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ARTICLES

Measuring Media Diet in a High-Choice Environment - Testing the List-Frequency Technique

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ABSTRACT

How to measure exposure to information in the media is highly disputed, primarily due to the difficulties of obtaining accurate self-reports. The growing supply of outlets and proliferation of information sources have added an additional level of complexity to these problems. Reflecting on old and new approaches for measuring exposure to political information, it is argued that both the specific source and the frequency of exposure must be taken into account. The validity of this so-called “list-frequency technique” is tested using a two-wave panel survey as well as a split sample experiment from the survey pre-test to enable comparison with the “list technique.” The results support the list-frequency technique in being a good solution, since it provides the same aggregate estimates of media use as the already validated list technique, and may give more detailed effect estimates and increase the explained variance when predicting political knowledge.

Introduction

Causes and effects of exposure to information in the media are fundamental concerns of communication scientists. To study these causes and effects in real world settings they often use survey data. However, measuring media exposure in surveys is related to several problems, which in Bartels’ (1993, p. 267) words have led to “one of the most notable embarrassments of modern social science.” In this article, we argue that the problems are caused by two main factors. First of all, respondents are bad at giving accurate answers about their media exposure. Second, the media environment has changed fundamentally during the last decades and now contains more sources of information than ever before. As a natural consequence it is more difficult than ever to get valid and reliable measures.

In recent years this challenge has led to a renewed discussion in the literature with different solutions being proposed (see e.g., Dilliplane, Goldman, & Mutz, 2013; Goldman, Mutz, & Dilliplane, 2013; Niederdeppe, 2014; Prior, 2009a, 2013; Slater, 2004). In the light of this discussion, the purpose of this article is to discuss and evaluate a refined survey measure that takes the challenges mentioned above into account. Focusing on exposure to political information and news, we argue that it is highly important to include both the specific source and the frequency of exposure in the measure, in order to assure a better solution for measuring individuals’ media diets in the high-choice media environment of the early 21st century. However, while taking the field of political communication as the pertinent case, many of the observations pertain to other fields of communication science, such as health and mass media communication as well as advertising and journalism research.

The article first identifies the problems with current measures. Possible solutions are discussed and the suggestion for a refined measure is presented. Afterwards the refined measure—the so-called “list-frequency technique”—is tested. It is shown how this technique is equally reliable and valid as

the simpler “list technique,” which does not take account of the frequency of exposure. But further the list-frequency technique is also likely to improve our understanding of media effects, since measures based on this technique may increase the effect estimates and the amount of explained variance when predicting levels of political knowledge compared to measures based on the simpler list technique. Finally, pros and cons of the list-frequency technique are discussed and directions for further possible improvements are outlined.

The challenges of measuring media exposure

As Price (1993, p. 615) puts it “One of the fundamental tasks confronting survey researchers interested in the processes and effects of mass communication is to elicit from respondents accurate self-reports of their mass media use.” This claim is supported by a still growing list of research, which has shown that people have a tendency to overstate their news exposure (LaCour & Vavreck, 2014; Price, 1993; Prior, 2009a, 2009b). Theoretically, this problem can be caused by three factors—social desirability, satisficing, or unrealistic demands on respondents’ memory. However, using an experimental approach Prior (2009a) finds that the only real reason seems to be the latter. One of the reasons for this problem lies in the way the media exposure questions are normally formulated (Price & Zaller, 1993). An often-used example is “How many days in a regular week do you watch news on TV?” When answering a survey question like this, respondents normally go through four cognitive tasks: (1) deducing the intent of the question; (2) searching memory for relevant information and retrieving it; (3) integrating the information into a single judgement; and (4) translating the judgement into a response from among the alternatives on offer (Tourangeau & Rasinski, 1988). Asking about “a regular week” as well as “news in TV” requires a lot from the respondents, especially in the first and second step. Evaluating “a regular week” is a lot in itself, but asking about “news on TV” further requires the respondents to evaluate what news on TV actually includes. This requirement is particularly problematic in today’s high-choice environment. What kind of content is news and what is not? Is watching news on a computer or mobile device to be included, or is it only watching news on a regular television? Ambiguities like these make it hard for the respondents to give accurate answers.

Besides the problems connected to the respondents’ self-reported answers, a new problem has emerged—today’s media landscape and content are fundamentally different from only a few decades ago. The availability of media outlets has proliferated and political information now comes in many different forms. Traditional media like newspapers, radio, and television have increased in numbers, expanded to new platforms, and are now accompanied by the Internet and all its possibilities. In addition, political information is no longer only available in news programs, but also in genres like soap operas, comedy shows, and political satire (Holbert, 2005a). In this high-choice environment media usage is more diversified and fragmented. More than ever before, people can now find the content that gives them the highest level of satisfaction, resulting in both “news drop-outs” and “political junkies” (Garret, 2009; Prior, 2007). In terms of measuring exposure to political information, this development adds an additional level of complexity to the already mentioned problems related to the self-reported answers. With the overwhelming number of different possibilities accessible today, it seems clear that it makes little sense to ask respondents to evaluate the overall amount of news they have been exposed to. Instead, measures need to be developed further to give an accurate account of what people are actually exposed to.

The current solutions

Despite the pitfalls of using surveys to measure exposure to political information in the media, the overall advantages are still so prominent that the method needs to be refined rather than dismissed. In Slater’s words, “expanded use of more sophisticated designs and methods is necessary if the media effects and campaign research area is to continue to advance” (2004, p. 179). And just as the literature points to considerable challenges for measuring media use, several attempts to meet these challenges have been made as well.

Regarding the challenges of self-reporting, Price (1993) has shown that providing respondents with more specific and recent time periods in the questions such as “past week” instead of a “typical” or “average” week significantly lower overall reports of media usage and thereby gives more valid and reliable measures. This finding underlines the importance of constructing the questions as precise and accurate as possible to lower the demands on respondents’ memory. With the same purpose in mind Prior (2009a) argues that questions should be accompanied by population frequencies. These frequencies should function as reference points and thereby help respondents anchoring their answers. Others have gone even further to automatically track media use through cell phones or other non-obtrusive forms of registration, independently of respondents’ memory (e.g., LaCour & Vavreck, 2014). At first sight the method is quite simple; the cell phone records the sound in the respondent’s surroundings and afterward it is compared to the sound from the media. However, despite the initial appeal and recommendation of this approach (Prior, 2013), it appears unrealistic to imagine that it would be possible to implement it in all future media research. The approach is highly expensive and demanding in terms of technological requirements or collaboration with external partners. Further, researchers will have no idea whether people actually used the media or just got registered as such because they were nearby the media source without paying attention.

