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Is the World Getting Flatter? A New Method for Examining Structural Trends in the
News

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Abstract

In this paper, we propose a new method to analyze structural changes in networks over time, and examine how the representation of the world in two leading newspapers, the *New York Times* and *Der Spiegel*, has changed during the last 50 years. We construct international networks based on the co-occurrences of country names in news items and trace changes in their distribution of centrality over time.

Supporting previous studies, our findings indicate a consistent gap between the most central and least central countries over the years, with the US remaining at the center of the network and African countries at its peripheries. Surprisingly, the most dynamic changes in the last 50 years occurred in what we call the middle range. In both outlets we identified a trend of convergence, in other words, a more equal centrality of European, Middle Eastern, and Asian countries in the news. The implications of these findings are discussed.

Keywords: flat world, news sites, news links, country co-occurrence, network analysis

Is the World Getting Flatter? A New Method for Examining Structural Trends in the News

The claim that the world is getting flatter has often been made by economically informed studies (Denning & Hayes-Roth, 2006; Friedman, 2007; Fung, Fung, & Wind, 2007). The term “flat” was largely used as a metaphor for the shortening distances between people, organizations and countries, and was linked to the development of ICTs, the growing interconnectivity between actors, and the broader processes of globalization (Galtung, 1993; Giddens, 1990; Hamelink, 1990). Yet, apart from general reservations regarding the use of this term to express the distributed network of global economy (Leamer, 2006), there have been no serious attempts to position the structural concept of “flat” within the communication context.

Although the term “flat” is not specifically used in communication-related studies, several information theories attempted to offer some explanations for the structural changes in the global information flows. Wallerstein’s (1997) World System Theory (WST), for example, suggests that information flows hierarchically from the richest and largest countries (core-countries) to the peripheries. Indeed, many studies that analyze different forms of information flows (e.g., telecommunications, hyperlink analysis, etc.) found such hierarchical structures (Barnett, 2001; Chang, Himelboim, & Dong, 2009; Park, Barnett, & Chung, 2011). But at the same time there is a growing body of literature that shows trends of regionalization and the emergence of local centers of information production (Boyd-Barrett & Thussu, 1992; Straubhaar, 1997, 2002; Thussu, 2000).

In this paper, we offer a new conceptualization of the term “flat”, and develop new measurements to analyze structural trends over time. We test these by looking at two different newspapers—the *New York Times* and *Der Spiegel*, and study how their

representation of the world has been changed in the last 50 years. The availability of large corpuses of online data enables us to conduct a longitudinal analysis of much longer period than done before, and to shed a new light on questions of world representation and information globalization.

Research Use of the Term “Flat”

In his book “*The world is flat*” Friedman (2007) defines the term as “the convergence of technology and events that allowed India, China, and so many other countries to become part of the global supply chain for services and manufacturing” (back cover). In the individual level, he suggests that the simple notion of flatness helps us to understand the growing number of people who can equally connect and collaborate in a global network. In other words, he uses this metaphor to describe a global process in which all competitors have an equal opportunity in the field of commerce and information exchange.

Some studies criticize Friedman’s claims for not being empirically substantiated. McCann (2008) suggested that together with globalization there are also strong indications for localization and thus the world is “curved” rather than “flat”. Similarly, Ghemawat (2007) found that more than 90% of the phone calls, internet traffic and investment is local rather than global, and thus the world is not (yet) flat. But within this debate there seems to be an agreement regarding the use of the term “flat”. This was, however, not the first attempt to use this metaphor in order to describe recent changes in the structure of things. Already in the 1950s scholars attempted to study the efficiency of “flat” organizations, as opposed to “hierarchical” or “tall” organizations (Bolton & Dewatripont, 1994; Porter & Lawler, 1964; Worthy, 1950). The term “flat” was used in these studies to describe the short distance or “chain of command” between the managers and their employees, as well as the benefits of outsourcing and growing interactivity between actors. The “distance” between actors, whether it is people, organizations or countries, is a key feature in understanding whether the structure is more “hierarchical” (longer distance) or rather “flatter” (shorter distance).

In the communication context, however, the term “flat” is not as common. Huang and Chang (2009) examined the global flows of visitors from different nationalities to websites. Similar to economic-related studies, they linked the concept of "flat" with "the death of distance" (Cairncross, 1997). The hypothesis that the world is getting flatter was translated to how much the web encourages international rather than national visits to websites. But perhaps the most commonly used theoretical framework to describe structural changes in communication infrastructures and information flows is the WST. The WST uses countries as the unit of analysis and divides them into core, semi-peripheries, and peripheries. Communication scholars have argued, for example, that information flows mostly from the core countries to the semi-peripheries or the peripheries rather than the other way around (Mowlana, 1985; Schramm, 1964). Empirical studies further show that the chances of core countries to be in the news are much higher than those of semi-peripheral and peripheral countries (Chang, 1998; Chang, Lau, & Hao, 2000; Kim & Barnett, 1996).

