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# Journalistic Homophily on Social Media

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# JOURNALISTIC HOMOPHILY ON SOCIAL MEDIA
## Exploring journalists' interactions with each other on Twitter

**Folker Hanusch** and **Daniel Nölleke**

*Journalists have for considerable time been criticized for living in their own bubbles, a phenomenon industry commentators have referred to as groupthink, while in scholarship the tendency of individuals to connect with people who are like them is termed homophily. This age-old process has come under scrutiny in recent times due to the arrival of social network sites, which have been viewed as both working against but also leading to more homophily. In journalism scholarship, these processes are still little understood, however. Focusing on the social network site Twitter and drawing on a large-scale analysis of more than 600,000 tweets sent by 2908 Australian journalists during one year, this study shows that journalists continue to live in bubbles in their online interactions with each other. Most journalists were more likely to interact with journalists who have the same gender, work in the same organization, on the same beat or in the same location. However, the study also demonstrates some notable exceptions as well as the importance of differentiating between types of interaction.*

KEYWORDS homophily; interactions; journalist; social media; Twitter; groupthink; bubble

### Introduction

Journalism scholars and industry commentators have for some time been concerned about the self-referential nature of journalism, with a particular point of criticism being that journalists think too much along similar lines and rarely give non-conformist narratives a voice. Such groupthink is argued to result in pack journalism, which leads to homogeneous media coverage (Matusitz and Breen 2012). Consequently, such co-orientation endangers diversity in the news which "has come to acquire the status of an end in itself for mass media" (McQuail 1992, 142). Indeed, as journalists maintain close professional and personal contacts with their colleagues (Donsbach 2004), fellow journalists can be considered to be a major reference group for journalistic actors (Hanitzsch et al. 2010; Weischenberg, Malik, and Scholl 2012). Journalists observe how their colleagues investigate, which news they select and in what way they cover events, adapting their own practices accordingly (Harder, Sevenans, and Van Aelst 2017; Krämer, Schroll, and Daschmann 2009). Of course, the groupthink phenomenon is not unique to journalists. The concept of homophily, developed more than 60 years ago,

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argues that individuals tend to maintain contacts with people who are similar rather than dissimilar to them (Himelboim et al. 2016). Similarity in this sense is based on a multitude of different attributes—shared occupation being one of them (McPherson, Smith-Lovin, and Cook 2001).

The digital age has renewed scholarly attention to homophily, particularly due to the role social networks play (Colleoni, Rozza, and Arvidsson 2014). First and foremost, social network sites (SNS) provide the opportunity to interact with other users and thus facilitate the maintenance of interpersonal contacts, making Twitter, Facebook, and others natural objects of study (Noë et al. 2016). In addition, SNS might readjust homophilious relations in the offline world, potentially dismantle social barriers and allow people to connect regardless of geographical distance or everyday encounters, and thus foster heterophilious relations (Brundidge 2010). On the other hand, debates on echo chambers and filter bubbles suggest SNS may reinforce homophily (Flaxman, Goel, and Rao 2016).

In order to further our understanding of social media and intragroup dynamics, this study examines journalistic homophily on Twitter. Using a dataset of more than 600,000 tweets sent by 2908 Australian journalists, we examine specifically how journalists interact with each other through retweets and mentions.

## Literature Review

### *Homophily and Journalism*

When people establish contacts in personal life, it is not unusual that they connect with people who are similar to themselves (McPherson, Smith-Lovin, and Cook 2001). This tends to lead to personal networks that are homogeneous with regard to socio-demographic characteristics and attitudes. In sociology, this principle was introduced by Lazarsfeld and Merton (1954), who referred to it as homophily, which suggests that "similar individuals will be socially closer to one another than dissimilar people" (Himelboim et al. 2016, 1385). Numerous studies have addressed this issue since, examining what kinds of networks and relationships are especially prone to homophily and which shared characteristics are the most important explanations for connections among people (McPherson, Smith-Lovin, and Cook 2001). Homophily has thus been able to explain a range of different social relations, such as marriage, friendship, and mere contact. More recently, the concept has also been applied to interactions on social network sites (e.g. Bakshy, Messing, and Adamic 2015; Barnett and Benefield 2017; Colleoni, Rozza, and Arvidsson 2014; Himelboim et al. 2016; Noë et al. 2016).

When exploring which shared characteristics can best explain homophilious networks, scholars distinguish between value and status homophily (McPherson, Smith-Lovin, and Cook 2001). Value homophily is concerned with people's attitudes and was identified for different fields such as politics (e.g. Colleoni, Rozza, and Arvidsson 2014; Gerber, Henry, and Lubell 2013; Halberstam and Knight 2016) and sports (Clavio, Burch, and Frederick 2012; Phua 2012). Hence, people's preference to connect to those who share the same political beliefs or favor the same sport teams are commonly explained through concepts like cognitive dissonance and selective exposure (Colleoni, Rozza, and

Arvidsson 2014; Garrett 2009). On the other hand, status—or objective—homophily refers to observable traits like gender, age, or race (Barnett and Benefield 2017), but also "acquired characteristics like religion, education, occupation, or behavior patterns" (McPherson, Smith-Lovin, and Cook 2001, 419). With regard to occupation, research has found that employees tend to cultivate social contacts, especially with those who occupy the same type of job or share a similar role in an organization (McPherson, Smith-Lovin, and Cook 2001). On social network sites such as Twitter, elite users have been found to predominantly connect with people from their own social sphere—e.g. celebrities to celebrities and media actors to media actors (Wu et al. 2011).

As a group of media actors, journalists maintain strong ties with each other, both in private and professional terms (Donsbach 2004), demonstrating the importance of shared occupation as a predictor for their social networks. However, journalism scholarship has so far not explicitly applied the concept of homophily to mutual relations among journalists. Instead, scholars have applied the concept to interactions between journalists and their sources (Cheng 2015; Maurer and Beiler 2017), to audience engagement (Marchionni 2013) and to audiences' media preferences (Dvir-Gvirsman 2016).