As for the self-reported answers, more specification is also needed to handle the challenges of the changing media environment (Slater, 2014). In this regard, some studies have tried to increase the level of specificity by asking for a limited list of widely read or watched news outlets, as it is often done within election studies or in advertising research (e.g., Appel, 1994; Brown, 1990; Smit & Neijens, 2011). Indeed, this approach has for example been the strategy for some European Election Studies (e.g., 1999; see <http://eeshomepage.net>) and has been used in panel-based campaign studies (e.g., van Spanje & de Vreese, 2014). Dovetailing with this approach, Dilliplane et al. (2013) developed what they dubbed “the program list technique.” In this measure the respondents are presented with a list of specific television programs and asked to check of the programs they watch “regularly,” defined as at least once a month. The measure was first implemented in the National Annenberg Election Study in 2008 and later in the American National Election Study in 2012. According to Dilliplane et al. this type of approach has two main advantages. First, it decreases the cognitive demands placed on the respondents. The reason is that respondents are more likely to recall the programs they have watched than how many hours or minutes they have watched (news on) television. Second, the approach promotes so-called content validity by listing all relevant programs and thereby eliminating the problem of having each individual respondent evaluating whether the content they have been exposed to is relevant (i.e., count as news). However, the program list technique can also be criticized (Prior, 2013). Most importantly, the measure does not capture the amount of exposure to the different programs. A respondent who watched a program one time in a month and a respondent who watched the same program every day will be treated equally, although the effect is most likely not to be the same.

Despite this shortcoming, the program list technique is a step in the right direction. By asking about specific programs it addresses the problems of the high-choice media environment and decreases the cognitive demands on the respondents’ memory. LaCour and Vavreck (2014) have used the earlier mentioned cell phone tracking method to compare the traditional approach and the program list technique with actual exposure. First, they find a positive relationship between the traditional approach and actual exposure. Second, they also find a positive relationship between the traditional approach and the program list technique. Based on these findings, they argue that increasing values of the program list technique would reflect increasing amount of actual news viewing. However, LaCour and Vavreck also point to problems associated with the program list technique. They find that there are people scoring a zero on program count who are actually consuming more than 10 hr of news a month. This shortcoming is caused by the fact that not all news shows are included in the original version of the program list technique. To solve this problem LaCour and Vavreck suggest that the number of programs that people are asked about should be increased. Especially, they encourage that programs only including “a little bit” of news (e.g., local news and news specials) should also be included in the list.

Another possible advantage of the program list technique is that it “has the potential to be used in measuring exposure to other media as well” (Dilliplane et al., 2013, p. 1). An attempt to test this potential on the Internet has recently been made by Guess (2015). Using an intelligent experimental design he compares three different survey exposure measures to the Internet browsing history of the respondents. The results show that open-ended questions produce the most accurate picture on an aggregate level. However, open-ended questions are hard to administer in large-scale surveys. Therefore it is interesting that the list technique—or “check-all questions” as Guess calls them—is the second best solution when trying to capture exposure to specific websites.

To summarize, it seems clear that the traditional survey questions for exposure to political information in the media are related with considerable methodological concerns and in need of an adaptation to today’s high-choice environment. A promising alternative is the list technique. Although the approach has its shortcomings, it also contains a potential that needs to be pursued.

What to do then?

Despite the advances outlined above, we argue that the program list technique can be improved. Specifically, we suggest adjusting the program list technique into a “list-frequency” technique, taking account of three essential shortcomings. First and foremost, the frequency of exposure needs to be taken into account. For questions about media effects it adds potentially important information to know if a respondent is exposed to a news outlet every day or only sporadically. Second, the amount of use must be captured on other platforms than television. Third, the time between exposure and reporting needs to be minimized. This technique has in a simpler version, focusing on a limited amount of platforms and outlets, been used in previous research. For example, de Vreese & Semetko (2002), Schuck, Vliegthart, and de Vreese (2014), and Kalogeropoulos, Albæk, de Vreese, and van Dalen (2015) asked about use of specific newspapers and TV news programs in an average or a typical week, and Strömbäck and Shehata (2010) as well as Shehata, Hopmann, Nord, and Höijer (2015) asked about specific newspapers and TV news programs in the past week. However, the technique has never, to the best of our knowledge, been validated and compared to the simpler technique. In the following we describe the improvement of the program list technique before testing the suggested list-frequency technique.

The program list technique has so far been restricted to television (Dilliplane et al., 2013) and the Internet (Guess, 2015). What we need is a measure that can capture media exposure to political information across different media. Therefore, the refined measure suggested here takes two other media types into account by including newspapers and radio as well as television and the Internet. To prevent that certain respondents answer strategically in a filter question to avoid the following questions, all respondents should be asked about their newspaper, radio, television, and Internet use, respectively. Thus, all respondents will be presented with a list of specific newspapers, radio stations, television programs, and websites as well as a category for only using other sources than the listed ones and a category for not using the specific media type at all.¹ Which specific sources the lists should contain and at which level are of course dependent on the purpose of the specific study. However, with regards to political information the optimal solution will in most cases be to include a wide range of sources from hard news to soft news and entertainment, as we do in this study. This solution ensures that all respondents—also those with no “classical” political information consumption at all—have something to choose on the list. Thereby, this type of respondent will be less inclined to report wrong answers and more likely to maintain their interest in the survey.

¹We are aware that these lists differ in their target level, since the lists for newspapers, radio, and websites are aimed at the channel level, while the list for television is aimed at the program level. However, individual TV news programs are directly comparable to newspapers and websites, since all of these individual sources contain several news items. Likewise, we could have included individual radio programs to our list for this media type, but exposure to news and political information in the radio was not the main focus of our data collection. Further, radio channels often have a specific focus on either news or music and are thus likely to differentiate more than TV channels. Therefore, we aimed the radio list at the channel level to keep it as short as possible.

Further, the suggested list-frequency technique focuses on the respondents’ media exposure during the past week. There are three reasons for this. First, this approach will decrease the cognitive demands put on the respondents’ memory, since it is easier to remember the media content one have been exposed to during the past week than during the past month or in an average or typical week (Price, 1993). Second, asking about the past week makes it more likely to observe changes in exposure over time. This can for example be an advantage when conducting panel surveys or doing surveys in connection to an election. Only asking respondents about their “regular” use reduces the variability in respondents’ answers in such designs. However, if the researchers are not interested in context specific variation the “regular week” or “typical week” approaches can be used instead. Third, asking about the past week makes it possible to link respondents answers to the exact content they have been exposed to. This possibility will especially be an advantage if the researchers wish to conduct a parallel content analysis.

In addition to the number of media types included and the time period of reference, the refined measure will most importantly also take account of the frequency. Thus, the respondents are not only asked whether or not they have been exposed to specific sources, but instead how many days during the past week they have been exposed to them. Further, the scale will not include a “don’t know” category. Alwin and Krosnick (1991) showed that including such a category in survey questions does not increase the reliability, and furthermore excluding the category minimizes the risk of satisficing. Lastly, all answer options will be set to zero from start to ease the work for the respondents. Thereby the respondents only have to change the answer option if they have used the specific source and not actively answer for every single item.

Together the refinements presented above will give a highly detailed and precise measure of media use. The overall structure of the list-frequency technique is shown in Figure 1 below and the specific questions and items used to test the measure can be seen in Appendix A (Tables A1–A4).

To summarize, the refined measure in this study improves the program list technique (Dilliplane et al., 2013) in three important ways. First, it includes frequency of exposure. Second, it expands the approach to other media types and includes newspapers, radio, television, and websites. And third, it reduces the time period from exposure to recall and answering.

