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ON METRICS-DRIVEN HOMEPAGES

Assessing the relationship between popularity and prominence

Rodrigo Zamith

As audience analytics systems have proliferated in newsrooms, scholars have expressed fears of, and in some cases assumed a shift toward, a metrics-driven workflow where certain gatekeeping decisions are made based on real-time measures of news consumption. This study evaluated the relationship between a news item's popularity and its subsequent prominence through a two-month analysis of the homepages of 14 news organizations. The results indicated a large divergence between popular and prominent items and limited effects of an item's popularity on its subsequent prominence and risk of removal from prominent areas of the homepage. The findings give pause to fears of an injudicious turn toward an "agenda of the audience," at least in the context of content placement, and point to directions for future research on the content-related impacts of audience metrics and analytics.

KEYWORDS analytics; audiences; computational social science; gatekeeping; homepages; metrics; online news; popularity

Introduction

Central to gatekeeping theory, in the context of journalism, is the notion that editors serve as central nodes in the process of shaping news products. In keeping their gates, these individuals decide not only what information gets through but also what it looks like once it has passed that gate. Until recently, conceptualizations of the gatekeeping process largely minimized the role of audiences. This changed when Shoemaker and Vos (2009) included an audience channel in a major revision of the gatekeeping model. This should not be viewed as a natural development, however, as it forces newswriters to reconcile values and beliefs like the professional authority of journalists and the need to be insulated from non-editorial considerations (Deuze 2005; Lewis 2012) with an increasingly active audience and pressures to make use of the readily available information about their preferences (Groves and Brown 2011; Usher 2012).

Helping drive the growing role of audiences in the gatekeeping process has been the proliferation of audience analytics, or systems that automatically and systematically gather, aggregate, and synthesize information about the consumptive behaviors of individuals. Much of the recent research (e.g., Nguyen 2013; Tandoc 2014, 2015; Tandoc and Thomas 2015; Usher 2013; Vu 2014) has pointed to the growing influence of audience analytics in newsrooms, with the balance of evidence indicating that news practices are changing in response to this phenomenon. This has led many scholars to assume that news products themselves are consequently changing as well.

There has been, however, limited empirical work looking at how the content of news products is changing (Bright and Nicholls 2014; Lee, Lewis, and Powers 2014; Welbers et al. 2016). Instead, much of what is known is derived from self-reported information gleaned from surveys and interviews, which represent only the extent to which the respondent believes he or she is using the data, and could be subject to over-reporting and under-reporting as a consequence of social desirability biases, especially considering the culturally charged nature of audience analytics and audience metrics. Moreover, in order to further the understanding of this phenomenon, there is a need for scholars to delineate the effects of these technologies on particular editorial behaviors.

The present research adds to the growing body of work on audience analytics and metrics by assessing the amount of overlap between the editorial and audience agendas as well as the effect a news item's popularity has on its subsequent prominence on the homepage and on the likelihood that it will remain in a prominent area of the homepage at a later point in time. In particular, this study builds on the scholarship of Boczkowski and Peer (2011), Bright and Nicholls (2014), and Lee, Lewis, and Powers (2014) by looking at a larger and more heterogeneous set of organizations over a longer period of time, linking different types of analyses, and using a rigorous computational approach to analyze shorter time lags. In doing so, it offers insight into the extent to which editorial decision-making may be changing in response to what has been called a turn toward the "agenda of the audience" (Anderson 2011a, 529).

Literature Review

Journalism as Profession, Ideology, and Logic

As scholars have observed, journalism, as practiced in the United States, is not a classical profession (Lewis 2012). For example, there is no formal mechanism for the inclusion or exclusion of would-be "journalists." While scholars may consider journalism to be a "semi-profession" (Witschge and Nygren 2009, 39) at best, there is little question that among its practitioners in the United States, journalism is widely regarded as being more than an ordinary occupation (Weaver et al. 2007). This is because journalism in the United States is marked by a strong and shared set of values and role conceptions that is derived from a robust occupational ideology (Deuze 2005).

Deuze (2005) argues that the occupational ideology of journalism consists of five central values: a public-service mission, impartiality, autonomy, immediacy, and a strong ethical sense. Lewis (2012, 845) adds that there is also a professional logic among US journalists that involves assumptions about the role of the journalist in society: "They take for granted the idea that society needs them as journalists—and journalists alone—to fulfill the functions of watchdog publishing, truth-telling, independence, timeliness, and ethical adherence in the context of news and public affairs."

However, occupational ideologies and professional logics are dynamic—they change over time as some ideas and values become marginalized and others codified (Deuze 2007). For example, the aforementioned occupational value of impartiality and objectivity as we know it today only became widely adopted in the 1920s (Schudson 2001). Given the notable shifts in the industry, both technological and cultural, it is possible that such values and beliefs, and how they should be enacted, may also be shifting. Nevertheless,

one must remain cognizant of these dominant ideologies given the influence they exert on journalistic practice.

The Audience in Gatekeeping Theory

For much of the twentieth century, journalism was based on a model of scarcity and exclusivity, with media organizations gaining social and economic power through their domination of the means of production and distribution of news. As such, the notion of professional control over content has been central to the professional logic of journalism (Lewis 2012). The work of gatekeeping in particular has long been key to the work of journalism, helping to set it apart as a distinctive domain of activity (Boczkowski 2004).

According to Shoemaker and Vos (2009, 22), “the basic premise of gatekeeping scholarship is that messages are created from information about events that has passed through a series of gates and has been changed in the process.” Gatekeeping, therefore, involves both the selection of what passes and does not pass a gate as well as the shaping of the item as it passes each gate (Shoemaker 1991). For online editors at news organizations, one critical aspect of this process is deciding where to place content—or how much prominence to accord that item—on a homepage (Lee, Lewis, and Powers 2014). At minimum, such decisions may impact the agendas of news consumers (McCombs and Shaw 1972). Although the impact of news organizations’ homepages has diminished in recent years as readers increasingly turn to aggregators and social media sites for news, they continue to be viewed by news organizations as an important vehicle for building their brand and communicating news priorities, making them important objects to study (Benton 2015; Tandoc 2015).

