

ONLINE APPENDIX A

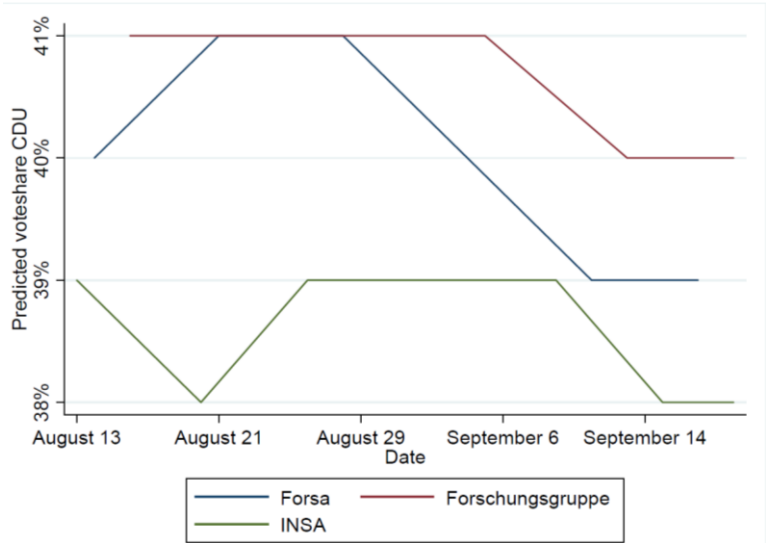


FIGURE A1: An illustration of systematic differences between polling firms: CDU/CSU poll predictions over time according to three (of the seven) different polling firms studied.

