



Article

Emotional Profiles of Facebook Pages: Audience Response to Political News in Hong Kong

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Abstract: As social media becomes a major channel of news access, emotions have emerged as a significant factor of news distribution. However, the influence of cultural differences on the relationship between emotions and news sharing remains understudied. This paper investigates the impact of cultural disparities on emotional responses to political news in Hong Kong. We introduce the notion of “emotional profile” to capture cultural differences in the level and structure of audiences’ emotional responses to political topics on Facebook news pages. The study was conducted at a highly significant political moment in the former British colony when the National Security Law (NSL) was passed. The study found that readers of China-critical news pages on Facebook express the highest emotional intensity while readers of China’s media in Hong Kong express the lowest emotional intensity, and readers of China-supporting media fall in between. Readers of China-critical Facebook news pages express the most anger, but their political news sharing is correlated the most with “wow” and “sad” reactions. In contrast, readers of Facebook pages of China’s media in Hong Kong are more likely to react with “love”, which is also the emotion most associated with their political news sharing. The notion of “emotional profile” helps discover similarities within and differences across political boundaries of the news ecosystem. We interpret the results with the help of recent scholarly understanding of emotional expression on social media within Hong Kong’s political context.



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1. Introduction

Emotions are now widely recognized as one of the audience responses to news consumption. As social media becomes a major channel of news, audience’s emotional responses have recently garnered attention due to their correlation with news sharing and the exploitation of emotions by politically extremist groups for disseminating disinformation (Ganesh 2020). However, studies of audience response metrics have found systematic cross-national and intra-national differences in the “culture of engagement” (Ferrer-Conill et al. 2021), implying that the level and types of emotion aroused by identical news topics or presentations may differ across cultures. We follow this lead and focus on cultural differences in the audience’s emotional reactions to news within the news ecosystem of Hong Kong, a former British colony and now a Special Administrative Region of China. We compare the level and structure of emotional reaction of readers to political news published by outlets of different political positions. We also examine the relationship between various emotional reactions and the sharing of political news. To conduct the comparisons, we developed an original categorization scheme for news media in Hong Kong and employed computational analysis of Facebook data. Interpreting the results, we highlight the expressive, social, and instrumental aspects of emotional reactions in the digitally networked

social space. The study contributes conceptually and methodologically by proposing the notion of “emotional profile” as one aspect of the “engagement profile” (Corner 2017), operationalizing the expressed acts of the emotional culture of engagement at the level of individual Facebook pages. It offers insight into the mechanism of networked news production on Facebook in an East Asian context by investigating the association of emotional reaction and political news propagation, at a politically significant moment of the place. It contributes to understanding the changing news ecosystem under Chinese rule by mapping a wide range of news outlets. The study adds to a growing body of literature focused on audience engagement with news in non-Western societies. In the rest of the paper, we review the literature on audience engagement with news on social media and on public emotions around politics on social media before putting forth our theoretical framework. We then describe the political news landscape in Hong Kong and introduce our categorization scheme for news providers. Finally, we explain the data, methods, and research hypotheses, before reporting and discussing our results.

2. Audience Engagement on Social Media

“Engagement” has recently become a buzzword in the news industry. It is an amorphous term that encompasses all dimensions of audience responses, incorporating “elements ranging from loyalty and attentiveness to behavioral response” (Napoli 2012, p. 86). Audience engagement with news can bring normatively positive consequences such as fostering political participation (Gil de Zúñiga et al. 2014) or negative consequences such as cyberbullying and the spreading of manipulative propaganda (Quandt 2018). However, economic incentives and the desire for social relevance drive news organizations to use engagement metrics as key indicators of journalistic performance (Moyo et al. 2019).

2.1. Audience’s Like, Emotional Reaction, and Share

Metrics of the “small acts of engagement” on social media (Picone et al. 2019), commonly consisting of Like, Share, and Comment, do not always correlate (Kim and Yang 2017). Like is the most common audience response across cultures followed by comments and shares (Ferrer-Conill et al. 2021; Larsson 2018), but newsrooms consider likes the least important as their meaning remains ambiguous (Kim and Yang 2017; Larsson 2018). Gerlitz and Helmond (2013, p. 1358) argue that the like button of Facebook’s social plugin on the web is “a one-click shortcut to express a variety of affective responses such as excitement, agreement, compassion, understanding, but also ironic and parodist liking”. Shares, however, are considered the most important as they increase story views (Sehl et al. 2018). In February 2016, Facebook added the Reaction functionality. Hovering the cursor over the like button under a post, the reader will see several additional reaction emojis labeled “love”, “haha”, “wow”, “sad”, “angry”, and, since April 2020, “care”.

