

Ethnicity and Media: A study of English and Non-English Language Print Media Coverage of Water Issues in Sydney

Abstract

It is critical to understand how matters relating to water are reported, or ignored, among linguistically diverse media and to understand the possible influence this may have on the conception of water issues among ethnically diverse groups. This research analysed five daily newspapers published in Sydney between 2011-2012 in three languages (English, Chinese and Korean) and found that water issues were presented differently by newspapers across language divides in Sydney. These differences may contribute to diverse conceptual constructions of water problems and water management among ethnically diverse communities. After allowing for the influence of other variables, this research highlights the necessity to investigate media construction of water issues in various Non-English language publications as an important approach to improving situated and place-based water awareness in an ethnically diverse city.

Keywords

Water, ethnically diverse media, environmental management, environmental justice, ethnic media

Introduction

Environmental justice has been the focus of debates surrounding immigration and the environment since the 1980s (Kay 1992; Whittaker , Segura, and Bowler 2005; Agyeman et

al. 2016; Pfeffer and Stycos 2002). A growing body of studies recognises the importance of an inclusive approach towards ethnic diversity, and the need to examine the environmental engagement of ethnic minorities (Klocker et al. 2015; Klocker and Head 2013), e.g., access to environmental information, having a say in environmental management and planning, and understanding the construction and articulation of environmental responsibility in diverse cultures (Clarke and Agyeman 2011).

Various studies have indicated that environmental attitudes and behaviours are influenced by people's ethnic and cultural backgrounds (see Klocker and Head 2013; Whittaker, Segura, and Bowler 2005; Yan, McManus, and Duncan 2018; Watson 2017). Furthermore, it has been found that people's environmental knowledge and information access mediate the influence of ethnicity (Yan, McManus, and Duncan 2018; Kollmuss and Agyeman 2002). Those with a high level of environmental knowledge are expected to be aware of, and understand, what constitutes environmentally responsible behaviour as well as the importance and benefits of undertaking said behaviour (Frick, Kaiser, and Wilson 2004). In an ethnically and culturally diverse society, immigrants are often expected by the citizens of their new community to learn the environmental responsibilities and behavioural expectations of the mainstream culture via accessing local environmental information and knowledge (Pfeffer and Stycos 2002).

Media serves as an important information source for the public on environmental issues, but it is not neutral. Media potentially influences attitudes and behaviours through the construction of social norms, but care needs to be taken with correlation and causation (Ching 2010). This is the case regardless of the language of the newspaper. It has been identified

that a strong preference for information provided in languages other than English was found among non-English speaking ethnic minorities, and bilingual people who often preferred information in their native language alongside English information (YU and Ahadi 2010; DECCW, 2010). This preference is important in aligning media production with readership, but still does not allay concerns about whether differences exist on questions regarding which environmental issues are reported, and their presentation by mainstream and ethnically diverse media. Examining media discourse across language divides is therefore crucial, especially in ethnically diverse societies.

Sydney is one of the most culturally and ethnically diverse cities in the world. According to the ABS 2016 Census, 42.9 per cent of residents in the Sydney Metropolitan Area were born overseas, having migrated from more than 250 places (ABS, 2016). Sydney, like many cities in the world, is facing a water crisis. In 2003 Sydney introduced compulsory water restrictions to residents, businesses, local councils and government agencies in responding to severe drought conditions (Sydney Water 2011). While restrictions were lifted in mid-2009, future water supply is not secured given predicted population growth and climatic stressors (long-term recurring drought and flood conditions). Indeed, Sydney was predicted to experience a 23% increase in water consumption between 2009 and 2026 (WSAA 2010). Allowing for annual variations due to seasonality, there was an increase of 7.4 per cent in total water use between 2012-13 and 2016-17, with a prediction that “over the next 20 years, another 1.74 million people will live here, and the pressures on our existing resources, housing and infrastructure will only increase” (Sydney Water, 2017, 3).