In a sense, communication related studies that adopt the WST framework would reject the claim that the world is getting flatter. Especially when it comes to the representation of countries in the international news. Yet, while the WST limits the country division into three groups, we propose using the terms “hierarchical” and “flat”, which are more continuous and accurate when describing the structures of international news-flow, and particularly their changes over time. Additionally, many of the studies focusing on the core-periphery framework tend to overlook the development of regional centers of media and news production. Tunstall (2008), for example, provided broad evidence that would support a flatter media environment. Looking at the various media channels, their ownership structure, flow and content, he found that the US media presence around the world is in decline. Beside the European news agencies, which exert a powerful influence, certain regional centers increasingly play an important role. Similar trends that would support the flattening hypothesis were observed in other studies (Boyd-Barrett & Thussu, 1992; Thussu, 2000;

Straubhaar, 1997, 2002), showing the declining share of American media in many countries and the continuous development of local and regional media channels.

Network Analysis and the Concept of Flat

When focusing on the structural changes involved in globalization processes, whether our examination is concerned with the existence of a core-periphery structure or the emergence of regional centers, centrality is a key measurement. Network analysis is particularly relevant in studying structures and complex patterns of relations between components rather than the attributes of each separate node. It was therefore chosen for the purpose of our study, which seeks to develop the concept of flat structures and understand the changes in the centrality of countries over time. A “flat” structure would essentially mean an equal *distribution* of node centrality values in a network where all nodes are connected. Applying this to the WST terminology, a core-periphery structure would follow a more uneven distribution, while a network with regional centers would follow a more even, or flatter, distribution.

Some studies (Chase-Dunn & Grimes, 1995; Maoz, 2010; Maoz, Terris, Kuperman, & Talmud, 2007; Snyder & Kick, 1979) realized the benefit of network analysis in understanding the world’s political and economic systems, the position of countries, and the transnational interactions as indicators of economic growth. Network analysis has also been used to examine and display the structure and flow of international and intercultural communication (Barnett, 2001; Monge & Contractor, 2003; Park & Thelwall, 2003). Most of these studies would actually reject the hypothesis that the world is flat, as they all point to the centrality of North America and Western Europe in the production and dissemination of information.

Chang, Himelboim, & Dong (2009) provided such a support, while examining the structure of hyperlinks in news websites. Their study indicated, in line with the WST, that core nations (such as the US and the UK) get much more incoming links from news sites than peripheral countries. When it comes to the peripheries, still in agreement with the WST,

several media-informed studies (Golan, 2007; Segev, 2008, 2010; Segev & Blondheim, 2013) found that the news coverage of African and South American countries around the world was almost nonexistent.

Yet, the longitudinal aspect of the question remained unresolved. Most of the content analyses of news are based on cross-section studies and cannot tell whether those hierarchies have been intensified or declined over time. Moreover, although ranging from telecommunications to hyperlinks, to our knowledge there is no news-related study looking at the structural changes in the representation of the world. Unlike previous studies that looked at the actual structures of information and communication flows, in the present study we offer a first systematic attempt to outline the world as represented in the news, and examine how this representation has changed over time. Since most previous studies on news content and flow, in line with the WST, displayed hierarchies in the news representation of countries, we would expect that:

H1: The US would maintain its central position, while African countries would maintain their peripheral position in the news of the two outlets.

But following recent findings regarding the rise of regional media centers (Boyd-Barrett & Thussu, 1992; Park, Barnett, & Chung, 2011; Tunstall, 2008), we would also expect that:

H2: The overall centrality of regional centers, particularly of European and Asian countries, will increase over time in the news of the two outlets

Methods

Network Analysis of News Links

The main novelty of our approach is that we do not merely count country mentions, but rather look at the co-occurrence of country names, i.e., the mention of two or more countries together in the same news item. For example, an article in the *New York Times* reported that foreign governments are upset with the Bush administration's decision to ban certain

countries from bidding on reconstruction projects in Iraq: “The White House has defended the exclusion of countries like France, Germany and Canada that opposed the war in Iraq from bidding on the next round of contracts, worth \$18.6 billion” (McGeehan, 2003). It is clear that the countries referred to in the article are not only in interaction with the US, but also share two major elements—being banned from bidding on reconstruction projects in Iraq and being angry about it. Countries may possibly have been mentioned together in the same news item even though they did not have any direct relation. But even in such cases there is almost always a reason for the co-occurrence of countries in the news. An article discussing the effect of the EU common market on Germany’s economy, published in *Der Spiegel* in 1969, provides such an example. The article refers to cheap imports from non-EU countries, such as “meat from Argentina, chickens from the US, wheat from Canada, and cheese from Denmark” (Author translation, *Der Spiegel*, 1969). It is clear that all these countries are explicitly connected to Germany. But, in fact, they are also connected among themselves in at least two ways—they are not part of the common market, and they all trade their agricultural products in a similar manner, trying to ensure cheap commodities.

An international network emerges when countries are considered as nodes, and news items about them provide a map of the links between them (hereafter: “news-links”). In this way, news items enable us to examine the reported relations between countries, providing observations on the overall structure of the international network, and not only the prominence of each country separately. Indeed, for a large-scale quantitative analysis of this kind, this method has previously provided a very accurate indication for the political, economic and cultural relations between countries (see, for example, Segev, 2008; 2010). News-link analysis further indicates which countries serve as central and dominant hubs in the network, and which are less connected and play a more marginal role.

Main Dataset

In order to examine structural changes in the world as represented by news we build networks based on news-links between countries. First, we employed native-speaker terminologists to construct lists of all 195 country names in English and German.¹ For each country name the terminologists provided all the common and alternative names (e.g., “England”, “Britain” and “the U.K.”). Finally, they were asked to omit all alternative country names that might be ambiguous and therefore yield irrelevant search results.