The general model of gatekeeping has received several updates in recent decades to account for new understandings of the roles of various actors and different sources of influence. In the majority of these models, however, the constructed audience—what a journalist thinks about when he or she thinks of his or her audience (DeWerth-Pallmeyer 1997)—received limited attention as a potential source of influence in the gatekeeping process. This is perhaps unsurprising given the traditional, widespread skepticism toward (if not outright rejection of) formal audience research on the part of journalists and editors, and the limited avenues for engagement available to members of the actual audience during that time (Deuze 2007; DeWerth-Pallmeyer 1997).

More recently, Shoemaker and Vos (2009) proposed a model that accords audiences a more prominent role in the gatekeeping process. In contrast to earlier models, the audience is considered to be a channel in this model (in addition to the existing media and source channels), pointing to their increasingly active role and both implicitly and explicitly calling attention to the notion of “audience gatekeeping” (Shoemaker et al. 2010, 61) and ideas of news driven by the “agenda of the audience” (Anderson 2011a, 529). In particular, it points to the growing perception of the influence of non-purposive forms of audience feedback gathered by sophisticated audience information systems (audience analytics) and distilled into real-time, quantified measures of user behaviors (audience metrics).

Toward an Agenda of the Audience

Because the primary economic model for most large US news organizations relies on advertising—and thus capturing large, attractive audiences—there is increasing pressure

on those organizations to ensure that news products align with audience demands. Specifically, news organizations in an online environment are being increasingly asked to cater to audience interests in order to generate more “clicks” (Tang et al. 2011), even if it comes at the expense of journalistic values (Cohen 2002).

As DeWerth-Pallmeyer (1997) notes, there is often tension between what audiences find to be interesting and what editorial newswriters find to be important. Boczkowski and Peer (2011) found that there was a “sizable” gap between journalists’ choices and consumers’ choices at the four organizations they studied, with journalists favoring news items that pertained to public affairs more often than audiences. Boczkowski, Mitchelstein, and Walter (2011) found a similar phenomenon at 11 organizations spanning six countries.

These findings were expanded in a broader synthesis by Boczkowski and Mitchelstein (2013), and are supported by the work of Lee and Chyi (2014), who found that content that was deemed to be “newsworthy” by media professionals was often not considered “noteworthy” by audiences. Boczkowski (2010, 153) observed that journalists at two Argentinian newspapers were becoming increasingly aware of what their online audience was interested in, but tended to stick to occupational values when faced with the “tension” between readers’ preferences and their own news judgment. More recently, Hanusch (2016) found that journalists were wary of letting metrics influence their news judgment, even though they saw it as a helpful input for fine-tuning their work.

The existence of a “choice gap” (Boczkowski and Peer 2011) or “news gap” (Boczkowski and Mitchelstein 2013) is notable because a rational-choice economic perspective would suggest that organizations should respond to uncertain market conditions, like the one currently faced by news organizations, by reconfiguring their resources and processes to ensure tighter organizational integration, such as by making knowledge about audience preferences more accessible (Gade 2009; Snow, Miles, and Miles 2005). Under a market-oriented logic, such a shift would present the opportunity to minimize the public-service mission that is central to the occupational ideology of journalism in order to maximize the return on investment in a news product by catering to audiences’ wants, such as more “soft news” (Fengler and Ruß-Mohl 2008; Nguyen 2012, 2013).

Audience Metrics and News Content

Despite the increasing availability of the technology and salience of the measures, few studies have examined the relationship between metrics and content. Instead, most of what scholars know about that relationship is based on interviews, surveys, and ethnographies that focus on how newswork is performed. This work has indicated that newswriters are becoming increasingly sensitive to audience metrics, with major editorial decisions sometimes being influenced by the number of times items are viewed (Groves and Brown 2011; Tandoc 2015; Usher 2012; Vu 2014). However, the extent of its use and the kinds of editorial activities informed by them appears to vary across newsrooms (Anderson 2011b; Hanusch 2016). Notably, these studies can only speculate about the effects metrics have on the shape news content takes because either their analytical focus is on news practices or they rely on self-reported information.

In the modest stream of work looking at the content-level effects of audience metrics, three studies stand out as key contributions. The first study, by Lee, Lewis, and Powers (2014), looked at the time-lagged effect the popularity of a news item—as measured by the amount of clicks it received—had on its subsequent placement, and vice versa.

Specifically, they analyzed the websites of three New York-based news organizations over a two-week period. They found that a story's popularity affected subsequent news placement and that there was a stronger effect of story popularity on placement than of placement on popularity. Notably, when their findings were disaggregated, there was a positive effect for one website, no effect for a second website, and a negative effect for a third website. Overall, the effects found by the authors were quite small. For example, the overall effect of a one-rank increase in popularity was a 0.15-rank decrease in prominence.

An alternative approach to studying content-level effects was adopted by Bright and Nicholls (2014). They analyzed a month's worth of data from five news organizations in the United Kingdom to assess the impact that being on a most-read list had on an article's likelihood of appearing somewhere on the homepage 15 minutes later. They found that articles appearing on a most-read list had a lower risk of being removed from the homepage than articles that did not; that this effect occurred, with little difference, for both soft and hard forms of news; and that the effect was more extensive for the quality publications than the tabloid ones.

Looking beyond the presentation of content, Welbers et al. (2016) found that articles on the most-viewed list were more likely to receive follow-up reporting on the websites of three out of the five Dutch newspapers they analyzed.

Research Questions and Hypotheses

Given the growing role of audiences in the gatekeeping process (Shoemaker and Vos 2009) as well as reports of the growing salience of metrics in the newsroom (Anderson 2011b; Groves and Brown 2011; MacGregor 2007; Tandoc 2015; Usher 2012, 2013) and how it is perceived to influence decisions relating to the homepage (Tandoc 2014; Vu 2014), one would expect that popular items would also tend to be prominent. However, an alternative theoretical perspective rooted in traditional conceptualizations of the gatekeeping process (Shoemaker 1991) and emphasizing the professional logic (Lewis 2012) and occupational ideology (Deuze 2005) of journalism would contend that there should be limited overlap, especially in light of the differences in the preferences of editors and readers (Lee and Chyi 2014).

