University of Glasgow | School of Social & Political Sciences

Dissertation

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Media coverage and public opinion towards protests

A case study of media frames in the coverage of the protests against Stuttgart 21, testing supervised machine learning for content analysis of frames

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Introduction

Whether public media discourse is a democratic counterweight to elites' power or intensifies their influence over citizens continues to be a topic of interest across disciplines. In their influential 1988 book 'Manufacturing Consent' Herman and Chomsky examine mass media in the United States and suggest that they are 'institutions that carry out a system-supportive propaganda function by reliance on market forces, internalised assumptions, and self-censorship, and without significant overt coercion' (Herman and Chomsky, 1988: 306). This assumption, that public discussion of politics and culture in the media are not driven by communicative rationality but by forces outside the public discursive sphere, is echoed by most contemporary scholars. The *indexing* hypothesis, one of the most prominent theories of media-state relations, predicts that coverage of new events falls in line with, or is indexed by, interpretations of governmental debate, mainly detached from public opinion (Bennett, 1990). This poses a severe problem for most theories of democracy as they require from the media at least some form of public deliberation to fulfil their watchdog-, information-, or representation-function (Scammell, 2005). If the above mentioned depictions are true, it would indicate a serious flaw of current democracies and effectively confute the idea of a deliberative democracy where public discourse is driven by principles of communicative rationality instead of economic and political power (e.g. Habermas, 1997 & Ackerman, 1991 & Bohman, 2000 & Gutmann and Thompson, 1996).

Yet, is the suggestion of a one-sided public discourse true? For a viable political media debate other actors than the elites in charge need to be able to contribute arguments as well. In autumn 2010 several ten thousand protesters took the streets in the state capital of Baden-Württemberg, Stuttgart, to demonstrate and promote their opinion in public discourse. The protests were not primarily for more democracy but against a local railway redevelopment project called

Stuttgart 21. Reporting of the events makes an interesting case to review media-state relations in Germany: government officials on the state and federal level were clearly in favour of the project while the opposition by regular citizens was belittled for a long time, yet received nation-wide coverage after they organised large-scale demonstrations. The incidents offer a critical opportunity, I argue, to test the *Cascading Activation of frames* model provided by Entman (2003): while dominance of one or few governmental frames is still considered the standard setting of media debate, different interpretations can be suggested by non-elite actors–although they need to spend far more energy to be heard.

In this dissertation, the central research questions are: how did the media cover the protests? And can the coverage be explained by the cascading activation model? I begin by reviewing literature of media effects and especially framing, to investigate why the media is considered important for individual opinions of citizens and why unilateral coverage must be seen as negative. Second, I describe the theoretical expectations of how protests and dissent of groups are usually covered in democratic media. Third, I offer an overview of the events and struggles surrounding the case Stuttgart 21 and pronounce how the concepts could be applied to the chosen case. I then continue by proposing a contribution to the empirical evaluation of the models by carrying out a quantitative text analysis of newspaper articles about the project during a two-year period including coverage before and after major protests against it. I manually code several hundred articles before I proceed to test two different supervised learning methods, namely individual classification and measuring proportions.

The findings suggest that the newspaper media debate about Stuttgart 21 and the protests against it was divers and different actors struggled over meaning throughout. The media picked up the protester's view in the coverage of the demonstration. This is consistent with earlier findings about the influence of

protests and casts doubt on the indexing model and the so called ‘protest paradigm’ (McLeod and Hertog, 1992). Automated content analysis with individual classification algorithms was proven to be currently not yet accurate enough to be useful in framing research; supervised learning however was successfully employed to measure proportions of frames in the debate.

Literature review

Media effects

How does mass media influence public discourse? Arguably, the three most prominent theories in media research are *agenda setting*, *priming*, and *framing* (Wolfsfeld, 2011). The idea behind agenda setting is that as soon as the media cover certain stories, people tend to talk and think about those more often: ‘The press may not be successful much of the time in telling people what to think, but it is stunningly successful in telling its readers what to think about‘ (McCombs and Shaw, 1972: 177). This often has an influence on politics as well, since political actors use high media attention on a subject to manoeuvre their own qualities into the spotlight (Elmelund-Praestekaer and Wien, 2008). However, setting the agenda also implies that news media can determine what people do not think about. If an issue is not covered at all by the media, the public is not able to generate meaningful opinions. This can either lead government officials to ignore the problem or facilitate organised groups to influence decisions more easily (Burstein, 2006).

Priming, as defined by Iyengar & Kinder (1987), describes the effect that by ‘calling attention to some matters while ignoring others, television news influences the standards by which governments, presidents, policies, and candidates for public office are judged’ (Iyengar and Kinder, 1987). This supposition supports the view that mass media have a substantial influence on the outcome of elections and ergo politics. A number of scholars have thus produced a multitude of evidence to support notions of priming effects (Miller

and Krosnick, 1996). However, Chong and Druckman (2007c) suggest that the priming concept, as defined by communication scholars, has no justifiably difference from the theory of framing. Besides agenda setting, framing is therefore the most important concept to explain, how media influence public discourse and–through public opinion–politics itself.

Framing

Framing is arguably the most often employed concept in communication and media research (as highlighted by overviews such as Scheufele, 1999 & D'Angelo, 2002 & Entman *et al.*, 2009 & Matthes, 2009 & D'Angelo and Kuypers, 2010 & Borah, 2011). The main theme of the concept is that in order to transform the seemingly meaningless succession of everyday life's events into a meaningful reality, people select and organise certain aspects of what is happening into consistent frames (e.g. Goffman, 1974 & de Vreese, Claes H. *et al.*, 2001). In communication, framing therefore means pre-selecting and emphasising some information while disregarding other in order to tell a co-herent story (Wolfsfeld, 2011). Doing so, communication actors, such as mass media, affect whether the audience notices issues or events, as well as how people evaluate and choose to act upon them (Entman, 1993). Yet, beyond being a concept, there is a significant discordance among scholars whether framing is an approach (e.g. Pan and Kosicki, 1993), an analytical technique ((Endres, 2004), a theoretical tool (Matthes, 2013), a theory (e.g. Scheufele, 1999), a (fractured) paradigm (e.g. Entman, 1993), or a multi-paradigmatic research program (D'Angelo, 2002). The reason is that research of frames and framing effects employ a huge variety of different approaches that understand framing in utterly different ways (Matthes, 2009).

On the one hand, some see this confusion as problematic and unfavourable for framing research, since empirical results often appear to lack comparability (Entman, 1993 & Scheufele, 1999 & Entman *et al.*, 2009). The diversity was argued to limit the integrative potential of the program that could otherwise

serve as a bridge between the sociological, psychological and communication science approaches to political communication. A unified framing research, in this perspective, could describe the whole process of communication in politics from one perspective (Reese, 2007 & Matthes, 2009 & Matthes, 2013). On the other hand, some scholars argue that the flexibility and polyphony of framing research is an advantage and may not only be responsible for the popularity of the concept but can actually help to examine aspects of the framing process that would remain unrecognised in a singular paradigm (D'Angelo, 2002). Nevertheless, since the looseness of the concept does not provide a *right* way to study framing, it is especially important to be clear about what kind of frames are researched, which theory is used to explain framing effects and how frames are identified empirically.

A basic distinction of the term *frame* in the literature is between *audience frames* and *frames in communication* (Chong and Druckman, 2007a). Audience frames refer to an individual's cognitive understanding of an issue or an event as described by Goffman (1974) (Chong and Druckman, 2007a). Frames in communication are the ones relevant for this dissertation. To frame–in this sense–is most often defined as

> '*to select some aspects of a perceived reality and make them more salient in a communicating context, 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, original emphasis; for a comparison of framing definitions see Matthes, 2009).

The major premises of researching frames in communication are that there are always different perspectives a frame could potentially reflect, as a selection in a completely objective way is not possible. The distinction between two fundamental types of frames exemplifies this point: issues can be described in either *episodic* or *thematic frames*. If media employ an episodic frame the focus of the story lies on concrete events and particular cases. Thematic coverage focuses on the overall political issue, pays attention to trends and provides evidence to describe the broader picture. In other words, episodic coverage is

more event-driven while thematic frames place reports in a general context (Iyengar, 1991). Iyengar (1990, 1991) established that whether a story is told in an episodic or thematic frame has influence on individual's attribution of causal and treatment responsibility for an issue (Iyengar, 1990, 1991). The bulk of attention in framing research has been on how such differences between frames in communication influence audience frames and therefore individual opinions (Chong and Druckman, 2007c). When the way information is presented by the news causes individuals to focus on emphasised considerations while constructing their own opinions, this is called a *framing effect* (Druckman, 2001).

Assuming that these effects occur unbounded, it would make the media an incredible powerful actor: since they could manipulate what people believe to be the most important considerations, they would be able to arbitrarily shape public opinion (Entman, 2007). In fact, this is what most earlier empirical evidence suggests (e.g. Price *et al.*, 1997 & Cappella and Jamieson, 1997). But if opinions could be determined that easily, it casts serious doubt on the capacity of citizens to participate in the democratic process. Albeit, these studies usually draw their conclusions from simple designs which expose two or more groups to news reports with one dominant frame per group leading to the unsurprising result of individuals employing the one frame they were exposed to in their considerations (Chong and Druckman, 2007b & Matthes, 2013). Studies that employ more advanced designs found that under realistic circumstances–a political debate with more than one perspective–framing effects cancel each other out (Sniderman and Theriault 2004) or at least complicate the cause-effect relationship substantially (Chong and Druckman, 2007b & Entman, 2010).