In cities like Sydney with water stress and diverse ethnicities and cultures it is vital to

understand variations in perceptions and attitudes among different ethnic groups in relation to water use, water conservation and related issues. Studies of English and Non-English language media can contribute to this understanding. Furthermore, studies on mainstream and ethnically diverse media deepen the understanding of how environmental justice can be achieved and environmental citizenship facilitated. Ethnically diverse media serve a larger function than just providing mainstream content in another language; they construct cultural narratives related to water use in a culturally diverse society. In terms of environmental justice and environmental citizenship, concepts such as voice, visibility and recognition are important in fostering environmental awareness and potentially influencing environmental perceptions (Murphy, 2015). Ethnically diverse media (often called ethnic media) is important in enacting these concepts within an ethnically diverse society.

This research studied five Sydney newspapers in three languages, with a focus on water related reports, to answer four research questions: (1) What water related issues were reported in the English and non-English language newspapers in Sydney between December 2011 and December 2012? (2) Did coverage of water issues differ across the language divides? How did they differ from each other? (3) How can any differences be understood? (4) What are the implications for environmental management in an ethnically diverse context?

Media and public perception

Mass media is at the centre of a functioning society (McChesney 2004). It plays an important role in providing environmental information for the public, and in turn impacts public debate and public opinion to some extent (Ching 2010; Hay and Israel 2001; Soroka 2002). In terms of water use, being better informed may not be enough to achieve behaviour change (Nerlich,

Koteyko, and Brown 2010), however, it may lead to a rise in positive attitudes and behavioural intentions towards water use and conservation (Dolnicar, Hurlimann, and Nghiem 2010; Trumbo and O'Keefe 2005). The selection of stories and emphasis of various topics in media can shape policy agendas, public conceptions and create public consciousness towards certain issues (Leiserowitz 2005; Soroka 2002). Agenda-setting theory theorises the greater the volume of reporting given to a certain issue, the higher the perceived importance of the issue and in turn the more public attention generated (Marks et al. 2007; McCombs and Ghanem 2001).

Media can also serve as a means of educating the public and improving their understanding of environmental issues. Importantly, Marks et al. (2007), indicates that international events are usually locally framed to engage readers, highlighting the role of local media in providing a situated perspective on issues of wider relevance. In regard to continued and widespread water shortages in Australia caused by drought events and climate change, Smith and Campbell (2009) investigated how rural communities learnt about drought issues and how to cope with drought conditions. Their findings indicate that print media played an important role in the learning process. A follow up study by Campbell et al. (2011) noted that the local newspaper tended to report drought and water scarcity issues through positive frames, emphasising the outcomes of projects and actions. Therefore, the local newspaper was seen as an important source of education for people who are otherwise not likely to participate in community events.

While good coverage empowers people and advances public debates, poor coverage may fail to draw public attention or mislead readers (Antilla 2010). Whilst accepting that the terms

“good” and “poor” are relative, the key point is that coverage, in itself, is not an adequate measure to suggest the potential influence of media on readers/viewers/listeners. For example, Hurimann and Dolnicar (2012) studied the print media coverage of various water issues across Australia in 2008 and identified that the lack of inclusive representation of a range of stakeholders, high level of hedging, and limited scientific evidence, was likely to undermine people’s confidence in water management and may result in negative opinions about public participation. In contrast, Haertsch (2005), analysing the agenda setting and framing of water reporting in print media in Sydney between 2003 and 2005, found prominent coverage given to water storage and supply issues during the period, with news reporting shifted from “short-term” concerns to “long-term” considerations as water shortages intensified (Haertsch, 2005, p. 6). While local and regional newspapers tended to structure their reporting depending on their different readerships, in general newspapers appeared to play a successful role in informing and enhancing readers’ knowledge of water issues.