2.2. Cultural Differences in Emotional Engagement with News on Facebook

While the news industry’s interest in audience engagement has prompted plentiful academic studies across different countries, the context dependency of engagement has caught relatively little attention. A prominent exception is Ferrer-Conill et al.’s (2021) study, which identified different levels of audience engagement as reflected in the like, share, and comment metrics across Nordic countries and between their state-owned and privately owned news media, which they called different “cultures of engagement”. Other studies have found different levels of engagement across political lines within the same countries. Readers of alternative news, especially on the political right, reacted to, shared, and commented more than readers of mainstream news in the US and Norway (Hiaeshutter-Rice and Weeks 2021; Larsson 2019).

Different types of audience emotions have also been expressed on Facebook news in different countries and on pages of different political positions. “Angry” is the most frequent emotional reaction to Facebook news in France, whereas “love” is the highest reaction in the US and “haha” the most common in Germany (Tian et al. 2017). In Austria,

many more angry reactions were found on far-right pages on Facebook than on pages of the social democrats (Eberl et al. 2020). In the US, left- and right-leaning hyper-partisan pages received a similar level of angry reactions, but left-leaning pages received much more love and laugh reactions (Sturm Wilkerson et al. 2021). However, the most likely audience reaction to hyper-partisan news in the US, whether left or right, is anger (Sturm Wilkerson et al. 2021). Emotional reaction is widely recognized as correlated to news sharing, but which specific emotions relate to news sharing varies across countries and political divides (Larsson 2018; Tian et al. 2017).

3. Public Emotions around Politics in Networked Social Media

For a long time, emotions have been disdained in journalism studies as being associated with sensational tabloid journalism, but recently their existence and significance in all phases of the news process have gained recognition in an “emotional turn in journalism studies” (Wahl-Jorgensen 2020), informed by developments in the sociology and psychology of emotions. One of these developments is the differentiation of emotions from related human states, aptly summed up by Eric Shouse (2005): “A feeling is a sensation that has been checked against previous experiences and labelled.... An emotion is the projection/display of a feeling, ...[which] can be either genuine or feigned.... An affect is a non-conscious experience of intensity...”. Another development is the identification of socially constructed properties in feelings and emotions. Individuals label their own feelings according to the “feeling rules” (Hochschild 1979) or an “emotion norm” (Thoits 1989) and decide what emotional reaction is appropriate according to the “display rules” (Hochschild 1979) or an “expression norm” (Thoits 1989). With this knowledge, “which emotions do gain purchase in the public sphere, why, and with what consequences” emerge as important research questions (Wahl-Jorgensen 2020, p. 177).

Relevant to the “which” question, scholars have found that the characteristics of social media posts including the topic and language such as emotive or populist language correlate with the level and type of the audience’s emotional reactions (Eberl et al. 2020; Jost et al. 2020; Sturm Wilkerson et al. 2021). However, the audience’s emotional responses, in turn, impact the news produced in a feedback loop between news consumers and producers (Beckett 2015). This makes the cause and effect of audience reactions and the news texts less clear. On the other hand, the design of the social media platform helps to answer the “why” question. The social media metrics on social media platforms have been found to act as “popularity cues” (Haim et al. 2018) in providing “social navigation” (Lünich et al. 2012) to the audience’s emotional reactions. The social process is expected to encourage a shared emotional interpretation of the news in the social network.

The existence of a shared interpretation strategy is central to the notion of “interpretive community” used by Janice Radway ([1984] 1991). Separately, discursive interactions in digitally connected spaces among participants with political discontent underlie the notion of “affective public”, conceived by Zizi Papacharissi (2014). Based on a study of Twitter users’ collaborative news making via hashtags during political movements, and defining affect broadly to subsume feelings and emotions, affective publics are defined as “publics that actualize by feeling their way into politics through media” (Papacharissi 2014, p. 115). Research on community and public formation is relevant to the “consequence” question. However, although abundant research has been conducted on community formation in online spaces, they primarily examine the use of language exchanges, and far less is known about the role of emojis in community formation. Emojis have been found to have a strong impact on reader perceptions of the writer’s commitment and personal mood (Ganster et al. 2012). Another study, conducted in online game environments, concluded that phatic emojis can help to create and/or reinforce community among players (Graham 2019, pp. 388–9).

4. Theoretical Framework

Ferrer-Conill et al.’s (2021, p. 96) notion of “culture of engagement” refers to “differences in how readers engage with news posts depending on the country of origin and

whether they are state- or privately owned outlets". We expand this conceptualization to encompass differences between media categories by political position, focusing on readers' emotional reactions. This extension and focus are justified as the studies reviewed above have found that readers of news of different political positions engage with news at different levels and express different types of emotions. Spotlighting the emotional aspect of cultures of engagement is consistent with research findings that emotional cultures operate at societal and group levels (Gordon 1989). Since human emotional response aligns with their underlying cognitive appraisal (Scherer 2005), we expect to find different emotional cultures of engagement in different media categories. Within the same media category, we expect minor differences between news providers due to their relatively unique engagement profile. Corner (2017, p. 2) suggested the term "engagement profile" to refer to "a variety of levels of engagement/involvement...generated across audiences who bother to attend at all, ranging from intensive commitment through to a cool willingness to be temporarily distracted right through finally to vigorous dislike" around a media product. Amid the wide range of audience responses, we limit our attention to the mix of emotional reactions to various political topics and operationalize it as the "emotional profile" of the Facebook page. In homage to Raymond William's notion of "structure of feelings" (Filmer 2003), we define the emotional profile of a Facebook public page as a composite measure that operationalizes the structure of feelings as emotional reactions expressed on a range of topics in the posts of the page over a period of time.