So, under which circumstances do framing effects appear and why? Again, there is no lack of theory in the framing literature to answer these questions, but rather a confusing surplus of theoretical and meta-theoretical approaches

(e.g. D'Angelo and Kuypers, 2010; Entman, 1993 & Pan and Kosicki, 1993 & Scheufele, 1999 & De Vreese, 2005). For this dissertation the theoretical effort made by Chong & Druckman (2007) seems most fruitful: they integrate former approaches by tracing the psychological mechanisms behind framing effects and furthermore include factors like competition and strength of frames into their model (Chong and Druckman, 2007a). Building on the conventional expectancy value model, Chong and Druckman consider an attitude of an individual towards an object as a combination of the evaluative beliefs of that person on a dimension and the salience of that dimension for evaluation (Chong and Druckman, 2007a). For example: a person may regard an issue to be advantageous on an economic dimension and harmful on a social justice dimension. If the economic dimension appears more salient to that person, she/he can be expected to have a positive opinion towards the issue.

Framing effects can thus result from introducing new beliefs to an individual's overall attitude as long as the recipient accepts and prioritise the new considerations while constructing her or his opinion. Alternativly, existing attitudes can also be changed by either altering an individual's beliefs–which is referred to as persuasion–or by altering the salience of one dimension. In order for this to happen, framing effects would have to increase the availability (a consideration must be stored in an individual's memory and the individual must comprehend its meaning), accessibility (the consideration must come to mind when reflecting on an issue), or applicability (the consideration must be judged relevant to the issue) of certain considerations (Chong and Druckman, 2007a, 2007c). From this explanation, several expectations can be derived: The most obvious one is that frequent repetition of a frame can ensure its availability and increase its accessibility–an explanation for framing effects that was given by a number of political communication scholars (e.g. Cappella and Jamieson, 1997 & Iyengar & Price *et al.*, 1997). But it leaves aside the applicability of considerations. For example: demonstrations usually interfere with traffic. Repeating this frame again and again will not lead people who

consider this information irrelevant to judge a protest negatively. And in fact, newer experiments showed only minor effects of frequent repetition and no effects whatsoever if the repeated frame has strong competition (Chong and Druckman, 2007b).

In non-competitive environments individuals may use whatever considerations are made available and accessible to them. But under normal circumstances, only strong compelling frames can influence people. What exactly constitutes a strong frame–apart from being persuasive–is not yet clear[1]. What has been established is that as soon as multiple interpretations are available, individuals tend to deliberate and personal values and evaluations of the quality of considerations become more important (Schemer *et al.*, 2012 & Chong and Druckman, 2007b). Even after people accepted a frame, it is likely to be discarded if it is weak and they hold their opinion with low certainty (Matthes and Schemer, 2012). It must also be remarked that some people are more knowledgeable and motivated than others and are therefore more prone to evaluate the applicability of frames. Yet, even unmotivated and less knowledgeable individuals have been found to choose strong frames in competitive environments (Chong and Druckman, 2007b). For the present case study this means that the frame most often used, was not necessarily the one that was the most influential. As long as a counter-frame was mentioned often enough to make it available and accessible to the audience, it is plausible to assume that it sparks a deliberation process within the audience. Only when one frame was absolutely dominant in the discussion, strong framing effects must be expected.

Cascading Activation

The last section established how essential it is for a democratic or deliberative public debate that the audience has access to contrasting interpretations. Some

[1] Although some efforts have been made to answer this question (e.g. Aarøe (2011) & Arceneaux (2012))

contemporary treatments of mass mediated communication, however, conclude that public discourse is mainly controlled and structured by economic and political elites and leave little room for frame competition beyond elite discourse (Herman and Chomsky, 1988 & Bennett, 1990 & Parenti, 1996). Entman (2003) paints a slightly less pessimistic picture by describing the formation and diffusion of interpretations with a waterfall-analogy: While frames usually cascade from top level elites via the media to the public, ideas from lower levels can potentially spread to upper. Yet in this case, extra energy has to be invested (Entman, 2003). The actors on the top have more power to push ideas to the media and subsequently to the public, because they profit from journalistic practice of favouring official sources and elites to whom they often have structured, long-lasting relations (Entman, 2004 & Hall *et al.*, 1978). This model thus builds on the *indexing* hypothesis, the other prevailing interpretation of state-press relations which also describes a hierarchical structure of influence (Bennett, 1990 & Rowling *et al.*, 2015). Nevertheless, actors on each level of the waterfall, from the government in office over other elites, like the parliamentary opposition, to the media and the general public contribute, adjust and sometimes contest frames (Entman, 2004). Yet, what differs is that Entman leaves room for considerations like the event-driven news model which suggests a greater press freedom and diversity in the immediate aftermath of events before officials can suggest meaning to dramatic imagery (Lawrence, 2000). Furthermore, Entman's model acknowledges that sometimes non-elite actors can define issues or counter-frames. Although, as the waterfall-metaphor implies, secondary players can mostly just respond to initial frames promoted by elites (Aday *et al.*, 2012).

Contributing to Entman's image of a waterfall is the useful analogy provided by Wolfsfeld (2011): he describes two doors leading to access to the news. The front door, which is reserved for VIPs, namely people with political power who are able to make political decisions and usually have additional advantages like PR resources and continuous relationships with journalists; and

the back door which is accessible for weaker political actors who are granted access only when they do something especially weird or deviant, or in other words, something newsworthy. In that sense, Entman's model seems plausible. If new events occur, officials get asked for their opinion or interpretation and can therefore initiate a frame, while non-elite opposition needs to become newsworthy first to object. Additionally, if a frame is suggested that way and is strong and compelling enough, it might work its way up the cascade and spread to other levels (Entman, 2004). Just like the indexing model, whether counterframes spread largely dependents on the unity of officials at the top levels: When officials stand united behind one frame, alternative narratives encounter fierce resistance or outright blockage ((Entman, 2004 & Bennett *et al.*, 2006).

The model therefore suggests that on a continuum between government control over media's interpretations of news and a Habermasian ideal speech situation with opinions competing for the best logical argument, we find ourselves nowadays more often near frame dominance than near frame parity. Almost solely in situations when elites are disagreeing, frame competition arises. In the case of the protests against Stuttgart 21 it is therefore important to ask if a counterframe was spread without the patronage of elites. If so, the case could not be explained by the indexing hypothesis and would lay further evidence for cascading activation.

Protest in the media

Usually, the weakest citizens in a state–weak in the sense of a lack of economic and political resources–are the ones that suffer from negative developments first and foremost. But these weak individuals do not usually have access to promote their cause in the wider forum of public media debate (Habermas, 1985). Wolfsfeld (2011) uses protests as an example of how actors without political or economic power can enter the media-stage through the metaphorical back door. Yet, in order for demonstrations and social movements to

spread their message in a favourable way, they need to overcome two distinct struggles: the competition over *news access* and the struggle over the intended *meaning* of their dissent (Wolfsfeld, 1997).

Numerous social movement scholars have already investigated the ways media select some actions over others. They found that the majority of protests does not receive notable coverage at all. Demonstrations that are covered are usually large-scaled, cause disruption, offer a certain drama, employ extreme tactics, have strong supporting sponsors, take place at a time that fits journalistic issue-attention cycle or have several of the mentioned features (Hocke, 1998 & McCarthy *et al.*, 1996 & Oliver and Maney, 2000 & Boyle *et al.*, 2012). The meaning associated with protests is most often considered to be determined by what was called the journalistic 'protest paradigm' (McLeod and Hertog, 1992). Oliver and Maney (2000) argue that the media have developed a certain routine and therefore place protest events into a pre-defined narrative that can be described as a 'law and order' frame (Oliver and Maney, 2000 & Wolfsfeld, 2011). The paradigm states that media outlets focus on spectacle, the clash between protesters and police and the disruption of day-to-day live, therefore marginalising the substance of the unrest (Donohue *et al.*, 1995 & Oliver and Maney, 2000 & Detenber *et al.*, 2007). Or in other words, the nuisance demonstrating citizens cause is covered much more commonly than the reasons for their dissent (Di Cicco, 2010).

The 'protest paradigm' stayed relatively unchallenged in the literature and amassed a striking amount of evidence (e.g., Boyle and Armstrong, 2009; McLeod and Hertog, 1992; Shoemaker and Reese, 1996 & McLeod, 2007). Only in recent years scholars have started to test the conditionality to which mass media coverage of protests mirrors the paradigm (Wouters, 2015). Boyle et al. (2004), for instance, found that status-quo protests are covered more favourably and are often able to spread their messages–which suggests that the specific goals of movements matter to journalists (Boyle *et al.*, 2004). More

recently, Boyle et al. (2009) established that even more than protester's goals, a group's tactics–e.g. peaceful or disruptive marches–affects how reports are framed in the media. Dardis (2006) found in a cross-national comparison between Iraq War protests coverage in the U.S. and the U.K. that socio-political differences between countries condition the use of the paradigm: the U.S. media followed the paradigm more closely than journalists in the UK. Finally, Wouters (2015) found Belgian media covered protests from 2003–2010 more with thematic frames than event-driven reports, placing emphasis more on the issues people are protesting than on the spectacle of demonstration–the exact opposite from what is described by the 'protest paradigm'. He suggests that his findings could be due to a better method of measurement, the observation that protest are perceived more normal today than at the time the 'protest paradigm' was established or that protest coverage in Europe is more favourable than in the US—most studies so far analysed U.S. cases from the late. This dissertation follows the latter mentioned studies in their aim to provide evidence for the conditionality of the 'protest paradigm'. I try to establish that in some cases, the protesters hold valid arguments and use effective communication which leads the media to report about them more diversified and favourably. The case described in the following should serve as an example for this phenomenon.