Media coverage and content study

Media influences public perceptions towards environmental issues through its presentation and interpretation of information (Hay & Israel, 2001). Meanwhile, the public are also likely to influence the media coverage with its interests and concerns. These interacting factors are defined as a pair of reinforcing spirals by Slater (2007). That is, media coverage on certain issues reflects public concern, and leads to further information seeking behaviours among the audience, which in turn drives more media coverage on the issue (Zhao 2009). Zhao (2009) indicated, in a study investigating media use and global warming perceptions, that the frequency and type of media use, mediates audiences’ perceived knowledge and environmental perception.

Ethnically diverse media performs important functions for people from ethnically diverse backgrounds as it reports issues relevant to immigrant communities, often including news from their land of origin and content relevant to their new geographic location. By using the term “ethnically diverse media” we indicate that media is not simply communicating the stories of the mainstream society in the official or dominant language, but understand this media is produced by and for people from ethnically diverse backgrounds and it is important that the referent not be the mainstream society. People from ethnically diverse backgrounds prefer ethnically diverse media over mainstream media because it is seen to more adequately address the cultural and practical needs of ethnically diverse groups (Sun et al. 2011).

Ethnically diverse media is expected to fulfil several roles, such as bridging immigrants with their country of origin (Pe-Pua and Morrissey 1994; Sun et al. 2011), integrating immigrants into the mainstream society (Zhou and Cai 2002), and empowering the immigrants to engage in local debates (Liu 2012). In doing so it contributes to the environmental justice concepts of voice, visibility and recognition, including through the provision of accessible information.

The establishment of ethnically diverse media and its impact on its audience have been explored in various studies (Liu 2012; Zhou and Cai 2002; Sun et al. 2011). However, research examining the coverage of environmental issues in ethnically diverse media is rare, though see Ching (2010) and Dugas and Young (2012). Shoemaker and Reese (2013) identified five nested hierarchical factors affecting media content, spanning from the micro to the macro-level. These are: the individual journalist, routines and social practices, the media organisation, the social institution, and the social system (e.g., political and cultural context). These factors are expected to present themselves differently between mainstream and

ethnically diverse media. Therefore, differences are expected to manifest in media content. The disparity between media in different languages or across distinct cultures requires further study, particularly in relation to an important social and ecological issue such as water. Therefore, this paper seeks to identify what disparities exist between mainstream media and ethnically diverse media and looks at how these disparities may impact the water perceptions of different ethnic groups in Australia.

Methods

Media Selection

Five newspapers in three languages – English, Chinese and Korean – were selected for this study (see Table 1 for details including newspaper format, circulation and readership). The newspapers selected were: the two main English-language daily newspapers in the Sydney region, *The Sydney Morning Herald* (SMH) and the tabloid *The Daily Telegraph* (TDT); the largest circulation Chinese newspaper in Australia, *Australian Chinese Daily* (ACD); the first simplified Chinese daily newspaper in Australia, *Australian New Express Daily* (ANED); and the only Korean daily newspaper published in Australia, the tabloid *The Korean Daily Hoju Dong-A* (KDHDA). Articles were collected from December 2011 to December 2012.

[INSERT TABLE 1 ABOUT HERE]

Article Selection and Coding

ProQuest Newsstand Database was used to search for water related articles in two English-language newspapers, using the following keywords: water, desalination, dam, reservoir,

drought, stormwater, rain, groundwater, river and climate. For the Chinese-language newspapers and the Korean-language newspaper, articles were collected manually, by searching the microfilm collections in the NSW State Library. Articles containing keywords not specifically relevant to water issues were removed, for example, articles talking about the water view in a real-estate project. All remaining articles were printed and organized chronologically for coding and analysis; a process also known as content analysis.

Content analysis was employed to evaluate the media texts. This method (developed by Berelson 1952; Krippendorff 2004; Hayes and Krippendorff 2007) was facilitated by employing a list of coding frames and measurements (scoring frames and correspondence analysis). Specifically, a coding system was developed based on a series of similar studies (Dugas and Young 2012; McManus and Montoya 2012; McManus 2000) to measure the significance and type of water coverage. The entire text of each article was examined and coded based on the coding frame in Table 2. Coding was conducted manually, referring to several characteristics of articles across newspapers, such as types of articles, article themes and geographic scope. Krippendorff's Alpha was used to test the inter-coder reliability¹.