Informed by the literature review above, we consider that emotional reactions on Facebook are not a mere reflection of individual readers' emotions aroused by reading the posts. The count of reactions to each type of emotion to a post has at least two meanings: one, it is the aggregate of various readers' emotional expressions to the post in consideration of appropriateness in the social network, and two, it is a signal to future readers of the post which emotional reactions are appropriate for expressing. The total count of emotional reactions to a post on Facebook, on the other hand, signals both the popularity of the post and the number of readers in the interpretive network of the post who make their emotional expression visible.

We see users' emotional reactions on a Facebook public page as social acts involving the public display of selected emotions associated with one's names in an interpretive network. In addition, the reactions could also express the users' feelings, or they could be enacted to achieve strategic goals. The interpretive network exists at the level of the Facebook public page and is activated from time to time around individual social media posts of the page, involving readers who interact with the particular post and with each other about the post. The interpretive network of a Facebook page also connects with those of other pages holding a similar political position through common followers of the pages and news sharing by readers of the pages. Unlike Radway's ([1984] 1991) concept of interpretive community, in online interpretive networks, we foresee the likely existence of a minority of users holding views that contest the majority interpretation, as has been found in networked framing studies of political issues (Meraz and Papacharissi 2013; Nip et al. 2020). In Papacharissi's (2014) conceptualization, affective publics are constructed through semantic discourses. However, we believe that users' emotional reactions on a Facebook page complement and support their commenting and sharing of news in building an affective public around the page and on networked pages.

5. Political Landscape of News in Hong Kong

Hong Kong's press freedom became an issue of concern following the 1984 agreement between Britain and China on sovereignty transfer. In 1997, the year of the political changeover, the Chinese-language news media in Hong Kong consisted of the mainstream (commercial) media, the de facto public broadcaster RTHK, and the local Party press.¹ Departing from the "centrist" model of journalism adopted in the 1970s (Chan and Lee 1989), the mainstream news media have become progressively influenced by—and supportive of—the Chinese authorities since the 1980s (Chan and Lee 1991; Frisch et al. 2018). In the

past decade, China's influence in the Hong Kong media has accelerated as local Party newspapers and China's national news media both started online products to target Hong Kong, while appointees of China's political structure, office bearers of China's United Front organizations,² and individuals involved in China-supporting politics in Hong Kong have started other pro-China digital news media. A notable exception in the mainstream news media was the *Apple Daily*, launched in 1995, which was highly critical of the Chinese regime. From the early 2000s, online dissenting media have also appeared.

The left–right division in Western societies cannot be directly mapped onto the politics in Hong Kong, where the degree of support for the Chinese Party-state is a better way to gauge the political position of the news providers. Under Chinese rule, opinion polarization in Hong Kong has intensified since 2003 (Chan and Fu 2017), when the first wave of large-scale street protests occurred. Supporters and opposers display different media consumption patterns, with protesters relying on dissenting news media and Facebook and anti-protesters consuming traditional media (Centre for Communication and Public Opinion Survey (CCPOS) (2020)). Given this, we expect news pages on each side of the political divide regarding China to have different emotional cultures of engagement.

6. Data and Methods

6.1. Media Sampling

The study focused on Chinese-language news providers headquartered in or targeting Hong Kong.

We started with lists of newspapers and broadcasters published by the Hong Kong government. Noting the absence of some widely known pro-China outlets on the lists, we included the Hong Kong service of China's national official media and searched for pro-China news outlets in local news reports extensively. For each outlet, we chose the Facebook page that published about society and politics.³ This resulted in 52 Facebook pages after excluding those that did not publish in the data period. We focused on the Facebook pages of the news providers because, at the time of data collection, online channels, and particularly Facebook, were the most used sources of news (85% and 58%, respectively) in Hong Kong (Chan et al. 2020).

6.2. Media Categorization

Academic studies and journalistic reports about the news media in Hong Kong commonly describe certain outlets as “pro-China” without identifying the correlates of such an ideological positioning. In view of the rapid growth of “pro-China” news outlets in recent years, we devised a categorization scheme to differentiate among them. The categorization considers two dimensions: (1) the location of the headquarters of the news outlet, and (2) the political–economic relationship between the news provider and the Chinese Party-state. Considering the first dimension, despite distinctions between Party/official and market/non-official media in mainland China (Stockmann 2013), all China-headquartered media in Hong Kong face equal restrictions when discussing national security issues under the Administrative Measures for Internet Information Services (State Council of the People's Republic of China 2020), distinguishing them from Hong Kong-based media outlets. For the second dimension, we analyzed the ownership of the news provider and the political awards/appointment and business connections of the owners/responsible personnel/majority shareholders in China. To do this, we corroborated information from Hong Kong's company registry, annual company reports, news reports, and academic research. This resulted in three categories: (1) China media, consisting of news providers headquartered in mainland China and those owned by them in Hong Kong; (2) China-supporting media, consisting of news providers headquartered in Hong Kong whose leadership is connected to China politically and/or economically; and (3) China-critical media, whose leadership does not bear identifiable political or economic connections with China (Table 1).