We developed data-mining software that automatically searches and tallies the number of news items mentioning each possible pair of countries in the *New York Times* and the *Der Spiegel* online archives. Countries were counted only once in each news item, even when mentioned several times. We chose to look at the online news archives in English and German of the *New York Times* and *Der Spiegel*, respectively, since they were found to be the most comprehensive and accessible for this longitudinal analysis. Additionally, both outlets have been very dominant and influential over time (Kioussis, 2006; Rössler, 2001). Being elite newspapers (Noelle-Neumann & Mathes, 1987; Winter and Eyal, 1981) they often influence other media, making them a useful source for content analysis and generalization (Althaus & Tewksberry, 2002; Charles, Shore, & Todd, 1979; Klaus & Kassel, 2005). Yet, it is important to note that the *New York Times* and *Der Spiegel* differ in the sense that the former is a daily newspaper while the latter is weekly. They may not represent the general American or German views, but they provide two different points of view and are useful corpuses to develop new methods to address the question of structural changes in world representation.

We divided the analysis into five periods: 1960-1969, 1970-1979, 1980-1989, 1990-1999, and 2000-2009. For each pair of countries we documented the number of search results in the newspaper archives for queries such as “China and Russia”, “United States and Iran”, and so on, where the results were limited to a specific time period.² The search for pairs of countries enables us to measure how many news items mentioned both countries together and

thus also their overall proximity as represented by the news in different periods. We standardized the number of results for each pair of countries, dividing it by the total number of results for all pairs during a period. The standardized values represent the percentage of results for each pair of countries out of the total results of all pairs. Since the total number of news items available in the online archives differs across periods and outlets, standardization enabled us to compare the strength of the ties over time. For example, in the *New York Times* there were 31,589 news items that mentioned the US and Vietnam out of a total of 2,665,268 news items between 1960 and 1969. The strength of the US-Vietnam news-link for that period in the *New York Times* was therefore $31,589 / 2,665,268 = 1.19\%$.

Having obtained five (period) matrices of 195x194 countries and their frequency of co-occurrence in the news of the *New York Times* and *Der Spiegel*, we built their news-link networks. Since almost every search for a pair of countries in the *New York Times* and *Der Spiegel* archives yielded some search results, we limited our analysis to the 100 pairs of countries that yielded the highest search results in each period, and thus were also the most reported in the news. A threshold of the 100 most frequently mentioned pairs of countries enables feasible analysis and comparison between periods and outlets. In this way, countries that were mentioned more frequently together with other countries, such as the US, also displayed the highest centrality level, and vice versa.

It is important to mention that this sample represents about the same depth of the entire network (27% to 30% of the news items) in each outlet and each period.³ Looking at the first 100 most frequent news links is an arbitrary decision, but we conducted a similar test for the first 1,000 most frequent news links, and confirmed our main findings regarding the general centrality trends of the network and the specific centrality trends of each region as will be detailed below.⁴

Analytical approach

Using UCINET 6 (Borgatti, Everett, & Freeman, 2002) we calculated the centrality level for each country in each period and news outlet. We operationalize “flat” as the distribution of country centrality in the news-link network.⁵ A “flatter” distribution means a smaller distance between the centrality of countries overall, and a more equal representation of the world, while a “hierarchical” distribution means a higher distance between the centrality of countries overall, and a more uneven representation of the world.

Network centrality of countries in the news could be measured in various ways such as degree centrality, closeness, betweenness, and Bonacich eigenvector (B-centrality). While testing several methods, we found that closeness and B-centrality are the most appropriate measures to describe the network centrality for our purpose, since they both take into account the position of each actor (country) in relation to the overall network (Barnett & Sung, 2005; Bonacich, 1972). While closeness measures the average path between a country to all other countries,⁶ B-centrality measures the extent a country is linked to other central countries. For example, if the US and China were each mentioned with three other countries, but the US also had a more central position in general (i.e., shortest path to all other nodes on average), the US and the countries linking to it would have relatively higher B-centrality values than China and the countries linking to it. Hence, in contrast to degree centrality or betweenness, closeness and B-centrality examine the flattering hypothesis in the appropriate conditions, as they take into consideration the overall position of each country in relation to other countries.

Since some centrality measures, and particularly B-centrality, were found to be sensitive to the sample depth (Costenbader-Valente, 2003), comparing two different measures can increase the validity of our results. Additionally, as was mentioned above, we made sure that the first 100 pairs of countries in each period represent about the same sample depth. Finally, since our focus is on the pattern of connectedness (i.e., the overall position of

countries), we used an un-weighted rather than weighted graph for calculating the B-centrality (see also Newman, 2004).

In order to determine the overall centrality level of the network and its trends over time, we look at the *spread* of the centrality levels of all countries. In a more central network there is a larger difference between the centrality level of the main hubs and the centrality level of the peripheral nodes, or in other words, the spread of the country centrality levels is higher. However, in a more distributed and flat network there is a smaller difference between the centrality level of the nodes and the spread of the country centrality levels is lower. There are several optional statistical measurements for spread (e.g., standard deviation, coefficient of variation, kurtosis, normalized entropy, Gini coefficient and concentration coefficient). We chose two different measures of spread, Gini coefficient and kurtosis, in order to express trends in the distribution of both the overall and the extreme values of country centrality.

