, which means that there was more interaction between the interviewers and each candidate than among the candidates.

Data Collection

Candidate statements. The televised debate was recorded using an online TV recorder service, and a transcript of the debate was obtained from <http://www.wahl.de/tvduell>. It was manually transformed into a tab-separated file with one column identifying the speaker and a second column containing her or his statement.

Tweets. Following a common approach, I used a slightly modified version of yourTwrapperkeeper (Bruns, 2011) to harvest tweets containing the hashtag #tvduell. This approach is, due to limitations imposed by Twitter, not capable of collecting *all* Tweets—and it has been shown that the resulting sample is not completely random and therefore not completely representative for the population of tweets (Morstatter, Pfeffer, Liu, & Carley, 2013). However, as I do not aim to obtain accurate polling estimates and as it is unlikely that the bias of the sample substantially affects the topics appearing in the data, I believe that the sample fits my purpose well enough.

Figure 1. Frequency distribution of tweets.

Note. Number of tweets in the sample by intervals of 5 min, plus the number of tweets in the hour before and after the sampling period (i.e., the time of the debate).

For the purpose of this study, I am only interested in the tweets sent during the debate itself. As Figure 1 shows, the use of the hashtag #tvduell skyrocketed at the beginning of the debate, but already half an hour after the last sentence has been spoken, the discussion largely comes to an end. Immediately after the debate, the debate was discussed in a talk show on the same TV channel, so people may have continued using the hashtag #tvduell while referring to new input they received from this show; therefore, I decided to include only tweets in the sample that were sent between the first and last minute of the debate. This maximizes the probability that most tweets in the sample can be seen as live commentary of the debate. This results in a sample of $N = 120,557$ tweets by $N = 24,796$ different users.

Preprocessing and Analysis

I wrote a series of Python scripts (which can be obtained from www.damiantrilling.net/downloads/twodifferentdebatescripts.tar.gz) to analyze the tweets. I removed stop words and stemmed all words employing the GermanStemmer-Snowball algorithm which is provided by the NLTK package (Bird, Klein, & Loper, 2009). When referring to a “word” in the Results section, I am therefore referring to the stem of a word and do not distinguish between, for example, “voting,” “votes,” “voted,” and “vote.” Words commonly used by both candidates that were unsuitable for the distinction of topics and angles (e.g., the most frequently nouns used by both candidates include “Germany,” “country,” and “people”) were added to the lists of stop words. The

Figure 2. Relationship between words on TV and on Twitter.

Note. $N = 21,411$. The relationship between the logarithms of the word counts can be described with a linear equation as $\ln(1 + \text{twitter}) = 1.631 \times \ln(1 + \text{tv}) + 1.639$ (which equals a correlation of .31), or, a bit more accurately, with a fractional polynomial equation as $\ln(1 + \text{twitter}) = 0.126 \times (x^{-2} - 46.951) - 7.588 \times (x^{-0.5} - 2.618) - 3.242$, where $x = \ln(1 + \text{tv}) + 0.0870$.

complete list can be found in the script. Next to calculating word frequencies, I determined the importance of words by following the approach suggested by Rayson and Garside (2000) who calculate log likelihoods and interpret the result qualitatively.

To visualize word co-occurrences, I developed a Python script that calculates how often each word co-occurs with each other word in the same tweet. Defining each word as a node (with the total frequency of the word represented by its size) and each co-occurrence as an edge (the edge weight representing the number of co-occurrences), it saves the results in a GDF network file. This file was imported to Gephi for visualization.

Results

To start with, I globally assess whether there is a connection between the words the candidates use on TV and the words used on Twitter. To which extent do they adopt them and link them to the candidates? In other words, how successful are both candidates in pushing their points?

First of all, even without examining the question which words are used exactly, there seems to be a clear relationship between words mentioned in the debate and words mentioned on Twitter.

As Figure 2 shows, there is an approximately linear relationship between the logarithms of the times a word is used on both TV and Twitter. To put it in a different way, a word repeatedly used on TV gets tremendously more attention on Twitter than a word used less frequently. But the relationship can be modeled even better than with a linear model. The second curve represented in the figure (a fractional

Table 1. Relationship Between Words on TV and on Twitter.

