Global Intermedia Agenda Setting: A Big Data Analysis of International News Flow

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Abstract

This study contributes to international news flow literature methodologically by significantly expanding its scope and theoretically by incorporating intermedia agenda-setting theory, through which we reveal how news media in different countries influence each other in covering international news. With a big data analysis of 4,708 online news sources from 67 countries in 2015, the study shows that stronger, wealthier countries not only continue to attract most of the world news attention, they are also more likely to decide how other countries perceive the world. However, international news flow is not as hierarchical and U.S. centric as found earlier. Online-only, emerging media in core countries are not necessarily more impactful in setting the world news agenda than those in (semi)-peripheral countries.

Keywords: international news flow, big data, intermedia agenda setting, World System Theory, online news, international communication

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The structure of international information is not a balanced. For example, U.S. presidential elections do not just attract enormous media attention domestically, but also garner attention from media around the world. On the other side of the earth, presidential elections held at the same time in Chad, Gambia, and some other smaller African countries are almost unheard of to people outside of these regions. The contrast is not surprising. It has been long established in the literature that news and information usually flow from countries with higher political and economic status to the rest of the world. For instance, the World System Theory (Wallerstein, 1974) categorizes countries into three interactive zones—core, semi-periphery, and periphery. Using this system communication scholars have consistently found that core countries decide the direction of the information flow (e.g., Chang, 1998).

Nevertheless, the global media ecology is not without change. With the emergence and prevalence of all sorts of online news sources, the question remains ripe whether a hierarchical information structure still holds true in today's new media landscape. Moreover, existing studies are limited in that they only involved a small number of news outlets—most often traditional, elite media—from select countries and analyses that were conducted over a short period of time.

What's more problematic is the structure of such studies. Previous research measures international news flow mainly by examining the salience of specific countries in foreign news media. While this can yield insight into which countries receive the most international news attention, it can hardly test how information *flows* from country to country. It remains unknown how news outlets in different countries respond to each other's coverage, and ultimately who leads whom in the global media landscape. For example, if the U.S. media repeatedly cover the rise of Islamic power, do news media in other countries follow this coverage? To what extent do

news media in hegemonic countries set the international news agenda?

This study has two aims. First, we examined the current international news flow with a big data analysis of the Global Database of Events, Language, and Tone (Leetaru, 2012, 2015), which archives *an exhaustive collection* of available online news sources in more than 100 languages from different countries throughout 2015. In total, 53,967,878 news items from 4,708 online news sources in 67 countries with different political and economic statuses were analyzed in this study. Second, we expand the information news flow literature by incorporating intermedia agenda-setting theory (McCombs, 2014), which measures the transfer of issue salience between different news agendas. Combining the two approaches, we propose a new theoretical perspective: *politically and economically powerful countries set the media agenda of less powerful ones in covering major topics facing the world*. We argue that this theoretical proposition is significant because we not only examine which countries are perceived important on the global stage, but also which countries decide how other countries perceive the world.

International News Flow and World System Theory

People rely on news media to learn and make judgments about foreign countries and the world at large (Wanta, Golan, & Lee, 2004). Yet, the picture the news paints of the world is not the same as the "real world." Studies of international news flow have revealed that certain countries are often considered more "newsworthy" than others. In general, national traits (e.g., political and economic power of a country), relatedness (e.g., geographical or cultural proximity between a reporting and a reported country), and events (e.g., disasters, wars) have been found to largely determine the prominence of a foreign country in the news (see a review in Segev, 2016).

Among the three groups of variables, the study of national traits has attracted the most academic attention. In particular, scholars consistently find that a country's political and

economic power, especially its GDP, has the strongest correlation with the country's prominence in the news of other countries (e.g., Golan, 2008; Segev, 2016). Theoretically, Wallerstein's (1974) World System Theory (WST) provides a helpful framework to conceptualize countries with different political and economic statuses. According to the WST, countries are located in three interactive zones of economic, political, social, and cultural relations: core, semi-periphery, and periphery. Based on an international division of labor, core countries concentrate on higher-skill, capital-intensive production whereas peripheral areas focus on low-skill, labor-intensive production. Semi-peripheral nations stand between the core and the peripheral. The lack of balance between dominant capitalist countries and less developed countries often results in the exploitation of peripheral and semi-peripheral nations and the hegemonic dominance of the core.

Scholars have applied the WST to the study of global trade, international relations, and globalization (e.g., Chase-Dunn, Kawano, & Brewer, 2000). Chang (1998) argued that the WST can also predict international news flow. During the past two decades, empirical research found that core countries such as the United States and United Kingdom attracted disproportionally more news attention than the rest of the world, both in terms of traditional news media such as newspapers and television networks (e.g., Golan, 2008) and newer media channels including online news sites and social media (e.g., Segev & Blondheim, 2013). Economic elites dominated both traditional and online media. In a challenge to these findings, Golan and Himelboim (2015) observed that on social media non-institutional actors (e.g., bloggers) conformed less to the core-hierarchical structure than institutional players (e.g., news media). The authors thus suggested that non-institutional actors made a modest contribution toward a more egalitarian structure of information flow.

While a large body of literature has contributed empirical evidence to the international

news flow theory, most studies have focused on the news flow within only a few traditional, elite news media or their online versions. In addition, most research relied on manual content analysis and therefore was only able to examine news coverage from a limited number of countries, or for a short period of time. As an exception, Segev (2016) employed web-mining techniques and analyzed 1,957,345 news items from 56 news sites in 10 countries during a five-year period. Still, due to the technological constraints, the study had to handpick only three online news sites from each country.

As such, existing studies have not yet been fully able to capture the trend of international news flow in this new media landscape, where people are consuming a much greater variety of news and information outlets (Napoli, 2011). In particular, a group of online-only, emerging media outlets such as Yahoo.com, the BuzzFeed, and the Canoe Network have begun to attract large audiences in many different countries (Meraz, 2011). These media, termed as "emerging media" in this study, are not rooted in traditional, offline media organizations such as newspapers or television and many mix original reporting and news aggregation. While some consider emerging media new players in the journalistic field, others problematize the media's identity as a legitimate journalistic entity mainly because of its tabloid nature (Tandoc & Jenkins, 2016). Little research has been conducted to empirically examine the difference between emerging and traditional media in terms of their journalistic practices. As an exception, Tandoc (2017) compared BuzzFeed's outputs with those of the *New York Times* and found that while the news articles produced by BuzzFeed exhibit some departures from traditional journalism, BuzzFeed has been mostly adherent to traditional news values. Still the question remains as to how other emerging media websites in the U.S. and elsewhere may be different from traditional media organizations, not to mention the impact of emerging media in international news flow.