Recent empirical work content analyzing the homepages of news organizations appears to lend support to the latter theoretical perspective. Boczkowski and Peer (2011) found thematic gaps in the types of content (e.g., public affairs versus non-public affairs) that were as low as 13 percent and as high as 51 percent in their analysis of four US news organizations. Similarly, Boczkowski, Mitchelstein, and Walter (2011) found thematic gaps as low as 8.7 percent and as high as 30.3 percent in their analyses of nine Latin American and Western European publications. In a study of German media, Wendelin, Engelmann, and Neubarth (2015) found differences in the journalists' and readers' topical preferences despite there being similarities in their news values. The United Kingdom-focused work of Bright and Nicholls (2014) indicated that, on average, just 12 percent of items that appeared *anywhere* on the homepage became popular at some point. In light of this, the following research question is posed:

RQ1: What proportion of prominent news items become popular at some point in time?

For an item's popularity to exert any influence on its prominence on a homepage, it must become popular prior to its final appearance in an area of prominence. It is therefore

important to assess the proportion of items that became popular (e.g., appeared on the list of most-viewed items) before they disappeared from an area of prominence. Unfortunately, the work of Boczkowski and colleagues (Boczkowski, Mitchelstein, and Walter 2011; Boczkowski and Peer 2011) and Wendelin, Engelmann, and Neubarth (2015) do not evaluate temporal relationships, and the work of Lee, Lewis, and Powers (2014), Bright and Nicholls (2014), and Welbers et al. (2016) offers little guidance in this regard. This is important because while a statistically significant effect may be found between those variables under certain analyses, that effect would be of limited consequence if it only applied to a relatively small number of items. In light of this, the following research question is posed:

RQ2: What proportion of prominent news items become popular before they are removed from an area of prominence?

In drawing from the literature, competing perspectives may be considered with regard to the impact of popularity on prominence. It may be reasoned that online editors will seek to ensure that content that is in high demand will remain in prominent areas and perhaps even be made more prominent in order to make it clear to news consumers that the organization has content pertaining to the topic that is of demonstrable interest. However, it is also possible that editors would reason that popular content will already have been seen by a large portion of readers and may be therefore removed from prominent areas or demoted to a less-prominent spot in order to make space for new content (see Tandoc 2015). It may also be reasoned that there should be no effect or minimal effects as online editors reject making short-term decisions based on audience metrics, relying instead on gut feelings and traditional notions of newsworthiness that are not directly related to audience preferences. In light of this divergence, the empirical findings from the modest body of relevant work on metrics-related content-level effects (Bright and Nicholls 2014; Lee, Lewis, and Powers 2014) guide the following research question and hypotheses. First, it is hypothesized that:

H1: Popular items will have a lower risk of being removed from the prominent regions of the homepage at a later point in time than non-popular items.

Second, it is asked:

RQ3: Among popular items, do more-popular items have a lower risk of being removed from the prominent regions of the homepage at a later point in time than less-popular items?

Third, it is hypothesized that:

H2: An increase in an item's popularity will lead to a small decrease in its prominence at a subsequent point in time.

Method

Sampling

To address the aforementioned questions and hypotheses, the websites of 14 of the 50 largest US newspaper-producing news organizations were analyzed (see Table 1). This purposive sampling frame was chosen because it represented organizations that are not only influential but are also likely to have the greatest amount of tension between

TABLE 1

List of news organizations analyzed

Organization	Location	Parent company	Circulation
<i>Daily News</i>	New York City, NY	New York Daily News	501,130
<i>Fort Worth Star-Telegram</i>	Fort Worth, TX	McClatchy Company	186,625
<i>Milwaukee Journal Sentinel</i>	Milwaukee, WI	Journal Communications, Inc.	202,573
<i>Oregonian</i>	Portland, OR	Oregonian Publishing Company	226,566
<i>Plain Dealer</i>	Cleveland, OH	Plain Dealer Publishing Co.	292,302
<i>Register</i>	Santa Ana, CA	Freedom Communications, Inc.	320,628
<i>Salt Lake Tribune</i>	Salt Lake City, UT	Newspaper Agency Corporation	237,493
<i>San Jose Mercury News</i>	San Jose, CA	MediaNews Group, Inc.	232,272
<i>St. Paul Pioneer Press</i>	St. Paul, MN	MediaNews Group, Inc.	236,279
<i>Star Tribune</i>	Minneapolis, MN	Star Tribune Media	303,929
<i>The Denver Post</i>	Denver, CO	MediaNews Group, Inc.	414,673
<i>The Star-Ledger</i>	Newark, NJ	Advance Publications, Inc.	305,903
<i>Wall Street Journal</i>	New York, NY	Dow Jones/News Corp.	2,320,915
<i>Washington Post</i>	Washington, DC	Nash Holdings, LLC	454,938

All names, locations, ownership, and circulation figures are according to the Alliance for Audited Media on September 26, 2014.

traditional journalistic values and growing pressures to use audience metrics to inform editorial decision-making (Soloski 2013; Weaver et al. 2007). Additionally, these organizations had comparable lists of most-viewed items, ensuring consistency in one of the key measures (see Zamith 2015).

Key Variables

The unit of analysis in this study was the individual news item, appearing on the homepage of a given news organization at a given time. A news item was operationalized as a package that includes a headline and a hyperlink (Boczkowski, Mitchelstein, and Walter 2011; Boczkowski and Peer 2011). The present study focused on two key sets of variables that deserve special attention: popularity and prominence.

Popularity was conceptualized in this study as the number of times a news item was viewed. This conceptualization was preferred because it is not only consistent with the relevant literature (e.g., Boczkowski and Peer 2011; Bright and Nicholls 2014; Lee, Lewis, and Powers 2014) but also because page views have been repeatedly found to be the most salient metric in newsrooms (Anderson 2011b; Groves and Brown 2011; MacGregor 2007; Usher 2012, 2013). Like Bright and Nicholls (2014), Lee, Lewis, and Powers (2014), Welbers et al. (2016), and Wendelin, Engelmann, and Neubarth (2015), information for this variable was obtained through the proxy of a news item's presence and ranking on a news organization's list of most-viewed items (see also Boczkowski, Mitchelstein, and Walter 2011; Boczkowski and Peer 2011).