[INSERT TABLE 2 ABOUT HERE]

For measuring the significance of coverage in each newspaper, a method adapted from McManus (2000) was employed. Specifically, as shown in Table 3, points were scored for each article based on article size (length), location of article, photo/picture used, headline size and primacy of the water theme. An ordinal score system was used for page estimating, large article-3, medium-2, small-1. Page estimate was then multiplied by 5 if it was located on the

¹ Krippendorff's Alpha is commonly used in content analysis to test the reliability of a study's coding.

front page of a newspaper, by 4 if it was continued from front page or had a headline on front page, by 3 if it was printed on the second or third page, and by 2 if it was printed on page four or five or the front page of a subsection of the newspaper. 15 points were awarded to each article accompanied with a photo or picture. 10 or 5 points were given to each article depending on the relative size of the headline in each newspaper. Points calculated based on the above processes for each article were then multiplied by 0.5 or 1, depending on whether water was a subtheme in that article or the main theme of the article.

[INSERT TABLE 3 ABOUT HERE]

The use of the coding framework combined with the scoring framework revealed the differing levels of coverage across the newspapers. The analysis of geographic scope, type of articles, and themes enables one to understand what water issues were reported and how they were presented across English and non-English-language newspapers. Correspondence analysis² was then applied to graph the differences in the coverage of themes across newspapers, by mapping their correlations in a two-dimension map.

² Correspondence analysis, first posed by Hirschfeld and later developed by Jean-Paul Benzécri, is a statistic analysis method, applied to examine the associations between categorical data. It is useful in revealing the relationship of correspondence between categories of different variables. It measures the distance between any two points (categorical values), mapping their associations in two or more dimensions, and displays plots points (categories) along the computed factor axes on the correspondence map. The analysis technique determines which categories are close together (correlated), and this is reflected in the distance between points (categories).

Results

In total 462 articles were analysed³. The distribution of articles across the five newspapers is shown in Table 4. The SMH published 144 articles, accounting for 31.2 percent of total samples. The Chinese-language newspaper ANED ranked second in the number of articles, containing 99 water articles. TDT and ACD published a similar number of water articles (92 and 93 respectively), accounting for 19.9 percent and 20.1 percent of total samples. The KDHDA had the lowest level of coverage, with only 34 articles addressing water issues. Of the total sample of articles collected, the majority were news articles, ranging from 50 to 93 percent depending on the source, followed by feature, opinion and editorial oriented articles. Letters were found mainly in SMH and TDT (17.4% and 20.7% respectively), with no or very few letters published in ANED and KDHDA regarding water issues. The prominence of water coverage across newspapers is shown in Table 4, with the SMH scoring highest, followed by ANED. The KDHDA had the lowest level of coverage.

[INSERT TABLE 4 ABOUT HERE]

Over the timeframe selected for the media analysis there were a number of major events related to water use in Australia, and in particular to Sydney and the state of NSW (see Table 5).

[INSERT TABLE 5 ABOUT HERE]

³ A subsample of 30 articles) was tested for coding reliability. The reliability coefficient (Krippendorff's alpha) for each coding field ranges from 0.79 (e.g., theme) to 0.96 (e.g., the accompaniment of an image), which indicates a good reliability.

A list of water-related topics (including pollution, water supply and water conservation), related to these major events, was developed to aid analysis of coverage across the five newspapers (see Figure 2). This analysis revealed differences and similarities across newspapers in three important dimensions; the geographic scope of water reporting, the distribution of coverage over study period and the coverage of water topics/themes. The following section details these results.