Gini coefficient is a more general measure for distribution inequality that refers to the mean of the absolute differences between all pairs of centrality values (see also Barnett & Park, 2005; Park et al., 2011; Stuart & Ord, 1994). It ranges from 0, which expresses total equality, to 1, which expresses maximum inequality. A trend of “flattening” in our context would be a decrease in the Gini coefficient values over the years, meaning that country centrality values are spread more equally. Kurtosis (Balanda & MacGillivray, 1988; Joanes & Gill, 1998; Leydesdorff, 2007), on the other hand, is more sensitive to the peaks or, in our case, to the hubs of the network. Positive kurtosis indicates that the most central countries are concentrated closely together far from the rest, representing a more hierarchical distribution. Negative kurtosis, on the other hand, indicates that the most central countries are spread more evenly, representing a flatter network.⁷

Results

In total, 18,915 pairs of country names were searched in each outlet (195 country names x 194 / 2). Table 1 presents the number of news items analyzed by outlet and period. The total number of news articles was $n = 12,985,717$ for the *New York Times* and $n = 1,972,119$ for *Der Spiegel*⁸, ranging from 114,667 news articles (between 1960 and 1969 in *Der Spiegel*) to 5,165,899 news articles (between 1980 and 1989 in the *New York Times*). The average number of news articles per pair of countries was 137.31 ($\sigma = 676.46$) in the *New York Times*, and 20.85 ($\sigma = 121.86$) in *Der Spiegel*.

[Insert Table 1 here]

Table 2 shows the top ten pairs of countries by outlet and period. As was mentioned earlier, we sampled the top 100 most frequently mentioned pairs of countries in order to construct networks for each outlet and each period. As a preliminary stage, we examined whether there was a significant change in the concentration of links in this sample over time. If indeed the world represented in the news has become flatter, one should expect that the mean link strength of the top 100 pairs would decrease over time. In other words, the news-link distribution in the entire network would become more even. However, a one-way ANOVA of link strength and time shows that in both outlets there is no significant difference in the mean link-strength between any of the five periods [$F(4, 495) = 1.264$, $p = 0.283$ in the *New York Times*, and $F(4, 495) = 1.389$, $p = 0.237$ in *Der Spiegel*]. This provides an initial support for our hypotheses, as it shows that the relative link strength of our sample did not change much over the years.

[Insert Table 2 here]

The number of countries in each network ranged from 42 to 47 in the *New York Times*, and from 34 to 40 in *Der Spiegel*. For comparing changes in the distribution of centrality we used all countries mentioned in any of the periods (63 for the *New York Time* and 61 for *Der*

Spiegel). Countries that did not appear in the top 100 pairs in a certain period got a zero centrality score.

Figure 1 presents changes in the distribution of countries' centrality (closeness and B-centrality) in the *New York Times* and *Der Spiegel* in all five periods. It delineates the trends of the overall flatness based on the Gini coefficient and the kurtosis values. It shows that the distribution of closeness and B-centrality follows a remarkably similar pattern over time. In the *New York Times* the kurtosis values of both measures increased between 1960 and 1999, meaning that the central countries become even more central over that period. Only in the last decade the kurtosis level declined, meaning that central countries became less central and thus the distribution of centrality became more even. On the other hand, the Gini coefficient values of both measures (closeness and B-centrality) display opposite trends—a constant decrease in value between 1960 and 1999, and an increase in the last decade. This suggests that while the centrality of few countries at the absolute centers of the network increased in the first four decades, other less central countries have become more equal to each other in their centrality values.

Likewise, in *Der Spiegel* we observe identical trends in the distribution of both closeness and B-centrality. The kurtosis values, representing the distribution of the absolute centers, increased between 1960 and 1999 and decreased in the last decade. The Gini coefficient values, representing the general distribution, display opposite trends of decrease between 1960 and 1999, and increase in the last decade. This suggests that similar to the *New York Times* in *Der Spiegel* countries at the center of the network become even more central over the first four decades, while other less central countries have become more equal to each other in their centrality level.

[Insert Figure 1 here]

The remarkable similarity between the distribution trends of the two centrality measures (closeness and B-centrality) firmly supports the claim that countries at the absolute centers of

the network have become even more central (as displayed by the kurtosis values), while some less central countries have become more equal in their centrality level (as displayed by the Gini coefficient values) in both the *New York Times* and *Der Spiegel*.

In order to address our hypotheses, Figure 2 shows more specifically the changes in the centrality level of the countries mentioned in the two outlets between 1960 and 2009. It summarizes the mean of the centrality levels of countries in each region based on their B-centrality values.

[Insert Figure 2 here]

North America (including the US and Canada) is by far the most central region in the *New York Times*. In line with H1, the centrality level of the US constantly increased between the 1960s and the 1990s, and only in the last decade has become less central. These trends correspond to changes in the kurtosis values.⁹ It is worth noting that Figure 2 does not include any African or Central and South American countries, since countries from these regions were hardly mentioned among the 100 most popular pairs of countries during the research periods.¹⁰ Still, in line with H1, the centrality level of African countries remained constantly zero.

