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Dynamics of political information transmission: How media coverage informs public judgments about politics

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Publication date
2013

[Link to publication](#)

Citation for published version (APA):

Elenbaas, M. (2013). *Dynamics of political information transmission: How media coverage informs public judgments about politics*. [Thesis, fully internal, Universiteit van Amsterdam].

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Reconciling Passive and Motivated Learning: The Saturation-Conditional Impact of Media Coverage and Motivation on Political Information

This chapter has been accepted for publication in Communication Research.

Abstract

Representative democracy requires that citizens express informed political opinions, and in order to inform their opinions, they must have the opportunity to acquire relevant facts from the media. In view of increasing audience segmentation, such opportunity may vary according to how widely political information diffuses across the various sources available in a media environment. However, it remains uncertain how differences in information saturation correspond with differences in information acquisition. Drawing on data from a rolling cross-sectional survey with nearly sixty waves and media content analyses spanning four European countries, this article examines if a wider availability of information in collective media environments facilitates acquisition of such information. It also specifies the conditions under which this effect differs for people with different levels of learning motivation. Using a multi-level model, we find the media environment to be a remarkably powerful force in equipping people with political information. We also find that better motivated citizens initially benefit disproportionately from the availability of information, yet motivation-based discrepancies in learning disappear entirely when media coverage becomes more prevalent.

Representation in democracy is founded on the principle that citizens have a voice in the process of government. The predominant view among researchers of public opinion is that citizens necessarily need relevant factual information in order to express their voices competently and ensure proper representation. Overall, when citizens become better informed and appropriately use what they learn to inform their political judgments and preferences, the opinions they express become more reliable. And when public opinion is more reliable, it becomes a better guide for political elites to policy and decision making (Althaus, 2003). Evidently, it follows from this view that citizens can inform their opinions only to the extent that the relevant facts are publicly available. Indeed, “citizens can use the facts only if the political system disseminates them” (Kuklinski, Quirk, Jerit, Schwieder, & Rich, 2000, p. 791). The *opportunity* to access and acquire important types of political information, then, is nothing less than a precondition that representative democracy must meet in order for an informed citizenship to flourish.

Every scholar in political communication would agree that the media are truly indispensable in providing opportunities that allow for the acquisition of political information (see Althaus et al., 2011). And yet, the principal mode of analysis in mediated political learning research centers on the inner *motivation* of citizens rather than the outer opportunities presented to them. In particular, the media effects reported in this literature are often based on motivational factors such as citizens’ demand for political information or their propensity to attend to the news media. As a result, write Delli Carpini and Keeter (1996), “the determining factor regarding who knows what about politics is reduced to the psychological rather than the social or political” (p. 8). However, citizens “occupy a world of considerable variation in the opportunity to learn about politics, [hence] the consequences of actual use of media depend not only on the individual but on what information is available” (pp. 209, 347). So, to presume, as much prior research has done, that citizens by and large construct their own learning opportunities “on demand,” is to ignore that the actual *supply* of political information in the media rarely is constant.

To be sure, as sweeping changes in the media landscape in recent decades have brought about abundance in media choice, motivation may now be considered the single most important individual trait that make citizens maintain regular surveillance over the political process (Prior, 2005, 2010). However, most studies on motivational learning fall short of inspecting the true reach of political information among the segmented mass public. As we argue below, even in high-choice circumstances, variation in learning can surpass individual differences in demand to reflect variation in the breadth of opportunity created by the collec-

tive media environment as a whole (see Barabas & Jerit, 2009). Furthermore, prior research proposes that motivation and information availability interact to affect the probability of information acquisition under *some but possibly not all* conditions (see *Chapter 2*). Motivation may thus prove a precondition for political learning in some media settings, but not in others. Yet extant indications to suggest a conditional interaction between supply and demand remain fragmentary at best, and to date, no study has formally examined if the moderation effect of motivation is in fact context-dependent.

Drawing on data from a rolling cross-sectional survey with nearly sixty waves and media content analyses spanning four European countries, the present article asks if a wider availability of political information in collective media environments facilitates acquisition of such information among individuals situated in these environments. It also specifies the conditions under which this effect differs for people with different levels of learning motivation. We find the contemporary high-choice media environment *en bloc* to be a remarkably powerful force in equipping citizens with information about current affairs in politics. We also find that while better motivated citizens initially tend to benefit disproportionately from the availability of information, such discrepancies in learning fully disappear when relevant media coverage becomes more widespread.

Information Saturation in Collective Media Environments

The supply of and demand for political information comprise two central pathways through which citizens learn about politics from the media. In order to acquire political information, citizens need to have the opportunity to do so. Opportunity is first and foremost determined by the *availability* of information, which “affects how easily a citizen can learn, given his or her ability or motivation” (Delli Carpini & Keeter, 1996, p. 179). All else equal, citizens should be more likely to absorb a piece of information that is more widely distributed across the media, as greater dissemination of information plausibly increases the odds that citizens encounter it. But aside from the opportunities presented to them in the media, citizens also vary in their demand for news and information – or learning *motivation*. Because better motivated individuals are more inclined to follow political affairs in the media, so, too, are they more likely to encounter and, by extension, acquire the political information conveyed through media coverage of politics.

Typically, studies focusing on the effects of media coverage on political information have put internal motivation, rather than the external environment, at the forefront of explana-

tions of why some citizens are more likely to learn from the media than others (e.g., Eveland, Shah, & Kwak, 2003). And in fact, in the current era of “post-broadcast democracy” (Prior, 2007) with strong media proliferation and rapid audience fragmentation, it appears increasingly appropriate to presume that political learning is now a process that occurs mostly on demand. With a wide range of media choices on offer, it is assumed that the probability that people encounter and absorb political information is becoming a matter of individual preference and self-selection on account of such motivational factors as needs, concerns, and interests. “As new media offer vastly more content,” writes Prior (2010), “politically uninterested people can more easily avoid news exposure than in the past, while the interested seek out more news [and] learn more about politics.” In other words, “the effects of this kind of intrinsic motivation are growing” (p. 747). In effect, then, studies focusing on the effects of motivation presume that citizens’ differential propensity to attend to political affairs *produces* variation in opportunity, which would make opportunity largely endogenous to motivation.

