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A Study of the Coverage of Plastics in a National Newspaper in Singapore

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Abstract
This study examines a news medium, The Straits Times, for newspaper articles published on the topic of plastics in the year 2018. It analyses the articles through a method of coding to get an overview of the kind of topics explored in relation to plastics. Of specific interest is microplastics, which does not seem to have been given adequate attention in the mass media or literature on plastics. Articles related to the keywords “plastics” and “microplastics” were identified and coded accordingly. A total of 30 codes were generated. The findings of this study include the various frames adopted by the news media in reporting on the issue of plastics, such as “attribution of responsibility frame” and “human interest frame”. It was found that there were only 8 articles that mentioned about microplastics. A pronounced emphasis seems to be placed on recycling, reducing and reusing of plastics. In addition, there were more articles on plastics from overseas wire-agencies in the newspaper than local news reports, including those on microplastics. There is also growing interest of various stakeholders such as government, private companies and non-governmental organisations in the debate on plastics.

Keywords: Microplastics, plastics, newspaper analysis, framing, The Straits Times

INTRODUCTION
The media plays a very important role in introducing and sensitising the public on important issues, particularly socio-scientific issues such as global warming which is detrimental to the survival of future generations. The mass media has been actively reporting on the effects of global warming which has led to increased temperatures on Earth, the most recent being “July was the hottest month ever recorded on Earth.” (LiveScience, 2019). Also, concerns over rising sea levels is another constant in the mass media - islands that are low lying face the prospect of “sinking” and disappearing from the face of the Earth – for example, those in the Tuvalu archipelago (The Guardian, 2019) and the Maldives (Los Angeles Times, 2019). A rather new, yet equally concerning, socio-scientific issue in recent years is the problem of plastics, the usage and disposal of it. Plastics is a very common material used in a wide array of products, ranging from food packaging to synthetic fibres in clothing and many more. Undeniably, the invention of plastics has made our lives easier due to the convenience provided by its properties — strong, lightweight and mouldable. However, it is its inherent nature that brings about the concerns of today – it is not easily biodegraded. Something as simple and small like a straw will take at least 200 years to biodegrade while a plastic bottle will take 450 years (Telegraph, 2018). Hence, the growing concern about what can be done to reduce usage and generation of plastic materials and how to better handle plastic wastes.

Plastics is well known for its durability and persistency. Microplastics, too, are like plastics. The difference is that they are extremely small pieces of plastic debris in the environment resulting from the disposal and breakdown of consumer products and industrial waste, usually smaller than or equal to 5mm in size. “Among marine debris pollutants, plastics-based materials constitute the largest portion of wastes in the oceans globally and were estimated to be between 60% and 80% from the total marine debris.” (Mobili et al., 2014) Common sources of microplastics include daily products such as toothpastes and facial exfoliants. Microplastics may also result from degradation of plastics when exposed to UV rays such as from the Sun. Subsequently, microplastics have become a common pollutant in oceans. largely due to the difficulty in filtering it out from the wastewater dumped into oceans, from plastics dumped into the ocean, and its breakdown when exposed to rough sea waters and UV rays. Due to its large presence in oceans and its small size, a constant worry is that these microplastics are entering our food chain, particularly when consumed by marine life such as fish. Marine life is commonly found to be consuming these microplastics, - for example, guts of fishes were found to be contaminated by these tiny plastic particles. (Alomar et al., 2017; Khan et al., 2016; Peters et al., 2017). In present times, people are becoming increasingly concerned about the food they consume – some only consume food from organic sources or adopt certain diets such as veganism. Hence, shouldn’t the matter of tiny plastic particles existing in the seafood that people consume be a pressing matter and that it should be more commonly mentioned and talked about in the common media that is exposed to the common folks?

All in all, in this important topic of microplastics with potentially huge impacts to our lives, there is little
awareness by news media and few researches in the science communication literature about this topic. This explains the rationale for this study, which investigates the coverage of plastics (including microplastics) in the news media.