Because different news organizations offer varying numbers of most-read items in their public-facing lists, only the top five items were considered in this analysis in order to ensure the comparability of the lists. Popularity was assessed as a dichotomous variable (popular if appearing on the list, non-popular otherwise) for some of the research questions and as an ordinal variable for others. When treated as an ordinal variable, items were

reverse coded so that the most popular item was assigned the value 5 and the least popular item the value 1, with items that did not appear on the list receiving a value of 0.

The prominence of an item refers to its relative position on the homepage, with items appearing in more-noticeable spots deemed to be more prominent and those appearing in less-noticeable spots deemed less prominent. To assign a ranking of prominence for the distinct areas of a homepage, the conventions adopted by Boczkowski and colleagues (Boczkowski, Mitchelstein, and Walter 2011; Boczkowski and Peer 2011) and Lee, Lewis, and Powers (2014) were also adopted in this study. Specifically, the prominence of a given item was determined by following an F-shape pattern that privileged items appearing left to right and then top to bottom (see Zamith 2016). Additionally, areas of the homepage that clearly intended to draw readers, such as those that included large pictures and larger font sizes, were also privileged. For an example, see Figure 1.

To ensure comparability, only the five most prominent areas of the homepage were coded from each organization. A single item was coded for each area (the dominant headline) and “related items”—news items that appear as sub-units of an associated parent item—were excluded. As with popularity, this variable was treated as dichotomous to assess some of the research questions and hypotheses, and as a reverse-coded ordinal variable to assess others.



FIGURE 1
A screenshot of *The Denver Post*'s homepage on October 25, 2014 at 22:30 UTC. The most prominent area is the center frame due to it having the largest font size and a large accompanying picture, followed by the four stories stacked on the left bar

Procedure

A computational content analysis was conducted because of the large volume of data involved in the study and because the systematic nature of the source of data made a computational analysis more accurate (Zamith and Lewis 2015). For example, changes in the headline of a story would not lead to the miscoding of the item as a new, distinct unit since the URL would not typically change. The homepages of the 14 news organizations were systematically downloaded and stored every 15 minutes between October 18 and December 20, 2014 through the use of computer scripts developed by the author. Because the US mid-term elections occurred during this time period, all data collected on November 3, 4, and 5 were discarded.

Computer scripts were then used to detect the layout of a page; identify the location of the list of most-viewed items and extract the top five items; identify the five most-prominent spots on the homepage and extract the dominant item in each spot; and store information about each item in a relational database. In order to ensure that only news items were coded (rather than links to static pages like section fronts), a URL pattern for news items was identified for each organization and only those items fitting the pattern were stored. For example, all of the URLs pertaining to news content on the *Plain-Dealer's* website either contained the string `"/(YYYY)/(MM)/"` and concluded with `".html"` or contained the string `"/news/article/"`. All scripts had extensive built-in error detection and a subset of the final coded data was manually reviewed by the researcher to ensure that the content was coded accurately. For a detailed description and discussion of this procedure, see Zamith (2016).

Findings

Data were collected for a total of 29,465 distinct news items that appeared on either the top five spots of the list of most-viewed items or in one of the five most-prominent areas of the homepages of the 14 news organizations over 61 days using 15-minute intervals. This yielded a total of 684,931 rows of data that included information like the time of the snapshot in the local time zone and its popularity and prominence rankings at that point in time.

Content that is Popular and Prominent

RQ1 inquired about the proportion of prominent news items that became popular at some point in time. As shown in [Figure 2](#), the overlap was greatest for the *Star Tribune* (54.9 percent), *The Star-Ledger* (50.6 percent), and the *Register* (43.3 percent). In contrast, the *Salt Lake Tribune* (12.1 percent), the *Fort Worth Star-Telegram* (15.4 percent), and the *Daily News* (20.4 percent) had the smallest proportion of items that were both popular and prominent. The median proportion was 33.6 percent, indicating that for the average news organization in this study, just one-third of the items were both popular and prominent at some point in time.

RQ2 inquired about the proportion of prominent news items that became popular before they were removed from an area of prominence. As shown in [Figure 2](#), the proportion was highest for the *Star Tribune* (49.7 percent), *The Star-Ledger* (47.9 percent), and the *Plain Dealer* (41.3 percent). It was lowest for the *Salt Lake Tribune* (9.1 percent),

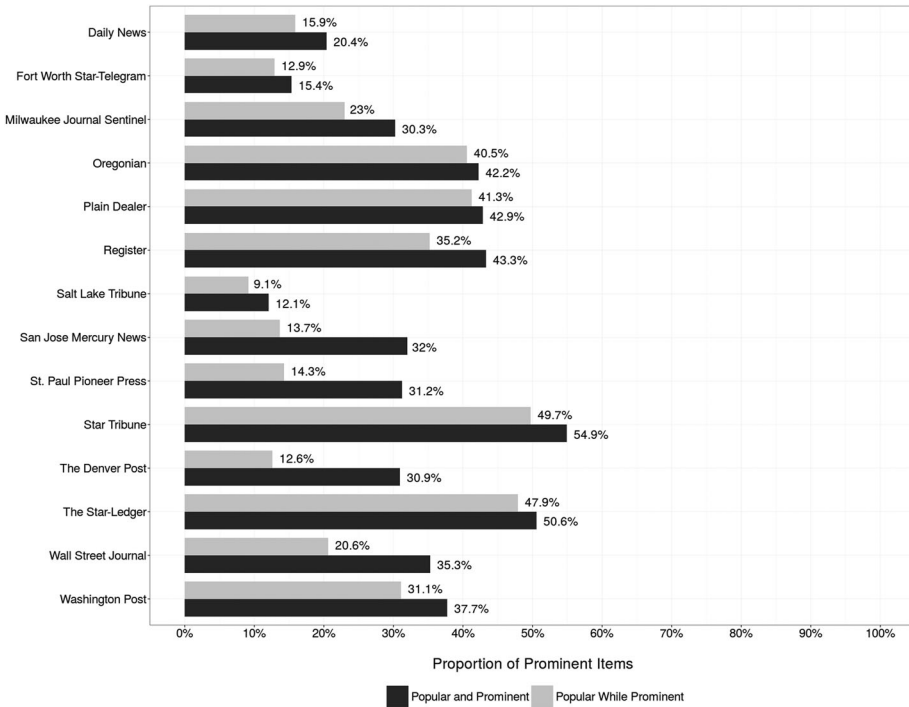


FIGURE 2

The proportion of prominent news items that were both popular and prominent at some point in time (black) as well as popular prior to being removed from an area of prominence (gray)

The Denver Post (12.6 percent) and the *Fort Worth Star-Telegram* (12.9 percent). The median proportion was 21.8 percent, indicating that for the average news organization in this study, just over one-fifth of the prominent items became popular before they were removed from an area of prominence.