The Case

The project to convert Stuttgart's overground railway terminus into an underground through station called 'Stuttgart 21' was contested ever since the first introduction of the plans in the early 1990s (Novy and Peters, 2013). Most notably, an alliance of regional environmental and transport groups called *Umkehr Stuttgart* (Turnaround Stuttgart) developed and introduced a complete alternative plan in 1998, which later became known as *Kopfbahnhof 21* (Terminal 21). They argued that by extensively modernising the existing terminus station, it wouldn't be necessary to tunnel the city's environmentally sensitive

basin, costs could be reduced and the region's infrastructure could nevertheless be upgraded considerably. Yet, the Deutsche Bahn AG–the legally privatised but still publicly owned German railway company responsible for the project–dismissed the plans as unfeasible or not fundable–a claim, they later acknowledged to be untrue (Novy and Peters, 2012). In 2007, it became obvious how strong the opposition against the project already was, when a petition to hold a referendum about the project and its alternatives was presented: 67,000 people signed the request, three times the votes necessary. Stuttgart's city council nevertheless rejected the application on formal and legal grounds (Novy and Peters, 2012, 2013). Many protesters later claimed that this decision, which was perceived as arrogant and undemocratic, fuelled their support for the protests and caused them to participate in demonstrations (Rucht *et al.*, 2015).

Yet, many Germans only learned of what was then one of the most expensive and ambitious railway and urban redevelopment projects in Europe when mass protests against *Stuttgart21* arose in late July and early August 2010. This cued national mass media to pick up the conflict (Brettschneider and Schuster, 2013a). At that time the demolition of parts of the state capital's historic train station, which is considered an icon of 1920s architecture and one of Stuttgart's most recognisable landmarks, began. On the first day, about 20,000 demonstrators tried to block workers before the protesters marched to the city hall. From then on, the protest rallies as well as other media-effective actions, rapidly draw more and more people (Novy and Peters, 2012). On the last day of September, the conflict escalated violently when police forces broke up a peaceful demonstration, injuring children and elderly who participated in the rally. The gruesome picture of the sixty-five-year-old Dietrich Wagner who was permanently blinded by a police water canon became a symbol of what was henceforth known as 'Black Thursday' (Novy and Peters, 2013). In the following weeks, the number of protesters rose to reportedly more than

100,000, making Stuttgart 21 one of the most contested projects in recent history (Novy and Peters, 2012).

Subsequently, project promoters, who had previously claimed they would not back down to the protests, felt forced to change their course and agreed to put the demolition on hold and negotiate with the demonstrators. In an unprecedented process, public mediation talks were held between protesters and those responsible for the project (Novy and Peters, 2012). The mediation became a media spectacle since it was broadcasted live on national television and was followed closely by the public (Brettschneider, 2013).[2] Hereafter, the demonstrations cooled down, while the project plans were amended by several improvements and by the condition that the project must pass a stress test to be continued.

However, many were still unsatisfied since alternative concepts were not even considered on the ground that the project was 'too advanced to be stopped' (Novy and Peters, 2012, 2013). This became especially apparent in the statewide elections in March 2011 which completely changed the political landscape of Baden-Württemberg. For the first time in the sixty-year-long history of the state, the Christian Democrats lost their political leadership in Baden-Württemberg to the Green party (Bündnis 90/Die Grünen)–the only party which opposed Stuttgart 21. And maybe even more notable, for the first time in German history, a member of the Green party became Ministerpräsident (governor) of a state in the Federal Republic of Germany (Brettschneider and Schuster, 2013b). Nevertheless, when the new government finally held a statewide referendum about the state's participation in the project, opponents suffered a devastating defeat. The run-out was 43% with almost 60% effectively in favour of Stuttgart 21 (Stuckenbrock, 2013).

[2] Besides on live TV and on the website http://www.schlichtung-s21.de/, the videos of the mediation were also made available on Youtube where they were watched more than 10,000 times.

Considering the preceding events, this outcome surprises and lays the focus on what makes the case ideal for a study about media debate and public opinion: The primarily local protests about a railway station project had sparked a heated national public debate. The discussion about the protests was clearly value-laden and went much further than the discussion about the project itself. Project supporters claimed the protesters to be driven by selfish concerns as well as misinformation and labelled their actions as an example of the so called NIMBY-ism (Not In My Backyard), which is considered to ruin public efforts for progress (Novy and Peters, 2013). One of the most prominent contributions to this discussion was an essay published in *Der Spiegel* which coined the term *Wutbürger*–angry citizens or more precisely anger citizens. The term suggests that a part of the German citizenry would not act rationally anymore but give way to their anger and selfishly oppose public efforts, cued by fear, misinformation and the desire to protect their own special interests (Kurbjuweit, 2010b). *Wutbürger* was found by the *Gesellschaft für deutsche Sprache* (Association for the German Language) to be the single term that shaped German public debate most in 2010 (Gesellschaft für deutsche Sprache e. V., 2010). From this perspective, the discussion fits well with the 'protest paradigm' since the goals of the protesters are discredited by emphasising the disruption they cause by being angry.

Yet, a study of protesters' motivations and backgrounds supports a different view. It suggests the movement against Stuttgart 21 to be a sign of a newly awakened civil society: members from all social strata participated and the project was not contested because of NIMBY-esque reasons but to fight for more openness and accountability in politics (Rucht *et al.*, 2015). In a political debate in October 2010, Winfried Kretschmann, later elected governor, accused the government coalition to be responsible for the conflict since they refused to take the project opponents or their arguments serious (Brettschneider, 2013). One week after the *Wutbürger* essay, *Der Spiegel* published another article that coined its antithesis: *Mutbürger*–brave citizen–meaning that

those who protested against the project are the ones who had the courage to fight an undemocratic style of politics, something a good citizen would do (Supp, 2010 & Baumgarten and Rucht, 2013).

The latter described part of the discussion doesn't fit with the 'protest paradigm'. And depending on how we define elites, it can also be seen to provide counter-evidence to the indexing hypothesis: members of the Greens opposed the project early on and even participated in the protests. But can the green party be seen an elite actor at this point? The party was continuously elected into Baden-Württemberg's state parliament since 1980 but was never part of a governing coalition and therefore never shaped policy decisions in a direct way. Bennett speaks of 'government officials' or 'official decision circles' who determine the frames in public discussion (Bennett *et al.*, 2006). Entman on the other hand offers a finer graduation, with 'nonadministration elites' being only one level below government officials in the hierarchy of influence (Entman, 2003). If the study shows frame parity, it can therefore count as evidence for the cascading activation, rather than the indexing model. In a relatively unsystematic review of the debate, Baumgarten and Rucht (2013) make it appear like the positive and negative coverage of the protests was distributed more or less unbiased which would support the cascading activation hypothesis. In the following analysis, this supposition is therefore put to an empirical test.

Hypothesis:

The protests against the project Stuttgart 21 were partly made sense of by the media according to the 'protest paradigm', discrediting the goals of the protesters; however, the protesters were able to suggest their own frame, thereby establishing a more balanced discussion.

Dataset construction

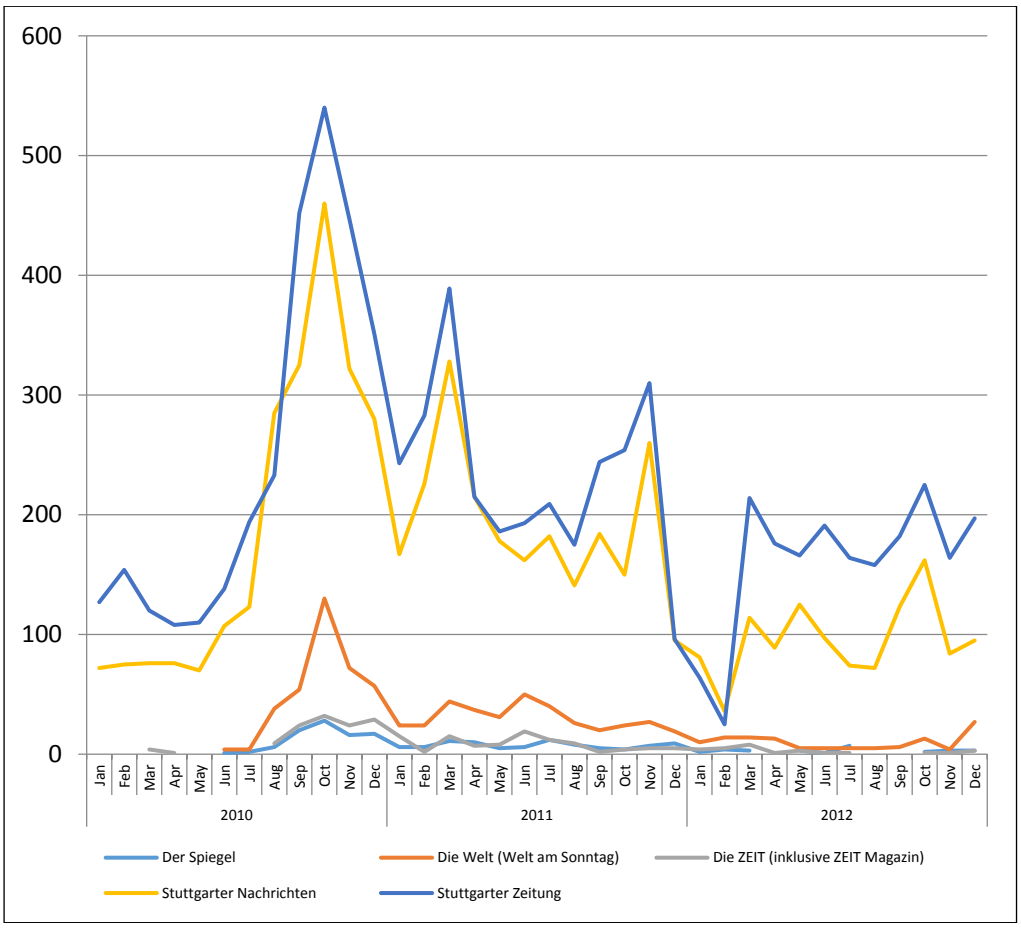
The dataset for the empirical analysis was constructed by collecting newspaper articles from the service *LexisNexis* using a keyword search with the term 'Stuttgart 21'. Although in recent years it became common to analyse media coverage in online-news (e.g. Scharkow, 2013), social media sites and blogs (e.g. Gil de Zúñiga *et al.*, 2012 & Theocharis *et al.*, 2014), as well as radio or TV broadcasting (e.g. Zeldes *et al.*, 2008), the analysis of newspapers to study media framing is still most prevalent (Matthes, 2009). Newspapers are still assumed to be the source of most original news stories and influence what ideas, people and stories other mass media consider as 'newsworthy'. In contrast, online news often only aggregate newspaper coverage (Ferree *et al.*, 2002 & Evans, 2014). The time period for data collection was set between 1st January 2010 and 31st December 2012. The supposition that the topic was not visible before 2010 and after 2012 was tested in several searches.[3] Five dailies and weeklies were selected: *Die Zeit* and *Der Spiegel* are considered the most influential national weeklies while *Die Welt* served as an example of a prominent national daily[4]. The other two are the biggest local newspapers in the state Baden-Württemberg, *Stuttgarter Nachrichten* and *Stuttgarter Zeitung*.