**LITERATURE REVIEW**

As highlighted, the news media and Internet media play an important part in generating awareness amongst the public when it comes to socio-scientific issues. When journalists focus on plastics, often it is about the pollution caused by plastics and what happens from our overuse of this. Also, the debate has moved towards the usage of plastics, especially how we can “reuse”, “reduce” and “recycle” them. However, few of these articles mention about microplastics, which are defined as plastic particles of size smaller than 5mm. (Arthur, et al., 2009) As far back as the 1960s, microplastics have been found in the stomachs of plankton samples (Thompson, et al., 2004).

Even in journals related to public understanding of science, science communication and health science communication, there is hardly any literature that explores or investigates the public awareness and understanding of microplastics. Most literatures look into the scientific aspects of microplastics – such as quantifying how much microplastics are in the ocean and trying to track the pollution caused by microplastics. This is likely due to the difficulty in quantifying the increasing amounts of plastics (and microplastics) causing pollution in the sea every year. Despite the lack of investigations on the public’s perception of microplastics, it is clear that pollution from microplastics can result in dire consequences if consumers of today do not start acting against the general use of plastics.

In the study of issues in the media, the frames adopted by reporters are very important. Framing, is “to select some aspects of a perceived reality and make them more salient in a communicating text, in such a way as to promote a particular problem definition, causal interpretation, moral evaluation, and/or treatment recommendation for the item described” (Entman, 1993). Framing devices may be in the form of words or images, usually containing depictions such as metaphors, phrases or storylines. These can be found by determining the overall aim of the article – for example, is the newspaper article depicting plastics in a negative light? Frames adopted by newspapers reporters play a crucial role in how the public interprets an issue. As highlighted by Jönsson (2011), the mass media is particularly important in portraying environmental issues to the public and sometimes the adoption of frames by these reporters may play against the goals of scientists.

**RESEARCH QUESTIONS**

This study is driven by three research questions:

1. In the coverage of plastics in newspapers, what frames do the reporters adopt?
2. What are some key features of the articles on plastics, based on the coding of the articles?
3. In the articles on plastics, to what extent is there coverage of microplastics?

**METHODOLOGY**

**Choice of medium**

The choice of news medium in this study was The Straits Times. The Straits Times, established in 1845, is an English-language daily broadsheet newspaper based in Singapore and currently owned by Singapore Press Holdings. The print and digital editions of the newspaper have a daily average circulation of about 383,600. Thus, being the most circulated local broadsheet newspaper, it was chosen as the medium for the study of plastics coverage.

**Retrieval of relevant articles**

The newspaper articles were retrieved from an online newspaper archive database, Newslink. Initially, only newspaper articles with the keyword “microplastics” was retrieved. Subsequently, the keyword “plastics” was added in due to the small number of articles collected on “microplastics”. The period of interest was the year 2018. Each article was looked through to ensure that they were articles relevant to this research and addresses the research questions.

**Coding of Articles**

The articles were coded according to the day and date of publishing, the section they belong to in the newspaper, the number of paragraphs, source of article (local/foreign), countries mentioned in the article, stakeholders involved, any mention of microplastics, and the frame adopted in the article. Appendix A shows the codes that were used in this study as well as a brief description of what the code encompasses. As there were no literature found where there were coding on newspaper articles pertaining to the coverage of “plastics” as a keyword, the deduction method of coding was employed to analysis the news articles, which was through a general lens in an attempt to discover possible relationships between codes and frames of the reporter (Semetko & Valkenburg, 2000).

Before commencing the coding, I did a read through of all the articles to get a sense of what each article was about. During the first-read, I generated some codes which were based on the emergent themes that were common across the articles. For example, many articles mentioned reduction in use of plastics by methods such as reusing or reducing our usage, hence I generated a code “Mentions curbing plastics usage via the 3 “R”s” (No. 15). From this first wave of codes generated, I went back to the first article and started coding the articles. As
I coded the articles, more codes appeared – these were codes which I did not think of during my first-read, and added them in as I carried on coding the articles. After my second-read, due to certain codes being generated in the midst of the read, I went back to the start and conducted my third read to ascertain if the articles were coded correctly and precisely. In total, there were 30 codes generated. The complete coding of articles is attached as Appendix B.

**Frames**

It is the norm for news media reporters to adopt frames in deciding what is newsworthy to be published in the paper. It enables them to create stories for the audience (Rachlin, 1988).