To make this analysis parsimonious, only those organizations that had at least 20 percent of their news items appear on the list of most-viewed items prior to their last appearance in an area of prominence were deemed to have the potential for practically significant effects. That is, additional analysis of organizations below that threshold would not detract from the conclusion that, for the vast majority of news items, their prominence is largely immune from their prior popularity.

Less than one-fifth of the news items became popular prior to being removed from the areas of prominence for the *Daily News*, the *Fort Worth Star-Telegram*, the *Salt Lake Tribune*, the *San Jose Mercury News*, the *St. Paul Pioneer Press*, and *The Denver Post*. In contrast, the *Milwaukee Journal Sentinel*, the *Oregonian*, the *Plain Dealer*, the *Register*, the *Star Tribune*, *The Star-Ledger*, the *Wall Street Journal*, and the *Washington Post* all had a considerable proportion of news items become popular prior to being removed from the areas of prominence. Using that baseline, it may therefore be surmised that just over half of the 14 organizations analyzed had the potential for a practically significant relationship between an item’s popularity and its subsequent prominence.

Effect of Popularity on Likelihood of Remaining in Prominent Area

In order to evaluate H1, which posited that popular items would have a lower risk of being removed from the prominent regions of the homepage at a later point in time than their non-popular counterparts, and RQ3, which inquired as to whether more-popular items would have a lower risk of removal than less-popular items, Cox proportional hazards models (Andersen and Gill 1982; Cox 1972) were used to analyze the eight organizations that demonstrated the potential for practically significant effects. This approach allows for the evaluation of the difference in the likelihood that an item will remain in an area of prominence 15 minutes later—as these were the measurement intervals—based on whether it was popular or not.

Two sets of models were analyzed. The first set treated popularity as a dichotomous variable (i.e., popular or not popular), assessing the risk of removal relative to non-popular items for all items that appeared in an area of prominence. The second set treated popularity as an ordinal variable (i.e., most popular to least popular), assessing the risk relative to the least popular items for items that were both popular and appeared in an area of prominence. In both sets of models, prominence was treated as a dichotomous variable (present in one of the five areas of prominence or not). This allowed the evaluation of both general popularity as well as relative popularity. The event condition for both sets of models was the removal of the item from an area of prominence.

As shown in the odd-numbered models in Table 2, it was the case for all but one of the organizations that being popular increased a news item's likelihood of remaining in an area of prominence 15 minutes later. The greatest effect was found for *The Star Ledger*, where the risk of removal was 62 percent lower than that of an item that did not appear on the list. It was followed by the *Star Tribune* (44 percent lower), the *Oregonian* (39 percent lower), the *Register* (32 percent lower), the *Plain Dealer* (29 percent lower), the *Wall Street Journal* (23 percent lower), and the *Washington Post* (22 percent lower). The lone exception was the *Milwaukee Journal-Sentinel*, where popular items had a 21 percent higher risk of being removed from an area of prominence. H1 was therefore supported.

With regard to RQ3, the ranking of an item within the list of most-viewed items had minimal effects on that item's risk of being removed from an area of prominence (see the even-numbered models in Table 2). Put differently, relative to the least popular item on that list, the differences in the risk of removal among the four higher rankings were usually statistically insignificant. In short, for most organizations, being popular enough to make it into the top five spots of the list of most-viewed items had a notable impact on the item's survival. However, the degree of popularity past that threshold did not.

Effect of Popularity on Subsequent Prominence

In order to assess H2, which posited that an increase in an item's popularity would lead to a small decrease in its prominence at a subsequent point in time, path analyses were conducted for the same eight organizations. This form of analysis is useful because it allows the researcher to perform simultaneous regressions on multiple dependent variables, which is necessary for evaluating effects at multiple time points. All analyses were performed using maximum likelihood estimation.

A single theoretical model, shown in Figure 3, was utilized for all analyses. This model was adapted from the work of Lee, Lewis, and Powers (2014), and assesses the effect of an

TABLE 2
Effect of being popular at Time (t) on item survival at Time ($t + 1$)

<i>Milwaukee Journal Sentinel</i>						
	Model 1			Model 2		
Predictor	B	SE	Exp(B)	B	SE	Exp(B)
Popular (yes)	0.19*	0.09	1.21			
Rank 2				0.19	0.30	1.21
Rank 3				0.19	0.28	1.21
Rank 4				0.30	0.27	1.35
Rank 5				-0.11	0.29	0.9
N		22,868			3234	
Wald		4.19*			3.31	
<i>Oregonian</i>						
	Model 3			Model 4		
Predictor	B	SE	Exp(B)	B	SE	Exp(B)
Popular (yes)	-0.50***	0.07	0.61			
Rank 2				-0.05	0.20	0.95
Rank 3				-0.22	0.20	0.80
Rank 4				-0.34	0.20	0.71
Rank 5				-0.08	0.19	0.92
N		25,871			7232	
Wald		54.51			3.89	
<i>Plain Dealer</i>						
	Model 5			Model 6		
Predictor	B	SE	Exp(B)	B	SE	Exp(B)
Popular (yes)	-0.34***	0.06	0.71			
Rank 2				0.14	0.19	1.15
Rank 3				0.21	0.18	1.23
Rank 4				-0.05	0.19	0.95
Rank 5				0.01	0.18	1.01
N		25,872			8061	
Wald		28.94***			3.32	
<i>Register</i>						
	Model 7			Model 8		
Predictor	B	SE	Exp(B)	B	SE	Exp(B)
Popular (yes)	-0.39***	0.11	0.68			
Rank 2				-0.29	0.32	0.75
Rank 3				-0.21	0.30	0.81
Rank 4				-0.33	0.30	0.72
Rank 5				-0.40	0.31	0.67
N		17,101			3855	
Wald		12.56***			1.95	