After 'noise' was discarded from the original data (e.g. copyright status) and the data was split up in articles and separate metadata, the dataset was cleaned from irrelevant articles (about 1,2%): First all articles from unrelated categories (e.g. sports) were extracted. Where the article itself did not contain the search term and LexisNexis delivered the item based on other information (e.g. 'category STUTTGART; 21' which means local news on page 21) the object was rejected. Articles shorter than 100 words were excluded too, since

[3] Most of the bigger protests occurred in summer 2010, the referendum was held on 27th November 2011.
[4] The common choices for national dailies–*Frankfurter Allgemeine Zeitung* and *Süddeutsche Zeitung*–were not available for academic use on LexisNexis.

they do not contain enough information to be clssified. Finally, all cases in wich LexisNexis failed to provide all metadata information (e.g. date or original source) were removed. The resulting master dataset contained 14,716 articles.

Figure 1: Coverage of 'Stuttgart 21'



The data shows right away, that the project received wide coverage during and after the protests. Salience peaked three months after the first large-scale protests in July 2010. In October, one local newspaper (*Stuttgarter Zeitung*) published over 540 articles about the issue. The nationwide papers follow the trends of the local newspapers although on a smaller scale. Before the occurrence of the protests, however, there is only moderate coverage of the project in the local newspaper and almost no coverage at all in national news (a total of five articles, all published in *Die Zeit*). The protests against Stuttgart 21

have therefore overcome the first obstacle of effective communication mentioned by Wolfsfeld (1997): the opponents of the project had gained *news access*. However, whether they were able to transport their *meaning* has to be established in the following chapter.

Initial coding showed that more articles than expected did not mention the protests at all and avoided to evaluate the project. Instead they merely mentioned the search term along different considerations (e.g. as important for voting considerations, the status of the construction or as an example for problematic mega-projects). This is especially remarkable, since figure 4 shows that the project was not at all on the national media agenda before the large-scale protests in July and August 2010 and it is plausible to assume that it were the protests who attracted media attention in the first place. However, the high number of irrelevant articles made a refinement of the initial search necessary. Using the keywords ‘protest’ and ‘demonstration’ the original set was thinned out once more resulting in a total number of 3,140 articles that were used for analysis.

Design

This dissertation is a critical case study to review and extend scholarship of media effects, especially the *Cascading Activation of frames* model. To do this, I carry out a quantitative computer-assisted textual content analysis of newspaper articles using two supervised learning algorithms and a cluster analysis. The goal of this dissertation is to get a better sense of the discourse regarding the project Stuttgart 21, the protests against it and the referendum about its continuation. In order to do so, it is first necessary to identify the different frames in which the protests were covered. Large-scale protests especially with participants over the age of 30 are a relatively young phenomenon in Germany. The case was widely discussed in the socials sciences as well as

in public discourse and shapes evaluations of protests that came afterwards. The data availability is therefore excellent, which makes this an ideal case.

Content Analysis of frames

Content analysis is defined as 'a research technique for making replicable and valid inferences from texts (or other meaningful matter) to the contexts of their use' (Krippendorff, 2004: 18). Essentially, researchers look for patterns and themes in recorded communicated human messages or their context, which makes them more accessible for summary and quantitative analysis. The method is one of the most popular in political communication and media research, since it is flexible regarding the form of content. It is furthermore efficient as well as accurate in investigating a body of messages (Krippendorff, 2004 & Wimmer and Dominick, 2011). Wimmer et al. (2010) report that between one fourth and one third of published research in those areas relies on content analysis (Wimmer and Dominick, 2011).

For the identification of frames, it is the standard method even though there are vast differences in how content analysis is applied (Matthes, 2009). I follow the method introduced by Matthes and Kohring (2008) which aims at better results in terms of reliability and validity compared to previous approaches to content analysis of frames. Since a frame is an abstract variable, hard to identify and hard to code in content analysis (van Gorp, 2005), Matthes and Kohring suggest to split up the frames into separate frame elements. Every element consists of several, relatively easy to code, content analytical variables. The idea of frame elements is derived from the second part of Entman's widely accepted definition of framing (Matthes, 2009) as '*to promote a particular problem definition, causal interpretation, moral evaluation, and/or treatment recommendation* for the item described' (Entman, 1993, original emphasis). In this definition, Matthes and Kohring see *problem definition*, *causal interpretation*, *moral evaluation*, and *treatment recommendation* as the elements which constitute a frame. The unit of analysis is the article.

After identifying these elements in the corpus–first inductively, then by deducing from the established list–they are quantified and the frames are subsequently revealed in a cluster analysis with low differences between articles in a cluster and high differences between clusters. Following Matthes and Kohring (2008), I transformed the original variables into binary variables. For instance, the variable problem definition had 9 different values which led to nine binary 'dummy' variables. I then excluded variables with a frequency less than 5% for statistical reasons. Subsequently I carried out a hierarchical cluster analysis using the ward method again following Matthes and Kohring (2008) (also see Breckenridge, 2000).

The main advantages of Matthes' and Kohring's method are that frames are operationalized objectively and transparently–which is rather the exception and not the rule in framing research (Matthes, 2009)–and determined empirically instead of defining them subjectively (Matthes and Kohring, 2008). The main disadvantage is that Matthes and Kohring suggest to exclusively employ manual coding. This makes sense as elements and frames are identified along the process and Matthes and Kohring do not believe that a computer can live up to the task of finding the elements in text since it 'is still not fully able to understand language in all its richness' (Matthes and Kohring, 2008).[5] The practice is also still most common as Matthes showed in a meta-analysis of 131 studies published in fifteen international journals; he found that only 8 used computer assistance to extract frames (Matthes, 2009). For the chosen dataset, however, aggressive subsampling would have been necessary since coding was solely done by myself. Matthes and Kohring used a sample of 1,000 randomly chosen articles from the source documents (Matthes and Kohring, 2008), which bears the problem of potentially producing non-

[5] Even though they acknowledge the potential of automatic coding.

representative results (Scharkow, 2013). To avoid the problems of sampling I chose a computer-assisted design.

Computer-Assistance

Since traditional forms of content analysis can't keep up with the continuously growing amount of publicly available texts–such as traditional media web sites or messages on platforms like Twitter or Facebook–approaches of automatic text coding find their way into the social sciences (Scharkow, 2013). Political science scholars hope that by analysing what political actors are saying and writing in the larger scale–now manageable with computer aids–we can get a deeper understanding of what politics is about (Grimmer and Stewart, 2013). The main advantage of computational methods of content analysis is that compared to manual coding they are cost and time efficient. Therefore, they can rapidly increase the output of projects quantitatively but also qualitatively since it is no longer necessary to exclude documents from the corpus due to restricted resources (Chuang *et al.*, 2014 & Evans, 2014). Consequently, computer assistance can help to expand research beyond the limitations of small datasets and make analysis of text corpora feasible for low- or no-budget projects like this dissertation (Evans, 2014 & Grimmer and Stewart, 2013).

Besides that, automatic content analysis is also perfectly reliable, in the sense that the computer always produces exactly the same model-based result, no matter if it is fed with dozens or millions of articles (Young and Soroka, 2012). Yet Matthes and Kohring are not altogether wrong to believe in human coders since all models used in automatic coding are in fact based on flawed models of language (Grimmer and Stewart, 2013). Grimmer and Stewart (2013) explain that believing automated content methods could substitute close reading or do not need much guidance is a misconception of what is possible: 'Quantitative methods augment humans, not replace them' (Grimmer and Stewart, 2013). A researcher has to make decisions regarding how much pre-processing of the texts is done, how much work they can leave to the

computer, what model they employ and how they can interpret the results. If she or he makes wrong decisions, the outcome might be seriously flawed.

