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Research Note

News Reporting of Opinion Polls: Journalism and Statistical Noise

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Polls play a key part in news media coverage of politics and election campaigns (Benoit, Stein, & Hansen, 2005; Strömbäck & Dimitrova, 2006; Strömbäck & Shehata, 2007). This media focus on the "*horse race*" of politics is not a new phenomenon (e.g., Lazarsfeld, 1944, p. 323; McCombs and Shaw, 1972, pp. 179–180), but polls on voting intentions have steadily become more prevalent in the news, and they now constitute a ubiquitous part of election campaign coverage (Strömbäck, 2012).

Given the prominent role played by polls, it is not surprising that they have been studied quite extensively, often as indicators of the media's tendency to frame politics as a strategic game (Aalberg, Strömbäck, & de Vreese, 2012). A substantial amount of literature has focused on the causes behind the extensive poll coverage (e.g., Crespi, 1980; Frankovic, 2005; Matthews, Pickup, & Cutler, 2012; Rosenstiel, 2005; Strömbäck, 2009), whereas an even larger body of literature has focused on the effects of polls and strategic framing in general (e.g., Adriaansen, van Praag, & de Vreese, 2010; Cappella & Jamieson, 1997; de Vreese, 2004, 2005; de Vreese & Semetko, 2002a; Hahn & Iyengar, 2002; Moy & Rinke, 2012; Pedersen, 2012). While the causes and consequences of poll reporting have been studied comprehensively, less systematic work has been conducted on how the media report on polls (Matthews, Pickup, & Cutler, 2012). However, poll coverage may have substantial political impact, not least on voters (Moy & Rinke, 2012). Therefore, some studies have investigated the quality of such coverage, primarily by studying whether it includes explicit methodological information, for example, about statistical uncertainty (Andersen, 2000; Brettschneider, 2008; Gahner Larsen & Straubinger, 2012; Hardmeier, 1999; Miller & Hurd, 1982; Sonck & Loosveldt, 2008; Welch, 2002).

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In this article, we add to the literature by taking a closer look at the key issue of statistical uncertainty in poll coverage. In line with previous studies, we first investigate whether news media coverage of polls includes explicit methodological information on statistical uncertainty. Second, we investigate a question that until now has received scant attention, namely, the extent to which the media's own interpretations of poll results take statistical uncertainty into account (Larson, 2003; Pétry & Bastien, 2013). In other words, are journalists' claims about differences in electoral support statistically justified? Finally, we investigate the relationship between these two characteristics of poll coverage by analyzing whether methodological information in news media poll coverage tells us anything about the journalists' own interpretations of poll results.

The Standards of News Media Poll Coverage

Scholars familiar with polling methodology know that all polls are subject to some statistical uncertainty, and that the precision and validity of all polls depend on a number of assumptions and methodological choices made by pollsters. For this reason, media coverage of polls has been evaluated by the degree to which the coverage includes relevant methodological information. Specifically, multiple studies have investigated newspapers' adherence to established standards set forth by survey and marketing associations, such as the American Association of Public Opinion Research (AAPOR 2010) or ESOMAR/World Association of Public Opinion Research (ESOMAR/WAPOR 2009) (Marton & Stephens, 2001; Sonck & Loosveldt, 2008; Strömbäck, 2009).

The studies investigating the news media's adherence to such standards have generally found that newspapers rarely include all of the recommended methodological data in their poll coverage. For example, while most poll coverage contains information on the sponsor or poll institute, newspapers rarely report estimates on statistical uncertainty (Andersen, 2000; Brettschneider, 2008; Hardmeier, 1999; Miller & Hurd, 1982; Sonck & Loosveldt, 2008; Szwed, 2011; Weaver & Kim, 2002; Welch, 2002; Wichmann & Brettschneider, 2009; but see de Vreese & Semetko 2002b). This general lack of methodological information in news coverage has often led to criticism of the news media, based on the premise that media users, like scholars, need this information to evaluate the reliability and validity of poll results (Brettschneider, 2008, p. 484; Welch, 2002, p. 111).