(Continued)

TABLE 2
(Continued)

<i>Star Tribune</i>						
Predictor	Model 9			Model 10		
	<i>B</i>	SE	Exp(<i>B</i>)	<i>B</i>	SE	Exp(<i>B</i>)
Popular (yes)	−0.59***	0.06	0.56			
Rank 2				0.09	0.16	1.09
Rank 3				−0.16	0.16	0.85
Rank 4				−0.34*	0.16	0.71
Rank 5				−0.48**	0.16	0.62
<i>N</i>		24,452			10,865	
Wald		93.29***			18.32***	
<i>The Star-Ledger</i>						
Predictor	Model 11			Model 12		
	<i>B</i>	SE	Exp(<i>B</i>)	<i>B</i>	SE	Exp(<i>B</i>)
Popular (yes)	−0.97***	0.07	0.38			
Rank 2				−0.06	0.21	0.95
Rank 3				−0.25	0.21	0.78
Rank 4				−0.57*	0.22	0.56
Rank 5				−0.23	0.21	0.80
<i>N</i>		24,861			9343	
Wald		172.30***			7.89	
<i>Wall Street Journal</i>						
Predictor	Model 13			Model 14		
	<i>B</i>	SE	Exp(<i>B</i>)	<i>B</i>	SE	Exp(<i>B</i>)
Popular (yes)	−0.26*	0.10	0.77			
Rank 2				−0.53	0.31	0.59
Rank 3				−0.55	0.31	0.58
Rank 4				−0.57	0.31	0.57
Rank 5				−0.48	0.28	0.62
<i>N</i>		22,710			2307	
Wald		6.40*			5.72	
<i>Washington Post</i>						
Predictor	Model 15			Model 16		
	<i>B</i>	SE	Exp(<i>B</i>)	<i>B</i>	SE	Exp(<i>B</i>)
Popular (yes)	−0.24***	0.10	0.78			
Rank 2				−0.22	0.28	0.80
Rank 3				0.26	0.26	1.29
Rank 4				−0.48	0.31	0.62
Rank 5				−0.31	0.26	0.73
<i>N</i>		21,864			4154	
Wald		6.55***			9.26	

Even-numbered models only include the items that appeared on the list of most-viewed items at least once. The reference category for the even-numbered models is Rank 1 on the list of most-viewed items. All rankings were reverse coded so that higher rankings indicate greater popularity.

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

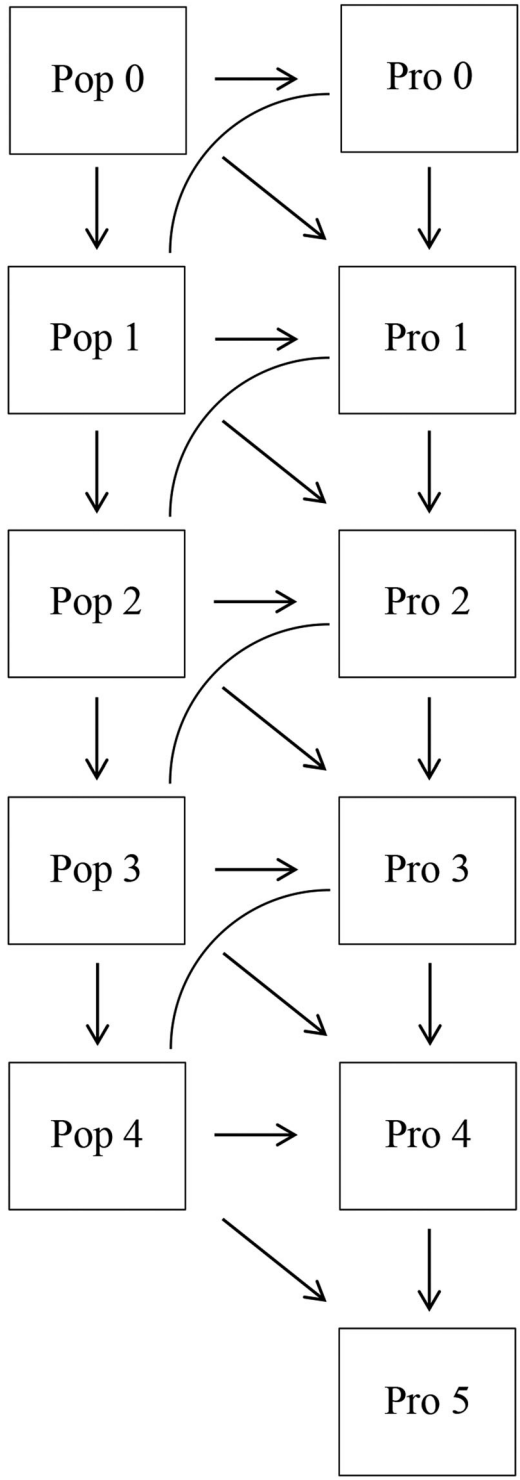


FIGURE 3 Path diagram illustrating the presumed relationships between an item’s ranking on the list of most-viewed items and its prominence ranking, at five different points in time

item's popularity ranking at Time (t) on its prominence ranking at Time ($t + 1$) across five distinct time points. In order to have a parsimonious model while assessing a sufficiently long period of time, a one-hour interval was used for this analysis. Time (0) therefore refers to when the item first became popular (i.e., the first instance in which an item appeared on the list of most-viewed items) and Time (1) refers to that item's ranking one hour after that.

As shown in Table 3, the theoretical model was a good statistical fit across the eight organizations analyzed. The Comparative Fit Index (CFI), Tucker–Lewis Index (TLI), Root Mean Square Error of Approximation (RMSEA), and standardized root mean square residual (SRMR) exceeded the suggested minimum thresholds of 0.93, 0.90, 0.05, and 0.08, respectively. For some of the organizations, however, the chi-square test of model fit was statistically significant, which would indicate that the proposed model should be rejected. Because that test has been found to be problematic with larger samples and models that have strong correlations (e.g., those with repeated measures), and because multiple alternative measures indicated an acceptable fit, this analysis proceeded with the theorized model.