Table 1. Categorization of sampled news providers in HK.

Category	Subcategory	Media Name	Follower No. *
China media (n = 12)	China national Party media	cctvhongkong	18.5K
		ChinaNewsService	1.16M
		Rmwhk	1.53M
		TongMediaHK	430.0K
		XinhuaHK	467.5K
	China local Party media	dotdotnews	21.5K
		hkorangenews	254.1K
		lionrockdailyhk	6.5K
		TWKK.HK	20.9K
		wenweipo	7.4K
	China national/global market media	Hongkongsina	158.6K
		PhoenixTVHK	28.4K
China-supporting media (n = 28)	HK pro-China digital media	Bastillepost	1.03M
		flamingwheels2019	75
		hk01.news	456.2K
		hk01wemedia	672.3K
		hkgpaocomhk	63.2K
		HongKongGoodNews	615.1K
		HKInsights	50.6K
		kinliuhk	33.7K
		litenevshk	22.2K
		looop.hk	34.2K
		masterinsightcom	67.4K
		silentmajorityhk	345.2K
		speakouthk	520.7K
		tap2world	511.8K
		thinkhongkong	222.4K
		todayreview88	170.4K
	HK mainstream media	am730hk	457.3K
		crhknews	44.3K
		ctnnet	783
		headlinehk	202.9K
		icable.news	924.6K
		MetroDailyNews	9.5K
		mingpaoi news	430.5K
		now.comNews	571.6K
		onccnews	750.2K
		RTHKVNEWS	999.6K
		singtaohk	49.0K
		Skyposthk	811.4K

Table 1. *Cont.*

Category	Subcategory	Media Name	Follower No. *
China-critical media (n = 12)	HK centrist digital media	fans.hkgolden	527.4K
		HK.CitizenMedia	58.1K
		theinitium	335.0K
		therightnewshk	8.5K
		truthmediahk	57.9K
	HK independent digital media	hkcnews	229.9K
		inmediahknet	682.8K
		maddogdailyhk	103.1K
		post852	75K
		Standnewshk	1.65M
	HK anti-China traditional media	hk.nextmedia	2.835M
		nextmagazinefansclub	54.1K

* The follower numbers were dated 1 July 2020 in the Asia/Shanghai (CST) time zone, manually collected from Intelligence on CrowdTangle on 14 July 2021, except for four pages (dotdotnews, hk.nextmedia, nextmagazinefansclub, and post852), which had closed at the time and for which we relied on estimates based on data from third-party sources.

6.3. Time Sampling, Data Collection, and Pre-Processing of Posts

Triggered by the government-proposed Extradition Law Amendment Bill (ELAB), in 2019–2020, Hong Kong experienced the largest-ever anti-government protests in its history, which increased political polarization, with supporters of the establishment labeled “blue ribbon” and opposers “yellow ribbon”. The events ended with China’s imposition of the National Security Law (NSL) on Hong Kong in 2020, which has been widely criticized for its broad scope and ambiguity that could enable the repression of political opposition and free speech. Our study captures this significant historical moment. Through the API of CrowdTangle, a public insights tool owned and operated by Facebook, we collected all posts from the 52 pages between and including 21 May 2020 (the date when the Chinese authorities announced that an NSL would be passed for Hong Kong) and 31 July 2020 (the date when the Hong Kong Office on National Security newly established by the Chinese authorities first met with the Hong Kong government’s Committee on National Security). We recorded the text (excluding visuals and videos) and the number of reactions, shares, comments, and likes for all posts.

The raw text data contained advertisements as well as other forms of noise such as signatures or links to the page’s other social media platforms. We used a mix of heuristic rules and regular expressions to clean the data. We then tokenized the text of the cleaned posts using the *jieba* library (Sun 2020), augmented with a Cantonese-specific dictionary (Shen et al. 2021), and filtered stop words. The data cleaning and pre-processing yielded a dataset of 89,896 posts containing, on average, 163 tokens (independent semantic units of one or more Chinese characters).

6.4. Topic Modeling of Posts

To identify the main topics present in the text of the news posts, we first applied a machine learning technique known as topic modeling to the dataset, using the non-negative matrix factorization (NMF) algorithm. The technique also enabled us to estimate the proportion of discourse devoted to each of the topics in each post. We opted for NMF over the more popular LDA (Latent Dirichlet Allocation) method because it has been shown to significantly outperform LDA with short texts (Si et al. 2022). We relied on the TC-W2C coherence measure, adapted to NMF (Greene and Cross 2017) to select the number of topics, and manually verified its appropriateness by iterating over neighboring topic numbers.