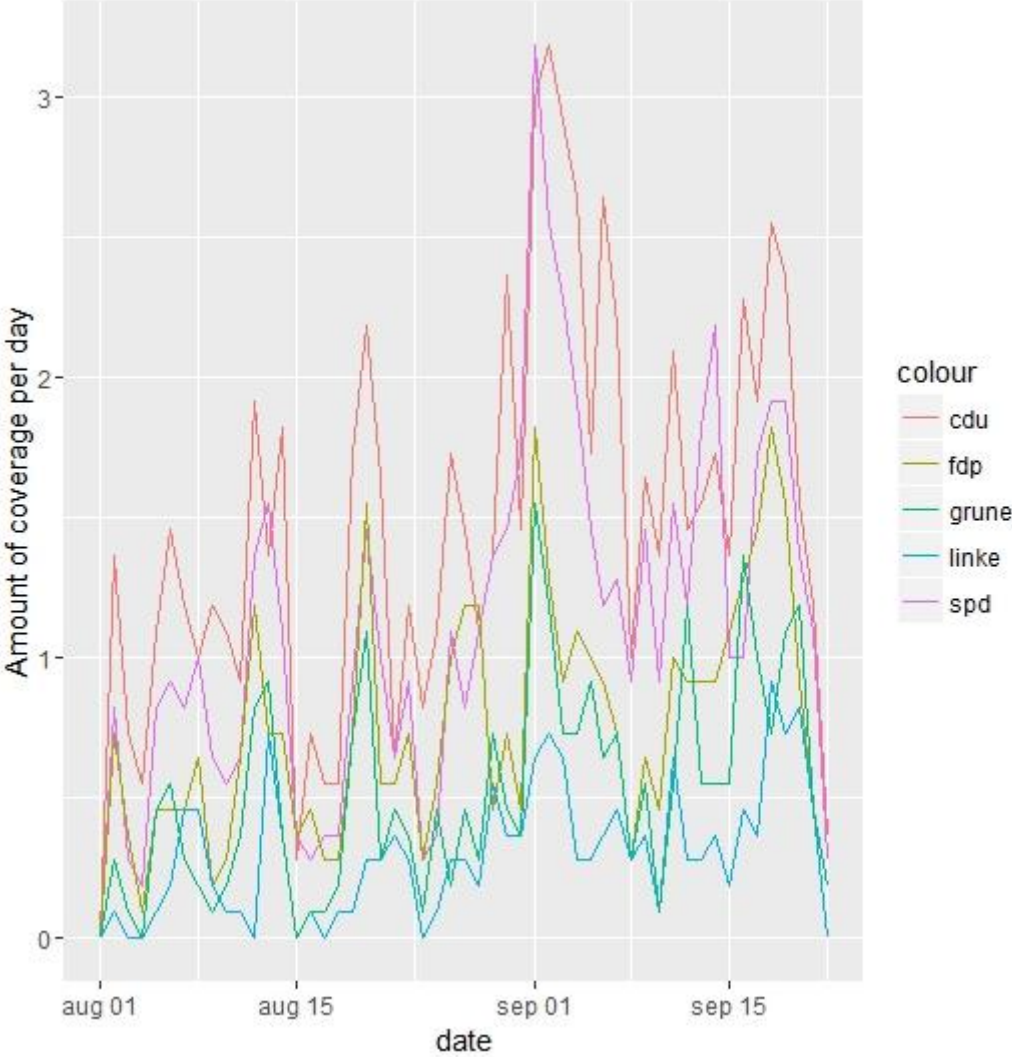


Figure A2: Amount of coverage (on average per outlet per day) over time per party.

ONLINE APPENDIX B

Equation

An example of the multilevel regression equation for the total amount of articles referring to a party on average per day in an outlet following a poll would be:

$$\begin{aligned}
 \text{next total amount}_{ijk} = & c + \beta_1 \cdot \text{past total amount}_{ijk} + \beta_2 \dots \beta_4 \cdot \text{poll change}_{ijk} \\
 & + \beta_5 \dots \beta_7 \cdot \text{time trend}_j + \beta_9 \cdot \text{TV debate (past)}_{ik} + \beta_{10} \cdot \text{TV debate (next)}_{ik} \\
 & + \beta_{11} \cdot \text{campaign coverage (past)}_k + \beta_{12} \cdot \text{campaign coverage (next)}_k \\
 & + \beta_{13} \cdot \text{lag length (past)}_k + \beta_{14} \cdot \text{lag length (next)}_k + \epsilon_{ijk}
 \end{aligned}$$

Where subscript “i” denotes the specific party, subscript “j” the specific outlet and subscript “k” denotes the specific poll list publication, and “c” denotes the constant. The lagged dependent variable “past total amount” is party, outlet and poll list publication specific, as is the change in poll rating. The effect of changes in poll ratings is estimated separately for the front runner, challenger and smaller parties. The time trend is likewise estimated separately for these three party categories. The “TV debate”-variable is related to party as it only applies to the two parties partaking in the debate (CDU and SPD) and related to poll list as it only refers to specific lists published right before or after the debate.

While poll change is a first difference variable, lagged dependent variables are used for amount of (positive/negative/neutral) coverage. These two different ways to account for change are used together because using first difference variables presupposes the coefficient of the lagged dependent variable to be equal to one, which is the case for polls, but not for amount as can be seen in the results (Table 1). Using a lagged variable for polls would be substantially difficult to interpret as absolute poll levels are strongly party related, in addition to causing high multi-collinearity with the current poll level.¹

ONLINE APPENDIX C

Dependencies in the dataset

In this paper the data is sorted according to periods before and after the publication of each list of poll ratings by a polling firm. This was done to capture effects distributed over a number of days, and avoid the various problems of aggregating different polls of the same party published on the same day, of comparing poll ratings of the same party by different polling agencies over time, or of dealing with days without any poll being published. This approach does have its own disadvantages though. One such possible disadvantage would be that it does not allow examining the differences between immediate and delayed effects, as it combines periods of different lag lengths into one analysis. However, the limited explained variance at the poll list level, and the small and non-significant coefficients for lag length effects provide some confidence that this problem is not too large.