Many statistical analyses of text are done with extensive pre-processing of the source text (Munzert *et al.*, 2015). Such steps include the removal of extremely frequent (*stop words*) or infrequent words in a corpus; *stemming*, which means to remove the ends of words to theirs stems, reducing the total number of unique words in the data set; discarding the order in which words occur in documents (*bag of words* approach); and retaining some word order by marking some words as unit (*n-grams*) (Scharkow, 2013 & Grimmer and Stewart, 2013). In this dissertation I tried to employ only mild pre-processing since Scharkow (2013) comes to the conclusion that the use of stop-words and stemming is, contrary to common recommendations, reducing classifier performance of German texts. But since the bag of words approach is a built-in function of the software packages (*RTextTools* and *ReadMe*) I used, it made sense to define several important bigrams (e.g. Stuttgart 21).

The second decision was how much of the process of classification should be left to the computer. Fully automated methods promise to be the quickest and least labour-intensive for the coder when it comes to classification of text. Those methods estimate what the most prevalent categories are and then go on to classify documents into those categories (Grimmer and Stewart, 2013). Yet, while this process doesn't require the definition of own categories, it also doesn't allow to choose which categories are analysed (Scharkow, 2013). Since I am not interested in the most prevalent categories but pursued to inductively determine frame elements from the corpus, based on Matthes' and Kohring's approach, fully automated methods are not suitable.

At the other end of the automation-spectrum, there are dictionary methods. They are the most prominent approaches to automatic text coding (Scharkow, 2013). The idea is to identify words that are often used in one category but are relatively rare in another. The computer is then able to categorise texts based

on dictionary rules of the relative rate at which words occur in each category (Grimmer and Stewart, 2013). The easiest way to get such a dictionary would be to use one off-the-shelf that was used before and was proven to be efficient. Yet, this would need to be a dictionary that was developed for the exact same use, language and goal like in the current project to prevent serious errors to occur (Loughran and McDonald, 2011 & Grimmer and Stewart, 2013). It would therefore be necessary to code documents first and then produce a dictionary based on human gold standard, using existing but labour-intensive methods (Grimmer and Stewart, 2013). In this dissertation I omitted this last step by using a supervised machine-learning approach which lies somewhere between fully automated and dictionary based methods on the automation-spectrum.

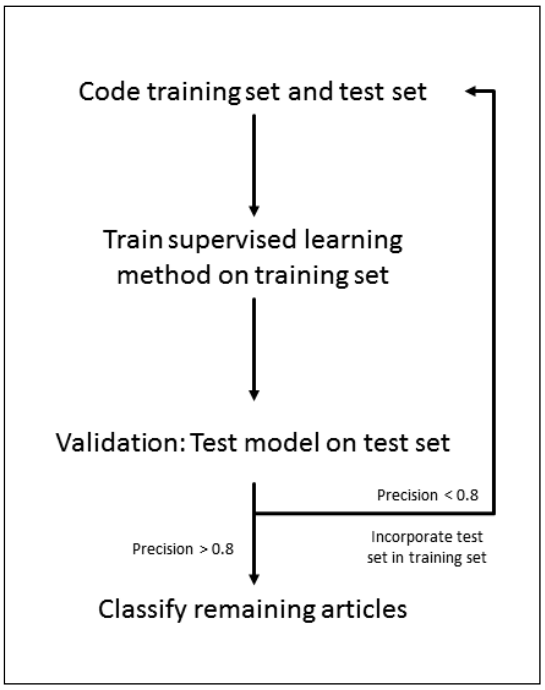
Supervised machine learning

There are major differences in how supervised learning methods work, but the idea is realitvly simple: first, human coders select categories and code a set of texts. Then this sample is used to train an algorithm which subsequently classifies the remaining texts into the determined scheme (*individual classification*) or infers the overall distribution across categories (*measuring proportions*). The advantage for my project compared to fully automated clustering is that the different frame elements can be used as pre-defined categories, while it was not neccesary to determine dictionary rules based on word occurrence myself. Using the method I generally followed the road map by Grimmer and Stewart (2013). Since I am intrested in both, the overall proportion of frames–to answer whether frame parity or frame dominnace was prevalent–and the framing of idividual documents–to determine when a more balanced discussion was established–I use individual classification and also measure proportions.

I use the software *RTextTools* introduced by Jurka et al. (2012) for individual classification. The advantages of the application is that it is a free opensource

add-on for the statistical software *R* which makes the text analysis procedure very transparent while staying fairly approachable. The package bascially provides a wrapper for 9 popular algorithms that can be used for classification (Jurka *et al.*, 2013): *support vector machine* (Meyer *et al.*, 2011), *glmnet* (Friedman *et al.*, 2010), *maximum entropy* (Jurka), *scaled linear discriminant analysis* (slda) and *bagging* (Peters *et al.*, 2002) from *ipred*; *boosting* (Tuszynski, 2012) from *caTools*; *random forest* (Liaw and Wiener, 2002) from *randomForest*; *neural networks* (Venables and Ripley, 2002) from *nnet*; and classification or *regression tree* (Ripley, 2012) from *tree*. Without having to rearrange the data, RTextTools provides the framework to access these models, evaluate them against each other and use them together (ensemble classification) (Munzert *et al.*, 2015).

Figure 2: Classifying procedure



As shown in Figure 2 the first step was to construct and code a training set. Following Grimmer and Stewart, I created a random sample from the population of all articles containing 500 documents (Grimmer and Stewart, 2013). Choosing the size of that sample I followed the rule of thumb offered

by Hopkins and King (2010) who explain that after hand-coding 500 articles, classifiying performance can not be substantially increased by a larger set. I chose the first 200 articles as training set and 100 more as the test set. After a first inductive stage that contained close reading and review of the literature on Stuttgart 21, I preceded to deductively hand-code the remaining articles while keeping my eyes open for new frame elements. The sample was then fed to RTextTools to train the nine different algorithms. To validate the different models they were tested against the manual coding of the test set. The results showed that none of the models was yet precise enough to be used. The initial test set was therefore incorporated in the training set and another 100 documents from the random sample were handcoded. This step could have theoretically be repeated until all documents would have eventually been coded. But as mentioned earlier, classifiying performance does not substantially increase anymore, once 500 articles are coded manually (Hopkins and King, 2010).

To measure the proportions of different frames, I use the *ReadMe* package that is based on a method introduced by Hopkins and King (2010). The package is another free opensource add-on for the statistical software *R* and therefore offers the same advantages mentioned above. Hopkins and King (2010) identify a severe problem with the use of individual classification of documents for social science: even with a high percentage of corrct classifcations, those methods bear the risk to generate hugely biased category proportions as they are optimized for differentaims. When all misclassified texts–or a high number of them–end up in one category, it is not possible to make qualified statements about the distribution of themes in a population of texts. Instead of seeking to classify any individual document, Hopkins and King (2010) argue that shifting the focus to estimating the proportions can substantially improve accuracy. *ReadMe* therefore estimates the distribution of texts between categories based on distribution in the learning sample and the features of the learning sample (e.g. the occurrence of certein words in a text)

compared to those of the whole population. I used the same learning and test sample as for individual classification to estimate proportions.

To determine dominance or parity of frames, a quantitative design was employed. I assume that if a high number of articles use the same frame, this frame is more dominant than others. While this is an objective way to measure importance, it has to be acknowledged that frequent occurrence does not necessarily make a frame more important than another, since some articles reached more readers and some arguments are more convincing than others (Wimmer and Dominick, 2011).

Results

Descriptives

Before getting into the computer-assisted content analysis, I describe the outcome of the manual coding and the thereby identified frame elements. Following Matthes and Kohring (2008) I treat the element *problem definition* as a combination of the content analytical variables actor and central issue under investigation in the text. This is because those two define the basic problem carried in a frame. *Causal attribution* was conceptualised by determining who was deemed responsible for the benefits and risks surrounding the project and the protests. This takes account of the observation that some actors are blamed for the portrayed risks in an article while others are celebrated for the benefits. The most frequently mentioned risks and benefits are treated as a proxy for the *moral evaluation* element as these promote certain decisions to the audience. Finally, *treatment recommendation* was determined by a positive or negative judgement of the protests. When protests are judged negatively, I assume the author of the article prompts the protesters to stop the demonstrations.

Table 1 shows all values and categories found during manual coding of the newspaper articles in the random learning and test samples (n=500). I assume that the list of frame element variables reflects all important categories, men-

tioned in the discussion. Some values had to be omitted for further analysis as they appeared too sparsely: business and the police were too seldom deemed responsible for benefits to be taken into account. Furthermore, reading the articles in the sample made clear how large thematic diversity between the articles is. If a text did not contain a certain frame element it was coded with zero. Theoretically this is no problem since a frame does not necessarily contain all elements (Matthes and Kohring, 2008); however, for some articles it was not possible to code any variable other than zero which indicated that those articles were not about the project or the protests at all.