For environmental issues, often it is not straightforward to code. For example, the issue of “Environmental risks in Baltic Sea” is an environmental issue and a military issue. Generally, the topic of plastics and microplastics is painted as not only an environmental issue but also as a social issue, where many articles actually call for action from the local community. Hence, we can adopt a social-environmental point of view to examine the frames of the newspaper articles in the case of plastics and microplastics.

The articles were examined and slotted into 1 of 5 frames: economic consequence, conflict, attribution of responsibility, human interest and morality frame (Table 1).

<table>
<thead>
<tr>
<th>Frame</th>
<th>Description of frame</th>
</tr>
</thead>
<tbody>
<tr>
<td>Economic Consequence</td>
<td>Economic consequences from event or problem on an individual, group, institution, region or country is highlighted</td>
</tr>
<tr>
<td>Conflict</td>
<td>Emphasis on conflict between individuals, groups, institutions or countries</td>
</tr>
<tr>
<td>Attribution of Responsibility</td>
<td>Issue or problem is presented in a way to attribute responsibility for the problem to either the government, individual or group</td>
</tr>
<tr>
<td>Human Interest</td>
<td>Highlight of an individual’s story or a take on the emotional angle to presenting the event, issue or problem</td>
</tr>
<tr>
<td>Morality</td>
<td>Event or issue is interpreted in the context of religious tenets or moral prescriptions</td>
</tr>
</tbody>
</table>

(Smetko & Valkenburg, 2000)

However, due to the possible scientific nature of the articles that deal only with scientific facts, there was a need for a sixth frame, the scientific frame (Table 2).

<table>
<thead>
<tr>
<th>Frame</th>
<th>Description of frame</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scientific</td>
<td>Presentation of scientific facts and findings regarding topic or problem in an informative manner</td>
</tr>
</tbody>
</table>

(Griffin & Dunwoody, 1997)

The articles were looked through and slotted into its most predominant frame. It was done using 11 framing mechanisms: Headlines, subheads, photos, photo captions, leads, source selection, quotes selection, pull quotes, logos, statistics and charts and concluding statements and paragraphs (Tankard, 2011). These 11 framing mechanisms were taken into consideration in sloting the article, and the classification of each article to its predominant frame is attached as Appendix C.

**Google Trends**

Google Trends was used as a comparison method for data analysis in this research. Google Trends is a trends search feature that shows the popularity of a search term in Google (Oberlo, 2019). Google Trends has proven to be a powerful tool, even adopted by Google to analyse the first 2020 Democratic presidential debate to keep track of what the people are searching related to the debate. (Business Insider, 2019) Google Trends was used in this research to compare the data of the search term “microplastics” and “plastics” over the year 2018 from Singapore with the number of ST articles collated across the same year.

**Data analysis**

After the coding was completed, each code was analysed through methods such as simple summing up of agreements (1) and disagreements (0). For example, 8 articles had mentioned the term “microplastics” in the article while 50 articles did not mention the term at all. Articles which were coded as (1) in agreement to the code means that the article mentions the keyword “microplastics” at least once. Examples of such articles include an article that mentions contamination of plastic bottles by microplastics seeping in during the process of water bottling “The plastic debris included polypropylene, nylon, and polyethylene terephthalate (PET), which is used to make bottle caps.” (The Straits Times, 2018) Another talks about the troubling situation of microplastics being trapped in the Arctic sea by the ice itself. “A team from the Alfred Wegener Institute for Polar and Marine Research found 17 different plastic types in ice samples gathered during three Arctic expeditions on board the research icebreaker Polarstern in 2014 and 2015.” (The Straits Times, 2018). Articles which did not mention “microplastics” included articles which tried to convey the importance of recycling of plastics such as the article “Recycling efforts need a boost” (The Straits Times, 2018).

To determine the length of each article, the number of paragraphs were counted.

**RESULTS**
Framing in the ST Articles

As shown in Figure 1, the most frequently occurring frame is the attribution of responsibility frame (23 articles). Articles with such frames often report about the state of pollution due to plastics and puts across that a certain stakeholder is largely responsible to take action to reduce the pollution.