And yet, even if people select their own information diet in line with their preferences, they also reside in a broader, collectively shared, environment that should affect the likelihood of encounters with relevant information beyond those preferences. That is, variation in political learning opportunity does not result from such individual characteristics as motivation alone, but also from characteristics of media coverage that exist externally to the individual. And unlike the common presumption in this area of research, the availability of political information within the wider environment – and therefore the relative ease with which the information can be acquired – may well *vary* significantly across time or space from one particular context to the next. Indeed, there is evidence, both longstanding (Delli Carpini, Keeter, & Kenamer, 1994; Zukin & Snyder, 1984; see also Price & Zaller, 1993, p. 155) and more recent (Iyengar, Hahn, Bonfadelli, & Marr, 2009; Jerit, Barabas, & Bolsen, 2006), for a link between learning and the mere availability of information, such that citizens are better informed, irrespective of their motivation, when residing in collective environments that are relatively rich in information.

Given the disjointed nature of news and information in the high-choice media environment, it is in such environments in particular, that the probability that people acquire a given piece of political information should depend, at least in part, on the scope of information *saturation* across the media environment as a whole. The scope of saturation signifies the “breadth” of information availability (see Barabas & Jerit, 2009). Accordingly, when the level of saturation is high, such that the information of interest spreads across a wide range of media sources, citizens should have a greater prospect of encountering and absorbing the in-

formation than when the dissemination of information remains restricted to a narrow selection of sources (Zaller, 2003). As Barabas and Jerit (2009) observe, the breadth of relevant media coverage bears directly to the ease with which the citizen can learn, because an individual who fails to notice a story in one source might still stumble upon it in another source. Crucially, then, availability of information across multiple sources “helps reach a news audience that is increasingly segmented due to the proliferation of media outlets” (p. 76).

In order for researchers to analyze the breadth of opportunity and its impact on political learning in modern media settings, they need to examine a large series of facts about current affairs in politics with considerable variation in cross-media diffusion. Aside from survey data on individual reception of those facts, such an examination calls for content analytical data revealing the distribution of facts across the collective media environment. Yet such studies have rarely been conducted (see Jerit et al., 2006). One exception is a pioneering study by Barabas and Jerit (2009), whose measure of breadth distinguishes between media coverage that either was or was not carried *jointly* in newspapers and on television. Comparing different policy-specific facts at one point in time as well as identical facts *over* time within the U.S. national media environment, they found that respondents are significantly more likely to learn when the information is available in *both* these media. This finding from the American case supports the proposition that differences in information saturation can cause differences in information acquisition.

The present study does not only extend this emerging literature by examining a different set of cases, but also advances this research by making a more refined distinction among media coverage contexts with lower and higher levels of information saturation. Specifically, our expectation is that individuals are more likely to acquire political information when the saturation of that information across the media environment is relatively high.

Hypothesis 1: Acquisition of political information increases with the saturation of that information across the collective media environment.

The Saturation-Conditional Motivation Moderation Hypothesis

Our theoretical argument above stipulates a positive impact of political information supply going beyond that of audience demand for such information. But even so, there is good reason to expect that motivation *moderates* the relationship between media coverage and information acquisition, such that the strength of the impact of information diffusion varies

considerably among citizens on account of individual differences in motivation. As pointed out in *Chapter 2*, we may presume that citizens with a relatively strong learning motivation should be especially inclined to follow political events and acquire information, given the opportunity to do so. One may expect, for instance, that well-motivated individuals pay more attention to the political information they encounter – and therefore process it better – than those with little motivation (Chaiken, 1980; Petty & Cacioppo, 1986). And of course, motivated individuals are more likely to seek opportunities for exposure to political information in the first place; notably through routine usage of news media and other channels typically offering high doses of such information (Luskin, 1990; Prior, 2007). Accordingly, as political information diffuses more widely, strongly motivated individuals should increasingly draw ahead of less motivated individuals in terms of learning because, at least initially, the former take greater advantage of increased access and opportunity.

To be sure, numerous studies have addressed the question of why political information gaps emerge in the wake of increased information flow (for reviews, see Gaziano, 1997; Viswanath & Finnegan, 1996). Following Tichenor, Donohue and Olien (1970), most of this research has connected such gaps to differences in socioeconomic status or cognitive ability (e.g., Eveland & Scheufele, 2000; Jerit et al., 2006). However, as Genova and Greenberg (1979) noted long ago, “the *choice* of media information to consume and the consequent learning of media information stem more immediately and directly from motivational interests of the public” (p. 80, emphasis added). This argument is especially intuitive in light of the dramatic expansion of media choice in recent decades (Baum, 2002; Prior, 2005). It is remarkable, then, that only few studies have explored the role of motivation as a moderator of information gaps (Kwak, 1999; Liu & Eveland, 2005; Prior, 2005). Moreover, those that do typically do not actually measure and analytically incorporate the supposed variability in information flow. Finally, some studies have suggested that the nature of the saturation-motivation interaction may vary as a function of the level of saturation itself (Genova & Greenberg, 1979, pp. 80-81; see also Moore, 1987, pp. 195-196), but this possibility has thus far not been systematically investigated. In the present study, we address this void in the knowledge gap literature.

Consistent with the notion of “motivated learning” (Prior, 2005), the theoretical argument that we put forward so far stipulates a positive interaction between opportunity and motivation that is linear in form. However, even though an interaction of this kind has in fact been established in prior studies (see *Chapter 2*; see also Barabas & Jerit, 2009, p. 85), it seems unlikely that the moderating impact of motivation continues to increase linearly with

the availability of information irrespective of how widely the information diffuses across the media. After all, the higher the level of saturation, the greater the opportunity for less motivated individuals to catch up with those more motivated. When availability abounds, even the weakly motivated cannot help but encounter some of the available information and absorb it; a presumption fully in line with research on “passive learning” (Delli Carpini et al., 1994; Zukin & Snyder, 1984). Indeed, as learning requires less effort in high-saturation environments, the supply of information in such contexts should partially compensate for deficiencies in demand such as a low level of learning motivation. If so, the projected opportunity-motivation interaction weakens and, eventually, fades away at ever wider availability of relevant media coverage.