From Standards to Interpretations

The premise that the quality of news media poll reporting should be judged on reporting of methodological information has been questioned by journalists and editors, arguing that inclusion of all the methodological details results in stories "*with footnotes that are longer than the stories themselves*," and that the methodological details are also of little use to ordinary newspaper readers (Meyer & Jurgensen, 1991). According to this perspective, a reporter should know the methodological details of the poll, but he/she should use these metadata to interpret the results when writing about the poll results rather than mindlessly pass this information on to the reader. Although this perspective may seem like a handy excuse for the media's lack of

methodological information in their articles, the few studies that have investigated news consumers' use of the methodological information lend some support to the following perspective: While news consumers are fairly adept at remembering margin of error in a poll-based newspaper article, they do not necessarily understand the concept (Lordan, 1993), and inclusion of too many technical details in media poll reporting seems to diminish the readers' ability to recall poll results (Wichmann, 2010).

Despite the apparent conflict between these two perspectives on poll coverage quality, the empirical relationship between these criteria has remained unexplored. Hence, we do not know whether journalists and media outlets that provide their readers with explicit methodological information about the margin of error are also better at taking the margin of error into account when interpreting the poll results in their articles. If they are, explicit methodological information in poll coverage would still be a good proxy measure for the overall quality of poll coverage in the news, even if readers do not use this sort of information actively. However, if explicit methodological information is not indicative of reasonable journalistic interpretations of poll results, our assessment of poll coverage quality arguably needs to include measures regarding journalistic interpretations. In this study, we therefore undertake an analysis, which includes both perspectives on poll coverage quality, and we analyze the empirical association between explicit methodological information on statistical uncertainty and the journalists' own interpretations of results with respect to the margin of error.

Context and Methodology

Our study is based on a content analysis of poll coverage in seven Danish newspapers before, during, and after the 2011 parliamentary election campaign. Similar to other Central and Northern European countries, the media system in Denmark is a democratic corporatist system (Hallin & Mancini, 2004) and daily newspaper readership is relatively high (Leckner & Facht, 2010). There are no legal restrictions on the publication of polls in Denmark (Petersen, 2012), and poll coverage is widespread in Danish newspapers (Pedersen, 2014). Denmark is also a clear case of a multiparty system: Nine parties ran for election in 2011 and only one party failed to gain representation.

The newspapers were chosen to cover the three most widely read broadsheets (*Politiken*, *Berlingske*, and *Jyllands-Posten*), the two most widely read tabloids (*Ekstra Bladet* and *BT*), and the two most widely read free daily newspapers (*Metroxpress* and *24Timer)*.[1] We investigated coverage over a 260-day period from May 9, 2011 to January 23, 2012, which includes the three-week formal election campaign preceding the 2011 national parliament election that began on August 26, 2011, and ended with the election on September 15, 2011. Articles were obtained from a newspaper database (*Infomedia.dk*), and we included all articles that contained the Danish term for "opinion poll" and the name of at least one of the nine political

[1]The two free newspapers are produced in several regional versions, and our coding was based on the version published in the metropolitan area of Copenhagen, Denmark. The regional versions mainly differ in advertisements, whereas the articles are largely identical across the regional versions.

parties running in the election. This search yielded 1,078 articles, which were subsequently coded by a team of three coders.

Coders recorded basic article-level variables on contextual information, including media outlet and date of publication.[2] Furthermore, as articles mentioning polls can substantially differ in nature, we coded for five different types of articles: (1) articles with poll results for all political parties, (2) articles with poll results for some parties, (3) articles that refer to poll results on vote intentions in the Danish electorate in more "generic" terms, without referencing specific, identifiable polls, (4) "meta-articles" on polls, that is, articles reflecting on the media's own use of polls, and (5) articles not belonging to one of the four preceding types, for example, polls about something other than voting intentions or about an election outside of Denmark. For the articles that did refer to identifiable polls (article types 1 and 2), the codebook instructed coders to determine whether the article (1) "mentions in any way that the results are accompanied by uncertainty," whether the article (2) "includes a confidence interval (e.g., margin of error is $\pm 3\%$)," and whether the article (3) "includes alpha level of the confidence interval (e.g., 95%)." For each of these variables, coders also recorded whether the information, if provided, was mentioned in the main text of the article or in an accompanying information box.