In light of this limitation of not considering emerging media in the existing international news flow literature, and with the advent of big data computer-assisted content analyses, the current study seeks to conduct a more comprehensive analysis of international news flow by including various online news sources, both traditional and emerging, from a large number of countries. Given that previous literature indicated that the WST and a country's GDP best predict international news flow, we hypothesize:

H1: A country's position in the world system (i.e., core, peripheral and semi-peripheral) is correlated with its salience in the online news coverage of other countries.

H2: A country's GDP is correlated with its salience in the online news coverage of other countries.

To explicate the unique role of emerging media in international news flow, we asked:

RQ1a-b: Will a country's position in the world system (a) or its GDP (b) predict its salience in emerging media and traditional media's online coverage of other countries differently?

Previous studies also suggest that while the United States maintains its high salience across all fields, other countries' salience in foreign news differs from topic to topic. For example, Segev (2010) compared 35 popular news sites from 12 countries and found that Iran and Israel had significantly higher salience in the "world news" category. Some Asian countries such as China and Japan were more salient for technology-related news. In this study, we also seek to explore the salience of each country in terms of different topic categories, with a more comprehensive topic list, in both traditional and emerging media landscape.

H3: The salience of countries will differ across different news topics.

RQ2: Is there any difference between emerging media and traditional media's online

coverage of foreign countries across topics?

The Direction of News Flow and Global Intermedia Agenda Setting

The majority of existing studies examined international news flow by measuring a country's salience in foreign news coverage. We contend that this operationalization of salience does not capture the entire picture of news *flow*. News flow implies an interaction dynamic between news outlets in different countries. For example, it is well known that the United States attracts media attention around the world, but do the same news items being discussed in the U.S. *flow* from the U.S. media to other countries? Are smaller countries solely interested in U.S.-related news, or do they also follow the U.S. media for other international news items? A group of researchers sought to address this aspect of the news flow by examining the direction of news website hyperlinks. For example, Chang, Himelboim and Dong (2009) used a random sample of foreign news stories selected from the websites of 28 media organizations in 15 countries and found that core countries (68.6%) received significantly more incoming hyperlinks from stories on foreign news sites than peripheral (29.0%) and semi-peripheral countries (2.4%). Himelboim (2010) examined the use of external hyperlinks from 223 news websites in 73 countries and found similar results. While outbound links can shed insight on the direction of news flow, both studies found that the overwhelming majority of the foreign stories (>90%) had no external links. This is likely due to the fact that source attribution, or the number of hyperlinks provided by news sites in semi-peripheral and peripheral countries, is extremely sparse. Therefore, the findings could be due to the nature of the online journalistic practices in different countries, rather than a true reflection of international news flow.

In this study a different theoretical approach is adopted to examine the direction of news flow. Agenda-setting theory predicts that the salience of objects—or attributes that describe the

objects—will transfer from the news media to the public's mind (McCombs, 2014). The theory posits that media tell us what to think about and how to think. As an extension of the original theory, intermedia agenda setting focuses on the interaction between different media outlets. It asserts that elite media will influence other media by transferring issue or attribute salience (Reese & Danielian, 1989). Within a given nation, intermedia agenda setting occurs partly because journalists need to validate their sense of news by observing the work of their colleagues, especially the work from more established, elite news media (McCombs, 2014). Empirical studies consistently found that elite media usually set the agenda of smaller-scaled, less elite media outlets (e.g., Golan, 2006; Reese & Danielian, 1989). In the United States, the *New York Times* and *Washington Post* were found to significantly influence the coverage of other media organizations, including newspapers, television and radio. However, it appears that the power of elite media has been challenged in this emerging media landscape. Recently, scholars examined intermedia agenda setting in the online news environment and found that emerging media such as political blogs and online partisan news websites are more likely to set the agenda (Meraz, 2011; Vargo & Guo, 2016). This could mean an online mediascape makes it possible for smaller, less established media to make their voice heard and gain influence.

Arguably, the investigation of intermedia agenda setting between news media in different countries can greatly enrich our understanding of international news flow and, ultimately, international relations. It is widely known that "soft power" (Nyle, 2004)—power over opinion—is increasingly important in this information age. As a key instrument of soft power, public diplomacy largely relies on media communications to inform and influence foreign publics (Gilboa, 2002; Golan & Himelboim, 2015). To do so, a country not only wishes to increase its own salience in foreign media; it also attempts to communicate its perspectives on

other foreign affairs globally (Miskimmon, O'Loughlin, & Roselle, 2014), thus being able to decide how other countries perceive the world. To examine the latter, a cross-national intermedia agenda-setting framework would be helpful because it allows researchers to determine to what extent the news agenda of one country is transferred to another. For example, if it is found that the U.S. media's coverage of China's human rights problem prompts other countries' media to cover the subject, one can speculate that the U.S. successfully shapes foreign public's view of the world through prioritizing China's problem. This reflection of soft power is the extent to which a country has the ability to push its international agenda on other countries. Despite the practical value of examining cross-national intermedia agenda setting, empirical evidence remains scarce with only two exceptions (Du, 2012; Rosenthal, 2015). Both studies found that the news agenda of western and non-western countries were reciprocal, suggesting that the long-standing narrative of Western/U.S. media hegemony was outdated. However, the two studies were limited in analytical scope. Further, the decision to categorize countries into western and non-western may mask differences among individual countries in terms of their political and economic strength.

To better understand global balance of power, the current study combines the theoretical perspectives of intermedia agenda setting and information news flow. Given that the majority of the studies thus far have found the WST and GDP to successfully predict international news flow in terms of salience and hyperlinks (i.e., source attribution), we hypothesize a hierarchical structure in cross-national intermedia agenda setting:

> *The salience of issues will be transferred from news media in politically and economically powerful countries to those in less powerful countries*.