	Model 1 ln(word frequency Twitter + I) <i>b</i> (SE) β	Model 2 ln(word frequency Twitter, co-occurring with Merkel + I) <i>b</i> (SE) β	Model 3 ln(word frequency Twitter, co-occurring with Steinbrück + I) <i>b</i> (SE) β
ln (word frequency TV Merkel + I)	1.59 (.052)*** .21	1.54 (.041)*** .26	.77 (.037)*** .14
ln (word frequency TV Steinbrück + I)	1.29 (.051)*** .17	.88 (.041)*** .15	1.25 (.037)*** .24
Intercept	1.64 (.008)***	.87 (.007)***	.60 (.006)***
R^2	.100	.115	.100
Test if the <i>b</i> coefficients Merkel and Steinbrück are different	$F(1, 21,408) = 12.29$ $p < .001$	$F(1, 21,408) = 96.69$ $p < .001$	$F(1, 21,408) = 63.38$ $p < .001$

Note. Ordinary least squares (OLS) regressions to predict how often Merkel's and Steinbrück's words are used on Twitter in general, on Twitter together with a mention of Merkel's name, and on Twitter together with a mention of Steinbrück's name. $N = 21,411$.

polynomial model) reveals that using a word only once has little effect—it has to be mentioned at least twice. Besides, at some point when a word is used extremely often, the effect wears off. This second model explains 10.5% of the variance compared to 9.7% of the simple linear model.²

Note the huge amount of words that score a 0 on the x-axis (in other words, that are not mentioned on TV but are mentioned on Twitter). The following are the two reasons for this: First of all, because of the large amount of tweets, it is pretty likely that a huge variety of words occur just by chance in the sample. Second, as I will discuss subsequently, there are some distinct topics talked about on Twitter *about* the TV debate, which are not part of the debate itself. A large amount of tweets are, for example, about a necklace Merkel was wearing. Also the other way round, there are some words that score a 0 on the y axis (words used on TV that did not make it to Twitter). An inspection shows that among these there are technical terms used by the debaters (like, e.g., *pflegerberufe* [jobs in the care sector], *umlagefinanziert* [pay-as-you-go financing], *rentenversicherungsbeitrag* [old age pension scheme contribution]) that are very cumbersome and unlikely to be used in a tweet of 140 characters, especially when written by a nonpolitician or nonprofessional.

Table 1 shows that both politicians seem to have similar influences on the Twitter discourse: The words they use on TV are not only more likely to be mentioned on Twitter at all but also more likely to be mentioned *together with their name*. If there are any differences, one could state that words used by Merkel seem to have a slightly stronger effect, but the overall picture is very similar.

Having established the notion of a potential for both candidates to influence with their word choice on Twitter, I turn to a detailed analysis (Table 2) of the words they use and the words used on Twitter. Regarding the statements on TV, there is a remarkable overlap: Central topics seem to be employment (*arbeit*, *arbeitsplatz* [job]), Europe, and the Euro. But also some differences emerge: Merkel had to defend her policy on financial support of Greece, which was probably due to the setup of the debate, which—as outlined previously—had some characteristics of a double interview. Steinbrück emphasizes social security topics (“*pfleg*” [care], “*sozialversicherungspflichtig*” [jobs in which social security fees are paid], . . .) more than Merkel does. However, apart from “*ökonom*” [economic], Steinbrück is not able to claim these topics exclusively—they are also, be it less frequently, addressed by Merkel. This means that (except the trivial case of the other candidate's name) *all* characteristic words that distinguish the two speakers are words that can be attributed to Merkel (Table 3).

Table 2. Word Frequencies.