Yet, similarity may not only shape journalists' relations with external stakeholders such as sources and the audience, but also journalists' relations with other journalists. To explore this aspect further, Donsbach's (2004) distinction between three types of journalists' orientations provides a useful starting point. First, journalists tend to maintain close contacts with their colleagues in private life, with most journalists ranking fellow journalists among their best friends (Weischenberg, Malik, and Scholl 2006). Second, journalists interact with one another on the job and cite their colleagues as an influence on their own working practices (Weischenberg, Malik, and Scholl 2012). Third, journalists tend to base their own news decisions on their observations of what and how other journalists report news (Donsbach 2004; Harder, Sevenans, and Van Aelst 2017). That way, they validate their own news decisions and reduce uncertainty in their working practice. However, while for journalists co-orientation serves as an important guide to process news, it may also lead to more homogeneous news coverage (Kiernan 2013; Matusitz and Breen 2012; Vergeer 2015). Thus, it endangers media diversity which is considered a crucial value for mass media in democratic societies (Van Cuilenburg 2007) and, consequently, as ideologically desirable (Voakes et al. 1996). In this study, we make no normative judgment about journalistic co-orientation but rather observe the shape of social networks among journalists.

Given the personal and professional relations among journalists (Vergeer 2015), the rise of social media could be expected to have a profound impact on these homophilious relations. In fact, there is a growing body of research that has examined the concept of homophily on social network sites more generally.

### *Homophily on Social Network Sites*

As a digital equivalent to personal networks in the offline world, SNS gave new topicality to the research tradition on homophily (Colleoni, Rozza, and Arvidsson 2014). Researching these "electronic ties" (Noë et al. 2016, 343) between people can reveal whether assumptions about homophily are transferred from analogous to digital rela-

tionships. As SNS potentially expand the social environment of individual users, one could assume that electronic ties are more heterophilious than social ties in real life (Brundidge 2010). Whereas, homophily in social networks is naturally caused by geographic proximity, shared organizational aspects (e.g. school, work), and shared leisure activities (McPherson, Smith-Lovin, and Cook 2001), technologies have decoupled social relationships from personal encounters (Kaufer and Carley 2012). This is particularly the case in relation to SNS, which also means that personal networks on social media could be expected to be more diverse than in the offline world, reducing "ideological segregation" (Flaxman, Goel, and Rao 2016, 299). On the other hand, the popular term "echo chambers" often used in public discussions suggests a reinforcement of homophily on social networks, as people have even more options to get in touch with like-minded people (Bakshy, Messing, and Adamic 2015).

One way to identify the design of social networks in the digital age is by analyzing interactions on SNS. Here, relationships are formed through different kinds of interactions between users (Himelboim et al. 2016). For example, on Twitter, social networks are built through followings, replies, retweets, and mentions (Bae and Lee 2012). There is some discussion among scholars over whether Twitter can justifiably be considered a social network or that it functions rather as an information service (Kwak et al. 2010; Verweij 2012), given that it allows for asymmetrical relations as people do not have to accept invitations to get in touch with other users (Vergeer 2015). Indeed, research indicates that Twitter shows a low level of reciprocity (Kwak et al. 2010), in particular as individuals with many followers do not usually follow many other users (Wu et al. 2011).

However, whereas one-sided followings indicate weak electronic ties, reciprocal followings, and more active interactions like mentions and retweets hint at emerging social networks. Indeed, Colleoni, Rozza, and Arvidsson (2014) found a higher degree of political homophily in the network of reciprocated followers than in the non-reciprocated network. Consequently, research on Twitter relationships mostly focuses on stronger social ties like reciprocal followings, replies, retweets, and mentions. Findings from Kwak et al. (2010, 591) suggest "some level of homophily" on Twitter with regard to geographic location and popularity on Twitter. Another study shows that reciprocal followers share the same topical interests (Weng et al. 2010), while Himelboim et al. (2016) found that Twitter users prefer to interact with users with whom they share message valence and the supportive nature of messages. Research also suggests a high degree of political homophily on Twitter (Boutet, Kim, and Yoneki 2013; Halberstam and Knight 2016).

### *Journalists' Interactions on Twitter*

So far, few studies have explicitly addressed the issue of homophily in relation to journalists' SNS usage. This is perhaps surprising, given the wealth of research on journalism and social media (see, for example, Hedman 2015; Hermida 2013; Lasorsa, Lewis, and Holton 2012). Platforms like Twitter have enjoyed widespread popularity among news workers, with typically 70–80 percent of journalists in many Western societies believed to operate an account (Hanusch 2017b). Twitter has enabled an unprece-

dented level of interaction, participation, and connectivity for journalists, who connect with audiences, but also among themselves (Hanusch & Bruns 2017). Importantly, too, scholarship suggests that journalists normalize social media (Larsson, Kalsnes, and Christensen 2016; Lasorsa, Lewis, and Holton 2012; Nuernbergk 2016), which means that new technologies are adapted to existing practices and change may only be incremental. In this way, we could expect that homophilious relations among journalists may also transcend into SNS.

Indeed, existing evidence shows journalists' online social networks are dominated by other journalists. Beyond findings that, more broadly, media actors overwhelmingly pay attention to other media actors on Twitter (Wu et al. 2011), evidence from Norway and Sweden shows public service broadcasters tend to especially interact with journalists on their Twitter accounts (Larsson, Kalsnes, and Christensen 2016). In the US, journalists often retweet other journalists and promote their own and colleagues' news stories and tweets (Molyneux 2015; Molyneux and Mourão 2017; Revers 2014). Similarly, German political journalists' interaction networks are dominated by exchanges between journalists, leading to what has been referred to as a "journalism-centered bubble" (Nuernbergk 2016, 877).