Geographic Scope of Water Coverage

A summary of the geographic scope of all water related articles across the five newspapers is presented in Table 6. Articles from the two English language newspapers – SMH and TDT mainly covered the local (Sydney Metropolitan Area) water issues (45.8% and 65.2% respectively), with the remaining percentage of articles focused on the state and national scope. In comparison, both Chinese newspapers demonstrated more interest in reporting on Chinese relevant water issues; 52.7 percent of ACD’s and 56.6 percent of ANED’s water coverage focused on the Chinese mainland, Hong Kong, and Taiwan. Similarly, there was significant a level of water reporting (35.3%) focused on the Korean context in the KDHDA, although its Australian focused reporting was 47 percent of total water coverage.

[INSERT TABLE 6 ABOUT HERE]

Water Coverage Distribution Across the Study Period

The distribution of water coverage across the study period showed that in both English-

language newspapers, water issues were reported most frequently in March 2012, along with substantial coverage in the following two months (Figure 1). Wet weather, Warragamba dam (the largest dam in the Sydney region) and the desalination plant were three main issues frequently reported in SMH and TDT during this period of time. Furthermore, the Murray Darling Basin Plan and the review of the Metropolitan water plan were also prominent discussions in the SMH between March and May, however were comparatively less covered in TDT.

[INSERT FIGURE 1 ABOUT HERE]

Water issues were intensively covered in February in the two Chinese-language newspapers, and frequently reported in May in ANED, and in June and November in ACD (Figure 1). The coverage in February was mainly focused on China, including continued news reports about river pollution in China and drought conditions in some provinces in western China. Only a small portion of the reporting focused on the Sydney Water's performance regarding the intention to raise water prices and staff cuts. The sub peak of water coverage in June in ACD was associated with the water price increases in Sydney and Melbourne, and drought conditions in China. Likewise, the high coverage in November in ACD was related to water pricing and water quality in Melbourne (Victoria, Australia) and China. In comparison, the water reports in the KDHDA were more evenly distributed across the time period, with slightly more coverage (six articles) in March, although there were no dominating issues. Consistently, across the five newspapers, frequency of reporting on water issues declined in August and December 2012.

Coverage of Water Themes Across Newspapers

The water-related articles were examined and 13 main themes identified. A comparison of the theme coverage among the five newspapers is illustrated in Figure 2. Coding allowed for multiple themes to be identified in each article. Of the 13 major themes identified, river/beach pollution and improvement was the most frequently discussed topic (69 articles, accounting for 13.6% of total coverage), followed by rainfall/ wet weather (52 articles, 11.3%).

[INSERT FIGURE 2 ABOUT HERE]

Water plan/ water right was the most frequently covered topic in the SMH (27 articles, accounting for 19% of SMH coverage), but was virtually missing in the three non-English newspapers, following which river pollution and water conservation were also two frequently reported themes in SMH. The TDT was relatively more interested in reporting rainfall/wet weather (26 articles, 28%) and desalination plant (14 articles, 15%) stories compared to SMH. Nevertheless, two English language newspapers were similar in thematic coverage, both newspapers having substantial coverage on ‘river/dam condition’ theme (16 articles, 11% of SMH and 13 articles, 14% of TDT). The KDHDA covered river/dam condition, rainfall/wet weather, drought and water infrastructure issues more frequently, though there were less articles than in other

newspapers. The two Chinese-language newspapers had a common interest in river pollution, mostly in China, with coverage at 25 percent and 20 percent respectively. They also both appeared interested in drinking water quality/pollution (18 articles, 19.4% of ACD and 16 articles, 16.2% of ANED), and water pricing issues (16 articles, 17.2% of ACD and 15 articles, 15.2% of ANED). This coverage is substantially higher than corresponding coverage in the English-language newspapers and the Korean-language newspaper.

Recycled drinking water was an important local issue during the period, however surprisingly, it was barely mentioned outside of the SMH (11 articles, 7.6 % of its total coverage). Likewise, the desalination plant, storm water/grey water collection and reuse themes, which refer to the importance of alternative water sources for Sydney, were generally missing in the three non-English language newspapers.