The method produced seven different topics, which we labeled based on the most indicative keywords and the content of posts as: “NSL”, “COVID-19”, “International & China”, “Police”, “Hong Kong”, “Confirmed COVID cases”, and “Legislative affairs” (Table 2).

Table 2. The seven topics generated from topic modeling and their 10 most representative words.

Topic No.	Topic Label	Top 10 Keywords
0	NSL	NSL, Hong Kong region, Hong Kong version, legislate, country, Basic Law, central authorities, national security, National People’s Congress, bill
1	COVID-19	New corona, pneumonia, epidemic, virus, mouth mask, health, new strain, epidemic prevention, test, fight the epidemic
2	International & China	United States, China, Trump, president, sanction, Sino-US, Pompeo, Britain, relations, protests
3	Police	Police, police officer, citizen, defendant, arrest, Causeway Bay, man, arrested, rally, scene
4	Hong Kong	Hong Kong, country, security, safeguard, legislate, one country–two systems, central authorities, law, national security, society
5	Confirmed COVID cases	Confirmed diagnosis, case, newly added, Hong Kong, centre, infection, sick case, accumulated, preliminary, new strain
6	Legislative affairs	Legislative Council, election, primary election, democratic camp, vote, meeting, enter into the election, councillor, government, mutual destruction

We eliminated posts whose content did not contain a significant proportion of any of the seven topics by applying a threshold. This left us with 51,280 relevant posts. Out of the seven topics, we narrowed down the dataset to the political topics (NSL, police, and legislative affairs), leaving us with 24,652 posts, which we call political posts below.

6.5. Emotional Analysis of Audience

Considering the unclear status of like, we focused on the six newer reactions as indicators of the reader’s emotions. These reactions have often been assumed to be good indicators of the audience’s actual emotional attitudes (Tian et al. 2017). However, as discussed above, we do not analyze the metrics of emotional reactions as a measure of the readers’ emotional states, but rather as emotional expressions within specific social contexts. Focusing on the audience’s emotional reactions allows us to overcome several limitations of traditional text-based approaches, which often focus on the content or sentiment of the post rather than comments and fail to provide an understanding of the effect of the posts on the audience. When comments are analyzed, one must contend with the fact that users who comment are far fewer than those who merely react; using them as a primary data source thus allows us to capture reactions from a wider set of users. Furthermore, text-based sentiment analysis most commonly classifies texts on a crude negative–(neutral)–positive scale. This assumes a single way of reacting to a post and fails to consider the diversity of audience reactions. Sentiment analysis libraries, which may display good performance on their training dataset, may not perform well when applied to domains not covered by the original dataset or to ambiguous text. Indeed, as part of our preliminary data exploration, we used human coders to manually annotate the sentiment of a subsample of the posts on a positive–neutral–negative scale and found very low intercoder agreement, which would make any algorithm trained on data with such interpretational variability unreliable. Although emotion recognition algorithms offer a finer-grained look by classifying text into several different emotions, state-of-the-art algorithms offer far less reliable results than binary detection of positive/negative sentiment (Alswaidan and Menai 2020), especially for languages such as Cantonese. In contrast, using reactions—data provided by actual users—allows us to do away with the unreliability of sentiment and emotion detection algorithms.

6.6. Emotional Profiling of Facebook Pages

While abundant research has been conducted to correlate emotional reactions with national and subnational divisions, we seek to explore the utility of emotional reactions as an indicator of the political stance of the audience around a Facebook page. Based on the expressed emotional reactions, we created an indicator that we call “emotional profile”. The emotional profile of a page considers the mix of content from the various topics identified in each of the posts as well as the type of audience emotional reaction to the post. We define it as the relative frequency distribution of the reactions of a page’s readers to each of the topics present in its posts.

For each page, topic modeling gives us a matrix A of dimension $n \times m$, where n is the number of posts and m the number of topics, so that the value $a_{i,j}$ for $i \in [1, n]$ and $j \in [1, m]$ will be the normalized weight of topic j present in post i . We also have a matrix B of dimension $n \times 6$, containing the number of each of the six reactions generated by every one of the n posts in our dataset. We first compute the product of A^T and B to distribute the number of reactions to a post across the topics covered in it and aggregate the results across all posts. We thus obtain a $6 \times m$ matrix C and compute row-wise percentages so that the value $c_{i,j}$ for $i \in [1, 6]$ and $j \in [1, m]$ gives us a representation of the proportion of reaction i to topic j as a percentage of all reactions to topic j . We flatten the matrix into a $6 \cdot m$ dimensional vector which constitutes the emotional profile of the page. We rely on proportions so that the profiles are relatively independent of the overall level of intensity of reactions and instead express the structure of emotional engagement.

6.7. Research Hypotheses

Given the above-discussed context, we expect that readers of China-critical media feel more intensely about political topics than readers of China-supporting media or China media.