	Word Frequency on Twitter			Word Frequency on TV			
	Total	With Merkel	With Steinbrück	By Merkel		By Steinbrück	
merkel	39,849	29,672	0	arbeit [work/job]	16	merkel	20
steinbrueck	2,8412	0	17,780	arbeitsplatz [job]	14	gesetz [law]	13
raab [name of host]	1,3992	2,848	1,272	Europa	13	euro [euro]	11
nsa	4,762	1,809	298	euro	10	europa [Europe]	10
moderator [host]	2,529	264	178	griechenland [Greece]	10	sozial [social]	8
kett [necklace]	2,419	1,628	34	rent [pension]	8	beitrag [contribution]	8
schwarz [black]	1,855	910	366	coalition [coalition]	7	pfleg [care]	6
vertrau [trust]	1,814	1,240	12	gemeinsam [together]	7	privat [private]	6
neuland [virgin soil]	1,802	886	103	international	7	flachendeck [nationwide (collective labor agreement)]	5
rot [red]	1,710	868	223	gesetz [law]	6	ökonom [economic]	5
maut [road toll]	1,704	956	163	mindestlohn [minimum wage]	6	europapolit [European policy]	5
stefan [name of host]	1,703	197	85	investi [investment]	6	mindestlohn [minimum wage]	5
fdp [a coalition partner]	1,613	985	29	kris [crisis]	6	arbeit [work/job]	5
koalition [coalition]	1,558	864	77	geld [money]	5	gesellschaft [society]	5
schlandkett [Germany necklace]	1,271	532	31	überzeug [belief]	5	pkw [car]	5
kloppel [name of host]	1,266	55	76	schuld [debt]	5	vorstell [image]	4
ann [name of host]	1,261	266	123	verdi [earn]	4	werkvertrag [contract for work labor]	4
rent [pension]	1,219	440	282	leiharbeit [labor leasing]	4	unternehmen [enterprise]	4
kloppel [name of host]	1,192	24	78	arbeitslos [unemployed]	4	maut [road toll]	4
arbeit [work/job]	1,169	502	228	finanzminist [minister of finance]	4	krisenstrategi [crisis strategy]	4
recht [rights]	1,074	287	216	recht [rights]	4	geld [money]	4
grün [green]	1,067	193	257	privat [private]	4	sozialversicherungspflicht [jobs with social security]	4
mindestlohn [minimum wage]	1,030	414	246	bildung [education]	4	amerikan [American]	4
csu [a coalition partner]	1,001	579	68	zins [interest rate]	4	zukunft [future]	4
syri [Syria]	977	150	182	partei [party]	4	csu [a coalition partner of Merkel]	4

(continued)

Table 2. (continued)

	Word Frequency on Twitter			Word Frequency on TV			
	Total	With Merkel	With Steinbrück	By Merkel		By Steinbrück	
pkw [car]	960	444	127	kind [child]	4	kommun [community]	4
pet [name of host]	955	29	37	verschuld [debt]	4	bundestkanz [chancellor]	4
deutschlandkett [Germany necklace]	944	493	181			staatsanleih [government bond]	4
gold [golden]	936	669	34			rentenkonzept [pension concept]	4
Wikipedia	915	40	502			debatt [debate]	4

Note. For TV, the 30 most frequent words are included. For Twitter, words occurring 4 times or more often are included. Mentions of the names “Merkel” and “Steinbrück” are not included in the TV lists. In the Twitter list, synonyms of the names “Merkel” and “Steinbrück” were merged, for example, “Steinbrueck” or “@peersteinbrueck.” The columns “with Merkel” and “with Steinbrück” refer to exclusive use, that is, occurring in a Tweet together with the candidate, and not with the other one.

Table 3. Most Distinctive Words on TV.

LL	Word	Frequency Merkel	Frequency Steinbrück
27.73	merkel	0	20
19.41	arbeitsplatz [job]	14	0
15.25	steinbruck	11	0
9.70	koalition [coalition]	7	0
9.70	international	7	0
9.70	gemeinsam [together]	7	0
8.55	griechenland [Greece]	10	1
8.32	investi [investment]	6	0
6.93	uberzeug [belief]	5	0
6.93	okonom [economic]	0	5

Note. The log likelihood (LL) describes how characteristic the word is for one of the two corpora compared to the other. The last two columns give the raw frequencies.

Having a look at the transcripts of the TV debate, one sees that topics that dominated the discourse in the media in the weeks before the debate (especially the NSA [National Security Agency] affair) were only briefly addressed. Research Question 1, which asked about the most prominent topics on TV, is answered.

Turning to the tweets, we see that 43,061 (35.7%) mention Merkel, while 29,474 (24.4%) mention Steinbrück; the remaining tweets often address the debate in more general terms, discuss the performance of hosts, or simply announce that the Twitter user is watching the debate. The difference between Merkel and Steinbrück is remarkable, given the fact that both candidates have roughly equal speaking time (though Merkel indeed did talk a little longer). But does that mean that Merkel was successful in setting her topics on the agenda? Do people on Twitter talk about “arbeit,” “euro(pa),” “griechenland,” and “rente”?

Not quite.

Figure 3. Quantile plot showing that very few words dominate the discourse on Twitter.

Note. Reading example. Of all occurring words, 90% are used less than 35 times; 99.5% are used less than 526 times. At the same time, the top 0.1% are used more than 977 times.

While very few words are tweeted tremendously often, the bulk of words are tweeted in negligible quantities (Figure 3). And those influential popular words on Twitter, interestingly, have very few to do with what the two candidates say (Table 2). They include names of the interviewers, especially Stefan Raab's name (whose good performance was discussed extensively), the NSA affair (which was only touched upon briefly at the end of the debate), and a necklace worn by Merkel ("kett").