Specifically, we hypothesize:

H4: When comparing the reverse relationship[1], news media in a higher-strata country are

more likely to set the agenda of media in lower-strata country.

H5: When comparing the reverse relationship, news media in a country with a higher GDP are more likely to set the agenda of the media in a lower-GDP country.

Just like smaller media may set the agenda of elite media within a nation state (Meraz, 2011; Vargo & Guo, 2016), the media agenda-setting power of different countries may exhibit a different pattern within the emerging media landscape. Therefore, we further asked:

RQ3a-b: Will a country's position in the world system (a) or its GDP (b) predict its cross-national agenda-setting power differently in terms of its emerging media and traditional media's online version?

Method

The study selected an initial list of core, peripheral and semi-peripheral countries based on Dunn, Kawana, Brewer (2000) and Babones (2005). We then refined the list and adjusted the world system positions of some countries based on a comprehensive review of recent international news flow literature. The final list includes 67 countries[2].

For news produced in each of the 67 countries, this paper utilizes the Global Database of Events, Language, and Tone (GDELT)'s Global Knowledge Graph (GKG), which is an index of worldwide news events. The GDELT open source data set was conceived at Georgetown University (Leetaru, 2012, 2015). It constantly "monitor(s) local news outlets in every corner of the world in more than one hundred languages[3] to identify the people, locations, counts, themes, emotions, narratives, events and patterns undergirding global society" (Leetaru, 2015, p. 43). More than 100 academic studies have used or cited GDELT news data in disciplines ranging from political science to mass communication (e.g., Hammond & Weidmann, 2014; Vargo & Guo, 2016). GDELT crawls the web and ingests stories from news media websites around the

world. It also ingests *Google News.* It then clusters the stories based on textual similarities and combines them into events (Schrodt, 2010).[4] Each day stories are processed and the corresponding event data is published online (Leetaru & Schrodt, 2013).

Country salience in foreign news coverage. H1 and H2 asked about the correlation between a country's position in the world system, or its GDP, and the country's salience in the news coverage of other countries. To measure the salience scores of the 67 countries, each media source needed to be manually assessed to determine (1) whether it was a news source, and (2) the source's origin country. Due to the extreme large number of media sources archived in GDELT, the decision was made to code enough media outlets to cover 90 percent of all articles (n = 53,967,878) in 2015. Sorting by the number of stories a media outlet published that contained at least one issue in the database, the top 4,930 media websites were analyzed. Websites that were inaccessible at the time of analysis or that were hosts to press releases and government websites were also excluded from the analysis. The Top-Level Domain (TLD) (e.g., .uk, .com) of each media website's Uniform Resource Locator (URL) was used to determine the country origin of the media. If the news website had a TLD that was not specifically associated with a country (e.g., .com, .org), the media's URL was queried in Wikipedia to determine its country of origin. In total, 4,708 media from across the world were included the analysis. On average, each country had 70 media sources (SD = 348). While the number of media per country was skewed to the right, so was the GDP distribution in this data (M = $14,328 billions, SD = 74,741). Interestingly, both datasets had a 5:1 standard deviation to mean ratio, suggesting that the distribution of GDP broadly relates to the distribution of the number of media (r = .40, $p < .05$). To answer RQ1-3, we further manually categorized all the media into (a) websites of traditional media including newspaper, TV/radio broadcaster, and news agency; and (b) emerging media (i.e., online-only

news websites). Three human coders independently analyzed 10% of the data (470 news websites) and reached intercoder reliability at .87 (Krippendorff's α). The discrepancies were resolved before the coders coded the remaining media outlets.

GDELT GKG data were then downloaded in its comma-separated values format. A computer-assisted content analysis was then performed using Python. Each file was iterated through by row. Each media article from each row was also iterated through. When an article contained a media source that matched one identified through the manual content analysis, it was counted as originating from that country (e.g., *USA Today* corresponds to USA). The number of times each of the 67 countries was mentioned in foreign news coverage was then calculated. GDELT, as a part of its event detection system, automatically searches the full text of the article in its native language to surmise if the article mentions a specific country. These annotations were recorded in concert with the originating country. Taken together, it allowed the researchers to know the amount of times a specific country was covering other countries. Using this data, the Global Salience Index (GSI) was calculated for each country (Segev, 2010). The GSI of a country is defined as the percentage of news items that mentioned it (not including items from its own news sites) out of all news items that mentioned any country name (e.g., the percentage of non-American news items mentioning the U.S. out of all non-American news items that mentioned countries). The GSI score was calculated for each country by year and by month. Correlation tests were conducted to explore the relationship between a country's position in the world system (1-core; 2-semi-peripheral; 3-peripheral) and its GSI score (H1); and a country's GDP (worldbank.org), expressed in dollars, and its GSI score (H2).

Country salience by topic categories. H3 explored country salience across different topic categories. A total of 285 "themes" exist in the GDELT dataset. Themes in GDELT signify

a wide range of things from affect to major political issues. To establish a theme, a computer system developed for the GDELT project is trained to recognize keywords in text that are associated with that theme. To paint a broader picture of the wide range of news themes in the dataset, we created a list of issues to unify the themes identified in GDELT and those in previous agenda-setting research (e.g., Vargo & Guo, 2016). Two human coders assigned the GDELT themes to one of the 16 issue constructs, reaching an intercoder reliability of .84 (α). 16 issues comprised the list: *taxes*, *unemployment*, *economy*, *border issues*, *healthcare*, *public order*, *military/terrorism*, *civil liberties*, *environment*, *education*, *politics*, *poverty*, *disaster*, *religion*, *infrastructure* and *media/internet*. These issues have been thought to broadly encompass most of the current, ongoing political issues facing the world. Each news item was inspected to see if it matched one of 16 pre-defined issue constructs. These annotations were made according to the corresponding GDELT theme codes that corresponded to the 16 issues.

What resulted was a Python dictionary that contained a count of news coverage of each issue. The data were structured by day and then by the country in which the media coverage originated. All possible issue / country combinations were calculated. For instance, for each day, the number of news stories that originated from the United States that mentioned *China* and the *economy* was counted. This was done for every day in 2015, for all 67 countries of origin, and for every possible country issue combination. There were 1,072 possible interactions of issue and countries (67×16), calculated for each country (67), per day (365), totaling to 26,215,760 million different counts of news coverage.