Testing the list-frequency technique

A good survey measure needs to be valid and reliable. In order to test the list-frequency technique, we partly rely our analyses on Dilliplane et al. (2013), who originally found the simpler list technique

How many days in the past week did you [read] [listen to] [watch] [visit] the following [newspapers] [radio stations] [TV programs] [websites]?

	0	1	2	3	4	5	6	7
Specific source 1	×							
Specific source 2	×							
Specific source ... n	×							
<input type="checkbox"/> I did only [read] [listen to] [watch] [visit] other [newspapers] [radio stations] [TV programs] [websites] in the past week <input type="checkbox"/> I did not [read] [listen to] [watch] [visit] any [newspapers] [radio stations] [TV programs] [websites] at all the past week								

Figure 1. Structure of the list-frequency questions.

Note: The specific questions and items for each media type can be seen in Appendix A (Tables A1–A4).

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to be highly reliable and valid for measuring exposure to political television. Dilliplane et al. tested the true-score reliability (Heise, 1969) of the program list technique using a three-wave panel survey and found that measures based on the list technique have a reliability score between .79 and .88. Furthermore, they tested the predictive validity of the program list technique by examining how changes in media use affect changes in political knowledge. Here they found that changes in exposure measures based on their program list technique had a significant positive effect on changes in political knowledge. If the reported exposure to the different specific sources and outlets do not differ on an aggregate level when using, respectively, the list-frequency technique and the simpler list technique, the list-frequency technique will have a high convergent validity (Carmines & Zeller, 1979). Thereby it can be argued that the results found by Dilliplane et al. (2013) for the simpler list technique also apply for the more detailed list-frequency technique—at least in regard to television. Since we have no reason to expect that the two different techniques should provide different estimates of exposure on an aggregate level we purpose the following hypothesis.

H1: There is a high degree of similarity between reported exposure to different media types on an aggregate level when using, respectively, the list-frequency technique and the list technique.

A key argument in this article is that the list-frequency technique provides us with more detailed media measures than the simpler list technique, since it also captures the frequency of exposure. Thereby the list-frequency technique also adds more variance to the media measures. This enrichment is likely to boost the validity of these measures. A common way to test the validity of measures of political media exposure is to examine how they affect levels of political knowledge—also known as the construct or predictive validity (Dilliplane et al., 2013). Political knowledge is seen as the most widely accepted (and logical) outcome of exposure to political information (de Vreese & Boomgaarden, 2006; Eveland, Hutchens, & Shen, 2009; Price & Zaller, 1993). Thus, an intuitive approach to test the possible advantage of the list-frequency technique is to examine the difference in explained variance when using this technique and the simpler list technique when predicting levels of current affairs knowledge (for a similar approach within health communication see Niederdeppe, 2005; Romantan, Hornik, Price, Cappella, & Viswanath, 2008). In this regard, we put forward the following hypothesis.

H2: Using media measures based on the list-frequency technique provides a higher amount of explained variance compared to measures based on the simpler list technique when predicting levels of current affairs knowledge.

In addition to the potential increase in explained variance, the list-frequency technique is also likely to affect the effect estimates of the media measures when predicting levels of current affairs knowledge, due to the increased variance in the measures. Since the list-frequency technique provides a more detailed account of media use, it can be argued that this technique should provide more precise effect estimates. In the case that the list-frequency technique produces lower effect estimates than the list technique, it will be an indication of potentially overestimating and inflating media effects when using the simpler list technique. If the list-frequency technique, on the other hand, produces higher effect estimates, it will be an indication of underestimating media effects when using the simpler list technique. However, we have no clear expectations in this regard. Therefore, we finally put forward the following research question.

RQ: How do the effect estimates differ between using the list technique and the list-frequency technique when predicting levels of current affairs knowledge?

Methods

To test the list-frequency measure we did two things. First, we conducted a split sample experiment as part of the survey pre-test. The experiment enables us to compare our list-frequency technique

with the list technique and thereby determine the convergent validity of the refined measure. Second, we tested the predictive validity of the list-frequency technique using a two-wave panel survey, where the refined measure was implemented.

Sample

Both the pre-test and the main study were conducted in Denmark through self-administrated web questionnaires managed by the opinion pollster and market research agency Epinion. Both the sample for the pre-test and the main survey was drawn from a population representative database. The database is invite only and generated using multiple recruitment strategies including face-to-face, web, and telephone interviews. The sample for the pre-test experiment was randomly drawn from this database ($N = 291$, response rate: 29 pct.), and the data collection was conducted in October, 2014. The main study sample was likewise drawn from this database using light quotas on gender, age, and region. 10,315 people were invited via e-mail to participate in the first wave (Internet access in Denmark is virtually universal (worldbank.org: 96 pct. in 2014)), of which 4,641 respondents completed (response rate: 45 pct.). 3,419 completed the second wave (attrition rate: 26.3 pct.). The panel survey was conducted from November 21, 2014 to January 5, 2015 (wave 1) and from April 10–22, 2015 (wave 2).

Measures

In the analyses of the predictive validity we distinguish between exposure to political information in newspapers, radio, television, and webpages. For each of these outlet types we include the specific sources known to provide political information. For the newspaper measure we included the three main broadsheets (Berlingske, Jyllands-Posten, and Politiken). For the radio measure we included three public service channels (P1, P2, and P4) as well as one private station with public service obligations (Radio 24/7), which all focus on providing political news and information. For the television measure we included four news shows from the public service provider DR (TV-Avisen, DR2 Morgen, DR2 Dagen, and Deadline) and one news show from the private channel TV 2 (Nyhederne) as well as their 24/7 news channel (TV 2 News). For the Internet measure we included the webpages from the three main broadsheets (berlingske.dk, jyllands-posten.dk, and politiken.dk) and the two main television providers (dr.dk and tv2.dk). When using the list-frequency technique, we summed the relevant individual sources into indexes reflecting the past week's amount of exposure to the specific types of media outlets. When using the simpler list technique, we recoded exposure to each specific source into dummy variables and summed these to an index. Thus, these measures provide us with the same information, as we would have obtained if we had used the simpler list technique. Current affairs knowledge was measured in both waves by the number of correct answers to four questions regarding political happenings, which had recently been covered in the media. In order to tap the "current" dimension the questions varied between the two waves. Compared to the often-used textbook versions of political knowledge measures, which contain questions about the political system primarily acquired through education, this approach is more appropriate, since it closer taps the ongoing learning from the media. Further, gender, age, education, and political interest were used as control variables (see Appendix B for specifications of all variables).

Results

We first compared the list-frequency technique with the simpler list technique using the split sample experiment from the pre-test of the survey, where the respondents were randomly assigned to the two different types of media measures. As mentioned, Dilliplane et al. (2013) found the list technique to be highly reliable and valid when measuring exposure to political television. Aggregate exposure should by randomisation be the same in the two groups in so far as the two techniques measure the same behaviour. If we find no differences on an aggregate level between the amounts of exposure

Table 1. Average share reporting use of specific sources within different media types (pct.).