When coding for the journalists' own interpretations of poll results, it was not appropriate to use articles as level of analysis, because each article often contains interpretations of several different poll results. Instead, we recorded every instance of a specific poll result being compared with another value by the journalist. Specifically, we recorded instances in which a poll result was compared with some fixed (nonsurvey based) value, such as previous election results or the electoral threshold (which is 2% in Denmark), and instances in which poll results were compared with other poll results (e.g., previous poll results for the same party or comparisons of poll results for two different parties). For each of these comparisons, we also recorded the sample size of the survey(s) used, the poll results for the party or parties compared, the size of the difference between the values compared, and whether it was claimed that the two values in the comparison were different from each other.

To estimate intercoder reliability, a subsample of 84 articles (10 days of newspaper coverage) was coded independently by all three coders. For the variables coded on the level of articles, Krippendorff's α was .82–1.00 (Hayes & Krippendorff, 2007), except the variable recording whether uncertainty was mentioned at all. This variable had a reliability of $\alpha = .58$, which is a bit below the customary criteria of $\alpha > .67$ (Krippendorff, 2004), and this should be taken into account when looking at the results for this particular variable. However, the two key variables recording article information on confidence interval and α level had perfect reliability ($\alpha = 1.00$).

It was less straightforward to assess the reliability of the variables describing the poll comparisons made by journalists; a traditional calculation of intercoder reliability requires multiple, independent codes of the exact same unit of analysis, but the multiple comparisons found within each article are not completely separable. We addressed this challenge in two ways. First, we tested the agreement between coders on the number of comparisons made within each article. Here, reliability

[2]A detailed codebook is available from the authors on request.

was easily satisfactory, with $\alpha = .82$. Second, we reran all our analyses, each time excluding one coder. All conclusions of the analyses remained essentially unchanged during this analysis.[3]

Results

Among the 1,078 analyzed articles, 406 did not report on the voting intentions of the Danish electorate (these articles were based on polls on other issues, polls from other countries, etc.). We exclude these articles from subsequent analyses.

Methodological Information in the Articles

As a first step in our analysis, we begin by looking at the distribution of overall article type: Among the 672 articles, only 26% refer to an identifiable poll; 9% of the articles provided poll results for all parties, whereas 17% of the articles contain results for some parties. About 4% of the articles were classified as meta-stories, that is, stories about news coverage of polls. Finally, a full 70% of the articles were generic. The role played by polls in these stories vary, but they all discussed poll results in such general terms that it was impossible to identify the data on which any of the discussion was made. Our study thereby affirms the high prevalence of "generic poll references" (Frankovic, 2005), and because the audience has no way of judging the validity or reliability of the polls behind such generic articles, the high prevalence may be said to increase the importance of the journalists' ability to interpret the polls on which they base their articles.

What about methodological information in the minority of articles that refer to identifiable polls? Among the 175 articles referring to an identifiable poll, 14% of the articles report a confidence interval either in the main text or in a text box, whereas a mere 3% of the articles mention the alpha level of the confidence interval.[4]

Interpretations of Poll Results in the Articles

Turning to the journalists' own interpretations of poll results, the data set includes 440 relevant comparisons where the journalist interpreted two percentages as different from each other.[5] A first look at the data reveals that a large share of the comparisons are of a small order: 25% of the comparisons concern values that are within .8 percentage points of each other, whereas the median difference is slightly <1.7 percentage points.