It appears plausible, therefore, that the strength of the interaction between media coverage and motivation depends on the *level* of information saturation across the media environment. As Iyengar et al. (2010) suggest,

the importance of individual-level motivational factors varies across contexts; they are less important in information-rich environments, but critical in information-deprived situations. When news coverage is informative and frequently encountered, even less attentive citizens become informed. But when the media environment is relatively barren of political content..., the acquisition of information becomes challenging and is limited to individuals who self-select into the news audience (p. 292).

Although Iyengar and his colleagues did not empirically assess the joint effect of their supply and demand variables, it is theoretically sensible to predict that the impact of motivation as a moderator of media coverage effects is indeed, as the researchers propose, “context-dependent” (p. 292). Accordingly, the moderating influence of motivation should be strongest in media environments in which the level of information saturation remains restricted to a fairly narrow range of sources, whereas a weak or no moderation effect would be anticipated in environments in which the information spreads more widely across the media (see also Druckman, 2005, p. 466). Put differently, we expect to find a curvilinear by linear interaction between opportunity and motivation, such that the acquisition of political information becomes less conditional on motivation as the level of saturation – that is, the breadth of opportunity – in a given media environment increases.

Hypothesis 2: There is a curvilinear by linear interaction between information saturation and motivation, such that motivation moderates the impact of saturation on political information acquisition, but only at lower levels of saturation.

Data and Measurement

The 2009 elections to the European Parliament serve as the setting of our study. The elections were held between June 4 and 7 in the 27 member states of the EU, and we use rolling cross-sectional (RCS) survey data collected in four of them: Denmark, Germany, the Netherlands, and the United Kingdom (UK). In a rolling cross-sectional design, a one-shot cross-section is partitioned into random subsamples of respondents for each day of interviewing and released accordingly (Johnston & Brady, 2002; Brady & Johnston, 2006). Fieldwork dates varied from country to country, but all subsamples were interviewed between May 14 and June 14, 2009.¹ All surveys were administered by TNS.² In each country for each fieldwork date, TNS selected a random subset of respondents from a representative national panel of citizens, and invited them to fill out an online questionnaire. In total, more than 80,000 citizens of 18 years and older were invited to participate.

A total of 22,504 individuals completed the questionnaire for a given interview date they were randomly assigned to, yielding an average response rate (AAPOR RR1) of 28 percent.³ Some of the surveys did not carry a factual information item tapping political learning, and the respondents participating in these surveys were excluded from the analysis. In total, our study employs 59 suitable surveys. Our final pooled sample, in which all surveys are combined into a large cross-section (see Zaller, 2002), consists of 20,943 respondents (on average 355 respondents per survey). It includes 4,851 individuals from Denmark, 4,931 from Germany, 6,245 from the Netherlands, and 4,916 from the UK. Each country sub-sample is by and large representative of the national adult population in terms of key sociodemographics.⁴

¹ In the Netherlands and the United Kingdom, the elections took place on June 4. In Denmark and Germany, the elections were held on June 7.

² All fieldwork was coordinated by TNS Opinion in Brussels. The surveys were conducted by TNS's national subsidiaries.

³ Each daily survey was launched at noon and in the field for exactly 24 hours, except for the June 8 survey, which was continued until June 14, 2009. More than 90 percent of respondents completed the June 8 survey within 24 hours, and our results remain unchanged if we exclude the other 10 percent of respondents from our analysis (see also Barabas & Jerit, 2009, pp. 79-80).

⁴ Census data from 2008 on age, gender, and education were obtained from Statistics Denmark, the Federal Statistical Office (Germany), Statistics Netherlands, and the Office for National Statistics (UK). Comparing the complete country samples with the respective adult populations, we observe few instances of deviation. In the

Political Information Acquisition

Our dependent variable is acquisition of EU-level political information. All 59 surveys asked respondents a single unique question about a recent occurrence in European politics. Several questions asked about key political actors in the EU elections or with an otherwise recent role on the European stage, but we also included questions about developments in relation to the substance and structures of EU politics (for a full overview, see Appendix C). All questions were put to respondents in a multiple-choice format including four response categories with random order rotation, plus a don't know option. Incorrect and don't know answers were scored 0 and correct answers were scored 1.⁵

The questions measure information that materialized over the course of the election campaign, even though not all the facts we asked about were reported in the media. Crucially, the rolling cross-section enables us to capture effects of political learning that result from these campaign dynamics. Among the most appealing features of the RCS design relative to other designs are its flexibility and precision. Whereas most survey designs require that information questions be composed well in advance of the period of fieldwork, RCS samples are released continuously *during* that period. This, in turn, allows for continuous updating of survey questions, such that measures of learning can be sensitized to real-time events and emerging media coverage of such events. Indeed, by permitting a direct link between the dissemination and individual-level acquisition of political information, the “fine ‘granularity’ of sample release facilitates causal attribution” (Brady & Johnston, 2006, p. 164).

We took advantage of this design by replacing the information question on the questionnaire prior to each new survey release.⁶ As a result, we were able to ask about subjects that emerged right before the interview, and indeed most of the facts we gauged had come forward just days or even within 24 hours prior to the time of interview. Other information had surfaced somewhat longer before measurement, but even this information was highly current as it was practically not available – and therefore not acquirable – before the campaign

Danish sample, individuals between 18 and 39 years of age are marginally under-represented, whereas the German and UK samples slightly under-represent people of 65 and older. The Danish and German samples also under-represent people with low education somewhat. Overall, our final pooled sample is mildly skewed toward middle-aged and educated individuals, and this observation is fairly typical with respect to the composition of online samples more generally (see Chang & Krosnick, 2009; Iyengar et al., 2009; 2010). We thank Maaïke Elenbaas, Favad Siddiqui, and Iben Oberggaard for valuable research assistance.

⁵ When we randomly reassign all don't know scores among the four substantive response options to account for respondents' differential guessing propensity (see Mondak, 1999), our key results are similar and conclusions remain the same.