Time series modeling for global intermedia agenda setting. H4 and H5 focused on the media agenda-setting power of each country. In order to determine how the media in different countries interacted with each other, we treated the news coverage data as a time series and

employed Granger Causality tests. Time series X is said to "Granger cause" another time series Y if regressing for Y in terms of past values of both X and Y results in a better model for Y than regressing only on past values of Y. Granger Causality presents a key statistical advantage of temporal causal models compared to Autoregressive Integrated Moving Average (ARIMA) time series models, which do not have as clear cut statistical measures for causality (Meraz, 2011).

Using OLS regression, a one-day time lag was tested through the regression of each country/issue media agenda. Each outcome variable was also regressed upon with its own past values, eliminating spurious causality from predictor variables better explained by the outcome variable's past values. Relationships were regressed based on a country's past country/issue agenda and the country/issue agenda of the other countries. Temporal causal models were constructed for each country/country × issue. In this way we could assess if one country's news coverage about a specific country and issue predicted another. An example of a Granger Causality test would be: Does the U.S. news coverage of China's *economy* affect Canada's news coverage of China's *economy*? 4,422 Granger causality tests were generated for all possible combinations of countries (66×67). F-tests provided values of significance in which Granger causality could be determined. This method has been used to determine causality in recent intermedia agenda-setting work (Meraz, 2011).

The agenda-setting power of a country was then operationalized as the number of issues the country Granger-caused other countries' media agendas ($p<0.05$). Correlation tests were conducted to examine a country's agenda-setting power and its world system position (H4) or its GDP (H5). Lastly, the network analysis visualization program NetDraw (Borgatti, 2002) was used to visualize how the 67 countries set each other's news agenda.

Results

Overall, the study found that a country's political and economic status better predicted its salience in the world news than its cross-national intermedia agenda-setting power. Different patterns were found with respect to the coverage of different topics, and when emerging and traditional media were considered separately.

In testing H1, the results showed that a country's rank in the world system was significantly and negatively correlated with its salience in the news coverage of other countries ($r=-.39$, $p<0.01$). In other words, the higher rank a country has in the world system (i.e., smaller rank number), the more salient that country is in other countries' news coverage. A stronger correlation was found between a country's GDP and its Global Salience Index (GSI) ($r=.804$, $p<0.01$), providing solid support to H2. In answering RQ1a-b, surprisingly, it appeared that the WST and GDP slightly better predicted the foreign news coverage of emerging media (WST: -.43, $p<0.01$; GDP: .81, $p<0.01$) than of traditional media (WST: -.36, $p<0.01$; GDP: .80, $p<0.01$). Taken together, politically and economically powerful countries still attracted much of the world news attention in this new media landscape, regardless of emerging media or the online version of traditional media.

Table 1 presents the top 10 most salient countries and top 10 least salient countries in the online world news in 2015. The GSI was provided for each of these countries in the overall online media landscape, emerging media, and traditional media, respectively. In line with the WST, several core countries such as the United States, the United Kingdom, France and the rising world power China are on the list of the most salient countries. When only emerging media was considered, another semi-peripheral country India made to the top list. Syria was the only peripheral country that caught much foreign media attention, largely because its civil war and the resulting refugee crisis. By contrast, all but one country (i.e., Iceland) that were barely

seen in the world news in 2015 are located at the second and third tier of the world system.

<Insert Table 1 & 2 about here>

In addition, the GSI scores for each country were quite consistent by month during 2015 (see Table 2). Several core countries appeared to be the most newsworthy across the year with few deviations. For example, France—replacing the United States—became the most salient country in the world news in November 2015 mainly due to the November 13th Paris terror attacks. In the same month, Turkey—a second tier country in the WST—made to the top list, likely as a result of the country's general election in November, which had a surprising outcome.

One noticeable difference between the present study and earlier findings is that while the U.S. still dominated international news agenda, it was not as prominent as found previously. For example, Segev (2010) found that the U.S. occupied about 20 percent of the foreign news attention—from traditional, elite media both online and offline. In the current study, which incorporates various online news sources, the U.S. GSI score decreased by about half to around 10 percent. Remarkably, the salience of the U.S. in foreign news coverage was even lower in emerging media (9.01%) compared with traditional media (10.53%, see Table 1).

H3 hypothesized that the salience of countries would differ across different news topics. The study showed that the U.S. remained the most salient country in 11 out of 16 topic categories (see Table 3). In particular, the U.S. *civil liberties* issues attracted 16.98% of the world attention. However, unlike previous research, the hegemonic country did lose its dominance in certain topics. For example, Greece topped the international news agenda in the coverage of two economy-related issues: *unemployment* and *taxes*. This could be explained by Greece's debt crisis and its continuing impact on other European countries such as Germany and France. When it came to topics such as *religion*, *border issues*, and *military/terrorism*, Middle Eastern countries

such as Syria and Iraq significantly increased their salience in the world news. As for Asian countries, China's general *economy* and *environmental* issues were under the spotlight in 2015.

<Insert Table 3 about here>

It is interesting to note that while a country's GDP successfully predicted its salience in world news across all topics, the WST failed to do so in five issues: *public order*, *military/terrorism*, *border issues*, *religion* and *poverty* (see Table 3). It is likely that conflicts and violence were more prevalent in peripheral and semi-peripheral countries. Because conflicts and violence often fall under *public order*, *military/terrorism*, *border issues*, *religion* and *poverty* it is logical that these issues are exceptions to the rule.

With respect to the difference between emerging and traditional media (RQ2), it appeared that the two types of media's coverage of foreign countries were quite similar in their issue focus. In addition, a country's GDP was found to predict its issue salience in both emerging and traditional media. A noticeable difference is that while the WST failed to predict the five aforementioned issues in traditional media, the theory only failed to predict three issues when it came to emerging media's coverage of foreign countries.[5] Again, it seemed that the structure of international news flow was not more egalitarian when online-only news media was considered.