For three of the organizations analyzed—the *Milwaukee Journal-Sentinel*, the *Register*, and the *Washington Post*—there was no statistically significant effect of an item's popularity at Time (t) on its prominence at Time ($t + 1$) (see Table 3). That is, for the average item on those organizations' homepages, a change in its popularity ranking had no discernible statistical effect on its subsequent prominence ranking.

As shown in Table 3, for four of the organizations—the *Plain Dealer*, the *Star Tribune*, *The Star-Ledger*, and the *Oregonian*—the effects were typically negative. This indicates that, for the average item and after controlling for other effects, a one-rank advancement on the list of most-viewed items at Time (t) led to a decrease in that item's prominence ranking at Time ($t + 1$). These effects were fairly consistent in terms of magnitude across the four publications, but they were strongest for the *Oregonian*: although there was no statistically significant lagged effect when the average item first became popular, there was a 0.13-unit decrease at Time (2), a 0.21-unit decrease at Time (3), a 0.19-unit decrease at Time (4), and finally a 0.06-unit *increase* at Time (5).

The lone organization not to have any negative effects was the *Wall Street Journal*. However, only one of those effects—four hours after the story first became popular—was statistically significant. Furthermore, this effect was quite small: a one-unit increase in the popularity ranking of that item at Time (4) led to a 0.08-unit increase in the prominence ranking at Time (5). H2 was therefore only partially supported, as only half of the news organizations exhibited the hypothesized small, negative relationship in a manner that was statistically significant.

Discussion and Conclusion

The purpose of this study was to assess the amount of overlap between the editorial and audience agendas as well as the effect that a news item's popularity had on its subsequent prominence on the homepage and on the likelihood that it would remain in a prominent area of the homepage at a later point in time. First, it was found that there remains an extensive gap between the editorial and audience agendas, evidenced by the fact that, for the average organization in this study, only one-third of the items became both popular and prominent at some point in time. Second, it was found that for roughly half of the news

TABLE 3
Effect of item’s popularity ranking at Time (*t*) on its prominence ranking at Time (*t* + 1)

Time (<i>t</i>)	Milwaukee Journal Sentinel		Oregonian		Plain Dealer	
	<i>B</i>	SE	<i>B</i>	SE	<i>B</i>	SE
Popularity at Time (1)	0.01	0.09	-0.09	0.06	-0.05	0.06
Popularity at Time (2)	0.01	0.09	-0.13**	0.05	-0.16***	0.05
Popularity at Time (3)	0.01	0.09	-0.21***	0.04	-0.27***	0.04
Popularity at Time (4)	0.16	0.12	-0.19***	0.05	-0.12**	0.04
Popularity at Time (5)	0.01	0.04	0.06*	0.03	0.04	0.02
<i>N</i>	206		553		566	
χ^2	37.77		47.89*		40.11	
RMSEA	0.03		0.03		0.02	
CFI	1.00		1.00		1.00	
TLI	1.00		0.99		1.00	
SRMR	0.03		0.03		0.04	
	Register		Star Tribune		The Star-Ledger	
Time (<i>t</i>)	<i>B</i>	SE	<i>B</i>	SE	<i>B</i>	SE
Popularity at Time (1)	-0.01	0.02	-0.10*	0.04	-0.13*	0.06
Popularity at Time (2)	0.02	0.03	-0.08*	0.04	-0.07	0.05
Popularity at Time (3)	0.05	0.04	-0.15***	0.03	-0.17***	0.05
Popularity at Time (4)	0.01	0.04	-0.06	0.04	-0.15**	0.05
Popularity at Time (5)	-0.01	0.03	0.01	0.02	0.05*	0.03
<i>N</i>	239		644		581	
χ^2	50.94*		36.25		76.63***	
RMSEA	0.05		0.01		0.05	
CFI	1.00		1.00		0.99	
TLI	0.99		1.00		0.98	
SRMR	0.03		0.02		0.05	
	Wall Street Journal		Washington Post			
Time (<i>t</i>)	<i>B</i>	SE	<i>B</i>	SE		
Popularity at Time (1)	0.05	0.06	-0.10	0.06		
Popularity at Time (2)	0.02	0.05	-0.03	0.06		
Popularity at Time (3)	0.09	0.07	0.03	0.06		
Popularity at Time (4)	0.12	0.06	0.02	0.06		
Popularity at Time (5)	0.08*	0.03	0.03	0.02		
<i>N</i>	293		276			
χ^2	32.84		27.22			
RMSEA	0.01		0.02			
CFI	1.00		1.00			
TLI	1.00		1.00			
SRMR	0.03		0.02			

Estimates represent unstandardized coefficients. All models have 32 degrees of freedom. All rankings were reverse coded; unit increases thus indicate greater popularity or prominence. **p* < 0.05, ***p* < 0.01, ****p* < 0.001.

organizations, less than one-fifth of prominent news items became popular prior to being removed from a region of prominence. This indicates that for many news organizations, only a relatively small set of items can be potentially influenced by the page view metric when it comes to placement. Third, it was found that, among the set of organizations

that had more than one-fifth of their prominent items become popular prior to being removed from a region of prominence, the effects of popularity on subsequent prominence were generally negative, though often statistically insignificant and invariably of small magnitude. Fourth, it was found among those same organizations that popular items were less likely to be removed from the homepage 15 minutes later than items that were not popular.

The first finding is consistent with the results from the work of Boczkowski and colleagues (Boczkowski, Mitchelstein, and Walter 2011; Boczkowski and Peer 2011), and offers evidence to Lee and Chyi's (2014) contention that readers rarely find content deemed to be newsworthy by journalists to be noteworthy (see also Wendelin, Engelmann, and Neubarth 2015). When viewed in conjunction with the second finding, one begins to see that the potential short-term effects of audience metrics on placement are relatively muted for many traditional organizations. Not only are the editorial and audience agendas very distinct in many cases but by the time an item gains extensive popularity, it has often already been removed from a region of prominence.