In contrast, our hypothesis regarding the increasing centrality of European and Asian countries (H2) was rejected. Figure 2 shows that while the average centrality level of European countries in the *New York Times* mostly decreased, the average centrality level of Asian countries remained relatively constant over time. Surprisingly, Middle Eastern countries have increased their centrality level over time. In fact, Figure 2 shows a convergence of the centrality levels of European, Asian and Middle Eastern countries into average eigenvector values of between 0.1 and 0.15. These trends correspond well with the more equal distribution of the less central countries as was displayed in the Gini coefficient. In short, while there is a convergence, or flattening, of some of the world's regions with a

medium centrality levels, this trend does not extend to the extremes, which are the US with the highest centrality, and Africa and South America with the lowest centrality levels.

Looking at the news-link networks of *Der Spiegel* and their structural changes over time reveals very similar trends. North America (and mainly the US) is also the most central region by far. Supporting H1 the centrality level of North America has remained relatively constant over the last 50 years. At the other end, still in line with H1, African countries were almost not mentioned in the news and remained a constant level of zero centrality.

In contrast to H2, however, the centrality level of European and Asian countries did not increase but rather remains relatively constant over time. At the same time, the centrality level of Middle Eastern countries has mostly increased over time. Similar to the *New York Times*, the centrality level of Middle Eastern countries in *Der Spiegel* has become closer to that of European and Asian countries and contributed to a more equal distribution of the less central countries. This was reflected in the decrease of the Gini coefficient values.

Finally, Figure 3 provides a visual demonstration of these trends. It shows the structure of two news-link networks based on news from the *New York Times*: the first summarizes the news-links between countries in period 1 (i.e., between 1960 and 1969), and the second summarizes the news-links between countries in period 5 (i.e., between 2000 and 2009).¹¹

[Insert Figure 3 here]

We used the Iterative Conductance Cutting (ICC), a graph clustering method which takes into account the eigenvector of nodes and was found to perform well in clustering nodes based on their mutual links (Brandes, Gaertler, & Wagner, 2003; Kannan, Vampala, & Vetta, 2004). This algorithm iteratively splits the graph into two subgraphs based on a minimum conductance cut. Figure 3 demonstrates the transition reflected in the *New York Times* from two clusters in the first period (1960s) to three clusters in the last periods (2000s). Middle Eastern countries have notably become more prominent in the last period as a result

of the many news-links between themselves. Apart from the emergence of a new cluster, Figure 3 clearly demonstrates that the US has remained by far the most central actor.

Discussion

Following the WST and previous findings of news flow and hyperlink analyses we expected that the representation of the world in the news would remain hierarchical rather than flat over time. In other words, we expected that the centrality levels of countries would remain unequally distributed in both the *New York Times* and *Der Spiegel*.

Our findings indeed showed that the world represented in the news is not getting flatter, since the US remained continuously at the absolute center over the last 50 years, while African countries were totally neglected. This gap, as numerous studies have already pointed out (Kim & Barnett, 1996; Segev & Blondheim, 2013; Wu, 2000), reflects in many ways the economic gap between the richest and poorest countries. It further emphasizes the significance of economy in determining the news prominence of countries.

The constantly high centrality of the US in the *New York Times* and *Der Spiegel* is particularly interesting in light of Tunstall's (2008) observations regarding the decline of American presence in global media around the world. A possible reason for the difference between our findings and those of Tunstall may be a result of its broader focus on various aspects of media production and dissemination, compared with our specific focus on news content. Media globalization for Tunstall means the emergence of regional centers, but his empirical findings are drawn from looking at the actual infrastructure, institutions, and production of media. Our study differs in two ways: it looks at the (1) representation of (2) relations between countries as appears in the news. When it comes to representations, our findings clearly show that the symbolic power of the US, at least in the two outlets explored, has been continuously maintained.¹² Additionally, in line with studies that looked at actual relations between countries (Chang, 1998; Chang et al., 2000; 2009; Kim & Barnett, 1996),

our findings provide a stronger longitudinal assurance to the hierarchical hypothesis for a much longer time-span.

In contrast with our second hypothesis, there was no indication for the strengthening of European or Asian centers in the news. However, both outlets clearly displayed the strengthening of Middle Eastern regional centers in the last 50 years. Looking at the changes that occurred in the network structure, we could identify the strengthening of a regional cluster that includes Iraq, Iran and Israel. In other words, the Iraq war, the Iranian nuclear threat and the Israeli-Palestinian conflict all play an increasingly central role in both the *New York Times* and *Der Spiegel*. However, conflicts in other areas such as Africa have not led to similar trends. The growing news attention to Middle Eastern countries rather than to African countries, particularly in the context of conflict coverage, clearly reflects a systematic rise in interest in this region since the 1960s, and sets new directions for further investigation on the reasons behind it.

Conclusion

In this paper we propose a new conceptualization of the term “flat” and develop a method to analyze structural trends over time. Using a large dataset of the *New York Times* and *Der Spiegel* archives since 1960, we also attempted to shed light on the current debate on the hierarchical / flatter structures of the world representation in the news. Our main findings show that when it comes to the over- and under-represented countries, the world in the news is not getting flatter. In other words, the gap between the American center and African periphery remains constantly high over the last five decades. In contrast, a flatter representation of the world is observed in the middle range, as Middle Eastern countries become more central players, reaching the prominence level of their European and Asian counterparts. These trends were clearly demonstrated in both the *New York Times* and *Der Spiegel* using different centrality measures.