H4 asked about the relationship between a country's strata in the world system and its relative agenda-setting power, that is, the number of issues the country Granger-caused other countries' media agendas. Overall, the correlation was significant: $r=-.25$, $p<0.05$. In other words, the higher rank a country has in the WST, the greater agenda-setting power the country exhibited. However, given the low coefficient, we conclude that the hypothesis was supported to a limited degree. Specifically, there are a total of 1,454 country pairs where two countries are from different WST stratus. More than half of the country pairs (840, 57.6%) supported our

hypothesis. In these cases the country with the higher strata set the media agenda of the lower-strata country. Out of the 352 country pairs from Tier 1 and Tier 2 countries, 196 supported the hypothesis; out of the 638 country pairs from Tier 1 and Tier 3 countries, 399 supported the hypothesis; and out of the 464 country pairs from Tier 2 and Tier 3 countries, 245 supported the hypothesis. In particular, the WST did not predict well for certain countries. Take China as an example. While China is considered a semi-peripheral country in the world system, the country's news media had a greater agenda-setting impact on 18 of 22 core countries when compared with the reserve relationship, that is, the core countries set the agenda of Chinese media.

A country's GDP was found to be a relatively better predictor of the country's media impact (H5). The results showed that a country's GDP, expressed in dollars, was positively correlated with the country's agenda-setting effect ($r=.44$, $p<0.01$). Overall the news media in wealthier countries were more likely to set the media agenda of the rest of the world.

In answering RQ3a-b, the results showed that a country's political and economic status was more effective in predicting the cross-national agenda-setting power of traditional media than emerging media. Specifically, a country's GDP was found to correlate with its agenda-setting power to a greater extent within the traditional media ($r=.59$, $p<0.01$) than within the emerging media landscape ($r=.47$, $p<0.01$). More interestingly, while a country's rank in the world system could also predict the agenda-setting power of its traditional media ($r=-.34$, $p<0.01$), the association was *not* significant when it came to emerging media. In other words, the higher rank a country has in the world system does not necessarily mean that country's emerging media is more powerful in setting other countries' news agenda.

Table 4 lists countries with the greatest and lowest agenda-setting impact in terms of all online media, emerging media, and traditional media, respectively. The results showed that the

United States was not only the most salient in the world news, it also dominated the international media landscape in terms of its agenda-setting power. However, other countries that had the greatest agenda-setting impact were not the same as the ones that had the highest salience scores. These countries represent different parts of the world (e.g., Middle East, East Asia, Africa and Australia) and it is likely that the news media in these countries served as major sources of information about stories that were originated in their respective regions. To illustrate, Table 5 lists the top 15 issues that flowed from the U.S. to Chinese media agenda, and the top 15 issues that flowed from China to the U.S. media agenda. While the U.S. media influenced Chinese media in covering issues from different continents, the Chinese media affected the U.S. media mainly in terms of topics related to its neighboring countries such as the Philippines, Thailand, Indonesia, South Korea, and Malaysia. On the other hand, it appears that countries with the least agenda-setting power are also the ones with the lowest salience scores in the world news.

<Insert Table 4-5 about here>

To further demonstrate the results, Figure 1 visualizes how the online news media overall in the 67 countries interacted with each other. Each country is color-coded based on its position in the world system: core (red), semi-peripheral (blue) and peripheral (green). The more central the country is in the graph, the greater influence it had on the global agenda (i.e., the greater number of issues that country set the media agenda of other countries). It is clear that several peripheral and semi-peripheral countries exerted significant agenda-setting power.

<Insert Figure 1 about here>

Discussion and Conclusion

With a big data analysis of 4,708 news sites from 67 countries around the world in 2015, the study empirically examined two theoretical statements. Replicating previous research, the study

first investigated international news flow from the lens of country salience. The results showed that in the overall online mediascape stronger, wealthier countries continued to be more newsworthy than the rest of the world, but the information structure is not as U.S. centric as found earlier. Second, we add intermedia agenda-setting perspective to understand international news flow and propose that the salience of issues will be transferred from news media in politically and economically powerful countries to those in less powerful ones. The results suggested that while in general core, powerful countries were indeed more likely to set the media agenda of peripheral or semi-peripheral countries, the cross-national agenda-setting effect was at best moderate and was not necessarily seen among online-only, emerging media. The study's theoretical and methodological contributions and some of its notable findings are discussed in more detail below.

Considering international news flow in terms of country salience, the study found that overall, an increasing number and variety of news outlets that exist today barely challenge the core-peripheral information structure. The World System Theory well predicts that news media around the world—be it established or new, large or small—are still paying extensive attention to a small number of core countries. Further, this hierarchical information structure is even more obvious with respect to online-only, emerging media than traditional media. This speaks to the finding of Tandoc (2017) that emerging media also rely on the reporting of professional journalists who mostly adhere to traditional news values, and therefore their focus of international news may not significantly deviate from traditional news organizations. The WST, however, failed to predict country salience with regard to some specific issues, such as ones pertaining to violence and conflict. These issues appeared to be more newsworthy regardless of the country it originates from. The finding is not surprising because *deviance*—unusual events

and conflict or controversy—has been considered an important predictor of international news coverage (Shoemaker et al., 1991).

While in general the earlier propositions of international news flow remain true, that is not to say the global media ecology has not experienced any change during the past decade. The role of the United States in the international news agenda is particularly worth noting. In his book *The Media Were American*, Tunstall (2008) argued that the influence of the U.S. mass media is in decline as it no longer controlled the global media market, and some regional media production centers have risen in Africa, Asia, Europe, the Middle East and South America. Further, the Internet facilitates the distribution of information around the world so that the reporting of international news no longer has to depend on U.S. news agencies. Previous studies have not confirmed this effect when considering international news flow. Until now, scholars have found that U.S. maintained a very high and constant share of approximately 20% of the world news. Across topics, U.S. was also considered the most newsworthy (Segev, 2010). Thus, contrasting Tunstall's (2008) statement, Segev (2016) posited that the U.S. hegemony might be with us for many years to come. Unlike previous research, our study suggests that while the U.S. still dominates the international news agenda, it is not as influential as it once was. Results show that the U.S. salience score in foreign news for 2015 was only about half as was once found earlier and it lost dominance in five out of the 16 topics examined including *economy*, *religion* and *border issues*. The discrepancy between this study's findings and those of others might be explained by the fact that this study included a myriad of online news sources into the analysis, both traditional and emerging. The impact of emerging media is particularly remarkable because the U.S. salience score was even lower when only emerging media was considered. In other words, while emerging media organizations around the world still followed the hierarchical

information structure to report international news, they did allocate less attention to the United States. Accordingly, emerging media also appeared to *vary* less in their coverage of foreign countries, with a standard deviation of 2.11% (GSI) for the top 10 countries smaller than that of traditional media, 2.42%. This suggests while the rank order of country salience in the world news largely stayed the same, the differences between countries seemed to be compressed in emerging media. Taken together, while the U.S. *may* remain the sole, foremost superpower in the eyes of a few traditional, elite media around the world, the networked, emerging media landscape is less Americanized where a number of other world powers are competing for global attention.