These findings indeed point to a normalization of Twitter with regard to journalists' social networks: The prominent role that colleagues play in journalists' offline networks is transferred to SNS. While this in itself is not surprising given past evidence, very little is known about the extent to which we may be able to find further signs of homophily within these online social networks. For example, we need to better understand which kinds of colleagues journalists connect with to identify areas of journalism that may suffer from "groupthink" phenomena more than others. Based on previous studies, as well as through theoretical reasoning, we can identify four key factors: gender, organizational context, beat, and geographic proximity.

### *Factors Enabling Homophily in Journalists' Networks*

With regard to gender, evidence indicates an underrepresentation of women in mainstream media quoting practices on Twitter (Artwick 2013). While female reporters quoted women more than their male counterparts, they also quoted far more men than women. Furthermore, journalists employed quotes and mentions on Twitter differently. While journalists' tweets show a severe underrepresentation of women in quotes, mentions were directed to a more diverse community.

Evidence from Scandinavia shows that media organizations intensely interact with journalists associated with their own organization (Larsson, Kalsnes, and Christensen 2016). While this might suggest that journalists themselves would also be more likely to interact with colleagues in their own organization, a study in the Netherlands found evidence to the contrary. Here, journalists were more likely to connect with colleagues outside their organization, arguably because they had "less need to keep in touch through Twitter, because they have more opportunities for face-to-face contact" (Vergeer 2015, 287).

At the same time, it did appear that spatial aspects might be more important, with geographical homophily evident in journalists' online networks, in that journalists

"working for media providing news for the same geographical area connect among themselves and thus form regional communities" (Vergeer 2015, 290). A similar trend might be assumed for journalists working on the same beat. As they are likely to meet face-to-face when working on the same story, one could expect that they do not connect via social media. However, being competitors in the same field, journalists covering beats such as sports, politics, or economics might especially want to interact with other journalists working the same beat. As indicated above, a reason for such beat homophily could be to reduce uncertainty about news selection and to serve as social validation for their own news decisions.

As there is still very little evidence about homophily within journalists' social networks, we decided to formulate the following research questions, rather than hypotheses:

> **RQ1**: What is the extent of homophilious relations within journalists' Twitter interaction networks with regard to shared characteristics such as gender, news organization, beat, and geographical proximity?

At the same time, the affordances of Twitter allow for different kinds of interactions between users. Because followings do not have to be (and rarely are) reciprocal, they can only be considered weak ties that do not necessarily constitute social networks. By contrast, retweets and mentions are explicit interactions (Conover et al. 2011) setting up publicly visible networks among Twitter users. In our case, publicity is important insofar as homophily among journalists has severe implications for audiences. Much like mutual relations among journalists in the offline world are discussed in terms of pack journalism, journalists' networks on Twitter should similarly be assessed from an audience perspective. More heterogeneous networks would hint at a higher degree of diversity, whereas homogeneous networks might imply uniformity and even indicate "virtual pack journalism" (Kiernan 2013, 40). If journalists only interacted with similar colleagues, their followers (i.e. audiences) on Twitter would only be exposed to a limited diversity of voices. Thus, our research includes retweets and mentions as user-to-user interactions that form public discussions (Nuernbergk 2016) and constitute publicly visible networks. We consider interactions as the total sum of retweets and mentions (Boutet, Kim, and Yoneki 2013; Russell et al. 2015).

However, retweets and mentions may serve distinct purposes. Retweets allow Twitter users to forward other users' posts, thus serving a "broadcast function" (Russell et al. 2015, 937) that raises the content's visibility (Conover et al. 2011). Consequently, retweets usually refer to the content of the original tweet and indicate the perceived informational value (Cha et al. 2010). However, as a retweet always refers to the original sender of a Twitter post it does not only connect a user to another user's content but also builds a relation between the user that retweets and the original sender. Thus, retweets establish a network in which users are connected if one rebroadcasts content produced by another (Conover et al. 2011). Meraz and Papacharissi (2013) list different reasons for retweeting such as amplifying thoughts, validating others' thoughts, starting a conversation, and making one's presence as a listener known. However, research mainly points to retweets as a form of endorsement (Bruns and Burgess 2012; Conover et al. 2011), where the opinion expressed in the original tweet is shared (Boutet, Kim, and Yoneki 2013). This suggests the retweet network consists of rather like-minded people, even if users can also pass along tweets they disagree with (Xu et al. 2014). As

retweets appear to be mostly used as endorsements, however, one can presume a rather homophilious retweet network.

Through mentions, Twitter users emphasize certain actors by referencing their usernames (Meraz and Papacharissi 2013). Mentions are mostly introduced as a way to directly interact with other users (Russell et al. 2015), engage them in a conversation (Cha et al. 2010), or merely to refer to another user (Conover et al. 2011). Both retweets and mentions establish connections, but the rationale behind them is different. While retweets are mainly driven by content value, mentions are driven by name value (Meraz and Papacharissi 2013). Consequently, structures of retweet and mention networks differ with regard to homophily. For political communication, retweet networks have been found to be more homogeneous than mention networks (Boutet, Kim, and Yoneki 2013; Conover et al. 2011). Journalists also appear to use retweets and replies differently, with Nuernbergk (2016) finding that journalists use mentions more often than retweets. Russell et al. (2015) also suggests that journalists refer more frequently to their own news organization by mentions than by retweets. Taking the different Twitter features into account, we pose the following research question:

> **RQ2**: What are the differences and similarities in journalists' Twitter interaction networks in terms of retweet and mention behavior, with regard to aspects of homophily?

Finally, bearing in mind the shared characteristics identified here, as well as the distinction between mention and retweet networks, it is important to examine which characteristics are important in which kinds of networks. This led us to posing the following research question:

> **RQ3**: Which kind of shared characteristics are the best predictors for interactions, retweets and mentions between journalists on Twitter?