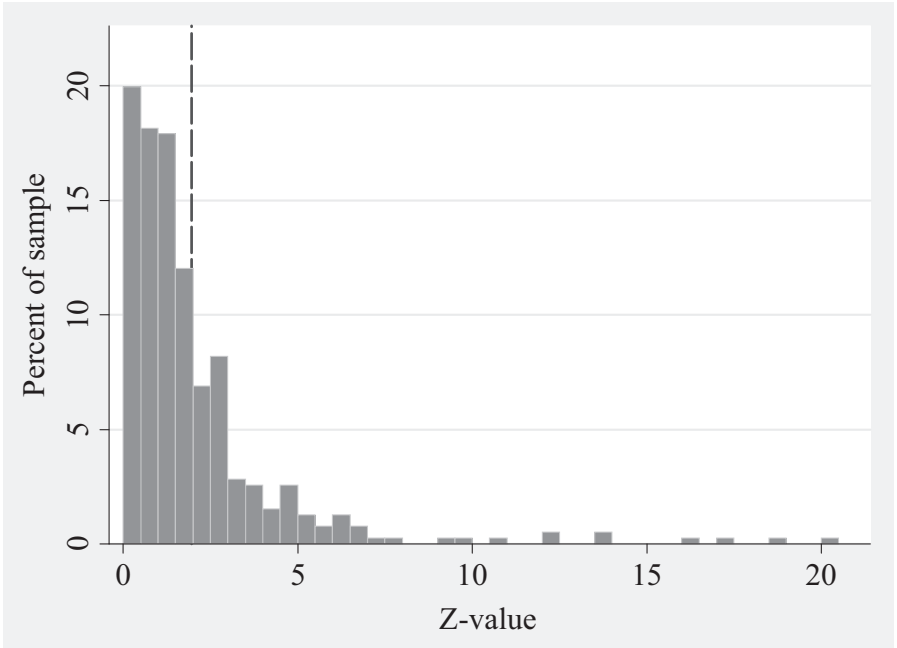
To more precisely investigate the extent to which margin of error is taken into account when reporters interpret poll results, we need to account for the fact that

[3]The median in Figure 1 varied between 1.27 and 1.35. In Table 1 the conclusion in all cases was a zero to weak negative correlation between reporting explicit methodological information and the z-values.

[4]Even allowing for a more lenient standard in our coding, just 16% of the articles give any indication that the results are subject to statistical uncertainty, though it should be noted that the reliability of this particular variable, as previously mentioned, was slightly lower than conventional standards.

[5]The content analysis detected 490 instances in which the journalist compared a poll result with another number. In 35 of the 490 comparisons, the journalist noted that there was essentially no difference between the poll results and the value of comparison, and we exclude these comparisons from the subsequent analyses. We also exclude 15 comparisons where it was only possible to obtain comparisons in the projected number of parliament members instead of percentages. This leaves us with 440 comparisons.

Figure 1
Distribution of the sample, in percent of the sample, by statistical certainty (z-values)



The dashed line indicates $z = 1.96$

margins of error are dependent on the absolute size of the comparison, on the absolute size of the figures involved in the comparison, and on the type of comparison (e.g., whether there is uncertainty on one or two values). For each comparison, we therefore calculate a standard score (z-value) for the difference in all the comparisons, where $z \geq 1.96$ denotes that the difference is significant at the conventional level of $p = .05$.[6] The scores are calculated using standard formulas, assuming simple random sampling (Agresti & Finlay, 2009, p. 175, 208; Scott & Seber, 1983).[7]

The distribution of estimated z-values is illustrated in Figure 1. For illustration, the figure marks the conventional threshold of significance at $z = 1.96$.

[6]In newspaper articles, the sample size is only provided for 44% of the fixed comparisons and 27% of the survey-based comparisons. To obtain the sample sizes for all comparisons, we used a database of Danish opinion polls (Thomsen, 2013). This, along with the sample sizes mentioned in the articles, provided us with sample sizes for 76% of the fixed comparisons and 65% of the survey-based comparisons. For the remaining comparisons, we imputed the sample size with the median sample size of those obtained. It should be noted that the sample sizes from the database are total respondent n (including don't knows) and not only those who actually stated a party preference. We also found that newspapers sometimes report the total respondent n. This might lead us to slightly overestimate the z-values. We exclude 49 of the 440 comparisons mainly because they are based on aggregate surveys with very uncertain sample size.