It is important to note, however, that our current study is limited in its focus. It does not aim to explain the actual structural trends but rather the representations of these trends in the news. Additionally, it would be wrong to generalize our findings based on two-outlet sample to news in other places or languages. The main contribution of this paper is rather in offering new conceptualization and methods to automatically organize and derive meaning from the increasing volume of online information. Moreover, while analyzing a much longer period than done by previous studies, we could offer a more comprehensive understanding of the changes in the representation of the world. By this we hope to encourage further observations of more outlets and languages, in order to substantiate our knowledge of media globalization and its structural trends around the world.

A more theoretical contribution of this paper is in explaining why some of the previous studies pointed on hierarchical while other on flat information structures. The answer is simple. There are indications for both depending on what and where researchers look at. In terms of what, we deal with news *representations* rather than actual relationships of countries in the media. When studying representations, we learn about the attention given to certain countries rather than about their actual properties. In terms of where, our findings show that indeed the gap between the absolute center and peripheries remained large. But at the same time, a representation of a flatter world à la Friedman, can be identified in the middle range countries. This news representation of the world does not always reflect the flattening economy, but rather the selective interest in certain regions for various other possible reasons. We hope that with these finding in mind, the ongoing debate on the global/local as well as the hierarchical/flat world represented in the news is put into more context.

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Table 1. The number of news items analyzed by outlet and period

Year	1960	1970	1980	1990	2000	Total
New York Times						
Total news items	2,665,268	1,898,321	5,165,899	1,490,906	1,765,323	12,985,717
Mean news items	140.9	100.4	273.1	78.8	93.3	137.3
Standard deviation	621.9	499.1	1350.2	394.3	516.8	676.5
Der Spiegel						
Total news items	114,667	156,240	233,213	262,063	1,205,936	1,972,119
Mean news items	6.1	8.3	12.3	13.9	63.8	20.9
Standard deviation	40.4	41.6	65.3	81.2	380.8	121.9

Table 2. Top ten pairs of countries by outlet and period

1960		1970		1980		1990	
Countries	News items	Countries	News items	Countries	News items	Countries	News items
New York Times							
U.S. and Vietnam	31,589	U.S. and Vietnam	19,808	Iraq and U.S.	49,339	Japan and U.S.	
France and U.S.	23,681	France and U.S.	15,833	Japan and U.S.	47,798	Germany and U.S.	
Germany and U.S.	19,943	Israel and U.S.	15,424	France and U.S.	46,842	France and U.S.	
England and U.S.	19,644	England and U.S.	15,217	Germany and U.S.	46,618	England and U.S.	
France and England	17,621	Germany and U.S.	15,180	China and U.S.	41,546	China and U.S.	
Canada and U.S.	15,637	Japan and U.S.	14,341	England and U.S.	40,413	Canada and U.S.	
China and U.S.	14,361	Canada and U.S.	13,290	Canada and U.S.	35,286	Russia and U.S.	
France and Germany	12,935	China and U.S.	13,124	Israel and U.S.	33,585	Iraq and U.S.	
Germany and England	12,908	France and England	12,039	Mexico and U.S.	31,446	France and England	
Russia and U.S.	11,751	Russia and U.S.	10,555	France and England	31,217	Mexico and U.S.	
Der Spiegel							
France and Germany	1,784	Germany and U.S.	1,966	Germany and U.S.	3,498	Germany and U.S.	
Germany and U.S.	1,773	England and U.S.	1,434	Russia and U.S.	2,375	France and Germany	
Germany and England	1,600	Russia and U.S.	1,292	England and U.S.	2,070	Germany and England	
Portugal and England	1,549	France and Germany	1,280	France and U.S.	1,951	England and U.S.	
France and England	1,290	France and U.S.	1,172	France and Germany	1,948	France and U.S.	
England and U.S.	1,243	Germany and England	1,170	Germany and Russia	1,679	Germany and Russia	
France and U.S.	1,115	Germany and Russia	1,104	Germany and England	1,641	Germany and Italy	
Germany and Russia	981	France and England	998	France and England	1,383	France and England	
Russia and U.S.	976	U.S. and Vietnam	892	Japan and U.S.	1,382	Germany and Poland	
Germany and Italy	844	Germany and Italy	840	Germany and Poland	1,135	Japan and U.S.	