Further examination of the topic coverage across the five newspapers was conducted by using the technique of correspondence analysis. The main purpose of employing a correspondence analysis approach is to outline the relative position (similarity and differential) of newspapers in terms of topic coverage. As shown in Figure 3, the Chinese-language newspapers were located on the left side of the vertical original line and were very close to each other, which indicated similarity in topic coverage. The two English-language newspapers located on the right side of the vertical centre line

were significantly different from the Chinese-language newspapers in topic coverage. They were also significantly different from each other (with SMH located in the I quadrant and TDT located in the IV quadrant). In contrast, the Korean-language newspaper differed in the selection of water topics from both English- and Chinese-language newspapers.

[INSERT FIGURE 3 ABOUT HERE]

Discussion

This paper is the first to explore how water issues are covered and reported among linguistically and culturally diverse media. 462 water related articles were identified among five English and non-English newspapers published in Sydney. These articles were assessed in the previous section with regard to the first two research questions; (1) What water related issues were reported in the English and Non-English language newspapers in Sydney between December 2011 and December 2012? (2) Did coverage of water issues differ across the language divides? How did they differ from each other? It was found that the media coverage and reporting evolved over time in line with the occurrence of major natural, social, economic and political events; such as: heavy rainfall, Warragamba dam spilling, and the review of the Metropolitan Water Plan and desalination plant performance. Water issues were covered by each of the five newspapers over the study period; however, there were significant differences

in the depth of coverage, distribution over time, the thematic content of the coverage and its geographical focus. This is consistent with the general arguments of Dugas and Young (2012) and Ching (2010) that ethnically and linguistically diverse media tend to cover and construct environmental issues differently. The following section will analysis these findings in regard to research questions three and four of this study; (3) How can any differences between English and non-English language newspapers be understood? (4) What are the implications for environmental management in an ethnically diverse context?

Significance of coverage and public interest

In general, water issues received more attention in English and Chinese-language coverage than in the Korean language newspaper. As shown in Table 3, there are no significant differences in the number of articles or significance of coverage between English and Chinese-language newspapers, suggesting that water is also an important issue in Chinese-language media. The Korean-language newspaper had the least number of articles and scored the fewest points. However, this may partly be because the KDHDA publishes only five issues a week, while other newspapers all published six days per week, and publication is usually suspended during important holidays, including a two-week break over the New Year holidays. The difference in coverage between the Korean language newspaper and the other newspapers may reflect the reader groups' interest and concerns on the topic, or the editors' perceptions of

readers' interest. Considering the interactive relationship between media and audience perceptions (Slater 2007; Zhao 2009), the low coverage may be interpreted as reflecting a relatively low priority accorded to water related issues by the Korean community. This argument is supported by research into attitude, perception and behaviour among selected ethnic communities in Sydney, in which a high percentage of Korean participants identified conserving water as a 'low-priority' (Yan, McManus and Duncan, 2016). Media influences the public, specifically, by influencing their readerships through an agenda-setting role. The volume of reporting and salience given to certain issues shapes the importance of said issues (McCombs and Ghanem 2001). Therefore, the low level of water issue coverage in the Korean-language newspaper implies that it had little potential to raise the profile of water related issues within the Korean community.

With regards to the distribution of water related reports over time, there were distinct patterns across the language divides (Figure 1). Close examination suggests that the divergent distribution patterns between newspapers is likely to be a reflection of diverse interests in water topics and focus on geographical locations, which points to two important findings of this study: varied geographic scope and varied theme coverage were found across the culturally and linguistically diverse and media studied.

Divergence in geographic scope

The two English-language newspapers were found to present a wide range of local, regional, national and international water issues, with a predominate focus on local water issues; whilst the Korean-language newspaper had a substantial level of coverage focused on Korea, and Chinese-language newspapers appear to have even higher coverage of Chinese water issues than Australian-relevant ones (Table 6).