To explore the relevance of the interdependencies between the observations in the dataset in terms of the poll list they are related to, the party and the outlet, Table C1 shows the proportion of explained variance for each of these levels if tested separately on an intercept-only model (so without predictor variables). The table lists results for total amount of coverage, but results are similar for the other dependent variables in this study. The figures in the first three columns show that variance in amount of party coverage is largest across parties, there is also considerable difference between outlets and poll lists. These results justify a cross-party perspective for the analysis of these data, as apparently differences between parties account for much of the differences in party coverage within the dataset. The fourth column of Table C1 shows that the variance between combinations of outlets and parties is larger than just the sum of its parts. While 30% of the variance in total amount of party coverage is accounted for by the party level and 12% by the outlet level, the combinations between each party and each outlet explain 49%.ⁱⁱ Apparently, different outlets cover different parties differently, underlining the importance of properly accounting for these differences. The fifth column shows the nesting structure used for the analysis of RQ1 below, a cross-classified model of poll lists and combinations of parties and outlets.ⁱⁱⁱ The bottom row shows that the

remaining unexplained variance is smallest for this model, compared to the other models in this table. Using this specification is thus the most precise test for RQ1.

Table C1
Explained variance at the poll list, party, outlet and party-outlet combination levels, of five intercept only models explaining amount of party coverage.

Level	Model 1	Model 2	Model 3	Model 4	Model 5
Poll list	8%	-	-	-	10%
Party	-	30%	-	-	-
Outlet	-	-	12%	-	-
Party-outlet combination	-	-	-	49%	50%
Unexplained	92%	70%	88%	51%	40%

ONLINE APPENDIX D

The content analysis and intercoder reliability

All dependent variables were calculated based on the content analysis. As the content analysis was part of a much larger project, a large number of specific actor codes were available for the coders. Coders were allowed to code up to ten (most prominent) actors within each article/item. Actors could be specific persons, like Angela Merkel, but also institutions or organizations such as a party, like "die Linke". For this specific application of the content analysis all actors belonging to a party are recoded as representing a party. If multiple actors associated/referring to the same party were coded within the same article/item, their average tone (valence) score was calculated. The inter-coder reliability for the actor coding was assessed for a limited reliability test sample, as is common for the kind of large scale content analyses projects similar to the one in which this study is embedded. In this test sample not all parties were equally represented.^{iv} Therefore, the best indications of reliability for each of the dependent variables are those referring to the two main parties CDU/CSU and SPD. They will be discussed for the amount of party coverage and the tone of party coverage in turn.

Amount of party coverage

The unit of analysis for this content analysis is the individual article/item for each actor mentioned. Intercoder reliability for whether a party is mentioned or not: CDU Krippendorff's alpha = 0.91; CDU percent agreement = 99%; CDU Standardized Lotus (λ) = 0.89; SPD Krippendorff's alpha = 0.73; SPD percent agreement = 99%; SPD Standardized Lotus (λ) = 0.97 (for Lotus (λ) see Fretwurst, 2013). The unit of analysis for the content analysis is thus the individual article/item. To arrive at a measure of amount of party coverage suitable for the analysis in this paper, the content of an outlet referring to a party is aggregated from article level to a daily level, and then averaged per day over each period between the publications of two polls by the same polling firm ($M = 0.86$; $SD = 0.80$; range [0; 5]).

Tone of party coverage

Intercoder reliability for the (negative/neutral/positive) tone with which the party is discussed: CDU

Krippendorff's alpha = 0.65; CDU percent agreement = 87%; CDU Standardized Lotus (λ) = 0.84; SPD

Krippendorff's alpha = 0.64; SPD percent agreement = 86%; SPD Standardized Lotus (λ) = 0.68).^v

ONLINE APPENDIX E

Table E1

Results of multilevel model explaining next amount of total, positive, negative and neutral coverage across parties.

Predictor	Total amount of party coverage (Coef.)	Amount of positive party coverage (Coef.)	Amount of negative party coverage (Coef.)	Amount of neutral party coverage (Coef.)
Change in poll rating (all parties)	0.82	-0.74**	1.52***	-0.24
Past amount	-0.05**	0.09***	-0.16***	-0.08***
General time trend	0.01***	0.00***	0.00***	0.01***
After TV debate	0.60***	0.09***	0.09***	0.43***
Before TV debate	0.30***	0.01	0.08***	0.20***
Lag length before poll	0.02	0.00	0.01	0.01
Lag length after poll	-0.02*	-0.00	-0.00	-0.01*
<i>Party dummies:</i>				
-CDU	0.93***	0.14***	0.17***	0.64***
-SPD	0.52***	0.09***	0.18***	0.27**
Constant	0.32**	-0.05**	0.02	0.36***
Explained variance at poll list level	5.85%	1.09%	5.78%	3.97%
Explained variance at party-outlet combination level	37.01%	17.90%	31.79%	34.86%
Explained by predictor variables ^a	3.41%	0.08%	1.29%	5.13%
Log-likelihood	-1618.32	1123.81	576.41	-1176.45