⁶ We determined the final composition and reading of the information item each day before 9 a.m. TNS then inserted the item into the questionnaire, and fielded the survey the same day at noon.

had properly started (see also Druckman, 2005, p. 474). Given the timely nature of our information items, respondents almost certainly needed to have encountered relevant media coverage shortly before the survey in order to know the correct answer (see also Slater, 2004). Again, then (see also *Chapter 2*), we can be confident that we measure what we intend to measure, which is actual *acquisition* of political information.⁷

Political Information Saturation

Information saturation, our key independent variable, reflects the level of dissemination of a given piece of information across the national media environment as a whole. Consistent with this conceptualization, the level of saturation across the media increases with the number of *different* media sources carrying the information. In adopting this approach to capturing information saturation, we build on Barabas and Jerit's (2009) analogous concept of "breadth" (pp. 76-77). In order to determine the level of saturation per piece of information, we content analyzed a heterogeneous sample of five of the most consulted national news sources per country. The sample includes the prime-time broadcasts of the country's main public and commercial television news programs, two leading highbrow newspapers, and one tabloid.⁸ Because our selection of sources acknowledges key segments of the national media market, we assume they jointly draw a representative picture of the level of information availability across the mediated environment as a whole.

For each of the 59 political information questions, we tallied the number of sources providing the correct answer in their coverage. The newspapers were analyzed from front page to back page; the television programs from start to finish.⁹ The period of content analysis corresponds with the time between the start of the campaign – four weeks before the election – and the date of interview. With the media content data collected, we scored respondents according to the level of cross-media diffusion of the information they were asked about in

⁷ We use the term "political information acquisition" interchangeably with "political learning," and take them to mean the same. Strictly speaking, of course, our study does not actually analyze political learning – or change in political information – within respondents over time; this would require a longitudinal design with panel data (e.g., Eveland, Hayes, Shah, & Kwak, 2005) or an experiment with a pre-post test design (e.g., Neuman, Just, & Crigler, 1992).

⁸ The Danish sample of media sources includes *TV Avisen*, *Nyhederne*, *Jyllands-Posten*, *Politiken*, and *Ekstra Bladet*. The German sample includes *Tagesschau*, *RTL Aktuell*, *Frankfurter Allgemeine Zeitung*, *Süddeutsche Zeitung*, and *Bild*. The Dutch sample includes *NOS Journaal*, *RTL Nieuws*, *NRC Handelsblad*, *de Volkskrant*, and *De Telegraaf*. Finally, the UK sample includes *BBC News at Ten*, *ITV News at Ten*, *The Independent*, *The Guardian*, and *The Sun*.

⁹ The content analysis was conducted by eight trained coders, each of whom fluent in the language of the news they coded. All coders took part in an intercoder-reliability test, for which they content analyzed a random sample of 35 news stories. Among other variables, the test included six nominal variables that asked about the presence of specific factual information per story. With Krippendorff alphas ranging between 0.72 and 0.83, the test yielded reliable levels of agreement on these variables (Krippendorff, 2004; Hayes & Krippendorff, 2007).

the survey. Because we content analyzed a total of five different sources, all scores vary between 0 and 5 sources transmitting the correct answer. We recode this variable to distinguish six levels of information saturation ranging from 1 to 6 ($M = 3.38$, $SD = 1.56$).

Motivation

We tap internal motivation with *political interest* (see also *Chapter 2*), which one scholar described as “typically the most powerful predictor of political behaviors that make democracy work” (Prior, 2010, p. 747). Our approach follows that of Luskin (1990, p. 335) and others in this domain of research (Delli Carpini & Keeter, 1996; Iyengar et al., 2010). We measure interest in politics with a single question worded as follows: “Generally speaking, how interested would you say you are in politics?” The response options range from 1, denoting “very little interest,” to 7, denoting “very high interest” ($M = 4.13$, $SD = 1.77$).

Analysis and Results

In order to test the proposition that political learning varies as a function of opportunity to relevant information encounters in the media – as we expect it does following *Hypothesis 1* –, we estimate a model in which a respondent’s answer to a given information question is linked directly to the level of saturation of the information in the respondent’s media environment preceding the survey in which (s)he participated. Because we pool data from all surveys and countries (see also Iyengar et al., 2009), our data comprise two levels – as individual survey respondents (Level-1) are nested in different media contexts across time and space (Level-2). Accordingly, multilevel modeling is appropriate (Goldstein, 2011; Raudenbush & Bryk, 2002). In order to account for variation resulting from clustering by information environments and questions among surveys, we use a random intercept model with a logit link function in which the intercept is allowed to vary across surveys (see also Jerit et al., 2006). Opting for a parsimonious model, we further assumed all Level-1 coefficients to be fixed (for a similar application of this approach, see Iyengar et al., 2009).

Aside from political interest – our measure of motivation –, the model includes a variety of control variables that are bound to confound the relationship between media coverage and political learning. To begin with, we recognize the cross-national scope of our study. While the four cases are quite compatible on systemic characteristics known to affect reception of political information, the four countries examined here potentially differ in various respects (Dimock & Popkin, 1997; Hallin & Mancini, 2004). To the extent that unknown

country factors affect the supply of (EU-level) political information in the national media, and to the extent such factors also have an independent influence on political learning, the impact of information saturation might in part be spurious. We must control, therefore, for country of residence. Specifically, our model includes three dummy variables, identifying respondents as Danish, German, or Dutch (scored 1 if applicable and 0 otherwise), that are compared against the baseline of the UK. In addition, we control for sociodemographics age, gender, education, and income, all of which we regard as exogenous predictors of both political information demand and acquisition.¹⁰

We furthermore control for general political information. Doing so does not only reduce concerns about spurious effects further (Price & Zaller, 1993), but also minimizes the risk of reverse causation (Eveland, Hayes, Shah, & Kwak, 2005). According to a possible counterhypothesis, well-informed individuals would have opted for greater access to political information in the first place. Such alternative interpretations of the relationship between information saturation and acquisition are much less plausible with general political information controlled. We measured this with four questions about national and EU-level political actors and offices, all of which refer to fairly static facts that were acquirable long before the information measured as outcome variable (see Prior, 2007, pp. 118-119).¹¹ In effect, then, our model can also be read as assessing the likelihood that respondents have learned from media coverage based on what is expected given their existing level of political information more generally.