Methodologically, it is the use of big data analytics that allowed us to obtain a more comprehensive picture of international news flow in this new media environment. Due to the methodological constraints, previous studies were only able to measure country salience for a few selected news media—most often traditional, elite news organizations. In this study, we considered various online news sources from each of the 67 countries in various languages and analyzed all the news stories published over a year. Results of the study empirically demonstrated the applicability of the international news flow theory in a much larger media landscape and therefore give it a higher level of external validity. We argue that this is an important methodological contribution to the international new flow literature.

With respect to the study's theoretical proposition regarding cross-national intermedia agenda setting, the results also suggest that the global media landscape has been altered. The study found that, overall, the correlation between a country's strata in the world system, or its GDP, and the country's agenda-setting power was significant, supporting our theoretical hypothesis. However, it should be noted that the correlation was only low to moderate in

strength. When only emerging media was considered, the WST even failed to predict the relative agenda-setting power of different countries. In other words, our proposition of a hierarchical structure in cross-national intermedia agenda setting was not necessarily supported in the emerging mediascape. This finding is significant because it could mean while smaller countries still do not attract much foreign news attention, it is possible for them to push its news agenda, and thus its *perspectives* on foreign affairs, to the rest of the world especially through its emerging media outlets. For example, Saudi Arabia only represented 1.41 percent of the world news, ranking 22th out of the 67 countries analyzed. However, the country's overall agenda-setting influence was only second to the U.S. in 2015. This may speak to the fact that Saudi Arabia has long played a major role in shaping the media environment within the Arab world and its global broadcasting channel *Al Arabiya* and some of its online media outlets are among the most influential in the globe (Nisbet & Myers, 2011). In other words, while Saudi Arabia—the country itself—might not be able to generate much interest, its produced news agenda exerted a strong impact on other countries. Likewise, India—a semi-peripheral country—ranked the 4th in its cross-national agenda-setting power, which again echoes the observation of Tunstall (2008) who asserts that media exports in countries like India have come to the top of the "world media pecking order" (p. 235).

These results well illustrate the theoretical contribution this study has made to the literature of international news flow and international relations in general. The incorporation of intermedia agenda setting into this study adds a new perspective in which to evaluate the structure of international news flow. Compared with country salience, the analysis of intermedia agenda setting provides a more detailed measure of information *flow*, that is, how the salience of issues is transferred from one country to another. This investigation goes beyond article counts

and external URL links to look at actual topical content inside the text of the news articles. To reiterate, a cross-national intermedia agenda-setting perspective allows researchers to measure which countries decide *how other countries are perceived*, and *which issues warrant global attention*. This theoretical development is significant because it greatly enriches our understanding of international relations where soft power is increasingly important and complicated. Researchers have argued that in this information age a country's soft power not only concerns about which country is more salient and attractive among foreign publics, but also about "whose story wins" (Nye, 2010), which speaks to a country's ability to promote its narratives on international politics to influence the world order (Miskimmon, O'Loughlin, & Roselle, 2014). In reality, more and more countries have realized the importance of this level of soft power and made great efforts to communicate their stories to the world (Melissen, 2005). This change of global politics results in a more competitive world marketplace of ideas, necessitating the need of more careful and comprehensive analysis of the global contention over narratives. Here, we argue that examining how effective a country sets the agenda provides a feasible way to measure "whose story wins." As results of the study demonstrate, the rise of emerging media, which have attracted larger audiences around the world and tend to be more timely in their news coverage (Tandoc, 2017), did seem to afford opportunities for smaller countries to add their voices to the world news agenda and therefore may become more competitive in global politics.

To conclude, our study suggests that while a country's newsworthiness may still follow a hierarchical structure in international news flow, the country's capability to set other countries' news agenda does not necessarily so in emerging media. Results of the study suggest that future research should consider evaluating the roles of different countries in international news flow

from multiple theoretical standpoints, including the intermedia agenda-setting one proposed here.

The study is limited in that results from the Granger causality tests did not necessarily establish a *causal* effect. Future research should consider alternative factors such as the news sponsored by international organizations, non-governmental groups, and public relations companies and examine how these variables may moderate the global intermedia agenda setting.

Endnotes:

1. As discussed in the method section, we used the Granger causality test to examine the media relationship in two directions: (a) news media in higher-strata countries set the media agenda in lower-strata countries; and (b) news media in lower-strata countries set the media agenda in higher-strata countries, which we termed as "the reverse relationship."

2. Core countries: US, UK, SZ, SW, SP, SN, NO, NZ, NL, JA, IT, EI, IC, GR, GM, FR, FI, DA, CA, BE, AU, and AS. Semi-peripheral countries: UY, TU, KS, SF, SE, RS, MX, MY, JM, IN, HU, FJ, CH, BR, BH and AR. Peripheral countries: ZA, VM, AE, TH, SY, SU, CE, SL, SG, SA, RW, PL, RP, PK, NI, NP, MR, MI, KU, KE, IZ, IR, ID, HA, GH, GA, EG, BG, and AF. Country codes are listed in FIPS 10-4 format: https://en.wikipedia.org/wiki/List_of_FIPS_country_codes

3. GDELT believes it has the "largest realtime streaming news machine translation deployment in the world" (GDELT Blog, 2017). The translation service is built on a myriad of open-source tools such as WordNet and Google Translate (Leeatru, Perkins & Rewerts, 2014). The final system "GDELT Translingual" is able to translate 98.4% of all news content ingested. Each sentence of each article is translated many times, using different open-source tools (GDELT Blog, 2017). Using a dynamic language model, GDELT scores translations by traditional linguistic fidelity. Translations are also scored by how closely they match multiword phrases (n > 120,000) contained inside of GDELTs GKG. The translation that is ultimately adopted for each

sentence is the one that scores highest with respect to both scores. Researchers assert the transcriptions achieve "high accuracy" and the system is a fair representation of global languages (GDELT Blog, 2017).