While the two Chinese newspapers are produced in Sydney, they are national in focus and circulation. The Australia/homelands divide in Chinese and Korean-language coverage of water reports reflects the dual function of ethnically diverse newspapers to integrate migrants into the local society by providing local information and guidance (Zhou and Cai 2002), while also informing and educating readers on current events in their country of origin (Pe-Pua and Morrissey 1994).

Practically, given the significant coverage of Chinese water issues, the two Chinese-language newspapers appeared to be trying to perform a “bridging role”, although the effects of this cannot be assessed without detailed study of the consumption of this media output which was beyond the scope of this paper. However, in terms of integration, these newspapers seemed unlikely to engage the ethnic Chinese-Australian community in the local water debate, due to limited information being

published regarding Australian water issues. Moreover, considering that the degree of emphasis on certain issues influences the relative importance that media consumers assign to such issues (Marks et al. 2007), the relative increase in coverage of Chinese rather than Australian centric water issues in the Chinese ethnic newspapers is likely to create a potentially misleading message that Sydney's water problems are less severe compared to China's water problems. This finding is important, as DEC (2005) indicate that immigrants tend to judge the state of Australia's environment in relation to that of their country of origin.

Disparities in theme coverage

In general, the two English-language newspapers reflect a wide range of water themes, in contrast to relatively selective coverage in three non-English newspapers (Figure 2). However, the two English newspapers are found to differ in theme coverage, while the SMH had a significant degree of interest in "water plan" and "water right" (Murray-Darling plan), TDT had more coverage of rainfall and wet weather issues. This divergence in coverage is likely due to a combination of two factors; firstly, the need for newspapers to brand themselves by focusing on particular issues and secondly, the variances in political stance of SMH and TDT newspapers. However, the divergence in theme coverage revealed between language divides is unlikely to be due to branding. Instead, as suggested by Dugas & Young (2012), the different coverage in non-English language media is likely to closely reflect the

specific interests and concerns of their readership as well as their cultural and environmental values. Additionally, the social context of the media organization as well as the cultural background of journalists have been found to impact upon media content (Shoemaker and Reese 2013). Drought and climate change are both challenges for water security in China, however water pollution and poor management are perceived to be the biggest threats to most cities (see Finlayson et al. 2013). Unsurprisingly, water pollution ranked top among water themes in the two Chinese-language newspapers. South Korea also faces great water stress, due to the monsoon climate which leads to high precipitation for three months of the year, followed by a long period of low precipitation or severe drought conditions. For the Korean community, it seems that storing more water during the wet season is an easier way to secure water supply (rather than reducing water use in the dry season). River restoration is also a heated public debate in South Korea (Jun and Kim 2011). These factors may help explain why the Korean-language print media tends to be more interested in dam, river and drought issues.

Given the mutually influential relationship of media content and public perception (Slater 2007; Zhao 2009), the divergent emphasis of themes among the media identified in the study not only reflects particular concern towards certain issues, but is likely continuing to shape and reinforce audiences' concerns and cognitions towards such issues. In this case, the divergent coverage of themes across the

language divides likely reflect the varied concern for water issues among Chinese, Korean and English-speaking readers. This consideration is consistent with the argument of Clarke and Agyeman (2011) that people from different ethnic and cultural backgrounds tend to be concerned about different aspects of the environment.

Our findings reveal a relative absence of local-focused water issues in Chinese and Korean-language coverage. This may imply that the Chinese and Korean community tend to be less informed about Sydney's water problems and proposed solutions.

Domestic and headline grabbing events (natural, social or economic) are regarded as opportunities to affect public opinion about sustainable water management (Wei et al. 2015). However, the low level of coverage or oversight of the relevant reports meant the non-English language media failed to take advantage of these opportunities.

Therefore, the non-English language media was likely to have a limited impact in raising awareness within their readership of important local water issues and pressing public debates, given that they did not produce content to facilitate agenda setting due to the observed silence or minimal content. This finding may partially explain the conclusions of relevant studies (DEC, 2005; Yan, McManus, and Duncan 2018) that non-English speaking community members are likely to have lower levels of knowledge about local environmental issues.