This means that a topic (like the NSA debate) can play an important role (as Figure 2 already suggested) in the Twitter debate in spite of its marginal role on TV—and in that, the Twitter discussion can enhance the public discourse. While some topics like pensions ("rent") are prominent on TV and also on Twitter a lot of substantial issues raised by the two candidates (e.g., European politics, unemployment, wage) did not make it to a prominent Twitter topic. Research Question 2, which asked about the most prominent topics on Twitter, is answered.

Next to the few substantial topics discussed on Twitter, there seems to be a clear rule of what aspects are successful: (a) everything that is funny (b) faux pas and unfortunate choice of words. A prime example of the first category is Merkel's necklace, largely dominating the discussion (someone even created an own Twitter account, @schlandkette). The fact that the visible part of the necklace actually showed the Belgian rather than the German flag connects well to the second category. A prime example for this is Merkel being mentioned very often in combination with trust (vertrauen). This can refer to a statement that the citizens would have to "trust the government," alluding to a popular perception of the government not being able to deliver any results, so the only thing one can do is trust her. The word trust is also used very often to refer to the fact that Merkel said several times she had faith in someone (vollstes Vertrauen aussprechen) and shortly after fired him or her, which turned the term into a sarcastic meme on Twitter.

Table 4. Most Distinctive Words on Twitter.

LL	Word	Frequency Merkel	Frequency Steinbrück
32443.39	merkel	29,672	0
30751.65	steinbrueck	0	17,780
1507.08	kett [necklace]	1,628	34
1241.14	vertrau [trust]	1,240	12
863.84	fdp [a coalition partner]	985	29
775.93	nsa	1,809	298
626.49	wikipedia	40	502
574.65	twittert [tweets]	40	469
544.87	koalition [coalition]	864	77
517.99	gold	669	34

Note. The log likelihood (LL) describes how characteristic the word is for one of the two corpora compared to the other. The last two columns give the raw frequencies of the word in tweets that mention Merkel exclusively and tweets that mention Steinbrück exclusively.

Another example is the high popularity of the word “neuland,” a reference to a statement by Merkel some days before, in which she stated the Internet was “Neuland,” “virgin soil.” This was widely perceived as an indication of incompetence with regard to modern media. In that sense, the high frequency of mentioning is very often *not* a good sign as it might be an indicator of having said or done something stupid.

Negative aspects, thus, seem to thrive in the Twitter debate. There are more examples for this negativity bias: Although Steinbrück tries to make a point about the NSA affair, he does not succeed in getting his argument (his idea about what should be done) to the Twittersphere. The NSA affair is vividly discussed on Twitter, but it is mostly discussed as Merkel’s failure, rather than Steinbrück’s strong point.

In line with this, Merkel has much more “exclusive” topics than Steinbrück (see Tables 2 and 4). While her necklace, but also for instance the NSA topic are very much linked to Merkel on Twitter, Steinbrück does not have a single topic he is associated with exclusively. Taking into account the often negative character of such associations, though, this might actually be good for him. Again, this is reflected in the most characteristic words based on their log likelihood. As Table 4 shows, the only two of the most distinctive words that are attributed to Steinbrück are “twittert” (“he tweets”) and “wikipedia.” In these cases, Twitter users were making fun of the fact that tweets were sent from Steinbrück’s account while he was live on TV, and of the fact that he advised during the debate to look something up on Wikipedia. Merkel, in contrast, is highly associated with her necklace, the trust issue, her coalition partner FDP, and the NSA affair.

A visualization of the patterns of co-occurrence (Figure 4) confirms these findings: Merkel and Steinbrück are mentioned together very frequently on Twitter. But while Merkel is highly associated with specific clusters of words (about her necklace, about her coalition partners and policy issues associated with them, about her alleged unfamiliarity with the Internet, about the trust issue, and about the NSA affair), there is no such cluster associated with Steinbrück. Next to this, we see a cluster around one of the hosts of the debate, Stefan Raab. If we interpret these co-occurrences as frames (Hellsten, Dawson, & Leydesdorff, 2010), we could tentatively argue that a meta-frame (in which the setting of the debate and the hosts are central), a Merkel critical Internet policy frame (NSA, Prism, Neuland), and a sarcastic Merkel frame (in which people make fun of Merkel) dominate the debate. The results of the visual inspection are in line with the findings from Table 2, in which words the two candidates are associated with on Twitter were shown. Thus, Research Question 3, which asked about the connections between the two candidates and the topics on Twitter, is answered.

dominate the discussion. A more optimistic reading would be that Twitter functions as a necessary corrective: Important political topics that got comparatively little attention during the debate (like the NSA affair) are brought to attention on Twitter. Still, there is no real-time bidirectional communication with the two main actors: At least in the current setup of the debate, the candidates have no chance to interact with the followers, so the impact of this enhancement is only an indirect one. However, bidirectional interaction is not inherently impossible: More and more TV shows actually do embed tweets, and also in debates, it is not unknown whether the hosts read out questions that ordinary citizens have send in. Even in the case under study, there was a modest element of bidirectionality: The social-media team that operated Steinbrück's account participated in the discussion on Twitter.