When analyzing the subset of prominent items that can be affected by their popularity, one finds what would at first appear to be contradictory findings. Specifically, how can an item lose prominence as it gains popularity yet remain in a prominent area of the homepage longer? First, both findings are consistent with prior work—Bright and Nicholls (2014) found a 26 percent lower risk, on average, of removal for popular items and Lee, Lewis, and Powers (2014) found an overall effect of -0.15 in their analysis of the lagged effect of popularity on prominence—thus easing fears that they are anomalies. Second, it is important to keep in mind that an item may maintain the same relative amount of popularity or prominence (i.e., the same ranking) for several consecutive points in time. Thus, an item may stay in a prominent region longer because it persists with the same amount of relative popularity. Third, and perhaps most important, the magnitude of the effect of a change in popularity on a change in prominence is invariably negligible for practical purposes: an item could increase from the lowest popularity ranking to the highest and not move down a single prominence ranking.

Though consistent with prior work, the present interpretation of the findings, informed by a theoretical framework that emphasizes the occupational ideology and professional logic of journalism in the gatekeeping process, suggests a different conclusion: that the influence of audience metrics on news content may not be as great as assumed by many scholars or feared by media observers, at least when it comes to the placement of content. While online editors may be consulting audience metrics, it is plausible that they continue to rely on other considerations that are consistent with the occupational ideology and professional logic of journalism described by Deuze (2005) and Lewis (2012). Although this study did not evaluate the extent to which particular content aligned with traditional journalistic values, the extensive gap between prominent and popular items, the limited time-lagged effect of popularity on prominence, and the modest effect on the likelihood of remaining in an area of prominence suggests that professional assessments of newsworthiness and public-service ideals, combined with traditional aesthetic considerations like the availability of an appealing graphical element, may outweigh the sheer number of clicks an item may be receiving.

Such an interpretation does not directly challenge the inclusion of an audience channel in the gatekeeping model, as proposed by Shoemaker and Vos (2009). Indeed, in their most recent formulation, the audience channel operates in conjunction with two

other channels, and these channels are situated within a broader cultural context (Shoemaker and Reese 2013). It would also be misguided to argue that audience metrics are of little consequence to journalistic work today. A great deal of ethnographic, survey, and interview-driven scholarship clearly indicates that they have become important discursive objects and have become embedded in journalistic practices in different ways (e.g., Anderson 2011b; Groves and Brown 2011; MacGregor 2007; Tandoc 2015; Usher 2012, 2013). For example, Hanusch (2016) argues that metrics are shaping new routines and reshaping existing ones, even as traditional news values and judgments remain unchanged and continue to serve as powerful inputs. Additionally, there is compelling reasoning to hypothesize that metrics may be impacting certain structures within newsrooms and the allocation of human and non-human resources, especially in light of the economic pressures placed upon news organizations and the uncertain environment in which they currently operate (Fengler and Ruß-Mohl 2008; Gade 2009; Nguyen 2013; Snow, Miles, and Miles 2005; Tang et al. 2011). For example, effects on subsequent news coverage, which taps into longer-term consequences, have been found in an international context (Welbers et al. 2016).

However, the findings of the present work indicate that, at large, traditional US news organizations, a shift toward an “agenda of the audience” (Anderson 2011b, 529) remains unfulfilled. This should ease fears of a paradigm of journalism-by-the-numbers (Nguyen 2013; Tandoc and Thomas 2015), at least as it pertains to a particular editorial practice: placing content on the homepage. Moreover, it should serve as a caution against overstating the role of audiences in and impact on particular journalistic processes at many news organizations, even as social news sharing becomes increasingly important as a distribution mode and economic imperatives create incentives to better align the presentation of content with observable audience demand. Put differently, it raises the need to conduct more empirical research on news content amidst the so-called audience turn within journalism studies, before presuming effects in the latter stages of news production and on elite news organizations with strong journalistic traditions. More broadly, the findings of this study call attention to the value of factoring in the ideological and cultural forces that may counterbalance economic imperatives (Deuze 2005; Lewis 2012).

It is possible that metrics exert a strong influence for certain types of content, and not others. For example, a news organization may want to include at least one politics-related story in an area of prominence at all times, and look to the most popular politics-related stories to guide the promotion of that content. Similarly, a news organization may want to keep its areas of prominence free of certain kinds of soft news, and thus ignore popularity for that type of story. Given the potential mediating role of the subject matter of stories, scholars are encouraged to consider that variable in future scholarship. The presence of such effect would bolster the contention that editorial decision-making remains strongly influenced by ideological components (e.g., conceptions of newsworthiness) but would add nuance to the argument. Moreover, pairing a content analysis of this type with in-depth interviews as part of a single study would offer a valuable contribution to the literature by helping explain differences among particular organizations while mitigating the shortcomings of relying exclusively on self-reported data (see Welbers et al. 2016).

The findings of this study are not intended to be generalized to the entire news industry. For example, *Gawker* and *BuzzFeed* have very different logics, structures, and histories compared to the *Washington Post*. Rather, these findings are most applicable to an important subset that has long been of interest to mass communication scholars: elite

news organizations with strong journalistic traditions and a connection to print media. Moreover, lists of most-viewed items—a criterion for inclusion in the sample—were only present on the websites of certain news organizations, introducing sampling biases (see Zamith 2015). Finally, only the five most-popular items were considered, using ordinal data that assumes equidistance between intervals and that limits the potential variance. A more comprehensive data source—though this is likely to be difficult to obtain for a large number of organizations—may yield results that are more sensitive to popularity gain, especially soon after an item is first published, and less influenced by the popularity of competing items.

In conclusion, the present study lends support to the contention that the impact of audience metrics on the shaping of content and on certain editorial functions (i.e., the placement of content) may not be as high as many media scholars and critics assume, and that empirical evaluation is necessary to support those assumptions. Specifically, the editorial agenda remains distinct from the audience agenda and the effects of popularity on prominence for the relatively small subset of items that can be affected are generally limited in both a statistical and practical sense. Therefore, although audience metrics may receive attention in placement-related decisions, they are likely to be just one consideration among many, including those pertaining to the occupational ideology and professional logic of journalism. Future scholarship should adopt time-lagged modeling techniques to evaluate the effects of different dimensions of newsworthiness in addition to metrics to offer empirical evidence upon which to base revisions to understandings of gatekeeping processes, especially as applied to news products and the latter stages of news production. In the meantime, these findings serve as a caution against overstating the impact of audiences on news content and the presumption that journalism has come to be ruled by metrics.

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