## Method

To answer the research questions, we examine all tweets sent by a comprehensive sample of Australian journalists over the course of one year. We draw on a database of 4186 journalists identified in a previous study (Hanusch and Bruns 2017), thus employing a sample believed to be quite comprehensive, given there are only around 8000 professional journalists in Australia (Hanusch 2013). Australian journalists operate in a media system that exhibits a number of similarities to other major Western European and North American contexts (Jones and Pusey 2010). Its journalistic culture is heavily influenced by other Anglo-American countries, especially the UK, but also the US (Henningham 1998), with a strong public broadcasting system but also heavily commercialized media characterized by a high degree of ownership concentration (Tiffen and Gittins 2004). The digital transformation of media industries has led to increased precarity of working conditions, resulting in mass redundancies, and significant declines in circulation and profits among established media groups (Zion et al. 2016), but also the arrival of a number of digital-only media players (Hanusch 2017a). Social media use among journalists is high and comparable to penetration rates in other Western countries (Hanusch and Bruns 2017).

Tweets were collected as part of the Tracking Infrastructure for Social Media Analysis (TrISMA) project, which captures the tweets of 2.8 million Australian Twitter accounts on an ongoing basis (Bruns et al. 2015). The period for tweet collection for our study was September 1, 2014–August 31, 2015. During this time frame a total of 2,660,816 tweets were sent from 3033 of the 4186 journalist accounts in our database (72.5 percent), equating to a mean of 877.3 tweets per account, or 2.4 per day. Of these, 660,625 (24.8 percent) were original tweets that did not address any other user via their Twitter handle. The remaining 2,000,191 tweets which did contain interactions in the form of mentions or retweets, included around 195,000 different Twitter IDs. Because our study is concerned with interactions among journalists, we only examined those tweets which mentioned or retweeted any one of the 4186 journalists in our database. This resulted in a final sample of 614,752 tweets, sent by 2908 journalists interacting with at least one of 3794 journalists in the sample. Thus, a significant proportion (30.7 percent) of journalists' tweets using interaction features mentioned or retweeted other journalists. To address RQ1, we focused on total interactions as the sum of mentions and retweets. To answer RQ2 and RQ3 we distinguished between retweets and mentions. In our mention network, we included any tweet that mentioned another user, including replies (Conover et al. 2011). The data collection procedure did not allow us to further differentiate mentions, however, and we were therefore not able to distinguish between more or less direct interactions within mention networks. We did not analyze quote tweets, as the feature was only introduced in April 2015.

All available profile information of each of the original population of 4186 accounts was gathered, using the public Twitter Application Programming Interface (API) and the command-line tool *t* (Michaels-Ober 2014). All data was captured on September 10, 2015. Subsequently, we coded each account, where possible, for the following variables: gender (male or female), media group (Australian Associated Press (AAP), Australian Broadcasting Corporation (ABC), Australian Provincial Newspapers (APN), Fairfax Media, News Corporation, NineMSN, SevenWest Media, Network Ten), geographic location (New South Wales, Queensland, Victoria, Australian Capital Territory, Tasmania, South Australia, Northern Territory, or Western Australia), as well as beat (politics, foreign news, other hard news, business or finance, lifestyle, sport, or other beats). Coding for location was supplemented through analysis of the Twitter location field attached to each account.

### *Sample Parameters*

As Table 1 shows, the sample of journalists who sent interaction tweets is reasonably evenly split between male and female journalists. In terms of their tweeting behavior, however, they differ substantially, with men sending a disproportionately large number of tweets. Among the major media groups, the three largest organizations dominate the sample—Fairfax, News Corporation, and the ABC, who each account for roughly 22 percent of the journalists who sent tweets. It does appear, however, that Fairfax and ABC journalists sent a slightly larger number of tweets than their proportional representation would suggest. Across most beats, journalists were active in line

**TABLE 1**
Sample parameters and tweeting behavior

| | | *N* | % | Tweets sent | % of tweets sent |
|---|---|---|---|---|---|
| Gender | Male | 1433 | 49.3 | 339,821 | 55.3 |
| | Female | 1475 | 50.7 | 274,930 | 44.7 |
| Media group | Fairfax | 655 | 22.5 | 148,198 | 24.1 |
| | News Corp | 654 | 22.5 | 129,385 | 21 |
| | ABC | 625 | 21.5 | 151,896 | 24.7 |
| | APN | 54 | 1.9 | 2750 | 0.4 |
| | SevenWest | 233 | 8 | 31,798 | 5.2 |
| | NineMSN | 222 | 7.6 | 38,073 | 6.2 |
| | Ten | 76 | 2.6 | 10,882 | 1.8 |
| | AAP | 81 | 2.8 | 10,003 | 1.6 |
| | Other | 308 | 10.6 | 91,766 | 14.9 |
| Beat | Politics | 157 | 5.4 | 63,424 | 10.3 |
| | Lifestyle | 193 | 6.6 | 33,189 | 5.4 |
| | Sport | 250 | 8.6 | 55,685 | 9.1 |
| | Other hard news | 157 | 5.4 | 42,173 | 6.9 |
| | Other | 77 | 2.6 | 16,544 | 2.7 |
| | Business/Finance | 90 | 3.1 | 27,742 | 4.5 |
| | Photojournalism | 58 | 2 | 7072 | 1.2 |
| | Foreign news | 45 | 1.5 | 8579 | 1.4 |
| | Unclear/other | 1881 | 64.7 | 360,343 | 58.5 |
| State | New South Wales | 1062 | 36.5 | 222,320 | 36.2 |
| | Queensland | 489 | 16.8 | 101,401 | 16.5 |
| | Victoria | 607 | 20.9 | 127,837 | 20.8 |
| | South Australia | 179 | 6.2 | 28,560 | 4.6 |
| | Western Australia | 192 | 6.6 | 28,162 | 4.6 |
| | Northern Territory | 39 | 1.3 | 6165 | 1 |
| | Australian Capital Territory | 199 | 6.8 | 69,593 | 11.3 |
| | Tasmania | 57 | 2 | 6285 | 1 |
| | Unclear/other | 84 | 2.9 | 24,428 | 4 |