	List technique	List-frequency technique
Newspapers	19.4	19.2
Radio	18.1	16.0
Television	26.8	29.9
Webpages	15.4	15.2
N	150	141

Note. The analyses show no significant differences between the two measure techniques on average. See Appendix C for differences between specific sources.

reported using the two different techniques, it is an indication that the list-frequency technique also is reliable and valid.

To enable comparison, we adjusted the original measure presented by Dilliplane et al. (2013) from asking about which specific television programs the respondents regularly used, to which specific television programs the respondents used during the past week, as we also do in the list-frequency technique. Further, we applied the same approach for newspapers, radio, and the Internet (for the full list of measures used in the test see Appendix A (Tables A1–A4)). A summary of the results from the split sample experiment can be seen in Table 1 (for source specific results see Appendix C).

The experiment revealed no significant differences on an aggregate average outlet level between the two types of measure techniques. We only identified a significant difference at a 95% confidence level for 8 out of 61 possible items across the four media types (see Appendix C). Further, there is no consistent pattern to whether these specific differences are positive or negative or within a specific media type. Thus, we find support for our first hypothesis that there is aggregate similarity in the answers given to respectively the list technique and the list-frequency technique. Thereby, the list-frequency technique has a high convergent validity.

To test the predictive validity of the list-frequency technique and compare it to that of the simpler list technique, we examined how media measures reflecting use of newspapers, radio channels, television programs, and webpages containing political information based on the two different techniques differ in their ability to predict changes in current affairs knowledge. For each of the two techniques we ran five regressions with a lagged dependent variable (Markus, 1979)—four regressions where we only included one media type at the time and one overall model including all media types.² The results can be seen in Table 2.

The results show that all the media measures—both the ones based on the list-frequency technique and the ones based on the simpler list technique—significantly and positively affect changes in current affairs knowledge. Although it is not possible to compare the results directly to existing findings in the literature, due to differences in operationalization and analytic models, they clearly point in the same direction (e.g., de Vreese & Boomgaarden, 2006; Dilliplane et al., 2013). Thus, both techniques have high predictive validity. Use of newspapers is, however, not significant in the list-frequency model including all media types at once (Model 11) and is also less significant when using the list technique (Model 6). Additional analyses show that newspaper use turns insignificant when Internet use is added to the model, but that these changes are not caused by multicollinearity. A possible explanation could be that people tend to use several media types, resulting in intramedia mediation effects where usage of different media sources affects each other (Holbert, 2005b)

The models presented in Table 2 are not conducive for assessing the amount of explained variance when using the two different techniques, since much of this variance is already accounted for by the inclusion of a lagged dependent variable. Further, since the models presented in Table 2 display the unstandardized coefficients, differences in the effect estimates between the two techniques cannot be interpreted directly either. The estimates for the measures based on the list-frequency technique reflects the change in current affairs knowledge when using the specific media types one additionally day during

²Dilliplane et al. (2013) used fixed effects regression models to test the predictive validity of the program list technique. It was not feasible to use the same approach in this study, since the specific questions used to measure the dependent variable, current affairs knowledge, varied between the two waves.

**Table 2.** The effect of political media use on change in current affairs knowledge.

	List technique (Model 2–6)						List-frequency technique (Model 7–11)				
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9	Model 10	Model 11
Political media use											
Newspapers		.095*** (.020)				.041* (.026)	.059*** (.014)				.024 (.015)
Radio			.076*** (.018)			.048** (.018)		.086*** (.016)			.071*** (.016)
Television				.077*** (.012)		.062*** (.013)			.071*** (.015)		.054*** (.015)
Webpages					.079*** (.016)	.052*** (.014)				.079*** (.013)	.056*** (.015)
Controls											
Knowledge W1	.420*** (.016)	.413*** (.016)	.415*** (.016)	.409*** (.016)	.404*** (.016)	.394*** (.016)	.413*** (.016)	.414*** (.016)	.412*** (.016)	.404*** (.016)	.394*** (.016)
Gender	-.239*** (.034)	-.234*** (.034)	-.234*** (.034)	-.247*** (.034)	-.232*** (.034)	-.236*** (.034)	-.233*** (.034)	-.236*** (.034)	-.245*** (.034)	-.230*** (.034)	-.233*** (.034)
Age	.008*** (.001)	.008*** (.001)	.007*** (.001)	.006*** (.001)	.010*** (.001)	.007*** (.001)	.008*** (.001)	.006*** (.001)	.006*** (.001)	.009*** (.001)	.005*** (.001)
Education	.047*** (.009)	.040*** (.009)	.042*** (.009)	.047*** (.009)	.039*** (.009)	.036*** (.009)	.040*** (.009)	.043*** (.009)	.049*** (.009)	.040*** (.009)	.037*** (.009)
Political interest	.107*** (.007)	.101*** (.008)	.103*** (.007)	.098*** (.008)	.098*** (.008)	.089*** (.008)	.102*** (.007)	.102*** (.007)	.101*** (.008)	.099*** (.007)	.090*** (.008)
Constant	.491*** (.080)	.499*** (.079)	.534*** (.080)	.506*** (.079)	.414*** (.080)	.482*** (.081)	.540*** (.080)	.577*** (.081)	.553*** (.080)	.450*** (.079)	.599*** (.083)
R ²	.407	.411	.410	.414	.414	.421	.410	.413	.411	.413	.420
Adj. R ²	.406	.410	.409	.413	.413	.419	.409	.411	.410	.412	.419

Note. OLS regressions, unstandardized coefficients, standard errors in parentheses. *** p < 0.01; ** p < 0.05; * p < 0.1. N = 3,373.

Table 3. Difference in effect size and explained variance between list and list-frequency technique

	Newspapers		Radio		Television		Webpages	
	Beta	R ²	Beta	R ²	Beta	R ²	Beta	R ²
List-frequency technique	.278	.078	.265	.070	.319	.102	.270	.073
List technique	.225	.051	.259	.067	.298	.088	.251	.063
Difference	.055*	.027**	.006	.003	.021	.014	.019	.010

Note: Beta and R² values are based on standardized OLS regressions predicting levels of current affairs knowledge without any control variables. N = 4.641. *** p < 0,01; ** p < 0,05; * p < 0,1.

the past week, while the estimates for the measures based on the simpler list technique reflects the change in current affairs knowledge when using one additional specific media source at all during the past week. To overcome these challenges, we used the media measures based on the two different techniques to predict levels of current affairs knowledge in the first wave only. We standardized all variables to enable comparison and left out the control variables to highlight the direct differences between the two techniques. The results of these analyses are shown in Table 3.

The results show how using the list-frequency technique increases the explained variance more compared to the simpler list technique when predicting levels of current affairs knowledge. Even though the difference is only significant for newspapers, they point in the same direction for all media types. Thus, we partly find support for our second hypothesis. Further, after standardizing the models it is possible to compare the size of the effect estimates based on the two different techniques. The results show that measures based on the list-frequency technique provides larger estimates than measures based on the simpler list technique. Again, the difference is only significant for newspaper, but point in the same direction for the other media types as well. Thereby we also partly find support for the idea that using the simpler list technique leads to a potential underestimation of media effects.