Finally, we control for duration of information response (see Malhotra, 2008; see also *Chapter 2*, fn. 11). To the extent that respondents satisfice or search the web while answering information questions in such surveys, scores on the outcome variable may be negatively associated with fast responding, and positively associated with delayed responses (see *Chapter 2*, Table 2.1). Accordingly, we include dummy variables for low and high response duration, coded 1 for completion times below 6 and above 30 seconds respectively, and 0 otherwise.¹²

¹⁰ Age was measured in years ($M = 46.84$, $SD = 16.02$). Education was measured on a standardized scale with qualification levels ranging from 1, primary school, to 6, MA or post-graduate education ($M = 3.43$, $SD = 1.59$). Income was measured as the gross monthly household income on a scale from 1, denoting less than €500, to 10, denoting more than €10,000, or the equivalent in British pounds or Danish crowns ($M = 5.16$, $SD = 1.98$).

¹¹ General political information is an index of correct answers to questions about the name of the national foreign affairs minister, the length of a single term in the national parliament, the number of member states of the EU, and the composition of the European Parliament. All questions were asked in a multiple-choice format with five randomly rotating response categories and a don't know option. Our index measure distinguishes five levels of general political information ranging from 0 to 4 ($M = 1.90$, $SD = 1.11$), comprising 13, 21, 38, 20, and 8 percent of the sample, respectively.

¹² Irrespective of whether we determine the threshold for low response duration scores at below 5, 6, 7, 8, 9, or 10 seconds, our results are identical. It is unlikely that completion time was systematically affected by differ-

We begin our multivariate analysis by examining the partial effect of information saturation on learning (Model 1). The results of this partial effects model, as estimated by random-intercept logistic regression, are shown in the left column of Table 3.1.¹³ Much as one would expect on the basis of previous research in this domain, the likelihood of acquiring political information is higher among males and increases with age, income, education, and general political information. Information acquisition also increases with motivation, such that individuals with a stronger interest in politics are more likely to learn. Furthermore, we find a relationship between learning and response duration. Specifically, political learning correlates negatively with fast responses and positively with prolonged completion times. In addition, we find none of the three country variables to have a significant effect on learning relative to the reference category (UK). Reassuringly, this latter finding suggests that country characteristics unaccounted for have no independent impact on political information acquisition beyond the variables included in the model.

Reading down the left column of Table 3.1, we observe, clear of all these possible confounders, a significant positive influence of information saturation. In other words, a wider diffusion of political information across the media environment stimulates learning. In order to get some perspective on the magnitude of this effect, we transform the estimated log odds (shown in the table) into odds ratios – the exponentiated regression coefficients. The odds ratio of the saturation variable is 1.687. Thus, with all other variables in Model 1 held constant, each one unit increase in information saturation increases the odds of learning by 69 percentage points. The strength of the impact of saturation is particularly revealing when juxtaposed with that of education (see Prior, 2005, p. 582); typically a key predictor of political information (Delli Carpini & Keeter, 1996; Highton, 2009). Both variables are measured on 1-6 scales and very similarly distributed (with nearly identical means and standard deviations). All else equal, a one unit increase in education increases the odds of learning by just 11 percentage points. Remarkably, the impact of saturation is more than six times stronger. (By comparison: a one unit increase on the 1-7 scale of political interest increases the odds of learning by 28 percentage points, all else equal.) In sum, we find strong support for *Hypothesis 1*: A wider dissemination of political information across media sources is associated with a significantly greater likelihood that citizens acquire that information.

ences in question length across languages. None of the mean differences in question length (measured as the number of words per question) between any pair of languages we compared were statistically significant (for all mean differences, $p > 0.10$).

¹³ The estimates shown in Table 3.1 are generated using `xtmelogit` in Stata (Rabe-Hesketh & Skrondal, 2008). All continuous variables are grand mean centered (see Raudenbush & Bryk, 2002).

Table 3.1 The effects of information saturation and motivation on acquisition of political information

	Model 1	Model 2	Model 3
Constant	-1.651** (0.244)	-1.650** (0.244)	-1.666** (0.261)
Denmark	0.147 (0.315)	0.147 (0.314)	0.167 (0.316)
Germany	-0.281 (0.332)	-0.281 (0.332)	-0.274 (0.330)
Netherlands	0.068 (0.335)	0.068 (0.335)	0.079 (0.333)
Low response duration	-0.217** (0.063)	-0.216** (0.063)	-0.221** (0.064)
High response duration	0.569** (0.054)	0.569** (0.054)	0.570** (0.054)
Age	0.010** (0.001)	0.010** (0.001)	0.010** (0.001)
Male	0.294** (0.038)	0.294** (0.038)	0.292** (0.038)
Income	0.057** (0.010)	0.057** (0.010)	0.057** (0.010)
Education	0.102** (0.012)	0.102** (0.012)	0.102** (0.012)
General political information	0.480** (0.021)	0.480** (0.021)	0.482** (0.021)
Political interest	0.246** (0.013)	0.245** (0.013)	0.285** (0.017)
Information saturation	0.523** (0.079)	0.522** (0.079)	0.502** (0.079)
Information saturation × Political interest	—	0.002 (0.008)	0.015 (0.009)
Information saturation ²	—	—	0.003 (0.047)
Information saturation ² × Political interest	—	—	-0.019** (0.005)
Log likelihood	-9326	-9326	-9319

(continued)

	Model 1	Model 2	Model 3
N_i/N_j	20943/59	20943/59	20943/59

Note. Cell entries are fixed effects estimates from a hierarchical linear model with standard errors in parentheses. The dependent variable is dichotomous and scored 1 if the respondent correctly answered a given political information question and 0 if otherwise. ** $p < 0.01$ (two-tailed).