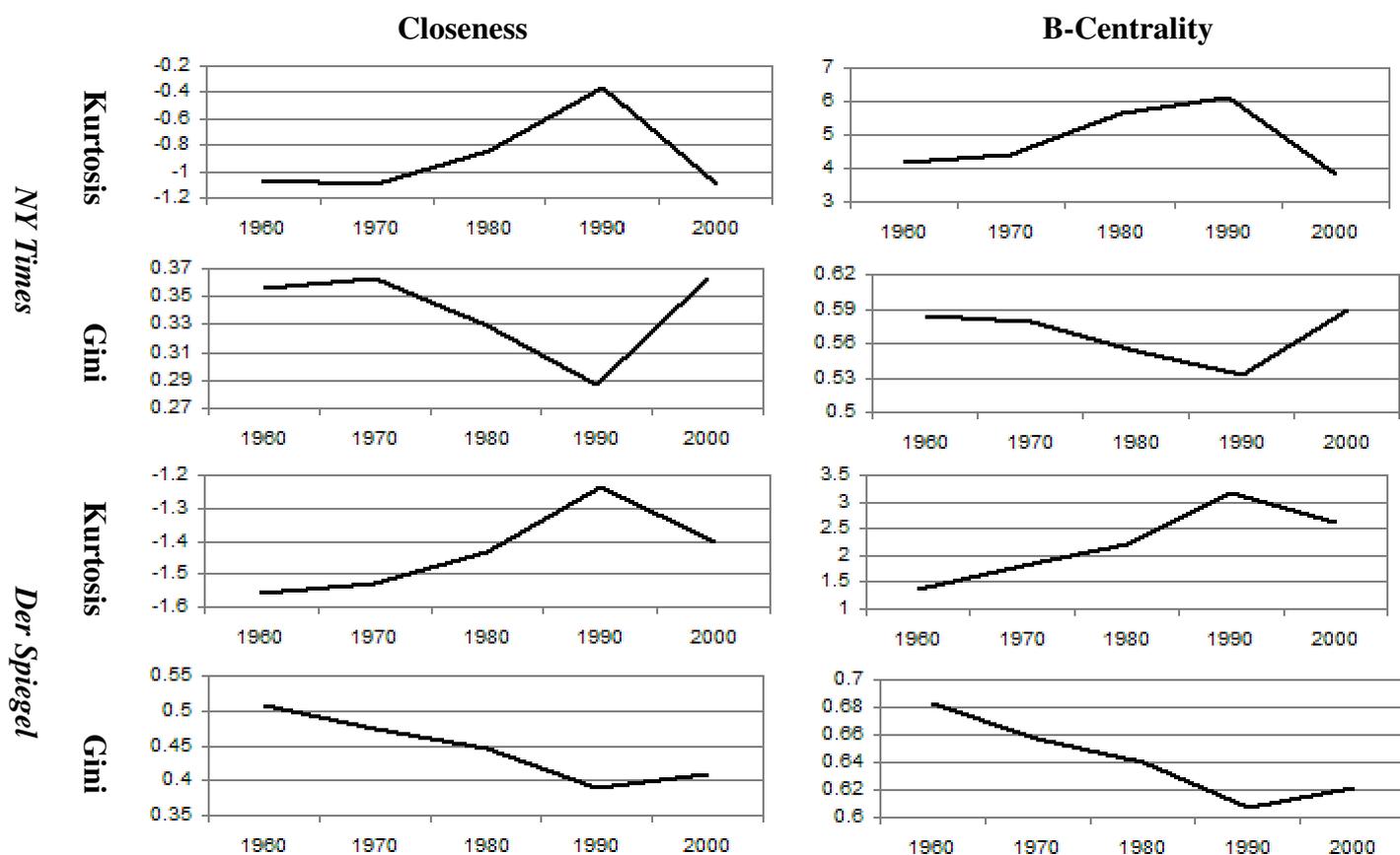


Figure 1. Changes in Centrality Distribution in the *New York Times* and *Der Spiegel*.

Note. The figure displays the distribution of country centrality values (closeness and B-centrality) in each of the five periods. The kurtosis represents the concentration of centrality values around the peak. The Gini coefficient represents the more general distribution of centers in the entire network.

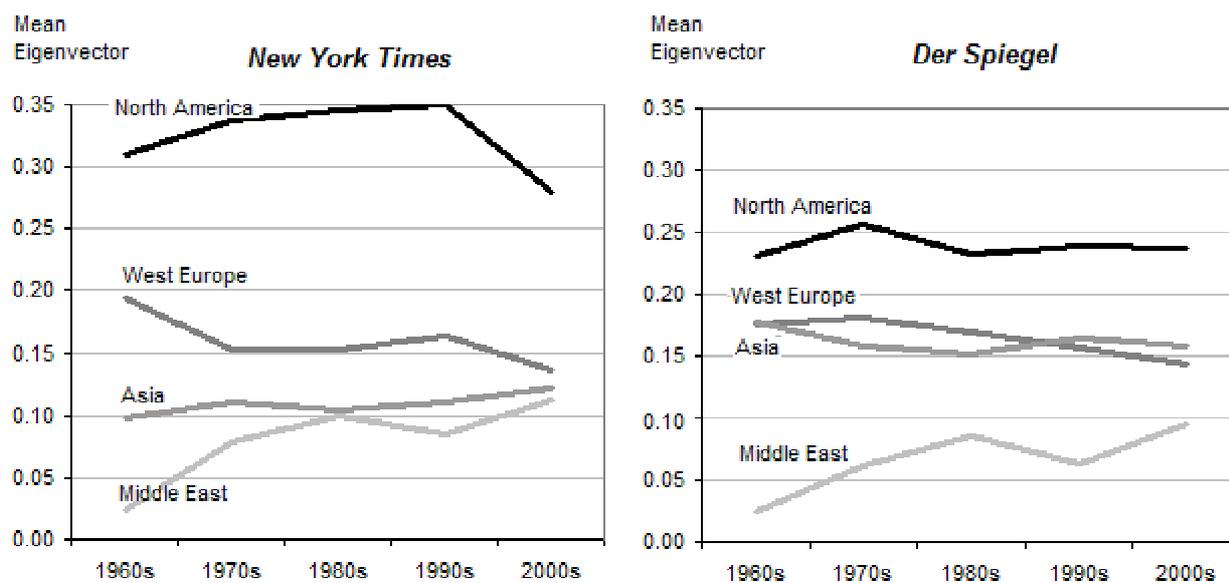


Figure 2. Changes in Centrality by Region in the *New York Times* and in *Der Spiegel*.