Discussion

The purpose of this article has been to improve and test a tool for measuring individuals' media diet in surveys, which can overcome some of the methodological challenges communication scientists are facing in today's high-choice media environment. Focusing on exposure to news and political information, it has been suggested that the list technique, originally presented as the program list technique by Dilliplane et al. (2013), should be refined by taking the frequency of use into account and be expanded to not only include television, but also radio, newspapers, and websites, while reducing the time period between exposure and answering. This approach has to a limited extent and in simpler versions been used before (e.g., Kalogeropoulos et al., 2015; Schuck et al., 2014; Shehata et al., 2015; Strömbäck & Shehata, 2010; de Vreese & Semetko, 2002), but has to the best of our knowledge never been tested and evaluated as we do in this study.

The list-frequency technique has been tested in different ways. First, we examined the convergent validity of the list-frequency technique by comparing it to the simpler list technique in a split-sample experiment. We found no substantial difference in the aggregate levels of exposure to different media sources between the two different techniques. This finding indicates that the list-frequency technique is equally reliable and valid as the simpler list technique, which was originally tested by Dilliplane et al. (2013). Second, we examined the predictive validity closer by using measures for use of newspapers, radio, television, and webpages based on the two different techniques to predict changes in current affairs knowledge. Both types of measures were found to predict changes in current affairs knowledge, and therefore having a high predictive validity. However, we also found that measures based on the list-frequency technique may increase both the amount of explained variance and the effect estimates compared to the measures based on the simpler list technique. Even though these differences were only significant for newspaper use, they point in the same direction for all media types. Thus, there is a risk of underestimating media effects when using the simpler list technique. Overall, these results support the list-frequency measure of being a good solution for researchers

interested in examining courses and effects of media use in surveys. These results are not only relevant for researchers interested in exposure to news and political information, but also for researchers investigating exposure to other types of media content.

Although the suggested technique has a lot of advantages, it also includes some compromises and disadvantages. First and foremost, even though the list-frequency technique is well suited for the high-choice media environment, since it is targeted at specific sources, it is also challenged in this regard. The problem is that the more personalized and fragmented media exposure becomes, the longer the lists of specific sources become as well. Longer lists mean more time is required to answer the survey. In Dilliplane et al.'s (2013) study the median of answering a question based on a list with approximately 50 television programs was 100 sec (2 sec per item in average). Including frequency to the measure does not affect this pattern dramatically. In our study the median across all four media types—in total including 54 specific sources—was 123 sec (2.28 sec per item in average). Thus, time should not be a primary concern for including frequency. However, for most studies both techniques will take up a substantial portion of the total response time. Therefore, it is instead highly necessary that researchers select the specific sources that are relevant to include in the measure dependent on the purpose of the study to limit the length of the lists. Further, although we have tried to limit the amount of over-reporting as much as possible by asking the respondents about their media use in the past week and ease the answering process as much as possible, this central concern is without doubt still a problem for the presented technique. However, the amount of this over-reporting is also very likely to be smaller than that of other less refined measures.

An important compromise is that the approach can only be used when the survey is conducted in a written manner (online or postal), since the respondents need to be presented with the list of programs, newspapers or websites. This makes the measure unsuitable for surveys conducted via telephone. Related to this, the list-frequency technique is most likely to be an available option for researchers planning and conducting their own surveys. Therefore, we also examined whether the differences between the list-frequency technique and the simpler list technique were dependent on specific characteristics, such as age, political interest, or total amount of news use. However, we did not find any significant differences within these specific characteristics. Thus, the risk of underestimating media effects when using the simpler list technique seems to be a general problem.

Further improvement of the measure is however also wanted. A general challenge for researchers trying to tap media use through surveys is that these measures typically do not include the attention, which the respondents pay to the media they consume (Chaffee & Schleuder, 1986; Eveland et al., 2009; Potter, 2008). This is also true for the list-frequency technique. In this regard, Price and Zaller (1993) stressed that we need to understand not only who is exposed to news, but more importantly who “gets” the news. In other words, we need to distinguish between simple exposure and reception of news because people are not always fully concentrated when they use media (Potter, 2008). For example, television viewing can be done as a secondary activity, while one attends to other things (Miller & Carnell, 1977). One possible way to handle this is by asking the respondents which platform they use to access the specific content. People are likely to make more active choices on new media types such as computers and smartphones than on old media platforms, and are therefore more likely to devote more attention to content accessed although these types of media. On the other hand, it can be argued that attention to the new media platforms is more sporadic. Likewise, a central problem is that people can use a lot of the same outlets on different platforms (cross media). Therefore, it will be difficult to incorporate a question about platforms in a survey measure without losing its simplicity. For the same reason, the measure does not include social media use. It is simply not possible to list the content that people are exposed to in this type of outlet. Therefore, respondents should be asked about social media use in a separate measure.

Although the presented technique provides very detailed measures of media use, these measures can also be further enriched. Specifically, it has been suggested that survey data should be linked to content analysis to avoid so-called “empty exposure studies” (Schuck, Vliegenthart, & de Vreese, 2015; see also Slater [2016] in this special issue). This approach is especially relevant when studying

how specific features of media content (e.g., use of specific frames) affect relevant outcomes or if specific news outlet differ in their coverage, which may lead to expectations about differential effects.

Despite the shortcomings discussed above, the list-frequency technique presented and tested in this article is a further step in the right direction. The approach is simple and comprehensive at the same time. It lowers the demands on the respondents' memory by using the list technique and asking about media use in the past week. It takes the fragmented media environment into account by expanding the technique to other media types than television. And finally it adds frequency of exposure to the measure and thereby provides a more detailed and precise measure for media exposure.