The Interactive Dynamics of Information Supply and Demand

We now extend the model to assess the nature of the interaction between political information saturation and motivation. Independent of one another, these variables of supply and demand both uphold a solid relation to political learning, as the outcomes of Model 1 show. According to our second hypothesis, motivation reinforces the impact of information saturation, but only when the overall scope of saturation remains limited to a narrow range of sources. However, an alternative hypothesis may be that motivation's moderating power persists across the entire range of information saturation, such that highly motivated individuals continue to benefit disproportionately from media coverage vis-à-vis those less motivated even beyond a modest degree of saturation. In that case, the interaction between saturation and motivation would take an unexpected linear form. To account for this possibility, we estimate a model similar to Model 1 but now including a linear by linear component designed to assess the first-order interaction between the two variables (Model 2). In order to account for the possibility of a curvilinear by linear interaction – as anticipated following *Hypothesis 2* –, we estimate a model that accommodates two additional components (Model 3). The first is a quadratic term of the saturation variable, and the second is the curvilinear by linear component designed to capture a nonlinear interaction effect (see Aiken & West, 1991; Cohen, Cohen, West, & Aiken, 2003).

The estimated effects of the predictors in Models 2 and 3 are presented in the middle and right columns of Table 3.1, respectively. The results of Model 2 indicate that the first-order interaction term of the joint effect of saturation and motivation does not significantly correlate with political information acquisition. This finding suggests that motivation-induced change in learning likelihood following media coverage does not come out as monotonic or uniform across the range of information saturation. In other words, the effect of saturation on political learning does not increase linearly with motivation consistently. Had we expired our analysis at this point, we would conclude that motivation does not moderate the influence of

media coverage. Yet such a conclusion would be premature, because it ignores the possibility that the information environment compensates for a lack of motivation at higher levels of saturation.

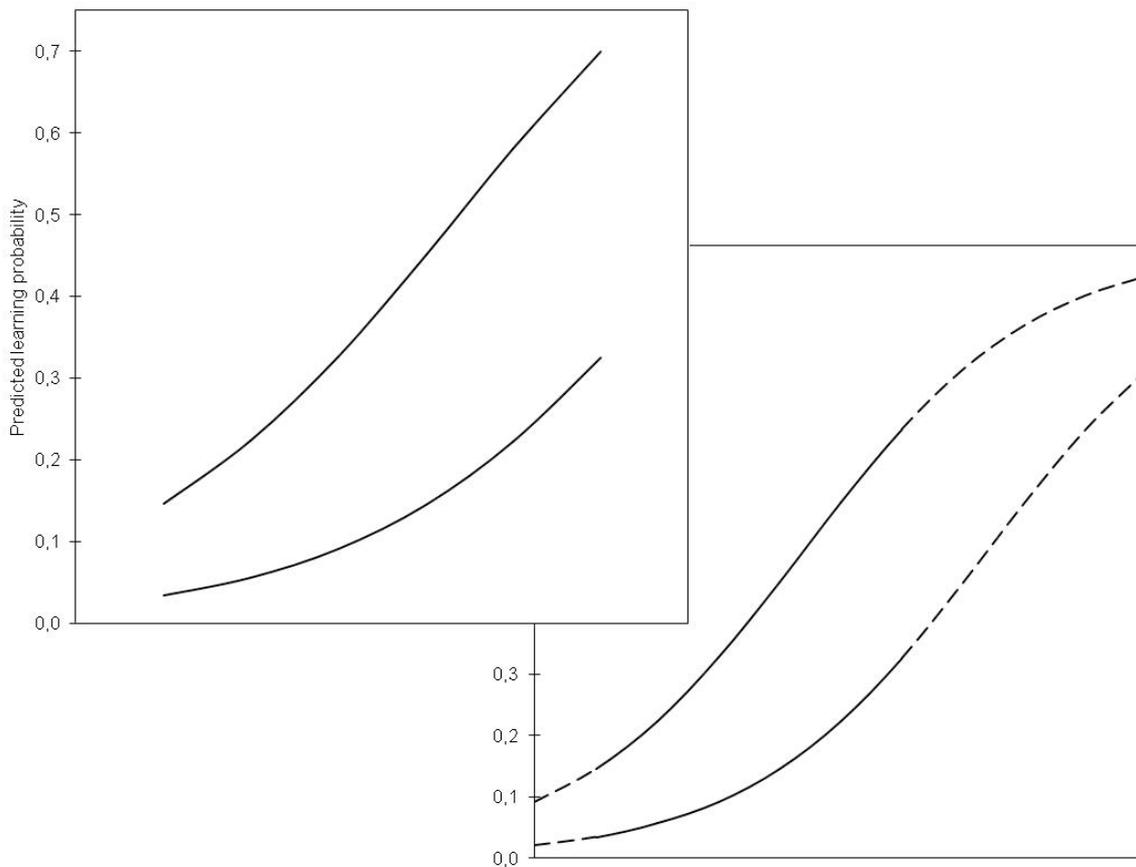
If the environment indeed does so, then the projected information lead of strongly motivated individuals over those weakly motivated may still emerge, but fail to increase indefinitely. We therefore turn to Model 3. The results of this model reveal that the higher-order interaction term assessing the curvilinear by linear interaction exerts a significant impact on information acquisition. The sign of the coefficient is negative, indicating that the further a score on the saturation scale is removed from the mean on that scale – that is, the higher the value on the squared saturation variable –, the weaker the moderating influence of motivation. As the level of saturation increases, the impact of media coverage is initially conditioned by motivation. However, beyond a certain threshold level, this interaction effect vanishes. Motivation *does* alter the effect of saturation, but only up to a certain point; that is, as long as the information is available from the media but not too widely so (see Druckman, 2005). A likelihood ratio test indicates that accounting for the nonlinear interaction in Model 3 produces a significant improvement in model fit ($\chi^2 [2] = 14.0, p < 0.01$).¹⁴

Figure 3.1 visualizes the curvilinear by linear interaction between information saturation and motivation using the coefficients from Model 3. The higher and lower bound slopes represent the effect of saturation among individuals with high and low levels of intrinsic motivation, respectively.¹⁵ We focus on the left-hand panel of the figure, which plots the interact-