with their proportional presentation, with the exception of political journalists, who accounted for 10.3 percent of the tweets sent, even though they make up only 5.4 percent of the sample. In terms of geographic location, just over one-third of journalists are from New South Wales, the most populous state and also where most media groups have their headquarters. Tweeting behavior was mostly in line with proportional representation, except for the Australian Capital Territory (ACT). This is not surprising, given the ACT is home to the nation's capital, Canberra, and where most national political reporters are based.

## Results

To examine the first and second research questions, we conducted a number of paired samples *t*-tests, which identified various levels of homophily. In relation to gender, our results show that male journalists predominantly interact with other male journalists on Twitter (Table 2). On average, male journalists interact with a much larger number of male than female journalists, with Cohen's $d = 0.45$ pointing to a medium-size effect. The case is similar for women, who interact more with other women than

**TABLE 2**
Gender

| | | Mentions | | | | Retweets | | | | Total interactions | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | *N* | Own gender *M*(SD) | Other gender *M*(SD) | Sig | Cohen's *d* | Own gender *M*(SD) | Other gender *M*(SD) | Sig | Cohen's *d* | Own gender *M*(SD) | Other gender *M*(SD) | Sig | Cohen's *d* |
| Male | 339,821 | 0.57(0.63) | 0.2(0.46) | *** | 0.44 | 0.25(0.44) | 0.16(0.36) | *** | 0.14 | 0.83(0.61) | 0.36(0.54) | *** | 0.45 |
| Female | 274,930 | 0.43(0.59) | 0.3(0.53) | *** | 0.15 | 0.23(0.42) | 0.23(0.43) | n.s. | | 0.66(0.63) | 0.53(0.59) | *** | 0.12 |
| Overall | 614,751 | 0.51(0.62) | 0.25(0.49) | *** | 0.30 | 0.24(0.43) | 0.19(0.39) | *** | 0.08 | 0.75(0.62) | 0.44(0.57) | *** | 0.29 |

with men, though we find a much smaller effect. The same is true for mentions, with both men and women more likely to mention a journalist from their own gender. In terms of retweets, however, the results suggest much less homophily. While men still retweet significantly more men, the effect size is small. Further, we find no statistically significant difference for women's retweet networks, indicating heterophily.

When it comes to the organizational context, results again suggest certain areas where homophily is more pronounced (Table 3). In all of the three largest organizations (Fairfax Media, News Corporation, and the ABC), we find journalists are significantly more likely to interact with colleagues from their own organization, with paired samples *t*-tests indicating small-to-medium sized effects. This also holds true for mentions, as well as retweets, although effect sizes are much smaller in the latter case. We also find significant homophily among journalists working for predominantly TV-focused companies like NineMSN and Network Ten, as well as for SevenWest Media. Again, results suggest more homophily for journalists' mentions, with larger effect sizes, while the retweet networks suggest less homophily. Two organizations did not exhibit signs of homophilious networks. Journalists at both Australian Provincial Newspapers (APN) and Australian Associated Press (AAP) interacted significantly more extensively with journalists outside of their organizations than within. This is the case for both mentions and retweets, with results showing small-to-medium-sized effects.

Beats also indicate homophilious networks, with journalists across all examined beats more likely to interact with others from their own beat (Table 4). Still, we find some beats are more homophilious than others. In particular, sports reporters stand out, with a very large effect, indicating a strongly homophilious network. We also found a medium-sized effect for political journalists, while all other beats exhibited only small effects, indicating less homophily. A similar trend holds true for mention networks. When it comes to retweet networks, however, we find less pronounced homophilious networks for political and sports journalists, and actually quite heterophilious networks for all other beats.

Finally, we were interested in the extent to which journalists' Twitter interaction networks may be affected by geographical proximity. The findings show that geographical proximity also plays a role in affecting homophily (Table 5). Journalists exhibit particularly homophilious interaction networks in New South Wales and Queensland—two states with relatively large journalistic populations in our sample. In both cases, Cohen's *d* indicates medium-sized effects. Journalists in Victoria, South Australia, and Western Australia all exhibit small-to-medium homophily effects. In the Australian Capital Territory, home to many national political reporters, we only found a relatively small homophily effect. A more heterophilious situation is the case in the two states with the smallest journalist populations. In the Northern Territory, a remote and sparsely populated region, journalists are significantly more likely to interact with colleagues outside the territory, while in Tasmania, we found no significant difference. Again, heterophily was more likely to occur in retweet networks, while mention networks appeared more homophilious on the whole.

Looking across the totals for the four characteristics we examined here, we find homophily across gender, organization, beat, and geography. The overall largest differences in terms of interactions are found in relation to journalists' beats, followed by