H1a. Facebook pages of China-critical HK media receive a higher level of emotional reactions than China-supporting HK media over political news.

H1b. Facebook pages of China-supporting HK media receive a higher level of emotional reactions than China media in HK over political news.

With the NSL implemented, we expect the China media and China-supporting media to tone down the antagonistic atmosphere in Hong Kong and encourage harmony, whereas readers of China-critical media would express high anger.

H2a. Facebook pages of China media in HK evoke a different structure of emotional reactions from China-supporting HK media over political news.

H2b. Facebook pages of China-supporting media in HK evoke a different structure of emotional reactions from China-critical HK media over political news.

H2c. Facebook pages of China-critical HK media evoke proportionally more anger among their audience than China-supporting HK media over political news.

H2d. Facebook pages of China-supporting HK media evoke proportionally more anger among their audience than China media in HK over political news.

Given the long history of protests in post-handover Hong Kong, we reckon that anger is a highly relevant emotion. Since the protests mobilized a far larger portion of the population than pro-government rallies, we expect the angry reaction moved readers of China-critical media to higher political participation in the form of sharing and commenting on political news.

H3a. Angry reaction on Facebook pages of China-critical HK media is more strongly related to the audience’s sharing of political news than on Facebook pages of China-supporting HK media.

H3b. Angry reaction on Facebook pages of China-supporting Hong Kong media is more strongly related to the audience’s sharing of political news than on Facebook pages of China media in Hong Kong.

H4a. Angry reaction on Facebook pages of China-critical HK media is more strongly related to the audience's commenting on political news than on Facebook pages of China-supporting HK media.

H4b. Angry reaction on Facebook pages of China-supporting Hong Kong media is more strongly related to the audience's commenting on political news than on Facebook pages of China media in Hong Kong.

6.8. Analyses

To provide a background for the comparisons, we analyzed:

1. The volume of all the posts published by each of the news pages and media categories;
2. The news agenda, measured by the proportion of the news topics above the set threshold in all the posts, of each of the news pages and media categories.

To test the hypotheses, we compared:

1. The level and proportion of each of the emotional reactions made by readers to the political posts of each of the media categories and news pages;
2. The correlations between the level of each of the emotional reactions and the number of news shares as well as the number of comments among the political posts of the media categories.

7. Results

7.1. Volume of News Publishing

News providers of the three media categories differed substantially in the number of posts they published in the 72 days of the data period: China-supporting HK media published the most—with an average of 1954.6 posts per page (27.1 posts per page per day)—followed by China-critical HK media—1786.0 posts per page (24.8 posts per page per day), and then China media in HK—1144.5 posts per page (15.9 posts per page per day). However, statistical difference in the average number of posts per page is found only between China-supporting HK media and China media in HK at $p = 0.1$ due to the small number of pages in the categories.

7.2. News Agenda

The news agenda of the three media categories differed substantially. Despite the high significance of the NSL, the China media covered the three political topics (NSL, police, and legislative affairs) the least (13.1 percent), followed by China-supporting media (33.6 percent), both much lower than China-critical media (58.7 percent) (Figure 1). These differences in the news agenda are consistent with the expectations behind our hypotheses.

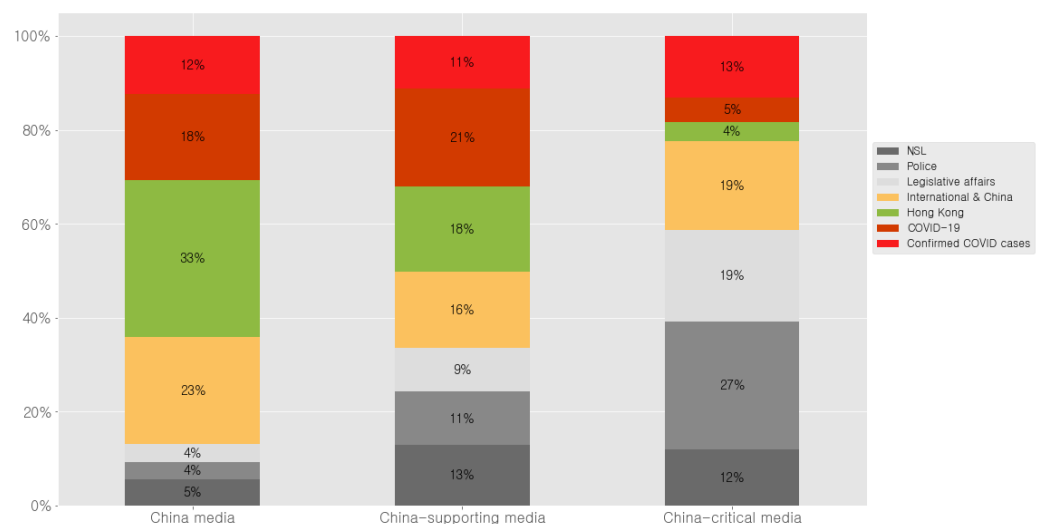


Figure 1. Proportion of seven topics by media category.