¹⁴ It may still be, however, that this apparent interaction is partly spurious. Media environments that differ in saturation may vary in various other ways. One way in which low- and high-saturation environments may differ, for example, is in the mixture of highbrow and lowbrow media sources that carry a piece of information. If availability in popular sources such as television and tabloids is more likely for broadly newsworthy and appealing stories, then low values of saturation may be associated with availability in quality newspapers and high values with availability in popular sources. To the extent that television and tabloids are preferred over quality newspapers by people with little learning motivation, the interaction in Model 3 may, at least in part, be an artifact of self-selection effects. To account for this possibility, we constructed a dichotomous variable scored 1 if the information of interest was included in television or tabloid coverage and 0 if it was not, as well as an interaction term between that variable and political interest. We then reestimated Model 3 using these two additional controls. While, in line with the self-selection hypothesis, the direction of the interaction between lowbrow availability and political interest is negative, it is not statistically significant ($b = -0.032, p = 0.31$). Moreover, including these controls leaves the nonlinear saturation-motivation interaction unchanged, suggesting this effect is not attributable to selectivity in media reliance by motivation. In order to further account for the possibility of spurious interaction, we examined if information saturation interacts in a nonlinear fashion with age, gender, income, education, general political information, or country of residence. Regardless if we enter each pair of interaction terms simultaneously or separately into Model 3, the curvilinear by linear interaction between saturation and motivation remains virtually unchanged and statistically significant. This finding counters the suggestion that individual differences on any of these controls explain the saturation-motivation interaction reported in Model 3.

¹⁵ Predicted probabilities are computed for a hypothetical Danish female with mean scores on the remaining background variables answering an information question with normal response speed. “High” and “low” motiva-

Figure 3.1 The effect of information saturation (x-axis) on acquisition of political information (y-axis) at high (upper bound line) and low (lower bound line) levels of motivation.



Note. Dashed lines indicate extrapolation beyond the range of saturation in the data.

tion for values of saturation within the range of the available data. (The right-hand panel provides an extrapolated picture of the interaction to be addressed in the discussion.) As can be seen from Figure 3.1, motivation transforms the curvilinearity of the relationship of information saturation to political learning. When motivation is low, the impact of saturation is curvilinear, but as motivation increases, the effect of saturation becomes increasingly linear. Accordingly, a high level of motivation appears to be a requirement in order to overcome the obstacle of learning in the low-saturation environment. Conversely, a high-saturation environment appears to make up for deficiencies in motivation, allowing even the least motivated individuals to make sizable information gains.

To get a better sense of these learning gap dynamics, we turn to Figure 3.2. This figure plots the percentage-point size of the *gap* in the likelihood of political information acquisition

tion correspond to the maximum and minimum scores on political interest, respectively. Each of these scores was reported by 10 percent of all respondents.

between individuals with high and low motivation by levels of saturation. Focusing again on the left-hand panel, this figure shows that the learning gap more than triples from 11 (the difference between 14 and 3) to 37 percentage points (the difference between 70 and 33) as one moves from the lowest to the highest observed value on the saturation variable. However, as can be seen from the figure, the gap clearly stabilizes toward the high end of our scale: the positive interaction between information saturation and motivation fizzles out. Indeed, once we move from the second-highest to highest measured level of saturation, the differential increase in learning likelihood between those with the highest and lowest levels of motivation is effectively zero, such that both groups of individuals make increments in information acquisition that are equally large.

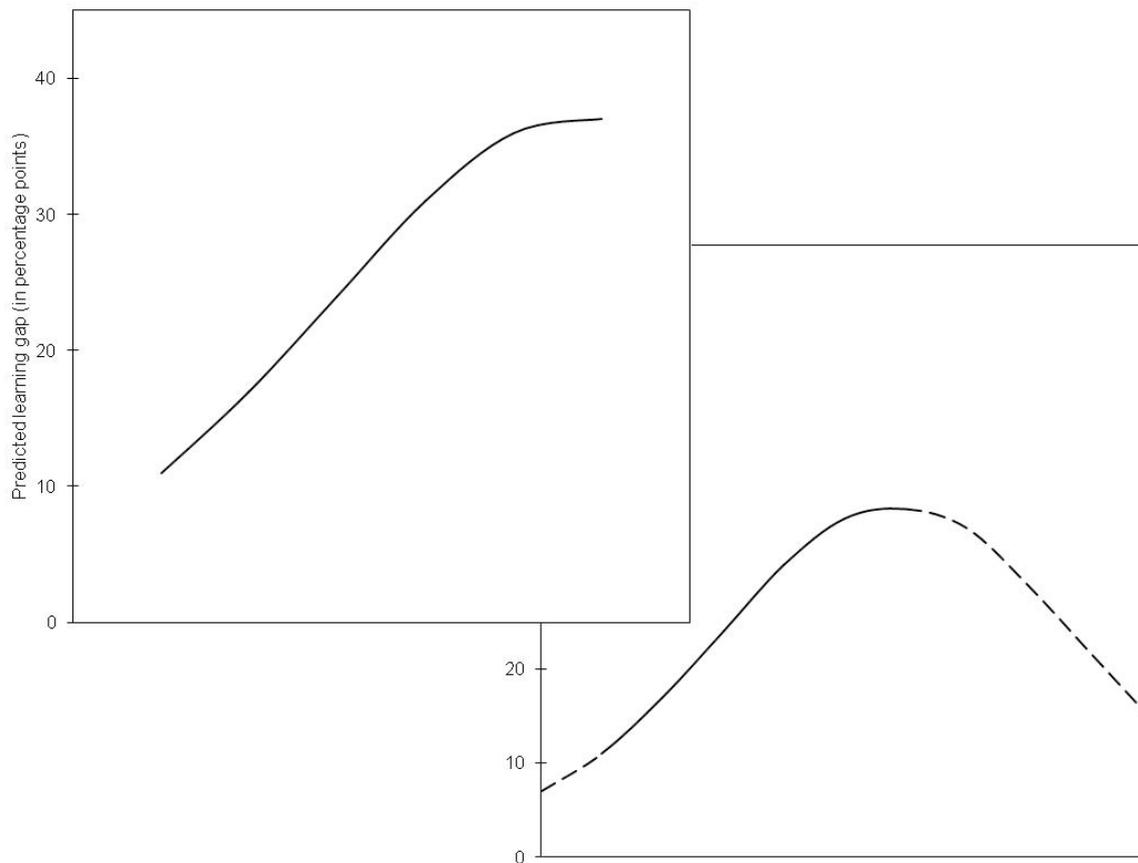
Taken as a whole, the results presented suggest that motivation is a saturation-conditional moderator of political learning effects, and this evidence is consistent with *Hypothesis 2*.