From the perspective of the optimistic reading of Twitter as a tool for Habermasian deliberation, which was sketched in the Introduction section, the following question has to be asked: In how far can Twitter serve as an important component in the public sphere in the sense of an undistorted public discussion of political issues in which everyone, regardless of his or her status or power, can take place? My results show that to some extent, this indeed seems to happen: Take the discussion of the NSA affair. But one should not mistake the Twitter discourse for a purely rational political debate: Fun, irony, and sarcasm play at least as big a role as constructive discussion. Twitter does not seem to be used as the ultimate tool for deliberation—but it can at least be a first step.

If we take the role of Twitter discussions about political TV events seriously, then we will have to continue investigating the linkage between those two debates. The results of this study have shown that candidates are linked to specific words and concepts on Twitter, Merkel much more than Steinmeier, while at the same time, the linkage between the concepts they use on TV and the ones they are associated with is not too strong. We need to further develop the toolbox of social scientists to systematically assess these linkages. This would enable us to conduct long-term studies in a comparative perspective and allow us to observe agenda-setting and framing effects in the contemporary online media environment. The results of this study suggest that it is necessary for our theoretical understanding of both effects to take into account more content characteristics (like a specific topic as the NSA affair or a style as sarcasm).

To advance our understanding of how commenting on the second-screen works during TV debates, this study linked content data of the TV debate to the content data of the Twitter debate, employing a method of automated content analysis. Further development of this method could provide us with a good tool to assess not only (instantly) how people perceive a debate but also what the consequences are for the public discourse as a whole: How is the discussion of political topics using social media linked to real-time events in real life?

The study also identified some challenges of such an approach. First of all, the distribution of expressions used on Twitter forms a problem: The discourse seems so diverse that even the most popular topics occur only in a tiny share of tweets. Next to this, the brevity of tweets poses challenges: Certain words are simply too long to use, and people use a very specific writing style that does not correspond to standard forms of neither spoken nor written language.

We saw that the content of the Twitter debate was largely influenced by topics that were not inherently important in the TV debate, like, for instance, the NSA affair. This means that a model that only takes into account what is said on TV and what is said on Twitter is too simplistic. Future research could try to include such real-world developments to get a deeper understanding to which extent it is the TV debate that drives the Twitter debate and to which extent other developments and events play a role. Nevertheless, this study has shown that public reactions to TV debates can provide a much more nuanced picture than a poll asking for a “winner of the debate” can tap into. Studying social media content is far from a panacea for all problems of public opinion research. But if we get better in carefully analyzing these data, our understanding of political communication will greatly benefit.

Appendix

Table A1. Descriptive Statistics of Word Frequencies.

	M	SD	Minimum	Maximum
Word frequencies on Twitter				
Total	20.50	127.41	0	13,992
Co-occurring with Merkel (but not Steinbrück)	6.02	37.99	0	2,848
Co-occurring with Steinbrück (but not Merkel)	3.21	16.26	0	1,272
logarithmic transformation of variables above				
ln(total + 1)	1.74	1.26	0	9.55
ln(merkel + 1)	0.95	1.01	0	7.95
ln(steinbrück + 1)	0.66	0.90	0	7.15
Word frequencies on TV				
Total	0.11	0.59	0	23
Words by Merkel	0.05	0.37	0	16
Words by Steinbrück	0.06	0.33	0	13
Logarithmic transformation of variables above				
ln(total + 1)	0.06	0.24	0	3.18
ln(merkel + 1)	0.03	0.17	0	2.83
ln(steinbrück + 1)	0.03	0.17	0	2.64
N = 21,411				

Note. SD = standard deviation.

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1. Recently, Facebook has introduced hashtags and also offers a search function to access public posts. However, both features are much less prominent and also much less used than on Twitter.
2. One should note that stop words have already been removed. With stop words, the explained variance would be artificially inflated, as the stop words obviously are part of both the dependent and the independent variables. We can thus be confident that the model reflects the use of "substantial" words rather than the fact that German sentences almost by definition share some words.

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