Note. The figure displays the mean of B-centrality values in each region, which describes the regions' overall network centrality. As noted, B-centrality takes into account not only the number of countries together with which a country is mentioned, but also its overall network position.

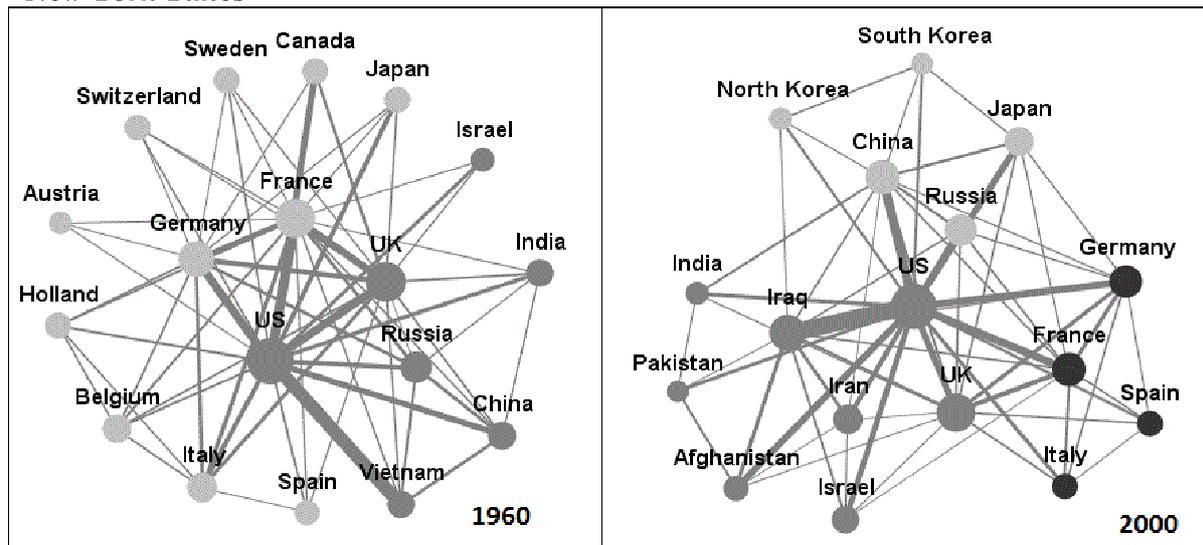
New York Times

Figure 3. News-link Networks in the *New York Times* in the 1960s and the 2000s

Note. The size of nodes reflects their B-centrality levels. The width of the links reflects their standardized weight based on the percentage of news items mentioning each pair of countries. Clusters of countries are marked with different gradients of gray based on automatic calculation using the Iterative Conductance Cutting (ICC) method with a granularity of 0.4 (Brandes et al, 2003; Kannan et al. 2004).

Endnotes

¹ Based on the most complete list of country names available from ISO (International Organization for Standardization). We also included countries that won their independence during the sampling period. Together with “Russia” we included the “Soviet Union,” which yielded more results until the 1990s.

² See for example:

<http://query.nytimes.com/search/query?query=%22United+States%22+Iranandsrchst=nytanddaterange=periodandmon1=01andday1=01andyear1=1990andmon2=12andday2=31andyear2=1999>, i.e. the number of news items that mentioned Iran and the US between 1990 and 1999 in the *New York Times*.

³ The first 100 pairs account for 26.9% of the network in all periods in average ($\sigma = 2\%$) in the *New York Times*, and 30.2% ($\sigma = 2.7\%$) in *Der Spiegel*.

⁴ The first 1000 pairs account for 64.3% of the sample in all periods in average ($\sigma = 1.9\%$) in the *New York Times*, and 69.2% ($\sigma = 2.4\%$) in *Der Spiegel*.

⁵ In fact, the distribution represents the overall “distances” between countries as was operationalized in earlier studies of organizational structure (Bolton & Dewatripont, 1994; Porter & Lawler, 1964; Worthy, 1950). See also the discussion above.

⁶ We use here the reciprocal of the closeness.

⁷ The number of countries in the networks ranged from 42 to 47 in the *New York Times* and from 34 to 40 in *Der Spiegel*. For comparing the distribution of centrality measures we looked at all countries mentioned in any of the periods (i.e., 63 in the *New York Times* and 61 in *Der Spiegel*). Countries that did not appear in one period got a zero score.

⁸ Each news article can be counted more than once if it mentions more than two country names.

⁹ A Pearson test between the US centrality values and the overall kurtosis values in the *New York Times* shows a very strong and significant correlation ($r = .97$, $p < 0.01$).

¹⁰ Some African countries experiencing heavy conflicts were mentioned in one period out of the five, displaying very low centrality levels (e.g., Congo in the 1960s and Somalia in the 1990s).

¹¹ We present here only countries with eigenvector values of 0.1 and above since most changes occur in this range.

¹² See also Segev & Blondheim (2013) for more empirical indications for the continuous US high presence in the news of many other countries around the world.