Table 1: Variables and Codes for Cluster Analysis*

Frame Element	Variable	Description
Problem definition	Topic: The project	Building process, plans, future perspectivers, costs etc.
	Topic: The protests	Number of protesters, costs for state, damage and injuries etc.
	Topic: Democratic deficit	Public opinion polls vs. decisions, failed processes
	Actor: Coalition	The parties in office before the election in March 2011 (CDU and FDP)
	Actor: Opposition	Opposition parties before election in March 2011 (SPD, Die Grünen, Die Linke)
	Actor: Protesters	Protesters against Stuttgart 21
	Actor: Business	Mainly Deutsche Bahn AG, the company responsible for the project
	Actor: Police	The police or individual policemen
Causal attribution	Benefit attribution: Coalition	The coalition parties are responsible for benefit
	Benefit attribution: Opposition	The opposition parties are responsible for benefit
	Benefit attribution: Protestsers	Protesters are responsible for benefit
	Benefit attribution: Business	Business actors are responsible for benefit
	Risk attribution: Coalition	The coalition parties are responsible for risk
	Risk attribution: Opposition	The opposition parties are responsible for risk
	Risk attribution: Protester	Protesters are responsible for risk
	Risk attribution: Buisness	Business actors are responsible for risk
	Risk attribution: Police	Police was responsible for risk
Moral evaluation	Benefits: Economy	The protests as a benefit for economy (e.g. since S21 would harm buisnesses)
	Benefits: Infrastructure	The protests as a benefit for infrastructure (e.g. since S21 would harm infrstructure)
	Benefits: Democracy	The protests as a benefit for democracy (e.g. since S21 was planned undemocratically)
	Benefits: Environment	The protests as a benefit for environment (e.g. since S21 would harm environment)
	Risks: Economy	The protests as a risk for the economy
	Risks: Infrastructure	The protests as a risk for the infrastructure
	Risks: Public safety	The protests as a risk for public safety
	Risks: Democracy	The protests as a risk for democracy
	Risks: Progress	The protests as a risk for progress
Treatment	Judgement: Negative	The protests were/are bad
	Judgement: Positive	The protests were/are good

*every variable also contained the code 0 for not applicable.

Individual classification: RTextTools

Automated content methods are incorrect models of language. Human language is incredibly complex and the use of only one different word or a different tone can change the meaning of a sentence dramatically. Humans are able to make sense of that through experience and by considering the context of a message. Supervised learning methods employ statistical models that try to reproduce the classification made by a human coder based on the occurrence of words in a text. And while the methods were successfully applied in the past, performance of classifiers varies substantially across different datasets and research questions (Grimmer and Stewart, 2013 & Scharkow, 2013). This is why the first step of analysis was to thoroughly validate performance of the algorithms. By gradually using the first 400 articles of the random sample as a training set and comparing the classifying results to the true labels of the test set–based on human gold standard–it is possible to evaluate reliability of the classification.

Fortunately, RTextTools offers aggregated *precision*, *recall* and *f-scores* for analysing algorithmic performance (Jurka *et al.*, 2013). *Precision* means the percentage of how often the algorithm predicts the right category for a text. *Recall* refers to the percentage of articles the algorithm put into a class that actually belonged in that class. *F-scores* are a weighted average of precision and recall with 100% meaning the algorithm was always right, whereas 0% indicating the algorithm was always wrong. Usually reliability means that repeating the measurement leads to the same results every time (*replicability*) (Wimmer and Dominick, 2011). This however is always the case for supervised learning as long as neither the manual classified data nor the algorithm changes. In content analysis usually the level of agreement between coders is used to measure reliability which can be interpreted as human machine agreement in automated content analysis (Scharkow, 2013 & Matthes and Kohring, 2008). For assessment of the individual algorithms' performances I used the

commonly accepted minimum agreement of 80%, specified by Krippendorff (2004).

Table 2: Overall algorithm precision, recall, and f-scores for frame elements

	Topic	Actor	Benefit attr.	Risk attr	Bene-fits	Risks	Judge-ment
SVM Precision	0.50	0.50	0.31	0.45	0.27	0.26	0.41
SVM Recall	0.49	0.50	0.33	0.24	0.33	0.27	0.37
SVM Fscore	0.48	0.48	0.32	0.25	0.29	0.26	0.36
SLDA Precision	0.42	0.31	0.35	0.22	0.31	0.24	0.45
SLDA Recall	0.40	0.30	0.38	0.19	0.31	0.23	0.48
SLDA Fscore	0.40	0.28	0.35	0.20	0.31	0.23	0.45
Boosting Precision	0.52	0.64	0.30	0.42	0.44	0.32	0.48
Boosting Recall	0.47	0.61	0.30	0.32	0.39	0.36	0.46
Boosting Fscore	0.46	0.61	0.30	0.34	0.40	0.34	0.47
Bagging Precision	0.43	0.40	0.31	0.49	0.26	0.25	0.31
Bagging Recall	0.40	0.36	0.32	0.33	0.31	0.27	0.32
Bagging Fscore	0.38	0.37	0.31	0.36	0.28	0.26	0.31
Forests Precision	0.43	0.28	0.31	0.23	0.27	0.26	0.32
Forests Recall	0.40	0.28	0.32	0.21	0.33	0.27	0.35
Forests Fscore	0.38	0.26	0.31	0.20	0.29	0.26	0.33
Glmnet Precision	0.45	0.60	0.35	0.31	0.37	0.23	0.49
Glmnet Recall	0.45	0.38	0.39	0.31	0.36	0.24	0.50
Glmnet Fscore	0.44	0.42	0.35	0.31	0.37	0.23	0.49
Tree Precision	0.28	0.42	0.30	0.22	0.50	0.24	0.26
Tree Recall	0.28	0.40	0.30	0.25	0.40	0.25	0.28
Tree Fscore	0.28	0.40	0.30	0.23	0.41	0.24	0.27
NNET Precision	0.28	0.22	0.33	0.28	0.37	0.27	0.41
NNET Recall	0.30	0.27	0.30	0.25	0.40	0.32	0.37
NNET Fscore	0.27	0.23	0.31	0.24	0.32	0.28	0.36
Maxent Precision	0.49	0.62	0.31	0.27	0.32	0.29	0.53
Maxent Recall	0.44	0.64	0.33	0.28	0.32	0.31	0.48
Maxent Fscore	0.46	0.52	0.32	0.26	0.32	0.30	0.50

As table 2 shows none of the algorithms perform well enough to be accepted as reliable. The highest values of agreement are for the element *actor* with the *boosting* (64%) and the *maximum entropy* algorithms (62%) but the values are far from reaching the specified 80% threshold. Risk attribution performs especially poor with SLDA and tree precision at only 0.22 which is even worse regarding that this category had only four possible labels. Some individual categories were assigned more accurately than the mean. Especially for the value ‘not applicable’ performance was usually better than for the other values. Yet, this is most likely due to the fact that ‘not applicable’ was assigned

much more frequently than the other values (some classifiers sorted all texts into that category) while it has also the largest proportion in the test set.

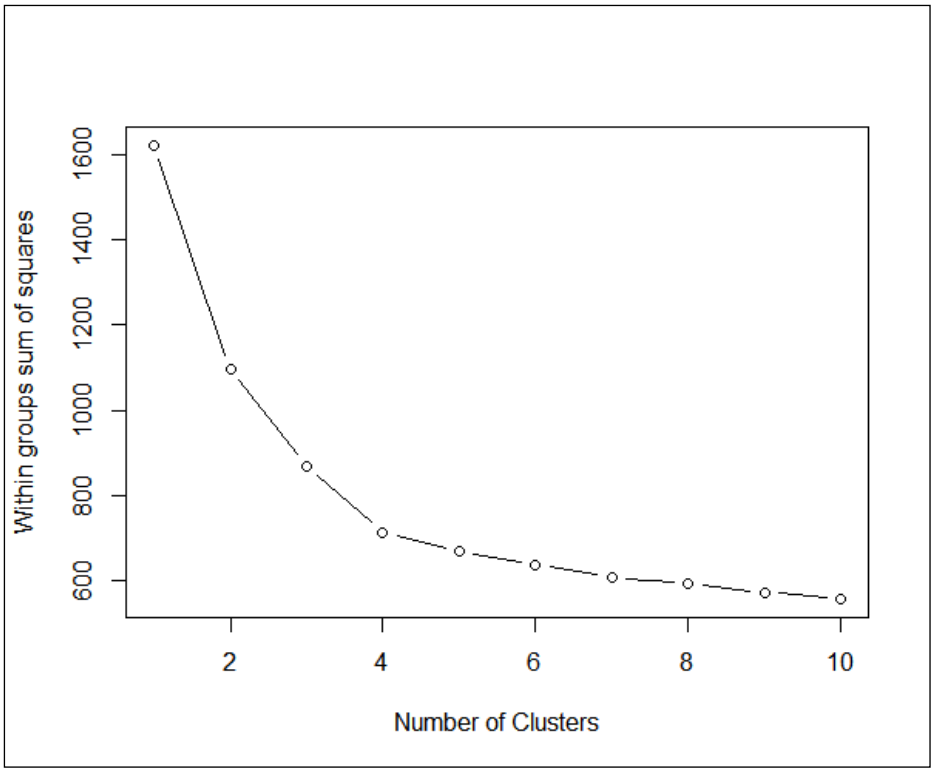
In general, the results indicate that supervised individual classification is not a viable option for the coding of frame elements–at least not in the presented case. After unsuccessfully testing to omit stemming and stop word removal, as recommended by Scharkow (2013), analysis with this method was aborted and deemed unfeasible. As the other supervised learning methods (measuring proportions) cannot use multiple categories[6], the next step of analysis was to empirically suggest frame clusters from the hand coded set.

Cluster analysis

The hierarchical cluster analysis (*Ward method*) was carried out for the hand-coded articles to determine the most important frames in the random sample. The Ward method is considered a good technique to determine the suitable number of clusters in the data (Breckenridge, 2000). The number of clusters is suggested by the so called elbow criterion which means to look for a bend in the plotted heterogeneity measures (within-group sum of squares for each partition), similar to a *scree* test in factor analysis (Everitt and Hothorn, 2006). Figure 3 shows the clearest bend at four clusters:

[6] The proportions of values are measured for one category at the time and it is not indicated which labels items receive. Combining frame elements afterwards thus becomes unfeasible.