4. Detailed descriptions of all the components that make up the GDELT system can be found by searching GDELT's blog (http://blog.gdeltproject.org).

5. Due to the manuscript page limit, we are not able to present the full statistical results for RQ2, which are available upon request.

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Table 1: The most and least salient countries in the world news

All online media		Emerging media		Traditional media	
Country	**GSI (%)**	**Country**	**GSI (%)**	**Country**	**GSI (%)**
United States	9.94	United States	9.01	United States	10.53
United Kingdom	7.57	United Kingdom	8.18	United Kingdom	7.19
China	5.80	China	6.76	France	6.13
France	5.78	France	5.23	China	5.20
Germany	4.71	Germany	4.38	Germany	4.92
Russia	3.50	Australia	4.32	Syria	3.95
Australia	3.48	India	3.69	Russia	3.76
Syria	3.39	Canada	3.59	Greece	3.00
Japan	2.96	Japan	3.36	Australia	2.95
Canada	2.87	Russia	3.07	Japan	2.71
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Gambia	0.12	Zambia	0.13	Haiti	0.14
Jamaica	0.12	Malawi	0.12	Jamaica	0.13
Malawi	0.12	Jamaica	0.11	Malawi	0.11
Iceland	0.11	Uruguay	0.11	Fiji	0.10
Zambia	0.10	Haiti	0.10	Iceland	0.09
Fiji	0.09	Fiji	0.08	Zambia	0.08
Uruguay	0.09	Gambia	0.07	Uruguay	0.08
Mauritania	0.05	Mauritania	0.06	Mauritania	0.05
Belize	0.03	Seychelles	0.04	Belize	0.03
Seychelles	0.03	Belize	0.03	Seychelles	0.02

Table 2: The most salient countries in the world news by month

Rk	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	US (9.88%)	US (10.35%)	US (12.17%)	US (9.66%)	US (10.26%)	US (10.78%)	US (10.20%)	US (10.23%)	US (9.05%)	US (10.49%)	FR (9.15%)	US (9.70%)
2	UK (7.28%)	UK (8.16%)	FR (8.25%)	UK (7.65%)	UK (8.09%)	UK (7.09%)	UK (8.07%)	CH* (8.01%)	UK (7.00%)	UK (7.65%)	US (8.46%)	UK (7.40%)
3	FR (5.31%)	FR (5.58%)	UK (6.36%)	FR (6.15%)	CH* (6.27%)	CH* (5.91%)	FR (5.50%)	UK (7.53%)	CH (5.78%)	FR (6.96%)	UK (7.6%)	CH* (5.70%)
4	GM (4.75%)	CH* (5.54%)	CH (4.57%)	GM (5.65%)	GR (5.57%)	FR (4.91%)	CH* (5.35%)	FR (4.36%)	GM (5.63%)	CH* (6.06%)	SY** (5.32%)	GM (4.77%)
5	CH* (4.70%)	GM (4.72%)	GM (3.79%)	CH* (5.45%)	FR (5.42%)	GM (4.28%)	GM (4.39%)	GM (4.16%)	SY (4.60%)	SY** (4.72%)	CH (5.14%)	FR (4.53%)
6	AS (4.40%)	AS (4.42%)	SY** (3.76%)	GR (4.41%)	GM (5.31%)	AS (3.84%)	AS (3.68%)	AS (3.71%)	FR (4.44%)	RS (3.98%)	RS (4.87%)	SY** (4.25%)
7	RS (4.19%)	RS (3.52%)	RS (3.49%)	RS (3.20%)	AS (3.51%)	IN* (3.34%)	RS (3.10%)	JA (3.60%)	IT (3.09%)	GM (3.76%)	GM (4.40%)	RS (4.09%)
8	CA (3.48%)	IN* (3.26%)	AS (3.39%)	CA (3.16%)	JA (3.03%)	RS (3.23%)	JA (2.92%)	IN* (3.21%)	AS (3.00%)	IN* (3.13%)	TU* (3.22%)	AS (3.15%)
9	SY** (3.07%)	JA (3.21%)	IZ** (3.04%)	AS (3.10%)	RS (2.87%)	JA (3.10%)	CA (2.78%)	CA (2.98%)	TU* (2.96%)	AS (3.12%)	AS (2.94%)	IN* (3.06%)
10	IN* (3.00%)	CA (2.97%)	JA (2.54%)	JA (2.96%)	CA (2.86%)	CA (3.09%)	IT (2.60%)	SY** (2.96%)	JA (2.86%)	JA (3.02%)	IZ** (2.66%)	CA (2.87%)