“Perhaps the Government can invest some resources into these two areas, given the lacklustre response from the private sector so far.” - Extracted from article 1101 (Offer monetary incentives to encourage plastic recycling)

Human interest frames are often adopted by the reporters in the topic of “plastics” (17 articles). As plastics is a topic that tends to be relevant for people of all ages and demographics, reporters used the human interest frame to appeal to its readers, for example, by writing stories of people who are successful at changing their everyday habits to do their part in reducing plastic pollutions.

“Since January 2016, she stopped using single-use plastics and she composts kitchen scraps in a pot, sends paper for recycling and keeps all her non-biodegradable trash, such as used plastic stirrers and dental floss, in a small glass jar.” – Extracted from article 1201 (No-trash lifestyle gains ground in Malaysia)

The Google Trends for people in Singapore searching for the keyword “microplastics” shows peaked interest in plastics and microplastics for the month of June - often the number of articles in the newspapers pertaining to a certain topic is also due to the level of interest by the general public.

Figure 2. Number of articles on plastics published in each month

As Google Trends only shows interest over time and the numbers represented are not absolute numbers, i.e. numbers represent search interest relative to the highest point on the chart for the given region and time. A value of 100 is the peak popularity for the term. A value of 50 means that the term is half as popular. A score of 0 means there was not enough data for this term. (Google Trends)

Hence, there is a need to compare this with the keyword search term of “plastics”. Doing so, we are able to see that the frequency of search term “microplastics” relative to “plastics” is almost negligible, as shown in Figure 4.

Figure 3. Google Trends on frequency of search term ‘microplastics’

Coverage in The Straits Times on Plastics and Microplastics

Figure 2 shows the number of articles in each month. The number of articles per month usually hovers around 2 to 6 articles on average, with only two months being an exception – 16 articles in June and 12 articles in August.
Figure 4. Google Trends of how “microplastics” compares with “plastics” as a search term in Singapore

Figure 5 shows the frequency of the search term “microplastics” by Google Trends compared against the number of articles published with the keyword “plastics”. There is a peak in both the frequency of searches of “microplastics” and the number of articles published in the month of June.

Figure 5. Comparing Google Trend “microplastics” and number of ST articles in each month

Across all 59 articles with the keyword “plastics”, only 13.8% of the articles mentions “microplastics”, as shown in Figure 6. The keyword “microplastics” is mentioned in only 7 out of 12 months in 2018. Additionally, when “microplastics” is mentioned, it is only once or twice the most in the month.

Figure 6. Number of articles in each month that mentions microplastics and plastics respectively

As a mere mention is not enough to conclude that the article’s main topic is about the keyword, Figure 7 shows the breakdown of the 59 articles into whether the main topic is indeed about either of the keywords. It can be noted that there are 4 articles whose main topic was not about plastics or microplastics. One such article is article code number 501, titled “There’s no Planet B for world’s trash”, which focuses on the importance of proper waste disposal despite the article mentioning both the keywords “microplastics” and “plastics”. Another notable data was that only 4 articles in the entire of 2018 has microplastics as its main topic or shares the main topic alongside plastics.

Figure 7. Main focus of articles

Figure 8 shows that 61% of the articles are from local sources while the other 39% are from wire agencies. On further inspection, it can be seen that only 25% of articles which mentioned microplastics are from local sources –
meaning 75% of articles which mentioned microplastics are from wire agencies.

Figure 8. Comparison of source of articles across keywords “Plastics” and “Microplastics”

Figure 9 shows the number of articles posted on each day across the whole of 2018. It can be found that a large percentage of it were posted on either Tuesdays (13 articles) or Thursdays (14 articles). Friday is another day where there are many articles published (10 articles).

Figure 9. Distribution of articles across different days of week

Figure 10 shows the distribution of the articles across the newspaper sections. A significant number of the newspaper articles came from either “World” or “Home” section – a total of 45.7% of the newspaper articles. Other notable contributions are that 22.1% came from “Forum” or “Opinion” section and 13.6% from “Special features” or “Top of the News”.

Figure 10. Section of newspaper that articles were published in

Across the articles, there are often stakeholders mentioned in the article. Figure 11 shows how often stakeholders such as the government, students, Non-governmental organisations (NGOs), scientists and private companies are mentioned. Examples of such mentions includes KFC (private company) introducing their ban of single-use plastics in their stores, scientists concluding their research on contamination of water bottles by plastic particles, and an undergraduate student challenging herself to not buy new clothes for the new year to reduce waste generation.