Figure 3: Within-cluster sum of squares for different numbers of clusters



For the interpretation of the four clusters, mean values of all variables were used to identify the most important topic, actor, benefit attribution and so on for each cluster. As Matthes and Kohring (2008) point out, the use of mean values of dummy variables is statistically problematic but can be used to assess the overall meaning of the clusters. The highest mean within one cluster indicates the most important variable. Table 3 illustrates the mean values and size of each cluster.

Table 3: Mean Values for coded elements for four identified frames

	Not applicable (n=193)	Government (n=130)	Law & Order (n=98)	Fight f. democracy (n=79)
Topic: 0	0.63	0.17	0.15	0.04
Topic: The project	0.09	0.17	0.10	0.09
Topic: The protests	0.26	0.58	0.75	0.57
Topic: Dem. deficit	0.01	0.08	0.00	0.26
Topic: Police operations	0.01	0.00	0.00	0.04
Actor: 0	0.56	0.00	0.15	0.04
Actor: Coalition	0.09	0.75	0.15	0.13
Actor: Opposition	0.13	0.09	0.00	0.13
Actor: Protesters	0.13	0.08	0.50	0.61
Actor: Business	0.01	0.08	0.00	0.09
Actor: Police	0.08	0.00	0.20	0.00
Benefit attribution: 0	0.95	0.00	0.95	0.26
Benefit attribution: Coal.	0.00	0.92	0.00	0.00
Benefit attribution: Opp.	0.04	0.08	0.00	0.09
Benefit attribution: Prot.	0.00	0.00	0.00	0.65
Benefit attribution: Pol.	0.01	0.00	0.05	0.00
Risk attribution: 0	0.84	0.08	0.05	0.35
Risk attribution: Coalition	0.09	0.00	0.10	0.30
Risk attribution: Opp.	0.00	0.08	0.05	0.04
Risk attribution: Protesters	0.01	0.83	0.80	0.00
Risk attribution: Business	0.01	0.00	0.00	0.26
Risk attribution: Police	0.04	0.00	0.00	0.04
Benefits: 0	0.99	0.67	0.90	0.04
Benefits: Infrastructure	0.01	0.17	0.05	0.00
Benefits: Democracy	0.00	0.08	0.05	0.87
Benefits: Environment	0.00	0.08	0.00	0.09
Risks: 0	0.96	0.00	0.00	0.74
Risks: Economy	0.03	0.17	0.05	0.04
Risks: Infrastructure	0.00	0.08	0.00	0.09
Risks: Public Safety	0.01	0.25	0.75	0.09
Risks: Democracy	0.00	0.25	0.10	0.00
Risks: Progress	0.00	0.25	0.10	0.04
Judgement: 0	0.96	0.08	0.05	0.09
Judgement: Negative	0.00	0.92	0.90	0.04
Judgement: Positive	0.04	0.00	0.05	0.87

The largest cluster is the one with articles that predominantly received the label ‘not applicable’ during the coding process and can therefore hardly be called a frame. In this category we find articles that are vastly different. For instance, one article tries to establish a connection between Colin Crouch’s description of a post-democratic society and several protest movements like Occupy Wall Street or the Arab Spring, which occurred at roughly the same time as the Stuttgart 21-protests, while another article in the category only lists

important events for the following week. What is interesting about the cluster is that it is the by far most often identified pattern (n=193). While this could be due to the way the data was collected–through a simple keyword search–, it could also be a reflection of the fact that the project became a metaphor for problematic development projects in Germany and is often depicted as a kind of bogeyman for the CDU in other states. Remarkably, whenever a judgement was coded in those articles only mentioning Stuttgart 21 by the way, it was positive. If somebody was deemed responsible for risks it was either the coalition government or the police. Only a fraction of articles made the protests responsible for economic risks or depicted them as a thread for public safety.

The second cluster was called '*government knows best*' as CDU and FDP were almost solely mentioned as the actor responsible for benefits and were never seen responsible for risks. Especially the protesters and sometimes the parliamentary opposition were made responsible for risks instead. The most important risks were for public safety, democracy and progress to an equal share, followed by the less often mentioned threats to economy or infrastructure. The demonstrations were overwhelmingly judged negatively. This is most likely the interpretation the government suggested. It reflects the strategy to discredit the protesters as *Wutbürger*, who hinder progress and threat a project that was democratically legitimised. Chancellor Merkel backed up this position during the protests and repeatedly announced that if Stuttgart 21 fails due to particular interests, then Germany's economic future and progress would be at stake, since no major projects could be realised anymore (e.g. Phn, 2010 & Kurbjuweit, 2010a).

The third largest cluster can be described as the expected '*law and order*' frame. It defines the project or the protests as topic and the coalition, the protesters or the police as main actors. It almost never deems any actor responsible for benefits. But if so, the police are praised for their actions. Risks however are solely caused by the protesters. Benefits of the protests are not men-

tioned, while they are deemed to be a risk for democracy or progress and especially for disruptions of public safety. The judgement is almost always negative. This fits with expectations from the described 'protest paradigm'.

The smallest cluster can be described by the label '*fight for democracy*' since the by far most often mentioned benefit of the protests was to reduce the democratic deficit. The topic of articles in that cluster is usually the protest or bluntly the democratic deficit perceived by German citizens. The protesters are usually seen as the most important actor while the coalition, the opposition or business actors are also mentioned as actors every once in a while. If an actor is deemed responsible for benefits, it's the protesters or sometimes the opposition before 2011, comprising the Green party and the SPD (Die Linke which was also a parliamentary opposition party at the time was not mentioned). The coalition or business is described as responsible for risks. Dangers of the protests are hardly mentioned but if so, infrastructure and public safety have an equal share while progress is sometimes mentioned. The judgment of the protests is overwhelmingly positive.

Surprisingly often, the protesters were depicted as actors (especially in the 'law and order' and 'fight for democracy' frame). The names of the spokespersons of several groups like the *Parkschützer* (park guardians) or *Leben in Stuttgart* (living in Stuttgart) were mentioned frequently and often featured direct quotes. This does not fit at all with the suppositions of the 'protest paradigm' which leads us to expect the media to depict protesters as a uniform mass of troublemakers and not as intelligent, quotable individuals. Furthermore, several articles (n=14) covered the violent clash between protesters and the police on the 30th September 2010 or the subsequent trials against protesters and policemen. In these articles protesters were only seen responsible in two articles while the police was deemed responsible in seven and the coalition in five stories. The protests were also almost as often depicted positive

(n=75) as they were perceived negative (n=91). Moreover, the distribution of frames over time casts further doubt on the expectation of a biased discussion.

Figure 4: Distribution of frames over time

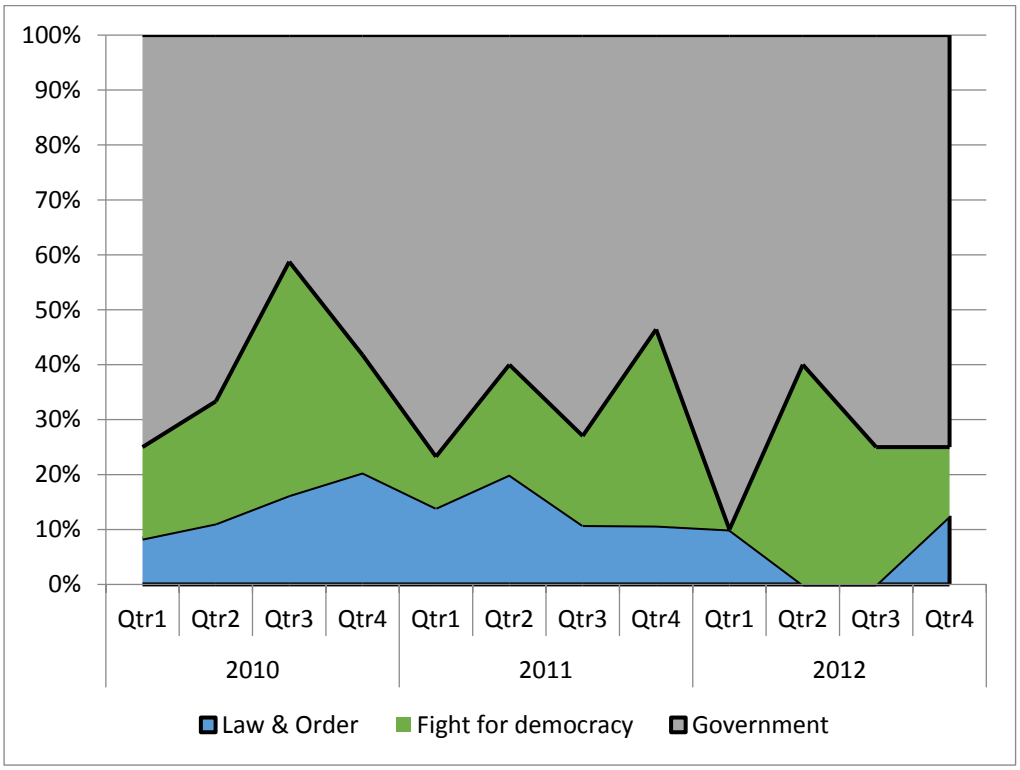


Figure 4 shows right away that the 'fight for democracy' frame promoted primarily by the protesters had its share of the debate during all times except in the first months of 2012, after the opposition against Stuttgart 21 was defeated in a referendum and a few protesters remained at the site, trying to block construction workers. In contrast, right after the dramatic events of the *Black Thursday*, 'fight for democracy' was the most frequently employed frame (42.50% of all articles). The 'government knows best' frame is prevalent almost throughout the whole period. Especially after the referendum in the last quarter of 2011 it dominated the discussion (90%). It seems that the defeat made the 'fight for democracy' frame appear implausible for some time and the majority for the project in the referendum proved the former CDU/FDP government right. Both observations fit with the theoretical expectations of the *Cascading Activation of frames model*: as government actors are more power-

ful to push frames to the media their frame prevails; yet the protesters were successful in suggesting their own interpretation.