7.3. Emotional Intensity

China-critical media received a much higher average number of emotional reactions per political post ($n = 1344.0$) than China-supporting media ($n = 308.6$) or China media ($n = 38.0$). This is partly because the two pages with the largest follower number, hk.nextmedia and standnewshk, were China-critical (Table 1). This is also because their readers were more active in reacting emotionally, as shown in the average number of emotional reactions per political post per follower. The differences between the three media categories apply to each of the six emotions in political posts (Figure 2). Pairwise comparisons using Tukey's HSD test indicate that all differences except two are significant at the 0.001 level.⁴ H1a and H1b are confirmed.

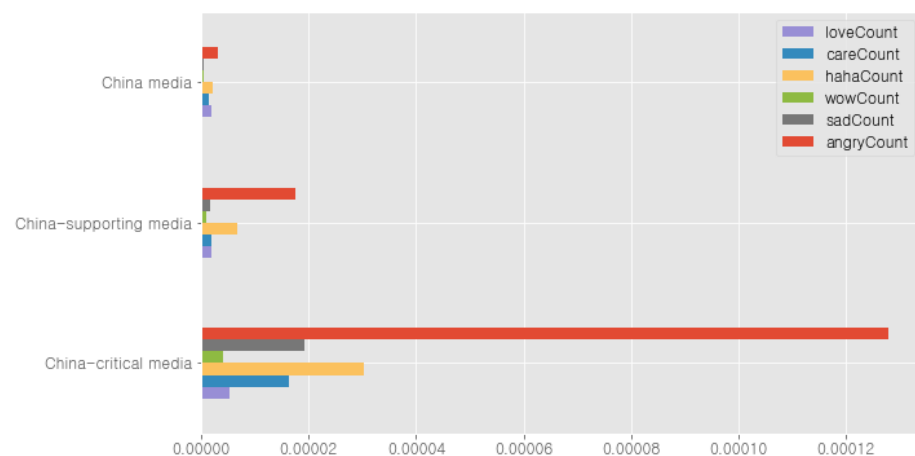


Figure 2. Average number of emotional reactions per political post divided by follower count.

7.4. Structure of Emotion

7.4.1. Proportion of Different Emotional Reactions

Anger is the most prominent emotion expressed on political posts in all the three media categories, but its proportion is far lower in China media (33.0%) than in China-supporting media (57.2%) or China-critical media (62.9%) (Figure 3). China media evoke the highest proportion of love reactions (20.8%) compared to the other two media categories (Figure 3). Pairwise comparisons using Tukey's HSD test indicate that all differences except two are significant at the 0.001 level.⁵

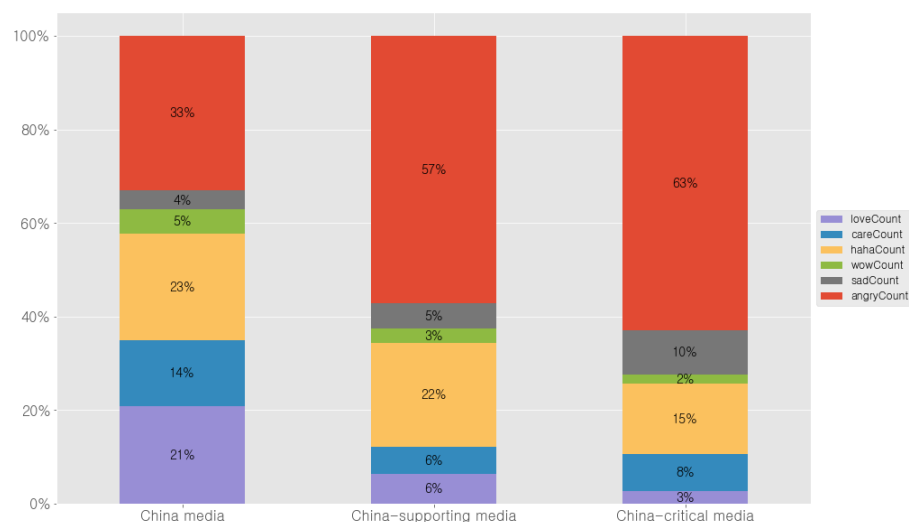


Figure 3. Average proportion of emotional reactions to political posts by media category.

The level of angry reactions to the NSL topic is significantly different ($p < 0.05$) between the three media categories, with China media being the lowest, higher for China-supporting media and the highest for China-critical media. However, on the legislative affairs topic, readers of China-supporting media were angrier than China-critical media (Table 3). In fact, the proportion of all the six emotions differs between all pairs of the three media categories in each of the political topics, except in the care reaction in the NSL topic, the care, haha, and sad reactions in the police topic, and the wow reaction in the legislative affairs topic (Table 3).

Table 3. Average proportion of emotional reactions to political topics in political posts by media category.