Notes:
*Semi-peripheral country
** Peripheral country

Table 3: The most salient countries in the world news by topics

Rank	**Civil liberties**	**Infrastructure**	**Disaster**	**Media /internet**	**Unemployment**	**Public order**	**Taxes**	**Military /terror**
1	US (16.98%)	US (7.11%)	US (8.84%)	US (10.71%)	GR (9.66%)	US (9.63%)	GR (10.25%)	US (8.09%)
2	UK (8.22%)	UK (6.08%)	UK (6.44%)	UK (7.69%)	GM (9.19%)	SY (6.18%)	UK (8.23%)	SY (7.12%)
3	FR (4.84%)	FR (5.89%)	FR (5.87%)	FR (6.42%)	FR (6.69%)	UK (6.17%)	GM (7.39%)	FR (6.26%)
4	RS (3.63%)	GM (5.74%)	SY (5.10%)	GM (4.93%)	US (6.65%)	FR (6.07%)	US (7.20%)	UK (6.08%)
5	AS (3.62%)	SY (4.87%)	CH (4.70%)	CH (4.84%)	UK (6.51%)	GM (4.35%)	CH (6.15%)	IZ (4.83%)
6	IZ (3.49%)	CH (4.83%)	GM (4.58%)	SY (4.51%)	CH (6.26%)	RS (4.12%)	FR (5.79%)	RS (4.77%)
7	CH (3.27%)	TU (3.41%)	RS (3.63%)	RS (3.84%)	SP (4.10%)	CH (4.00%)	BE (4.55%)	GM (4.70%)
8	EI (3.20%)	GR (3.10%)	IZ (3.19%)	IZ (3.02%)	JA (3.85%)	IZ (3.81%)	CA (3.62%)	CH (3.66%)
9	IN (3.17%)	IZ (3.08%)	TU (3.03%)	AS (2.91%)	BE (3.27%)	TU (3.16%)	JA (3.42%)	TU (3.52%)
10	IT (3.13%)	IN (2.97%)	AS (2.81%)	GR (2.74%)	IT (3.18%)	IT (2.40%)	AS (3.30%)	GR (2.78%)
r (WST)	-.522**	-.365**	-.292*	-.323**	-.456**	-.236	-.578**	-.231
r (GDP)	.717**	.797**	.761**	.793**	.785**	.773**	.818**	.762**
Rank	**Politics**	**Education**	**Border issues**	**Economy**	**Healthcare**	**Environment**	**Religion**	**Poverty**
1	US (8.27%)	US (12.62%)	SY (10.03%)	CH (9.43%)	US (11.70%)	US (8.68%)	SY (9.12%)	US (5.60%)
2	UK (6.22%)	UK (8.11%)	TU (5.69%)	US (8.28%)	UK (7.72%)	CH (8.63%)	US (7.46%)	SY (5.15%)
3	FR (5.80%)	FR (5.11%)	GM (5.51%)	UK (7.48%)	CH (5.42%)	UK (6.64%)	IZ (6.76%)	GM (4.86%)
4	CH (5.43%)	CH (4.96%)	IZ (5.10%)	GR (6.70%)	FR (4.85%)	FR (5.53%)	FR (6.36%)	FR (4.75%)
5	GM (5.04%)	GM (3.83%)	FR (4.87%)	GM (6.58%)	GM (4.13%)	JA (4.27%)	UK (5.60%)	UK (4.47%)
6	SY (3.49%)	CA (3.36%)	US (4.73%)	FR (5.45%)	IN (3.28%)	AS (4.21%)	RS (4.03%)	GR (4.34%)
7	RS (4.79%)	IN (3.19%)	UK (4.37%)	JA (4.30%)	AS (3.25%)	CA (3.91%)	TU (3.95%)	IN (3.69%)
8	GR (3.61%)	AS (3.17%)	GR (3.92%)	RS (3.73%)	CA (3.16%)	IN (3.90%)	GM (3.91%)	IT (3.68%)
9	IZ (3.17%)	SY (2.97%)	RS (3.44%)	AS (3.49%)	SY (3.03%)	GM (3.78%)	SA (3.49%)	CH (3.63%)
10	TU (2.74%)	JA (2.72%)	AF (3.17%)	CA (3.01%)	JA (2.51%)	RS (3.53%)	IR (3.48%)	TU (3.27%)
r (WST)	-.293*	-.350**	-.203	-.463**	-.288*	-.360**	-.171	-.170
r (GDP)	.789**	.758**	.728**	.829**	.731**	.779**	.743**	.716**

Notes:
* $p<0.05$
** $p<0.01$

Table 4: Countries with the greatest and lowest agenda-setting impact

All online media		Emerging media		Traditional media	
Country	**Issues (%)[a]**	**Country**	**Issues (%)**	**Country**	**Issues (%)**
United States	33.41	United States	19.32	United States	19.42
Saudi Arabia	30.15	Saudi Arabia	14.58	China	17.06
China	29.23	Ireland	12.82	India	15.65
India	26.43	Australia	12.82	South Africa	15.24
South Africa	26.06	India	12.47	Canada	14.59
Canada	24.72	Canada	9.84	New Zealand	14.34
New Zealand	24.10	Belgium	9.73	Malaysia	13.90
Ireland	24.00	United Kingdom	9.48	Pakistan	13.22
Bangladesh	23.77	Japan	8.98	Ireland	12.87
Pakistan	23.72	China	8.79	United Kingdom	12.14
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Zambia	5.77	Finland[b]	2.27	Senegal[c]	2.03
Iceland	4.77	Malawi	1.94	Finland	1.97
Senegal	4.69	Iceland	1.91	Poland	1.90
Malawi	4.69	Seychelles	1.38	Hungary	1.80
Uruguay	4.22	Belize	1.33	Syria	1.79
Poland	4.20	Gambia	1.29	Sweden	1.73
Belize	3.66	Zambia	1.28	Uruguay	1.70
Gambia	3.34	Haiti	1.19	Sierra Leone	1.45
Seychelles	3.31	Singapore	1.00	Malawi	1.43
Haiti	2.39	Sudan	0.92	Belize	0.80

Note:

[a] The number of issues the country significantly set the media agenda of other countries divided by the entire number of issues.

[b] Emerging media websites from six countries (AR, KS, KU, PL, SG and UY) were not found in the GDELT dataset, so these six countries were excluded from this analysis.

[c] Traditional media websites from 15 countries (AE, AU, BE, BR, DA, GA, HA, IC, IZ, MR, MX, NL, NO, SE, SZ) were not found in the GDELT dataset, so these 15 countries were excluded from this analysis.

Table 5 Excerpt of Granger Test of Causality

U.S. on China's media agenda		China on U.S. media agenda	
JM environment	161.48*	RP economy	90.79*
GA poverty	155.03*	FJ terrorism	71.81*
JM politics	135.03*	GA environment	66.83*
AU religion	116.33*	TH poverty	45.83*
NP infrastructure	111.58*	ID poverty	40.64*
NP poverty	102.66*	BG poverty	40.01*
NP environment	97.32*	SL religion	38.96*
NP education	83.44*	SW border issues	37.40*
BG healthcare	78.43*	SE politics	37.64*
HU terrorism	71.93*	BG border issues	37.40*
HU religion	67.35*	KS healthcare	35.54*
NP border issues	66.58*	SG poverty	35.37*
PL taxes	64.55*	HU religion	34.73*
FR environment	64.20*	AU infrastructure	33.07*
NP disaster	63.25*	MY poverty	31.90*

Notes:
1. *$p < .01$
2. Lag = 1 - F (1,361)

Figure 1 Intermedia agenda setting among the 67 countries