References

- Alwin, D. F., & Krosnick, J. A. (1991). The reliability of survey attitude measurement: The influence of question and respondent attributes. *Sociological Methods & Research*, 20(1), 139–181. doi:10.1177/0049124191020001005
- Appel, V. (1994). Length of screening interval and print media audience estimates. *Journal of Advertising Research*, 34(5), 22–26.
- Bartels, L. M. (1993). Messages received: The political impact of media exposure. *The American Political Science Review*, 87, 267–285. doi:10.2307/2939040
- Brown, M. (1990). *Dear reader. Some readership measurement questions ... and some answers*. Harrow, UK: Research Services Ltd. and the British Market Research Bureau Ltd.
- Carmines, E. G., & Zeller, R. A. (1979). *Reliability and validity assessment*. Newbury Park, CA: Sage.
- Chaffee, S. H., & Schleuder, J. (1986). Measurement and effects of attention to media news. *Human Communication Research*, 13(1), 76–107. doi:10.1111/hcre.1986.13.issue-1
- de Vreese, C. H., & Boomgaarden, H. (2006). How content moderates the effects of television news on political knowledge and engagement. *Acta Politica. International Journal of Political Science*, 41, 317–341.
- de Vreese, C. H., & Semetko, H. A. (2002). Cynical and engaged: Strategic campaign coverage, public opinion, and mobilization in a referendum. *Communication Research*, 29, 615–641. doi:10.1177/009365002237829
- Dilliplane, S., Goldman, S. K., & Mutz, D. C. (2013). Televised exposure to politics: New measures for a fragmented media environment. *American Journal of Political Science*, 57(1), 236–248. doi:10.1111/j.1540-5907.2012.00600.x
- Eveland, W. P., Hutchens, M. J., & Shen, F. (2009). Exposure, attention, or “use” of news? Assessing aspects of the reliability and validity of a central concept in political communication research. *Communication Methods and Measures*, 3(4), 223–244. doi:10.1080/19312450903378925
- Garret, K. (2009). Echo chambers online?: Politically motivated selective exposure among Internet news users. *Journal of Computer Mediated Communication*, 14(2), 265–285. doi:10.1111/jcmc.2009.14.issue-2
- Goldman, S. K., Mutz, D. C., & Dilliplane, S. (2013). All virtue is relative: A response to Prior. *Political Communication*, 30(4), 635–653. doi:10.1080/10584609.2013.819540
- Guess, A. M. (2015). Measure for measure: An experimental test of online political media exposure. *Political Analysis*, 23(1), 59–75. doi:10.1093/pan/mpu010
- Heise, D. R. (1969). Separating reliability and stability in test-retest correlation. *American Sociological Review*, 34(1), 93–101. doi:10.2307/2092790
- Holbert, R. L. (2005a). A typology for the study of entertainment television and politics. *American Behavioral Scientist*, 49, 436–453. doi:10.1177/0002764205279419
- Holbert, R. L. (2005b). Intramedia mediation: The cumulative and complementary effects of news media use. *Political Communication*, 22(4), 447–461. doi:10.1080/10584600500311378
- Kalogeropoulos, A., Albæk, E., de Vreese, C. H., & van Dalen, A. (2015). The predictors of economic sophistication: Media, interpersonal communication and negative economic experiences. *European Journal of Communication*, 30(4), 385–403. doi:10.1177/0267323115582149
- LaCour, M. J., & Vavreck, L. (2014). Improving media measurement: Evidence from the field. *Political Communication*, 31(3), 408–420. doi:10.1080/10584609.2014.921258
- Markus, G. B. (1979). *Analyzing panel data*. Newbury Park, CA: Sage Publications.
- Miller, P. V., & Carnell, C. F. (1977). Communicating measurement objectives in survey interview. In P. M. Hirsch, P. V. Miller, & F.G. Kline (Eds.), *Strategies for communications research*. Beverly Hills, CA: Sage.
- Niederdeppe, J. (2005). Assessing the validity of confirmed ad recall measures for public health communication campaign evaluation. *Journal of Health Communication*, 10(7), 635–650. doi:10.1080/10810730500267662
- Niederdeppe, J. (2014). Conceptual, empirical, and practical issues in developing valid measures of public communication campaign exposure. *Communication Methods and Measures*, 8(2), 138–161. doi:10.1080/19312458.2014.903391

- Potter, W. J. (2008). The importance of considering exposure states when designing survey research studies. *Communication Methods and Measures*, 2(1–2), 152–166. doi:10.1080/19312450802062299
- Price, V. (1993). The impact of varying reference periods in survey questions about media use. *Journalism & Mass Communication Quarterly*, 70(3), 615–627. doi:10.1177/107769909307000312
- Price, V., & Zaller, J. (1993). Who gets the news? Alternative measures of news reception and their implications for research. *Public Opinion Quarterly*, 57, 133–164. doi:10.1086/269363
- Prior, M. (2007). *Post-broadcast democracy*. New York, NY: Cambridge University Press.
- Prior, M. (2009a). Improving media effects research through better measurement of news exposure. *The Journal of Politics*, 71(3), 893–908. doi:10.1017/S0022381609090781
- Prior, M. (2009b). The immensely inflated news audience: Assessing bias in self-reported news exposure. *Public Opinion Quarterly*, 73(1), 130–143. doi:10.1093/poq/nfp002
- Prior, M. (2013). The challenge of measuring media exposure: Reply to Dilliplane, Goldman, and Mutz. *Political Communication*, 30(4), 620–634. doi:10.1080/10584609.2013.819539
- Romantan, A., Hornik, R., Price, V., Cappella, J., & Viswanath, K. (2008). A comparative analysis of the performance of alternative measures of exposure. *Communication Methods and Measures*, 2(1–2), 80–99. doi:10.1080/19312450802062539
- Schuck, A. R. T., Vliegenthart, R., & de Vreese, C. H. (2014). Who's afraid of conflict? The mobilizing effect of conflict framing in campaign news. *British Journal of Political Science*. doi:10.1017/S0007123413000525
- Schuck, A. R. T., Vliegenthart, R., & de Vreese, C. H. (2015). Matching theory and data: Why combining media content with survey data matters. *British Journal of Political Science*. doi:10.1017/S0007123415000228
- Shehata, A., Hopmann, D. N., Nord, L., & Höjjer, J. (2015). Television channel content profiles and differential knowledge growth: A test of the inadvertent learning hypothesis using panel data. *Political Communication*, 32, 377–395. doi:10.1080/10584609.2014.955223
- Slater, M. D. (2004). Operationalizing and analyzing exposure: The foundation of media effects research. *Journalism & Mass Communication Quarterly*, 81(1), 168–183. doi:10.1177/107769900408100112
- Slater, M. D. (2014). Reinforcing spirals model: Conceptualizing the relationship between media content exposure and the development and maintenance of attitudes. *Media Psychology*. doi:10.1080/15213269.2014.897236
- Slater, M. D. (2016). Combining content analysis and assessment of exposure through self-report, spatial, or temporal variation in media effects research. *Communication Methods & Measures*, 10(2–3), 173–175.
- Smit, E. G., & Neijens, P. C. (2011). The march to reliable metrics: A half-century of coming closer to the truth. *Journal of Advertising Research*, 51, 124–135. doi:10.2501/JAR-51-1-124-135
- Strömbäck, J., & Shehata, A. (2010). Media malaise or a virtuous circle? Exploring the causal relationships between news media exposure, political news attention and political interest. *European Journal of Political Research*, 49(5), 575–597. doi:10.1111/ejpr.2010.49.issue-5
- Tourangeau, R., & Rasinski, K. (1988). Cognitive processes underlying context effects in attitude measurement. *Psychological Bulletin*, 103, 299–314. doi:10.1037/0033-2909.103.3.299
- van Spanje, J., & de Vreese, C. H. (2014). Europhile media and eurosceptic voting: Effects of news media coverage on eurosceptic voting in the 2009 European Parliamentary Elections. *Political Communication*, 31(2), 325–354. doi:10.1080/10584609.2013.828137
- worldbank.org. (2015, October). Internet users (per 100 people). Retrieved from <http://data.worldbank.org/indicator/it.net.user.p2>

Appendix A

Table A1.1. Newspaper “list” measure.

Which of the following newspapers did you read in the printed version (on paper or electronic) in the past week?		
<input type="checkbox"/> Berlingske	<input type="checkbox"/> Jyllands Posten	<input type="checkbox"/> Søndagsavisen
<input type="checkbox"/> BT	<input type="checkbox"/> Kristeligt Dagblad	<input type="checkbox"/> Weekendavisen
<input type="checkbox"/> Ekstra Bladet	<input type="checkbox"/> MetroXpress	<input type="checkbox"/> Regional newspaper
<input type="checkbox"/> Information	<input type="checkbox"/> Politiken	<input type="checkbox"/> Local newspaper
<input type="checkbox"/> I did only read other newspapers in the past week		
<input type="checkbox"/> I did not read any newspapers at all the past week		

Table A1.2. Newspaper “list-frequency” measure.