Figure 11. Stakeholders involved/mentioned in article
An important code that was taken is the mention of pollution. All types of pollution that results from plastics and microplastics are included under this code, such as land pollution due to the difficulty in biodegrading plastics and sea pollution due to improper disposal. 61% of the articles are found to mention some form of pollution. (Figure 12)

Figure 12. Articles which mentioned pollution by plastics (land, water, etc.)

Out of the 36 articles which mentioned pollution, the articles are examined further to code for the effects of the pollution, such as plastics being present in drinking water, plastics affecting marine life, climate change, plastics affecting arctic ice and posing a health risk to humans. The most frequently mentioned effect - 47.2% of the 36 articles (17 articles), is that plastics are present in drinking water and that plastics affect marine life. (Figure 13)

Figure 13. Effects of pollution by plastics mentioned in articles

Miscellaneous

The majority of the articles had lengths of 11-20 paragraphs.

Figure 14. Length of articles (by the number of paragraphs)

In examining the mention of Singapore in the articles, the content of the articles were looked at to determine its code. In 61% of the articles, Singapore was mentioned either due to the context of the article being local or that a case study or example of Singapore was provided in the article. About 39% of the articles did not mention Singapore, including those that did not mention Singapore, despite being written by local authors.

Figure 15. Mention of Singapore in the articles

It was found that a large percentage of the articles were published in the first 10 days of the month. (42%)
A large percentage of the articles (72.9%) were found to have mentioned the curbing of plastics usage using the 3 “R”s – Reuse, reduce and recycle.

Figure 16. Dates the articles were published on

DISCUSSION

The study focused on exploring the coverage of plastics in The Straits Times for the year 2018. The most common frame is that of attribution of responsibility. This might be due to the fact that there is no clear individuals or groups of individuals that are solely responsible for plastics pollution. Rather it is that everyone has a part to play in this, thus the attribution of responsibility to the different stakeholders, such as individuals, private companies and even the government by the different articles. The literature supports this and even more – the pollution, particularly in oceans, is not only hard to quantify but also hard to clean up when the lines are blur as to who is to blame for the pollution. (Leous & Parry, 2005) On a separate note, reporters adopting the frame of human interest may point that there are many who are willing to role model the way out of this plastics pollution problem. With these two frames in mind, overall the news media in Singapore, particularly The Straits Times, frames the issue on plastics with a call for action in general, whereby certain changes in thinking are pushed and emphasised by the reporters - hopefully to improve our current day-to-day habits.

However, the contribution of articles towards the topic or mention of microplastics is evidently insufficient in the context of Singapore. A mere 8 articles throughout the year 2018 simply mentions the word microplastics. There is thus a gap that needs to be bridged by the media in Singapore, especially in sensitizing the public about this issue. Although the articles are able to cover a sufficient variety, such as covering the contamination of water in plastic bottles and trapping of microplastics in arctic ice, the articles are still lacking in terms of educating the public in regards to how the micro-particles come about, and what people can do to help reduce the production of the said microplastic particles. The importance of this is backed by the 14% of plastics-related articles being from the Forum section. The Forum section is represented by the public as it is a section dedicated for its readers to voice their opinions by sending in contributions to the newspaper. This highlights that much is talked about and discussed in Singapore with regards to our usage and proper disposal of plastic materials.

The number of articles’ peaking in June is reflected by Google Trends as well. This finding suggests that there might be an increased public awareness of the topic “microplastics” in June which might have been associated with the increased number of articles that was in the news media regarding the same issue.

In regards to the contribution of the number of articles per month for the keyword “plastics”, the spike associated with June and August is largely due to the sudden increase in actions by companies such as KFC and major hotels in Singapore in that month as they announced their stance against the use of plastics and kicked in their actions to reduce their consumption as business owners. This shows that companies in Singapore do recognise that there is a need for them to take action to reduce the consumption

It is interesting to note that the days of the week have a bearing on the number of articles published. This might be attributed to the section of the newspaper that the article is published in – for example, 20% of the articles were published in the “Home” section, which publishes different topics of articles according to the different day of the week – namely Education for Monday, Mind and Body for Tuesday, Digital for Wednesday, Community for Thursday and Science for Friday. Hence, it might be
expected that Tuesday and Friday have slightly higher number of articles published due to the socio-environmental nature of the topic.