**TABLE 3**
Organization

| | | Mentions | | | | Retweets | | | | Total interactions | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | *N* | Own media group *M*(SD) | Other media group *M*(SD) | Sig | Cohen's *d* | Own media group *M*(SD) | Other media group *M*(SD) | Sig | Cohen's *d* | Own media group *M*(SD) | Other media group *M*(SD) | Sig | Cohen's *d* |
| Fairfax | 148,051 | 0.54(0.65) | 0.23(0.49) | *** | 0.35 | 0.27(0.45) | 0.14(0.35) | *** | 0.21 | 0.82(0.65) | 0.37(0.56) | *** | 0.40 |
| News Corp | 129,367 | 0.54(0.67) | 0.24(0.50) | *** | 0.32 | 0.28(0.46) | 0.14(0.35) | *** | 0.21 | 0.82(0.68) | 0.38(0.57) | *** | 0.38 |
| ABC | 151,806 | 0.53(0.64) | 0.19(0.46) | *** | 0.39 | 0.32(0.47) | 0.15(0.36) | *** | 0.25 | 0.85(0.64) | 0.34(0.56) | *** | 0.46 |
| APN | 2732 | 0.23(0.46) | 0.33(0.53) | *** | −0.14 | 0.14(0.35) | 0.39(0.50) | *** | −0.35 | 0.37(0.55) | 0.72(0.56) | *** | −0.33 |
| SevenWest | 31,795 | 0.44(0.56) | 0.23(0.50) | *** | 0.25 | 0.27(0.45) | 0.19(0.40) | *** | 0.12 | 0.71(0.57) | 0.42(0.60) | *** | 0.27 |
| NineMSN | 38,070 | 0.55(0.63) | 0.19(0.46) | *** | 0.41 | 0.30(0.46) | 0.12(0.33) | *** | 0.28 | 0.84(0.61) | 0.31(0.54) | *** | 0.51 |
| Ten | 10,878 | 0.45(0.58) | 0.22(0.51) | *** | 0.27 | 0.31(0.46) | 0.15(0.36) | *** | 0.24 | 0.76(0.57) | 0.37(0.60) | *** | 0.36 |
| AAP | 10,001 | 0.23(0.46) | 0.54(0.75) | *** | −0.33 | 0.12(0.32) | 0.30(0.46) | *** | −0.29 | 0.34(0.53) | 0.84(0.70) | *** | −0.45 |
| Overall | 522,700 | 0.52(0.64) | 0.22(0.49) | *** | 0.33 | 0.29(0.46) | 0.15(0.36) | *** | 0.21 | 0.81(0.65) | 0.37(0.57) | *** | 0.39 |

**TABLE 4**
Beat

| | | Mentions | | | | Retweets | | | | Total interactions | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | *N* | Own beat *M*(SD) | Other beat *M*(SD) | Sig | Cohen's *d* | Own beat *M*(SD) | Other beat *M*(SD) | Sig | Cohen's *d* | Own beat *M*(SD) | Other beat *M*(SD) | Sig | Cohen's *d* |
| Politics | 42,633 | 0.56(0.65) | 0.14(0.37) | *** | 0.51 | 0.29(0.46) | 0.12(0.32) | *** | 0.29 | 0.85(0.62) | 0.26(0.46) | *** | 0.61 |
| Lifestyle | 20,857 | 0.52(0.54) | 0.23(0.47) | *** | 0.33 | 0.13(0.34) | 0.16(0.37) | *** | −0.05 | 0.65(0.56) | 0.39(0.54) | *** | 0.25 |
| Sport | 44,869 | 0.84(0.61) | 0.05(0.24) | *** | 1.10 | 0.20(0.41) | 0.03(0.18) | *** | 0.37 | 1.04(0.53) | 0.09(0.30) | *** | 1.32 |
| Other hard news | 26,285 | 0.40(0.54) | 0.26(0.49) | *** | 0.17 | 0.18(0.39) | 0.22(0.42) | *** | −0.06 | 0.58(0.57) | 0.48(0.57) | *** | 0.10 |
| Business/Finance | 19,769 | 0.49(0.56) | 0.25(0.50) | *** | 0.28 | 0.12(0.33) | 0.23(0.43) | *** | −0.20 | 0.61(0.59) | 0.48(0.58) | *** | 0.12 |
| Foreign news | 5636 | 0.46(0.54) | 0.32(0.51) | *** | 0.15 | 0.09(0.29) | 0.19(0.39) | *** | −0.19 | 0.54(0.56) | 0.50(0.56) | *** | 0.04 |
| Overall | 160,049 | 0.59(0.62) | 0.17(0.41) | *** | 0.51 | 0.20(0.40) | 0.13(0.34) | *** | 0.12 | 0.79(0.60) | 0.30(0.50) | *** | 0.49 |

**TABLE 5**
State

| | | Mentions | | | | Retweets | | | | Total interactions | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | *N* | Own state *M*(SD) | Other state *M*(SD) | Sig | Cohen's *d* | Own state *M*(SD) | Other state *M*(SD) | Sig | Cohen's *d* | Own state *M*(SD) | Other state *M*(SD) | Sig | Cohen's *d* |
| NSW | 222,320 | 0.60(0.66) | 0.19(0.46) | *** | 0.46 | 0.25(0.44) | 0.14(0.35) | *** | 0.18 | 0.85(0.64) | 0.33(0.55) | *** | 0.48 |
| QLD | 101,401 | 0.54(0.68) | 0.17(0.43) | *** | 0.42 | 0.34(0.48) | 0.14(0.35) | *** | 0.29 | 0.88(0.67) | 0.31(0.53) | *** | 0.52 |
| VIC | 127,837 | 0.52(0.64) | 0.23(0.48) | *** | 0.32 | 0.24(0.43) | 0.20(0.40) | *** | 0.07 | 0.76(0.65) | 0.42(0.58) | *** | 0.30 |
| SA | 28,560 | 0.49(0.68) | 0.19(0.47) | *** | 0.33 | 0.30(0.46) | 0.19(0.39) | *** | 0.16 | 0.79(0.68) | 0.38(0.57) | *** | 0.36 |
| WA | 28,162 | 0.56(0.65) | 0.19(0.46) | *** | 0.41 | 0.25(0.43) | 0.17(0.38) | *** | 0.11 | 0.80(0.63) | 0.36(0.57) | *** | 0.39 |
| NT | 6165 | 0.29(0.55) | 0.45(0.66) | *** | −0.17 | 0.16(0.37) | 0.32(0.47) | *** | −0.23 | 0.45(0.63) | 0.76(0.65) | *** | −0.27 |
| TAS | 6285 | 0.42(0.58) | 0.29(0.52) | *** | 0.15 | 0.14(0.35) | 0.28(0.46) | *** | −0.23 | 0.56(0.61) | 0.57(0.60) | n.s. | |
| ACT | 69,593 | 0.46(0.66) | 0.30(0.54) | *** | 0.17 | 0.25(0.44) | 0.21(0.41) | *** | 0.07 | 0.71(0.68) | 0.51(0.61) | *** | 0.18 |
| Overall | 590,323 | 0.54(0.66) | 0.21(0.48) | *** | 0.37 | 0.26(0.45) | 0.17(0.38) | *** | 0.15 | 0.81(0.66) | 0.38(0.57) | *** | 0.38 |