Note. ^aExplained variance at poll list and party-outlet combination levels in the intercept only model minus the explained variance at the poll list and party-outlet combination levels in the models listed here. * = $p < 0.10$, ** = $p < 0.05$, *** = $p < 0.001$, N(cases) = 1980, N(poll lists) = 36, N(parties) = 5, N(outlets) = 11.

Note that this model is slightly different from the one presented in Table 1 in the paper, since the models behind Table 1 in the papers focus specifically on whether CDU and SPD are treated differently, additional controls are included for the separate time trends in the coverage for each of these parties, as well as the general campaign coverage before and after each poll for all parties.

ONLINE APPENDIX F

Table F1

Pairwise correlations between main variables.

	Total amount of party coverage	Amount of positive party coverage	Amount of negative party coverage	Amount of neutral party coverage
Change in poll rating	-0.018 (0.431)	-0.024 (0.289)	0.034 (0.126)	-0.031 (0.174)
Change in front runner poll rating (CDU)	-0.135 (0.007)	-0.227 (0.000)	-0.083 (0.099)	-0.071 (0.161)
Change in challenger poll rating (SPD)	0.149 (0.003)	0.088 (0.081)	0.180 (0.000)	0.106 (0.035)
Change in poll rating (other parties)	0.054 (0.033)	0.085 (0.001)	0.085 (0.001)	0.015 (0.549)

Note. p-levels in brackets.

Table F2

Results of multilevel model explaining next amount of total, positive, negative and neutral coverage specified for CDU versus SPD versus other parties, without controls.

Predictor	Total amount of party coverage (Coef.)	Amount of positive party coverage (Coef.)	Amount of negative party coverage (Coef.)	Amount of neutral party coverage (Coef.)
Change in front runner poll rating (CDU)	-9.08*	-8.00***	0.18	-1.45
Change in challenger poll rating (SPD)	9.89**	-0.18	4.01***	6.66**
Change in poll rating (all parties)	-0.25	0.53	0.47	-1.56
<i>Party dummies:</i>				
-CDU	1.01***	0.16***	0.17***	0.69***
-SPD	0.62***	0.11***	0.17***	0.34**
Constant	0.59***	0.03**	0.10***	0.46***

Note. ^aExplained variance at poll list and party-outlet combination levels in the intercept only model minus the explained variance at the poll list and party-outlet combination levels in the models listed here. * = p<0.10, ** = p<0.05, *** = p<0.001, N(cases) = 1980, N(poll lists) = 36, N(parties) = 5, N(outlets)= 11.

ONLINE APPENDIX G

To be sure our specific choice of outlets in our media sample did not drive our results, we have conducted two robustness tests, replicating Table 1 from the main paper, when excluding either the most rightwing oriented outlets BILD Zeitung and BILD-online (Table G1) or WELT Zeitung (Table G2) respectively.

Table G1

Results of multilevel model explaining next amount of total, positive, negative and neutral coverage specified for CDU versus SPD versus other parties, when excluding BILD Zeitung and Bild Online from the media sample.

Predictor	Total amount of party coverage (Coef.)	Amount of positive party coverage (Coef.)	Amount of negative party coverage (Coef.)	Amount of neutral party coverage (Coef.)
Change in front runner poll rating (CDU)	-5.20	-2.85**	-2.82*	-0.05
Change in challenger poll rating (SPD)	4.50	-0.55	0.59	3.83
Change in poll rating (all parties)	0.08	0.12	1.12	-1.15
Past amount	-0.13***	-0.01	-0.23***	-0.15***
CDU time trend	0.00	0.01***	-0.01***	0.00
SPD time trend	0.00	0.00**	-0.00	0.00
General time trend	0.00	0.00*	0.00***	-0.00
After TV debate	0.48***	0.09***	0.08***	0.32***
Before TV debate	0.19***	-0.03*	0.09***	0.11**
General amount of campaign coverage after poll	0.12***	0.01***	0.02***	0.09***
General amount of campaign coverage before poll list	0.02**	0.00**	0.00	0.01*
Lag length before poll	-0.02	-0.00*	-0.00	-0.01
Lag length after poll	0.01	0.00*	-0.00	0.00
Party dummies:				
-CDU	0.85***	-0.02	0.34***	0.56***
-SPD	0.39**	0.03	0.18**	0.19
Constant	-0.31**	-0.07***	-0.12**	-0.08