Although 25.4% of the articles had mentioned the government as a stakeholder, it cannot be concluded that the government is active in this topic as some articles are mere mention that the government has a part to play in changing the mindsets and providing incentives to nudge Singaporeans to do their part in recycling plastics. (Article code 301: Carrot and stick approach needed in tackling plastic waste and article code 303: Dip in amount of waste recycled last year) Thus, despite the government being the second most frequent stakeholder mentioned by the articles, it seems that the mentions were mostly in passing.

Additionally, the finding that 35.6% of the articles mentioned companies, 18.6% of the articles mentioned NGOs and 13.6% of the articles were forum articles by the generally public shows that there were other stakeholders that may have contributed more to the topic at hand than the government. In the articles, NGOs that voiced their opinions included the Singapore Environmental Council which conducted a poll and concluded that only 2% of plastic bags are recycled by consumers. (Article code 801: 1.76b plastic items used here yearly: Poll) It was generally agreed by forum posters that there was a need for government to take more actions and state their stance in this war against plastics.

However, this might be due to the fact that Singapore stands far below in terms of total waste production and pollution of plastics, mainly due to the small size of Singapore. However, if we look into plastics consumption per person, Singaporeans generates 0.19 kg per person per day of plastics waste, compared to that of a big country like China, at 0.12 kg per person per day. (Ritchie, 2018) China is one country that has been mentioned in a few of the articles, mainly at how they convert plastics waste into another form and re-using them instead of disposing of them as waste. Hence, if the Chinese government is able to implement policies to reduce plastic waste in their huge nation, Singapore should be able to do even more given that we are a small country.

**CONCLUSION**

The important issue of microplastics in Singapore evidently requires more attention by the mass media, given its crucial role in generating awareness and providing information to the general public. It may be an unintentional gap in the very small number of articles on microplastics, placed in the frames of plastics, where the articles pushes responsibility of this pollution and issue to various stakeholders. It is difficult to adopt the same frame used in articles on plastics to advocate for change because of the inherent nature of microplastics being micro. It not easily visible to the human eye and thus makes it less public-friendly and relatable to the general public. However, clearly microplastics has its implications on human lives. The media can create more awareness towards the issue as it is an inherent problem we face in our society – for example, the problem of plastic particles contamination in water bottles is highly relevant as buying drinks in bottled water is something Singaporeans do often due to convenience. Being a small country does not mean that we do not contribute to the pollution of plastics. Everyone has a role to play in the conscientious usage of materials and generation of waste, and every effort counts!

**Limitations**

This study has its limitations, the biggest being that it is only looking at the articles published in The Straits Times in the year 2018. This data collected cannot be extrapolated to infer statistics and data for other years and other news medium, particularly in other countries. Year 2018 was a great year for minimising plastic wastes as many people had a sudden increase in awareness and took steps to reduce plastics waste by switching to greener alternatives. More people are starting to look past just plastics and looking into microplastics, even nanoplastics as they are recognising that marine life are affected by this immense pollution of plastic particles. Many researches are looking into the effects of plastics working up their way into the food chain, although nothing can be determined if humans consuming plastics particles would have any health impacts in the future as this is still a research field that is relatively new. As of this study, the year of 2019 is coming to an end and several articles had been published which focuses on microplastics and trying to quantify the amount of microplastics that we ingest, such as the article titled “How much plastic does a person ingest weekly? A credit card’s worth in weight on average.” published on 12 Jun 2019. Hence there might be spikes related to the year depending on how much research has shown, which thus might indicate a significant improvement in the number of articles regarding microplastics in year 2019 compared to 2018.

Another limitation is in Google Trends. Google Trends may not a good representation of public knowledge or interest in the topic. Google Trends is unable to filter out irrelevant searches but can only do a generic keyword trends – for example, in the case of the keyword “plastics”, searches that included the word “plastics” but is off-topic such as “plastic surgery” would have been included in the trend even though it is irrelevant to this study. In addition, Google Search is used by many people for many different intentions, hence it cannot be easily concluded that the trend is showing the public’s interest and awareness in the keyword.

**ACKNOWLEDGEMENTS**

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