The difference in how media shaped water-related issues between English and non-English media has significant implications for environmental management and studies concerning migration/ethnicity and the environment. Growing literature on migration, ethnicity and the environment indicate that ethnicity and related cultural understandings influence the development of environmental attitudes and behaviours (Leung and Rice 2002; Milfont, Duckitt, and Cameron 2006; Watson 2017; Yan, McManus, and Duncan 2018). This research has highlighted the importance of studying media across language divides to understand the variance in perceptions and attitudes towards environmental issues among an ethnically diverse population. Having contributed to debates around ethnic diversity, environmental justice and environmental citizenship by identifying issues of access to information, the presence or absence of voice and the visibility of place in relation to ethnicity and environmental issues.

The identified differences in the ethnically diverse/mainstream media have implications for water management and environmental education. Ethnically diverse media is perceived as an effective means to approach ethnic minority members (YU and Ahadi 2010), and to promote engagement among non-English speaking ethnic minorities. However, it is unlikely to contribute to inclusive education unless the differences between ethnically diverse and mainstream media are recognized and ethnically diverse media is supported by policy makers and others to provide

culturally relevant information. This may include, for instance, providing additional background or context when reporting on local environmental issues in non-English media; perhaps including a reference or comparison to the readers' original country of birth in local news stories; and addressing particular local environmental issues not simply by translating material into a different language, but considering communication as a two-way process and providing material in a form most likely to be understood by the readership (Yan, McManus, and Duncan 2018).

Conclusion

Comparing the coverage of water issues between five selected English- and Non-English-language print media sources published in Sydney revealed that water issues were reported differently in Chinese- and Korean-language newspapers from their English-language counterparts in regard to coverage, article type, temporal distribution, theme and geographical focus. This finding provides further empirical evidence for the argument that media discourses across language divides present environmental issues differently, as indicated by Dugas and Young (2012). Different media presentation is likely to be accompanied by differences in public perception (Marks et al. 2007), thus, the disparities in media coverage revealed may also contribute to differences in perceptions and attitudes towards water use and conservation. Moreover, by ignoring or minimally reporting local water issues, the ethnic newspapers failed to inform their readers about important local water issues.

Therefore, many ethnically diverse community members who rely on, or prefer, the ethnic newspapers as a source of information were probably unaware of those local issues and less concerned about them.

While individual differences are vital, this article highlights the need to investigate media construction of water issues in Non-English language publications as part of water management in an ethnically diverse city. The information provided by mass media is a first step for fostering situated and place-based water awareness. However, the findings of this article suggest that newspaper selection may lead to a significantly different conception of Sydney's water situation, water use and conservation. Apart from the difference in media coverage, future research on how water issues are framed in English and Non-English language print media is also needed. While the media disparity may contribute to a diversity of public perceptions of water between ethnic groups, the existence of a casual chain and its significance, requires further investigation. Furthermore, a range of other media sources could be studied.

Today, many cities are becoming increasingly diverse in terms of ethnicity. The existence of newspapers and the proliferation of radio, television and internet sites in various languages adds to the multiculturalism of urban areas and provides an important source of community cohesion, information about local news and a bridge

to the country of origin. How this media reports, or does not report, issues ranging from water management to climate change and biodiversity conservation, is important in influencing perceptions of the relative importance of the issue, and how the issue is understood. This paper has highlighted various constructions of urban water issues in Sydney in five newspapers across three different languages, during one year. The lessons drawn from this research are applicable in many other cities, and for other environmental issues. This research highlights the importance of ethnically diverse media, and the need to understand what is produced, how it is produced and how it is received. This paper enhances our knowledge on ethnically diverse media and environmental issues, but more work is required in other cities, and on different issues, to increase our knowledge of this important phenomenon.

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