**TABLE 6**
Predicting tweeting behavior (regression model displaying standardized beta coefficients)

| | Mention | Retweet | Total interactions |
|---|---|---|---|
| Own gender | 0.185 | 0.145 | 0.113 |
| Own media group | 0.049 | 0.185 | 0.044 |
| Own beat | 0.167 | 0.101 | 0.059 |
| Own state | 0.246 | 0.153 | 0.188 |
| $R^2$ | 0.214 | 0.121 | 0.076 |

Note: All variables are significant at $p < 0.001$.
$N = 136{,}188$.

organizational context and geographic proximity. Gender appears less strongly homophilious. Examining these results by interaction type, we find reasonably similar results for mention tweets, with the largest effect for beat, followed by geographic proximity, organization, and gender. Journalists' behavior appears quite different when looking at retweets, where the largest effect sizes are found for media group, followed by geographic proximity, beat, and gender.

To examine the relative importance of each of these four variables, we conducted a multiple linear regression analysis. To do so, we created new variables to indicate the extent to which journalists addressed colleagues from their own gender, organization, beat, and state. The new dependent variables were calculated by deducting the number of "other" users from the number of "own" users for each tweet. A positive value indicates that the tweet addressed more users from a journalist's own gender, organization, beat, or state (indicating homophily), while a negative value indicates heterophily (Table 6).

The regression analysis shows that, in terms overall interactions, gender, organization, beat, and geographic proximity together accounted for a significant, albeit small 7.6 percent of the variability in interaction tweets, $R^2 = 0.076$, adjusted $R^2 = 0.076$, $F$ (4, 136,184) = 2796.36, $p < 0.001$. Each of the four predictor variables was also significant at $p < 0.001$. In terms of their relevant contribution, the largest impact is in relation to geographic proximity, followed by gender. Both organization and beat, while significant, make a much smaller contribution when controlling for the other variables. In relation to tweets that mentioned another journalist user, all four characteristics together accounted for a significant 21.4 percent of variability, $R^2 = 0.214$, adjusted $R^2 = 0.214$, $F$ (4, 136,184) = 9281.24, $p < 0.001$. Each predictor variable was also significant. Again, the largest contribution is in relation to geographic proximity, followed by gender and beat. Organization, on the other hand, is a relatively small contributor. Finally, the model was also significant for retweets, with gender, organization, beat, and geographic proximity together accounting for a significant 12.1 percent of variability, $R^2 = 0.121$, adjusted $R^2 = 0.121$, $F$ (4, 136,184) = 4699.62, $p < 0.001$. Once more, all predictors were significant. This time, however, the largest impact is made by organization when controlling for the other three variables. This is followed by state and gender, with beat making the smallest contribution.

## Discussion and Conclusion

The findings presented here provide important insights into homophilious networks among journalists' on Twitter. We can identify a significant degree of homophily across gender, organization, beat, and geographic proximity, but there are also important distinctions that need to be made, both across these networks and across types of interactions. We first discuss the results across networks, before returning to the distinction between mention and retweet networks.

To answer our first research question, we find a large degree of homophily across all four shared characteristics. Both males and females are significantly more likely to interact with their own gender, although, women show less pronounced homophily and, for retweets, even some heterophily. This partially confirms more general findings from previous studies. Artwick (2013) had noted that women were more likely to quote other women than their male counterparts, though they also quoted and mentioned more men than women. While we find evidence to support the former, as women mentioned more women than men did, we also found homophily among women as they mentioned other women more frequently than they mentioned men. Overall, men still dominate the interaction networks examined here, with women typically interacting with a larger number of journalists from the opposite gender than did men. We cannot determine whether such networks solely represent professional homophily. Research has found that journalists use Twitter for both personal and professional purposes (Lasorsa, Lewis, and Holton 2012). Thus, their interaction network is likely to be shaped by both, an assumption that is also based on the dissolution of traditional boundaries between private and professional in social networks. Consequently, the actual effects of Twitter homophily on professional practices cannot be assessed by our analysis. However, referring to results on journalistic sourcing practices, it is reasonable to assume that male voices have a disproportionately high presence in the news ecosystem. Hence, audiences are exposed to a low degree of gender diversity in the news—a fact that seems to be reinforced by journalistic interactions on Twitter.

Strong evidence for homophilious networks among journalists working for the same organization was also identified for most organizations in our sample, reaffirming similar evidence from Scandinavia (Larsson, Kalsnes, and Christensen 2016), but contrasting a Dutch study that argued the opposite (Vergeer 2015). One explanation for these differences is that the extent of homophily may depend on the type of organization. As our results showed, journalists from two media groups—Australian Provincial Newspapers (APN) and Australian Associated Press (AAP)—actually displayed heterophilious networks. We believe there are two possible reasons. First, APN is a small company, with far fewer journalists in our sample than the other organizations. This means an organization's smaller size may provide less opportunity to engage with each other. Further, it may demonstrate that large organizations and hence more well-known journalists dominate discussions on Twitter. This would echo research on intermedia agenda-setting which has found that individual journalists and news organizations tend to follow up the reporting of elite media (Breed 1955; Harder, Sevenans, and Van Aelst 2017; Ragas and Tran 2015). Different degrees of organizational homophily may also be explained by different social media policies, as these probably influence individual tweeting behavior (Ihlebæk and Larsson 2016; Russell et al. 2015). News organizations

may request their journalists to interact with colleagues or to retweet tweets sent by the news organization or other members of staff to increase visibility. Second, the AAP finding is most likely due to the organization's mission as the national news agency. Journalists there may be more likely to interact with a wider range of journalists who they are actually serving as part of their work.