Note. * = p<0.10, ** = p<0.05, *** = p<0.001, N(cases) = 1620, N(poll lists) = 36, N(parties) = 5, N(outlets)= 9.

Table G2

Results of multilevel model explaining next amount of total, positive, negative and neutral coverage specified for CDU versus SPD versus other parties, when excluding WELT Zeitung from the media sample.

Predictor	Total amount of party coverage (Coef.)	Amount of positive party coverage (Coef.)	Amount of negative party coverage (Coef.)	Amount of neutral party coverage (Coef.)
Change in front runner poll rating (CDU)	-8.66**	-3.45**	-3.90**	-1.53
Change in challenger poll rating (SPD)	4.07	-0.65	1.10	3.05
Change in poll rating (all parties)	0.05	0.30	0.73	-0.99
Past amount	-0.05**	0.03	-0.13***	-0.08***
CDU time trend	0.00*	0.01***	-0.00***	0.00
SPD time trend	0.01**	0.00**	0.00*	0.00**
General time trend	0.00	0.00	0.00***	-0.00
After TV debate	0.61***	0.11***	0.07**	0.44***
Before TV debate	0.23***	-0.01	0.10***	0.13**
General amount of campaign coverage after poll	0.10***	0.01***	0.01***	0.08***
General amount of campaign coverage before poll list	0.01**	0.00	0.00	0.01**
Lag length before poll	-0.01	-0.00**	0.00	-0.01
Lag length after poll	0.00	0.00	-0.00	0.00
Party dummies:				
-CDU	0.78***	-0.04	0.25***	0.60***
-SPD	0.35**	0.05*	0.10**	0.20
Constant	-0.22*	-0.06**	-0.07**	-0.07

Note. * = p<0.10, ** = p<0.05, *** = p<0.001, N(cases) = 1800, N(poll lists) = 36, N(parties) = 5, N(outlets)= 10.

ⁱ This study has not looked at the reverse effect of media coverage on polls. This relation appears intuitive and is found in earlier studies (e.g., Box-Steffensmeier, Darmofal & Farrell, 2009; Vliegenthart & Van Aelst, 2009). However, the surveys of German polling agencies are fielded over a period of multiple days and their results are not published directly, but after a time lag. Depending on the specific poll and polling firm it can take up to a week after the last survey is filled out before its results are published (see www.wahlrecht.de for field and publication dates). It is likely that such delays are also present outside the German context and therefore might have biased the results of earlier studies reporting the effect of media content on polls. In this study we only have access to the aggregate poll rating and have no knowledge of how respondents within a poll's sample slot differed over time. This makes it difficult to determine what specific media content should logically relate to each subsequent poll in the analysis. The difference between the date respondents fill out a poll's survey and the date of its publication has one important advantage: it makes it less likely that party performance is a confounder of the relation found in this paper between polls and coverage. If performance explains both media coverage and changes in polls, these changes in coverage would likely coincide with changes in poll ratings. However, due to the delay, such coverage would then precede the *publication* of that poll. The analyses in this paper are centered around these publication dates and preceding coverage is included as a control. Therefore, it is unlikely that party performance confounds our findings.

ⁱⁱ The literature disagrees on the appropriateness of using levels with less than twenty units (see Gelman and Hill, 2006), by using combinations of outlets and parties, this problem is avoided (as this level has $11 * 5 = 55$ units).

ⁱⁱⁱ A cross-classified model allows each unit to be clustered separately in each of the levels, in this case poll lists and outlet-party combinations.

^{iv} For the purpose of the reliability test, in contrast to the actual content coding, coders could only indicate up to five actors per article/item.

^v Krippendorff's alpha was calculated based on a four category coding, including "missing" if an article didn't mention this party.