[7]When a poll result is compared with a fixed value, we use the formula for comparing a sample proportion to a parameter proportion (see Agresti & Finlay, 2009, p. 175). We compared two poll results from two different polls by using the formula for comparing two independent proportions (see Agresti & Finlay, 2009, p. 175). Finally, in the case of two results from the same poll, we used the formula for comparing two multinomial proportions (see Scott & Seber, 1983).

Table 1
Predicting Statistical Certainty (z-Values) of the Comparison From Reporting of Methodological Information

Variable	OLS	OLS	Logit
Reports statistical uncertainty	−.67 (.38)	−.49 (.37)	−1.14* (.48)
Reports confidence intervals	.17 (.45)	.36 (.49)	.33 (.58)
Reports alpha level	.67 (1.05)	−.10 (.58)	.23 (.55)
Comparison of two survey results	–	−1.65*** (.35)	−1.51*** (.30)
Square root of sample size	–	.10*** (.03)	−.01 (.01)
Size of poll result	–	−.01 (.01)	.02** (.01)
Constant	2.16*** (.20)	−.18 (.97)	.16 (.52)
Joint effect of the three reporting variables (Wald test, *p*-value)	.28	.62	.03*
N	391	391	391
R^2/pseudo-R^2	.01	.21	.10

Note. The coefficients are unstandardized ordinary least squares (OLS) or logistic (logit) regression coefficients. Robust standard errors in parentheses clustered by article. *$p < .05$, **$p < .01$, ***$p < .001$.

More than 67% of the comparisons were of differences below the conventional threshold. The median *z*-value is 1.30, with a lower and upper quartile of .61 and 2.50, respectively. In other words, when reporters comment on differences in poll results, two-thirds of these comparisons are between numbers that do not differ significantly from each other.

The Relationship Between Methodological Information and Interpretation

As our final step, we investigate whether journalists who report methodological information about uncertainty are more statistically conservative in their interpretations. We do this by regressing the *z*-values from the previous section on methodological information variables from the first part of the analysis, thereby attempting to explain the variation in the statistical certainty of the comparisons included in the articles by reporters (we include the general uncertainty measure but the relatively low reliability of this particular variable should be noted).

As shown in Model 1, the effect of the three reporting variables is not statistically significant individually or jointly, indicating that the inclusion of explicit methodological information in poll articles is not indicative of the journalists' own willingness or ability to take statistical uncertainty into account. In Model 2, we check the robustness of the results by including three poll characteristics as controls: a dummy for whether the comparison is between two survey results (as opposed to comparisons with a fixed value), the square root of the sample size, and the size of the poll result. We include these three variables because they are factors in calculations of *z*-values. The inclusion of these controls does not change the finding from Model 1 (the fact that some of these control variables have a significant coefficient suggests that

journalists do not take such factors fully into account when interpreting poll results). Finally, in Model 3 we use a logistic regression, with $z = 1.96$ as the threshold. In this model, explicit information about statistical uncertainty in a poll story article slightly decreases the likelihood that comparisons in the article are statistically significant, underscoring that explicit information about statistical uncertainty in poll stories does not predict high quality of the journalists' own interpretations.

Conclusion and Discussion

As discussed in this article, the quality of poll reporting in the news media can be judged from two perspectives. First, we can evaluate whether the reporting includes the methodological information required by associations such as AAPOR and ESOMAR. Second, we can analyze whether the journalists' own interpretations of poll results are correct.