How many days in the past week did you read the following newspapers in the printed version (on paper or electronic)?								
	0	1	2	3	4	5	6	7
Berlingske	x							
BT	x							
Ekstra Bladet	x							
Information	x							
Jyllands Posten	x							
Kristeligt Dagblad	x							
MetroXpress	x							
Politiken	x							
Søndagsavisen	x							
Weekendavisen	x							
Regional newspaper	x							
Local newspaper	x							
<input type="checkbox"/> I did only read other newspapers in the past week								
<input type="checkbox"/> I did not read any newspapers at all the past week								

Table A2.1. Radio “list” measure.

Which of the following radio stations did you listen to in the past week?		
<input type="checkbox"/> DR P1	<input type="checkbox"/> DR P4	<input type="checkbox"/> The Voice
<input type="checkbox"/> DR P2	<input type="checkbox"/> Radio 24/7	<input type="checkbox"/> Local radio station
<input type="checkbox"/> DR P3	<input type="checkbox"/> NOVA fm	<input type="checkbox"/> Foreign radio station
<input type="checkbox"/> I did only listen to other radio stations in the past week		
<input type="checkbox"/> I did not listen to any radio stations at all the past week		

Table A2.2. Radio “list-frequency” measure.

How many days in the past week did you listen to the following radio stations?								
	0	1	2	3	4	5	6	7
DR P1	x							
DR P2	x							
DR P3	x							
DR P4	x							
Radio 24/7	x							
NOVA fm	x							
The Voice	x							
Local radio station	x							
Foreign radio station	x							
<input type="checkbox"/> I did only listen to other radio stations in the past week								
<input type="checkbox"/> I did not listen to any radio stations at all the past week								

Table A3.1. Television “list” measure.

Which of the following TV programs did you watch in the past week?		
<input type="checkbox"/> TV-Avisen (DR1)	<input type="checkbox"/> DR2 Dagen (DR2)	<input type="checkbox"/> Go’ morgen Danmark (TV 2)
<input type="checkbox"/> Nyhederne (TV 2)	<input type="checkbox"/> Penge (DR1)	<input type="checkbox"/> Go’ aften Danmark (TV 2)
<input type="checkbox"/> Regionale nyheder (TV 2)	<input type="checkbox"/> Horisont (DR1)	<input type="checkbox"/> Monte Carlo (DR3)
<input type="checkbox"/> Deadline (DR2)	<input type="checkbox"/> Bag Borgen (DR1)	<input type="checkbox"/> Robinson ekspeditionen (TV3)
<input type="checkbox"/> TV 2 News	<input type="checkbox"/> Debatten (DR2)	<input type="checkbox"/> Vild med dans (TV 2)
<input type="checkbox"/> DR2 Morgen (DR2)	<input type="checkbox"/> Aftenshowet (DR1)	<input type="checkbox"/> Kender du typen? (DR1)
<input type="checkbox"/> I did only watch other TV programs in the past week		
<input type="checkbox"/> I did not watch any TV programs at all the past week		

Table A3.2. Television “list-frequency” measure.

How many days in the past week did you watch the following TV programs?	0	1	2	3	4	5	6	7
TV-Avisen (DR1)	×							
Nyhederne (TV 2)	×							
Regionale nyheder (TV 2)	×							
Deadline (DR2)	×							
TV 2 News	×							
DR2 Morgen (DR2)	×							
DR2 Dagen (DR2)	×							
Penge (DR1)	×							
Horisont (DR1)	×							
Bag Borgen (DR1)	×							
Debatten (DR2)	×							
Aftenshowet (DR1)	×							
Go’ morgen Danmark (TV 2)	×							
Go’ aften Danmark (TV 2)	×							
Monte Carlo (DR3)	×							
Robinson ekspeditionen (TV3)	×							
Vild med dans (TV 2)	×							
Kender du typen? (DR1)	×							
<input type="checkbox"/> I did only watch other TV programs in the past week								
<input type="checkbox"/> I did not watch any TV programs at all the past week								

Table A4.1. Internet “list” measure.

Which of the following websites did you visit in the past week?		
<input type="checkbox"/> berlingske.dk	<input type="checkbox"/> ekstrabladet.dk	<input type="checkbox"/> politiken.dk
<input type="checkbox"/> billedbladet.dk	<input type="checkbox"/> information.dk	<input type="checkbox"/> seoghoer.dk
<input type="checkbox"/> bt.dk	<input type="checkbox"/> jyllands-posten.dk	<input type="checkbox"/> sondagsavisen.dk
<input type="checkbox"/> dagens.dk	<input type="checkbox"/> kristeligt-dagblad.dk	<input type="checkbox"/> tv2.dk
<input type="checkbox"/> dr.dk	<input type="checkbox"/> mx.dk	<input type="checkbox"/> weekendavisen.dk
<input type="checkbox"/> I did only visit other websites in the past week		
<input type="checkbox"/> I did not visit any websites at all the past week		

Table A4.2. Internet “list-frequency” measure.

How many days in the past week did you visit the following websites?	0	1	2	3	4	5	6	7
berlingske.dk	×							
billedbladet.dk	×							
bt.dk	×							
dagens.dk	×							
dr.dk	×							
ekstrabladet.dk	×							
information.dk	×							
jyllands-posten.dk	×							
kristeligt-dagblad.dk	×							
mx.dk	×							
politiken.dk	×							
seoghoer.dk	×							
sondagsavisen.dk	×							
tv2.dk	×							
weekendavisen.dk	×							
<input type="checkbox"/> I did only visit other websites in the past week								
<input type="checkbox"/> I did not visit any websites at all the past week								

Appendix B

Table B.1 Specification of variables.