Our analysis of journalistic beats showed that sports journalists are a particularly tight-knit group who rarely interact with anyone outside their own beat, indicating that sports journalists form a quite distinct community. We found a similar trend for political journalists, reaffirming our theoretical considerations and expanding Nuernbergk's (2016) finding that political journalists are more likely to interact with other journalists. In fact, when political journalists interact with other journalists, it is much more likely these are also political journalists. For other beats, however, notions of homophily mainly only apply to mentions. For retweets, we found a number of beats—lifestyle, other hard news, business or finance, and foreign news—exhibited heterophily.

Geographic proximity pertains quite distinctly to the concept of homophily, given its importance in the offline world (McPherson, Smith-Lovin, and Cook 2001). Indeed, previous studies have indicated that journalists who work in the same geographic area form "regional communities" on Twitter, suggesting substantial degrees of homophily (Vergeer 2015). Our findings add further support to this, with journalists typically interacting more with colleagues from their own state. Interestingly, we only found a small homophily effect in the Australian Capital Territory, where many national political journalists are located. Evidence from offline networks would suggest stronger homophily within national capitals as these are home to many political reporters (Crouse 1973). One reason may be the more distributed nature of political reporting across different metropolitan state capitals of the Australian media system. We only found two exceptions for Tasmania and in the Northern Territory. As with organizations, we believe size, but perhaps also distance may play a role. Both are geographically remote, perhaps allowing for fewer opportunities for journalists to contact colleagues in other states in the offline world. Hence, Twitter may be opening up such contact, and thus contributing to heterophily. One reason may also be that in terms of journalist population, they are the smallest states and therefore online exchange with each other is limited. Obviously, our study has only been able to assessed four key variables in respect of online homophily. Hence, it is important to note that future studies may point to even more such factors. Previous research has found, for example, that journalists with different roles use Twitter differently (Rogstad 2014), which may affect their social networks as well. Future research should therefore address more thoroughly how notions of class, identity and journalistic roles shape journalistic networks with regard to homophily.

Our second research question concerned the use of mentions and retweets. Across our analysis of the four characteristics, we found a consistent trend in how these journalists employ the two key types of interaction. In line with past evidence, journalists do use mentions and retweets in different ways (Molyneux and Mourão 2017; Nuernbergk 2016), with consistently higher levels of homophily in mention networks compared with retweet networks. Thus, our findings suggest a higher level of homophily when journalists engage with each other through mentions. When it comes to

endorsing or promoting colleagues' work (as typically done through retweets), the degree of homophily is lower, and in some cases we even identified heterophily. If we assume that retweets are more about the content of a tweet, and mentions are more about an individual user (Meraz and Papacharissi 2013), our findings could be interpreted in a way that—while journalists do live in a bubble online in terms of their conversations with each other—audiences are exposed to slightly more diversity when it comes to retweets. On the other hand, our results concerning Research Question 3 showed that, while a journalists' organization was the least strong predictor for mention networks, it was the strongest predictor for retweet networks. Thus, when journalists retweet, it is primarily the content of their immediate colleagues, pointing to a certain level of organizational content promotion. Hence, this finding also feeds into the literature on branding activities on Twitter (Hanusch and Bruns 2017).

In conclusion, the shape of interaction networks among journalists on Twitter resembles the structure of their offline networks. Like in the offline world, journalists prefer to connect with those journalists on Twitter who are like them. Thus, interaction networks tend to be homogeneous, providing further evidence for a normalization of Twitter (Lasorsa, Lewis, and Holton 2012). For journalists, a homogeneous network reduces uncertainties and provides a stable orientation horizon for practices at work and in private life. However, in contrast to real-life networks, Twitter networks are publicly visible. Thus, these networks should also be discussed with regard to their effect on audiences. In this respect, interacting with journalists from the same news organization hints at journalists' strategy to establish and promote an organizational brand (Nuernbergk 2016). From an audience perspective, following interactions among journalists on Twitter does not guarantee an ability to obtain diverse information. Instead, Twitter users witness bubbles which consist of more or less similar journalists.

Future research should engage more closely with the structures of influence within these interaction networks. For example, our findings hint at processes of intermedia agenda-setting (Harder, Sevenans, and Van Aelst 2017; Vonbun, Königslöw, and Schoenbach 2016), where journalists from more prestigious media appear more influential than those from smaller organizations. Our study also points to the need to compare and combine different characteristics as elements of homo- or heterophilious networks. While studies often focus on one dimension like gender, religion, and political values, our research has shown that different dimensions can and do overlap.

Despite the large sample of tweets covered here, there are limitations. First, we were only interested in the extent of homophily within intra-journalistic networks. Journalists did interact with a much larger number of users overall, and future studies would need to explore in more detail the profiles of these users to determine more broadly who journalists interact with in general. Second, we only examined whether journalists interacted with each other, but, beyond differentiating between retweets and mentions, did not examine the actual content of each tweet. This would certainly be an interesting follow-up study to identify the types of conversations journalists have with each other. Third, some of the measures applied here were necessarily broad. Future studies might delve into these aspects by applying more detailed measures, such as actual distance from each other, or whether journalists inhabit the same news-

room rather than the same organization. These should also include comparative approaches, to examine the contribution of media system variables.

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