Discussion and Conclusion

The findings reported in this research resonate with an important take-home message from Delli Carpini and Keeter's (1996) classic account of political information in the American electorate: that "[w]hat people know about politics tells us much about citizens *and* about the political environment in which they operate" (p. 8, emphasis in original). Most research efforts in this domain of scholarship have been directed strictly at the individual antecedents of political information acquisition, but as Delli Carpini and Keeter point out, such endeavors leave out a crucial contextual input variable. Indeed, because the environment – and most notably the mediated information environment – is a critical determinant of political learning opportunity, and because such opportunity is rarely constant across contexts, it is of much greater consequence for how well-informed the public ends up being than commonly assumed.

The present study, which is based on data from citizens and media across North-West Europe, clearly supports this contention. It demonstrates that a wider distribution of political information in the media strongly increases the odds that citizens acquire that information; a finding in keeping with original American-based research merging survey and media content analytic data (Barabas & Jerit, 2009). Of course, we realize that in the contemporary high-choice media environment, citizens' intrinsic motivations are an important – if not the most important – force in shaping individual opportunities for exposure to political information

Figure 3.2 The percentage-point size of the political learning gap (y-axis) between individuals with high and low levels of motivation across levels of information saturation (x-axis).



Note. Dashed lines indicate extrapolation beyond the range of saturation in the data.

(Prior, 2007). To be sure, relevant information salient to some individuals often goes largely unnoticed by others, depending on the media offerings that individuals *choose* to resort to or avoid. However, despite divergences in media use among citizens that result from individual media preferences, the larger media environment might still regularly give rise to learning opportunity above and beyond such preferences. While we say little about the specific sources that people rely on, our results show that when political information spreads across a wider array of sources in a given media marketplace, citizens will encounter and absorb the information more easily, independent of media self-selection.¹⁶ Overall, what citizens learn about politics varies not only as a function of demand for political information, but also of supply (Delli Carpini & Keeter, 1996).

¹⁶ It is quite plausible, moreover, that the availability of political facts across a given environment diffuses *beyond* the media into interpersonal political discussions, which in turn may translate into information gains (e.g., Eveland, 2004).

Yet, aside from comprising two central pathways to political information of their own, media coverage and motivation additionally interact to produce political learning effects. Indeed, in line with Iyengar et al.'s (2010) assertion that “the prevailing level of information is affected jointly by both demand and supply variables” (p. 292), our study demonstrates that motivation modifies the impact of information saturation. Importantly however, it does so, we find, only under conditions of limited saturation. When political information travels more widely across the media spectrum, disparities in information acquisition disappear, such that the information diffuses across *all* levels of political interest. In media environments characterized by a narrow availability of information, learning hinges on a relatively high level of motivation. But in the high-saturation environment, even citizens with a weak motivation – that is, those most inclined to eschew the news of politics – tend to passively pick up information from encounters with relevant media transmission. While previous studies of passive and motivated learning have provided separate snapshots of the opportunity-motivation interaction by holding the media environment constant, this study is the first to capture these differential learning perspectives in an inclusive analysis spanning multiple markets.

By revealing how information saturation ultimately serves as an external information leveler between the most and least attentive strata in society, our research reiterates the democratic significance of the collective media environment (Delli Carpini & Keeter, 1996; Kuklinski, Quirk, Jerit, & Rich, 2001). The right-hand panels of Figures 3.1 and 3.2 plot the predicted probabilities for an extended range of hypothetical values of information saturation beyond those actually observed in our media content data. As these extrapolated projections indicate, the least motivated even begin to catch up with the most motivated citizens once the latter reach a learning ceiling toward high levels of information diffusion. At that point, the interaction between opportunity and motivation will take a *negative* form.¹⁷ Our point is that as the environment changes, so does the nature of the interplay between supply and demand. In certain contexts, motivation turns out to be a precondition for political learning; other contexts do not require people to be so involved or to actively monitor the news media. At the same time, it is worth emphasizing that an effectual *narrowing* of the learning gap requires a media environment highly dense in information. That is, a story conveying relevant political information is unlikely to catch the attention of the disinterested citizen unless that story, in Zaller's (2003, pp. 121-122) words, “breaks through the fog of disjointed news [to] penetrate every corner of public space so few could miss it” (see also Price & Zaller, 1993).

¹⁷ For a discussion of the risks associated with such counterfactual predictions, see King and Zeng (2006).

What *type* of political information, then, tends to be transmitted in such exceptionally high-saturation media stories of political events? Presumably, those stories abound in contexts of political contestation and controversy, as with certain high-profile policy debates or election campaigns.¹⁸ Yet “communication in these situations often consists of ideological rhetoric and stark predictions... – hardly the stuff of enlightened deliberation” (Barabas and Jerit, 2010, pp. 239-240). Most media coverage of politics, of course, typically does not reach the level of saturation that extraordinary news events do. To the extent that the public distribution of facts about policies, political performance and other types of information critical to competent citizenship remains relatively confined (Bennett, 2003), then accordingly, the most important kinds of political learning might remain limited to only those citizens sufficiently motivated to tune in to relevant coverage (see *Chapter 2*). In fact, as Althaus et al. (2011) remind us, no medium can be counted on to reliably convey these facts, and so “routine transmission of politically important information should never be assumed” (p. 1076). It is imperative, therefore, that future research not only reveals the democratic consequences of disparities in citizen motivation, but also maps disparities in the distribution of “politically important information” in media environments across time and location.

¹⁸ Conflict within a political entity, for example, increases conspicuousness of and social concern about an issue, and therefore increases media coverage of the issue (for a recent illustration of this dynamic in the context of European elections, see Schuck, Xezonakis, Elenbaas, Banducci, & de Vreese, 2011). As social and elite tensions provide a strong stimulus to political communication, including interpersonal discussion, community conflict over some issue may narrow gaps in political information between different segments of the public (Donohue, Tichenor, & Olien, 1975).

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