Our analysis of the first perspective confirms previous findings (e.g., Andersen, 2000; Brettschneider, 2008; Hardmeier, 1999; Miller & Hurd, 1982; Sonck & Loosveldt, 2008; Welch, 2002). In the vast majority of articles on poll results, the newspaper reader is not provided with explicit methodological information about statistical uncertainty. Seen from the second perspective, this is not necessarily a major problem, as the average newspaper readers may in fact not have much use for information about sample size, confidence intervals, alpha level, etc. However, our investigation of the second perspective does not instill much trust in the journalists' role as interpreters of poll results. A large share of the interpretations made by the journalists is based on differences in numbers that are so small that they are most likely just statistical noise. As our analysis also documents, this tendency to interpret statistical noise as meaningful variation in poll results is also prevalent in the articles that do include explicit methodological information. This last finding has implications for the way we study poll coverage quality: Because explicit methodological information in news does not guarantee that the journalists themselves interpret poll results in line with this information, future analyses of poll coverage quality should arguably include analyses of the journalistic interpretations of poll results.

When assessing poll coverage quality, one might reasonably question whether the standards for statistical significance applied in social science are too strict in regard to journalism. It is not entirely unreasonable to argue that the 95% confidence level could be relaxed somewhat in news coverage of polls. However, while this line of reasoning might be enticing to reporters, it can only be stretched so far without questioning the quality of the news reporting. For example, a quarter of all comparisons in our study had z-values of $\leq .61$, meaning that there was $>54\%$ chance of finding a result of that magnitude even if the true difference was in fact zero. We doubt that journalists would trust information from other sources if there was a corresponding likelihood of the source being misleading.

One might also question whether poll coverage quality is really important from a societal perspective, beyond the narrow confines of scholars investigating poll coverage. We would, however, argue that bad poll reporting does have societal implications. The most obvious consequence of bad poll reporting is, of course, that news consumers are provided with stories that are not substantiated by facts, a self-evident

problem given the generally accepted norms of reliability of information among journalists (Hanitzsch et al., 2011). An additional concern could be that these unsubstantiated poll stories impact the voting behavior of news consumers. While some studies have argued for, and sometimes found, a "bandwagon effect," that is, that voters tend to shift their support in favor of parties doing well in the polls, other studies have suggested an opposite "underdog effect" (Aalberg & van Aelst, 2014; Moy & Rinke, 2012). Hence, although we cannot say definitively whether unsubstantiated poll stories are particularly detrimental or beneficial to specific political parties, the potential for such effects makes bad poll reporting problematic.

Finally, bad poll reporting may have consequences for the media outlets themselves. Even in countries without any restrictions on the publication of opinion polls, a large share of parliamentary politicians have been found to favor such restrictions (Aalberg & van Aelst, 2014), and the many unsubstantiated poll stories may drive some of this political antagonism toward the free publication of polls. The news media may choose to view the widespread desire for poll restrictions as democratically suspect, but they may also consider whether increased quality of poll reporting could diminish this antagonism.

The quality of poll reporting could potentially increase if this reporting was based on more precise poll results, for example, results based on aggregations across several different polls (Hillygus, 2011). Nevertheless, many newspapers continue to base much of their poll coverage on their own traditional polls, and, in any case, polling aggregation does not completely remove statistical uncertainty. Hence, newspapers will, in all likelihood, continue to provide unsubstantiated poll interpretations unless they take statistical uncertainty into account. Whether media outlets can be expected to do this to a higher degree in the future is obviously dependent on the causes behind the current state of affairs. Unsubstantiated poll stories might be due to poor statistical skills among journalists, as previous studies have shown that journalists tend to be "number phobic" (Ranney et al., 2008) and have relatively poor math skills (Maier, 2002, 2003; Wormer, 2007). If this is the main reason behind the many unsubstantiated poll stories, more comprehensive methodological training in schools of journalism may alleviate the problem.

However, the unsubstantiated poll stories may also be driven by journalists' and editors' desires for interesting horse race stories. Hence, the problem may not be a lack of methodological skills but may also be caused by a lack of a genuine adherence to the journalistic norms of reliability and fact-based news. If this is the case, unsubstantiated poll stories may be a more permanent and unavoidable feature of modern horse race coverage.

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