Current affairs knowledge - first wave	Measure (Mean = 1.90, SD = 1.24, Min. = 0, Max. = 4, KR-20 = 0.58) reflecting the number of correct answers to the following four question about foreign and national current affairs: 1) Which post has Margrethe Vestager been appointed to in the European Commission? (Commissioner for Competition); 2) In what country is there currently war against IS (Islamic State)? (Iraq); 3) Who is the Conservative People’s Party’s spokesperson on politics? (Mai Mercado); 4) Who is Minister of Employment in Denmark? (Henrik Dam Kristensen).
Current affairs knowledge - second wave	Measure (Mean = 2.53, SD = 1.23, Min. = 0, Max. = 4, KR-20 = 0.58) reflecting the number of correct answers to the following four question about foreign and national current affairs: 1) Which party was Klaus Riskær Pedersen recently excluded from? (The Alternative); 2) Which country is currently experiencing fierce fighting after a rebel group overthrew the president? (Yemen); 3) What did a majority in the parliament recently decide that the Danes must hold a referendum about? (The EU legal reservation); 4) Who is Minister of the Environment in Denmark? (Kirsten Brosbøl).
Newspaper (List-frequency technique)	Index (W1: Mean = 0.86, SD = 1.31, Min. = 0, Max. = 7, W2: Mean = .88, SD = 1.28, Min. = 0, Max. = 7) reflecting the number of days in the past week the respondents were exposed to the printed version (on paper or electronic) of the broadsheet newspapers Berlingske, Jyllands-Posten, or Politiken.
Newspaper (List technique)	Index (W1: Mean = .66, SD = .86, Min. = 0, Max. = 3, W2: Mean = .67, SD = .86, Min. = 0, Max. = 3) reflecting the number of the printed (on paper or electronic) broadsheet newspapers (Berlingske, Jyllands-Posten, or Politiken) the respondent has been exposed to during the past week.
Radio (List-frequency technique)	Index (W1: Mean = 1.00, SD = 1.16, Min. = 0, Max. = 7, W2: Mean = 1.05, SD = 1.15, Min. = 0, Max. = 7) reflecting the number of days in the past week the respondents were exposed to the radio channels P1, P2, P4, or Radio 24/7.
Radio (List technique)	Index (W1: Mean = .92, SD = .97, Min. = 0, Max. = 4, W2: Mean = .98, SD = 1.00, Min. = 0, Max. = 4) reflecting the number of radio channels (P1, P2, P4, or Radio 24/7) the respondent has been exposed to during the past week.

Table B.1 Specification of variables (continued).

Television (List-frequency technique)	Index (W1: Mean = 1.55, SD = 1.23, Min. = 0, Max. = 7, W2: Mean = 1.57, SD = 1.25, Min. = 0, Max. = 7) reflecting the number of days in the past week the respondents were exposed to TV-Avisen (DR1), Nyhederne (TV 2), DR2 Morgen, DR2 Dagen, Deadline (DR2), or TV 2 News.
Television (List technique)	Index (W1: Mean = 2.21, SD = 1.44, Min. = 0, Max. = 6, W2: Mean = 2.22, SD = 1.44, Min. = 0, Max. = 6) reflecting the number of television programs (TV-Avisen (DR1), Nyhederne (TV 2), DR2 Morgen, DR2 Dagen, Deadline (DR2), or TV 2 News) the respondent has been exposed to during the past week.
Webpages (List-frequency technique)	Index (W1: Mean = 1.10, SD = 1.32, Min. = 0, Max. = 7, W2: Mean = 1.12, SD = 1.34, Min. = 0, Max. = 7) reflecting the number of days in the past week the respondents were exposed to the websites <i>berlingske.dk</i> , <i>jyllands-posten.dk</i> , <i>politiken.dk</i> , <i>dr.dk</i> , or <i>tv2.dk</i>
Webpages (List technique)	Index (W1: Mean = 1.42, SD = 1.40, Min. = 0, Max. = 5, W2: W1: Mean = 1.43, SD = 1.42, Min. = 0, Max. = 5) reflecting the number of websites (<i>berlingske.dk</i> , <i>jyllands-posten.dk</i> , <i>politiken.dk</i> , <i>dr.dk</i> , or <i>tv2.dk</i>) the respondent has been exposed to during the past week.
Gender	0 = male (49.17%), 1 = female (50.83%)
Age	Age in years (Mean = 50.11, SD = 15.41, Min. = 18, Max. = 86)
Education	Measure (Mean = 4.28, SD = 1.89, Min. = 0, Max. = 7) based on respondents' answers to the following question: What is your highest completed education? Categories: 0) None; 1) Primary school; 2) Vocational education; 3) High school; 4) Short higher education; 5) Medium higher education; 6) Bachelor; 7) Long higher education.
Political interest - second wave	Measure (Mean = 6.57, SD = 2.50, Min. = 0, Max. = 10) based on respondents' answers to the following question: Generally speaking, how interested are you in politics? With answer options from 0 (Not interested at all) to 10 (Very interested).

Appendix C

Table C.1 Comparing the list measure and the list-frequency measure (pct.).

Source	Newspaper			Radio			Television			Internet		
	List	List-freq.	Source	List	List-freq.	Source	List	List-freq.	Source	List	List-freq.	Source
Berlingske	21.3	17.7	DR P1	30.7	30.5	TV-Avisen (DR1)	74.7	80.1	berlingske.dk	22.0	21.3	
BT	24.0	21.3	DR P2	12.7	11.3	Nyhederne (TV 2)	66.7	69.5	billedbladet.dk	2.7	4.3	
Ekstra Bladet	26.0	18.4	DR P3	31.3	22.0*	Regionale nyheder (TV 2)	54.7	56.0	bt.dk	31.3	31.9	
Information	9.3	11.3	DR P4	51.8	44.0	Deadline (DR2)	32.7	35.5	dagens.dk	2.7	3.5	
Jyllands-Posten	22.0	20.6	Radio 24/7	12.0	13.5	TV 2 News	41.3	44.0	dr.dk	42.0	40.4	
Kristeligt Dagblad	8.7	7.1	NOVA fm	9.9	14.0	DR2 Morgen (DR2)	9.9	12.0	ekstrabladet.dk	32.7	31.2	
MetroXpress	31.2	22.0*	The Voice	7.3	2.1**	DR2 Dagen (DR2)	9.3	16.3*	information.dk	6.0	10.6	
Politiken	29.3	29.8	Local radio station	13.5	16.0	Penge (DR1)	34.7	38.3	jyllands-posten.dk	21.3	29.8*	
Søndagsavisen	16.0	25.5**				Horisont (DR1)	21.3	27.7	kristeligt-dagblad.dk	4.0	11.3**	
Weekendavisen	8.7	9.2				Bag Borgen (DR1)	15.3	13.5	mx.dk	2.0	6.4*	
Regional newspaper	14.7	17.7				Debatten (DR2)	25.3	22.0	politiken.dk	28.7	28.4	
Local newspaper	50.7	62.4**				Aftenshowet (DR1)	28.0	40.4**	seoghoer.dk	4.0	3.5	
						Go' morgen Danmark (TV 2)	20.7	32.6**	søndagsavisen.dk	1.3	1.4	
						Go' aften Danmark (TV 2)	26.0	30.5	tv2.dk	27.3	26.2	
						Monte Carlo (DR3)	4.7	4.3	weekendavisen.dk	1.3	2.1	
						Robinson ekspeditionen (TV3)	5.3	7.1				
						Vild med dans (TV 2)	23.3	36.2**				
						Kender du typen? (DR1)	24.0	29.1				
Only other newspapers	1.3	0.0	Only other radio	3.3	2.1	Only other TV programs	2.7	1.4	Only other webpages	9.3	4.3*	
No newspapers at all	10.7	6.4	No radio at all	8.7	4.3	No TV programs at all	6.0	2.1*	No webpages at all	23.3	2.1***	
Avg. score	19.4	19.2	Avg. score	18.1	16.0	Avg. score	26.8	29.9	Avg. score	15.4	15.2	

Two-sided significance test for difference: *** p < 0.01; ** p < 0.05; * p < 0.1. N_{List} = 150, N_{List-frequency} = 141.
 Note: Table shows percents of respondents reporting using a specific media source in the two conditions.