The ‘law and order’ frame appears less important than expected: it reaches only 20% at its peak (quarter 4, 2010 until quarter 1, 2011) when the sentiment towards the protests was low but the government had lost trust during the mediation. Between the second and third quarter of 2010 the frame even disappeared completely. This casts further doubt on the ‘protest paradigm’. In the present case, it seems to have played a minor role. Overall, the results of the cluster analysis from the hand-coded sample confirm the hypothesis. During most of the 2-year-period, the debate was characterised by frame parity between the three frames. The goals of the demonstrations were discredited more often than not, yet the counter-frame was apparent enough to plausibly assume that it was available and accessible to the audience.

Measuring proportions: ReadMe

As for the preceding section, the research questions are formally answered. However, recall that I only analysed roughly one sixth of the data so far. A second supervised learning method was therefore applied to the data to evaluate the quality of the results from the small sample. I used the *ReadMe* package for the statistical software R to determine the proportions of clusters in the remaining data. Again, I used the first 400 articles of the random sample as learning set and the subsequent 100 articles as test set to validate the performance of the nonparametric estimator that underlies the *ReadMe* package. In figure 5 I plotted the actual proportions of the learning set on the x-axis and the estimated proportions of remaining articles on the y-axis. One open circle stands for each category; categories that appear close the 45° line indicate approximately unbiased estimates.

Figure 5: Out-of-Sample Validation

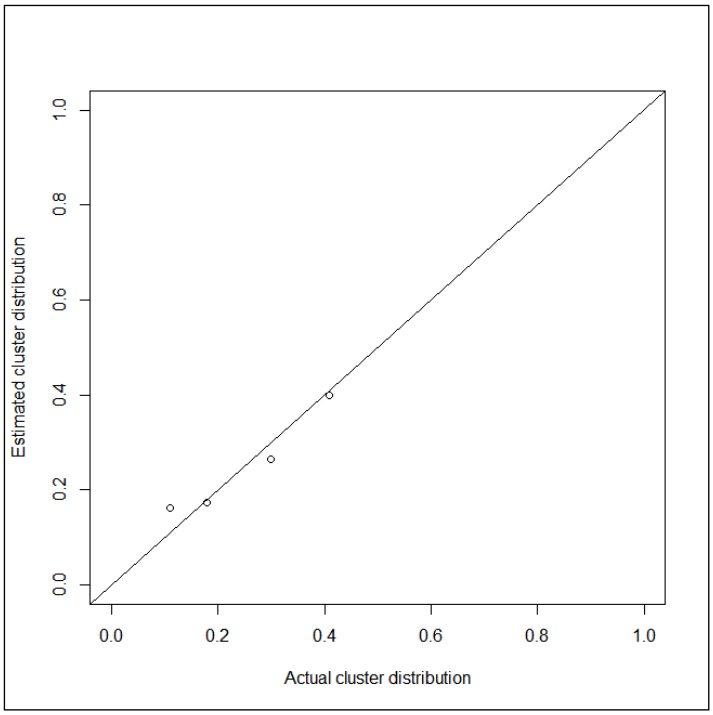


Figure 5 shows that the results of the *ReadMe* package appear very close to the 45° line. Table 4 shows the distribution values of the four clusters. Especially the mean absolute proportion error confirms the overall impression from Figure 5 that the nonparametric method has a much lower error in estimating the document category proportions than the individual classification method. I therefore assume that the estimation is valid. The results confirm the impressions from the analysis of the hand coded sample which clearly underscores the answers found for the research questions. The recommendation by Scharkow (2013) to omit certain pre-processing steps for German texts reduced the mean absolute proportion error from 0.029 with stemming and stop word removal to 0.012 without these steps.

Table 4: True and estimated distribution of clusters

	Not applicable	Fight f. democracy	Government	Law & Order
True	0.386	0.158	0.260	0.196
Estimated	0.400	0.161	0.266	0.173

*Mean absolute proportion error: 0.012

Moreover, one run of the estimation only took about four minutes of computer time on a regular laptop, or a total of 15 hours for 300 bootstrapped runs. Compared to that, it took me more than 45 hours to hand-code the first 500 articles. The method therefore appears feasible for quickly and accurately determining the overall proportions in media frame analysis which clearly emphasises its future use–even for real time analysis in on-going debates.

Discussion and Conclusion

The protest movement against the train station redevelopment project Stuttgart 21 was one of the largest in contemporary German history and–at least partly–responsible for some of the broadest and most powerful political repercussions in the history of Baden-Württemberg. Before the protests occurred, the project was long contested but opponents did not receive much attention, neither by the media nor the government. When the large scale protests were picked up by local and national media, first the course of the government and later the political landscape gradually changed in favour for a re-evaluation of the project plans. Only for the project plans to be finally affirmed in a referendum. This outcome, I argue, was due to the relatively balanced media debate surrounding the demonstration. My data shows that three frames dominated the discussion: *government knows best, law and order* and *fight for democracy*.

While the dominance of the first two frames are consistent with the notion that government officials have large influence on the choice of frames, a counter-frame that harmed the majority of the political elites in Baden-Württemberg persisted its presence over time. This finding casts doubt on prominent media theories: The indexing hypothesis suggests that journalists' interpretations would be indexed by governmental debate. Yet, the coalition parties as well as the oppositional SPD kept supporting the project while parts of the media turned against it. Solely the relatively small Green party contested the project and supported the protests. In addition, the evidence provided here falls in line

with recent studies that challenge the ‘protest paradigm’. Instead of the one-sided negative coverage the paradigm predicts, the demonstrations were judged relatively balanced and the protesters’ goals were regularly picked up in news reports. The evidence, I argue, can only be made sense of by the *Cascading Activation of frames* model. Only this model acknowledges the greater influence on the activation of frames the data suggests for government officials, while providing an explanation for the fact that I found a persisting frame suggested by non-official and non-elite actors.

Additionally, I was able to successfully apply one of the two illustrated supervised learning methods. I argued that the sample I chose for manual coding was potentially largely biased–even though it was randomised–since it contained only about a sixth of articles in the whole dataset. However, due to limited resources for this dissertation it was not possible to employ any extra coders to assess the remaining articles. The promise of automated classification methods is to massively reduce costs of evaluating additional texts while providing reliable results. In fact, this promise was kept this time: the absolute mean error the *ReadMe* package produced while estimating the proportions of the clusters in the test set was small enough to justifiable assume the estimations to be reliable. The estimation of proportions in the whole dataset then largely agreed with the proportions traced in the hand-coded set. This provided further validity to the results of the sample.

This dissertation, however, is not without its limitations. The second suggested supervised learning method–individual classification using *RTextTools*–produced no valid results whatsoever. Multiple reasons could be responsible for this. For one, low classification performance often indicates inferior coding scheme or flawed manual coding. Coding and developing the scheme was only done by myself which arguably significantly lowered the chance of identifying any ambiguities (Grimmer and Stewart, 2013 & Scharkow, 2013). Another potential cause was the large diversity of articles in the dataset. Especially

articles in the ‘not applicable’ category are vastly different. The category therefore appears disproportionally broad to the learning algorithms–an assumption that is supported by the undue preference of this category by most algorithms. Furthermore, frame elements are very specific features of a text and the decision to code each text in multiple categories could have harmed classification performance. Possibly, frame elements are too subliminal to be categorised in that way.

Moreover, a limitation of the content analysis method is that it uses articles as the unit of analysis. This means it cannot be taken into account if more than one frame is used in a single article (Matthes and Kohring, 2008) Yet, this limitation is true for most framing research and since frame elements are identified independently from each other, this limitation is arguably not as severe as in former approaches (Matthes, 2009). Another limitation of the research is that articles were not weighted according to influence. As mentioned above, the *Wutbürger* article was repeatedly picked up and its content is still used years later to make sense of similar events. It was arguably the most important text for many who followed the issue even if they didn't agree with Kurbjuweit’s suppositions. Yet, in my analysis, it had the same weight as every other article. Furthermore, the national and local newspapers vastly differ in the size of their audiences, but articles were treated as equal in this study even though it could be argued that an article which was read by more people has a larger impact. A further limitation is that pictures provided in the articles were not taken into account in the analysis–which is also true for most framing research (Matthes, 2009). The reasons were that LexisNexis provides the articles without images and the classifying algorithms are not capable of analysing pictures. This potentially important data was therefore ignored. The final shortcoming of this work is that it only focuses on newspaper outlets. Despite the notion above, that the study of newspaper articles is still the most effective way of media framing research to see the bigger picture, it would be desirable to compare these articles to social media and online news.

In sum, this dissertation builds on and expands evidence for the cascading activation model by clarifying the way by which frames can travel upwards in the cascade. The case study demonstrated a diverse debate about large-scale protests against a project the majority of political elites in Germany supported. However, demonstrators successfully triggered a counterframe. Officials' interpretations of the issue and events prevailed but media took their chance to provide challenging information about the project and favouring depictions of the protesters. Furthermore I laid ground for future research in media framing by successfully combining the method of content analysis of frames provided by Matthes and Kohring (2008) with the automated nonparametric content analysis approach for measuring proportions by Hopkins and King (2010) that underlies the *ReadMe* package. In future research, this combination could be used to determine frames in on-going debates and track the development of their distribution in real time. This could help establish if the reporting of the protests against Stuttgart was an isolated case or exemplifies a broader pattern in German or even European news media.

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