Topic	Emotion	China Media	China-Supporting Media	China-Critical Media
NSL	Love	31.6% †§	7.9% *§	2.5% *†
	Care	19.7% †§	4.8% *	6.1% *
	Haha	28.0% †§	29.9% *§	25.2% *†
	Wow	1.8% †§	2.4% *§	2.1% *†
	Sad	1.0% †§	3.5% *§	7.9% *†
	Angry	17.8% †§	51.6% *§	56.3% *†
Police	Love	7.4% †§	5.2% *§	2.4% *†
	Care	9.9%	7.4% §	7.3% †
	Haha	20.0% §	13.3% §	8.5% *†
	Wow	9.3% †§	4.1% *§	1.8% *†
	Sad	8.2% §	9.1% §	11.5% *†
	Angry	45.1% †§	60.9% *§	68.4% *†
Legislative affairs	Love	27.2% †§	5.3% *§	3.1% *†
	Care	11.7% †§	5.4% *§	11.8% *†
	Haha	20.6% †§	25.1% *§	21.9% *†
	Wow	3.0% †§	1.9% *	2.4% *
	Sad	1.5% †§	1.9% *§	4.2% *†
	Angry	36.0% †§	60.4% *§	56.7% *†

* indicates a significant pairwise difference with China media ($p < 0.05$), † a significant difference with China-supporting media, and § a significant difference with China-critical media.

7.4.2. Emotional Profiles

We trained a machine learning classifier to predict the category each page would be classified into based on their emotional profile, i.e., the relative proportions of different reactions to each different topic. We used the Random Forest algorithm with 10-fold cross validation, with a mean F-score of 80.5% (standard deviation 0.09). We isolated the 10 most salient features used by the train model to make a prediction. We then plotted, for each category, the average proportion of each feature among the pages included in the category (Figure 4). This allows us to focus on the aspects of the pages' emotional profile that were most likely to be representative of their category. We can then, in turn, visualize how each category differs from the others. The results validate our postulation that pages taking a different political position have significantly different cultures of emotional engagement. China-critical media pages, for instance, are characterized by angry reactions to NSL- and police-related news. While those features are also characteristic of China-supporting media pages, the scale is comparatively lower. In contrast, angry reactions to the NSL are virtually irrelevant for China-media pages' where instead the love reaction to the NSL is highly represented. While also important, albeit to a lesser extent, among

China-supporting media pages, love reactions to NSL-related news are virtually absent from China-critical media pages.

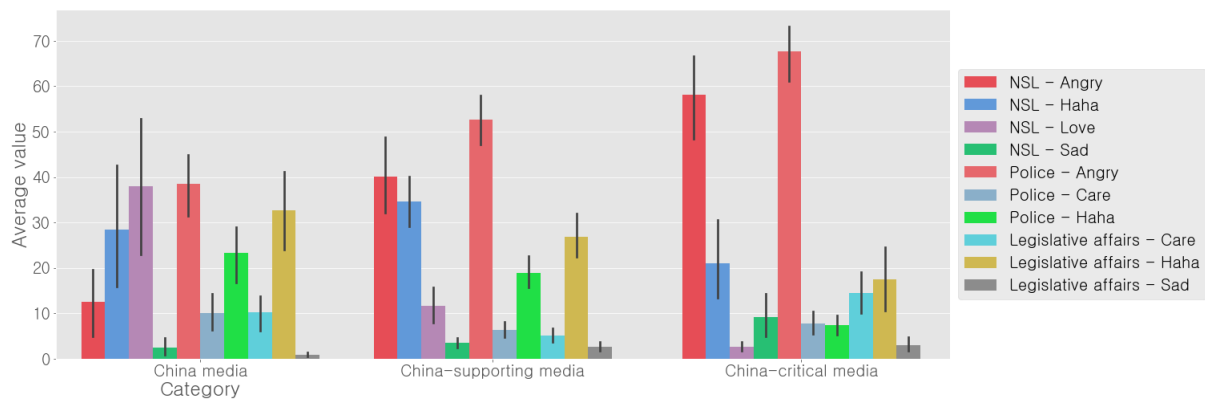


Figure 4. Average (standard deviation indicated by the black line) proportion of each of the 10 most salient features among the categories.

The above analyses of proportion of emotional reactions and emotional profiles together provide evidence for a different structure of emotional reactions over political topics between China media in HK and China-supporting HK media, and between China-supporting and China-critical media. H2a and H2b are supported. The anger expressed over political topics by China-critical media is higher than in China-supporting media, which, in turn, is higher than in China media. Hypotheses 2c and 2d are supported.

7.5. Angry Reaction and News Share

The political posts of China media and China-supporting media, in that order, drew fewer shares and comments than China-critical media (Table 4). Consistent with studies elsewhere, the total reaction count of political posts correlates significantly with the *sharing* of political posts, but the relationship is the strongest among China-critical media (Table 5). In both China-critical and China-supporting media, angry reaction to political posts is significantly associated with sharing of political posts, but the correlation is stronger among China-critical media; H3a is supported. Angry reaction to political posts in China media is *not* significantly related to sharing of political posts (Table 5); H3b is supported.

Table 4. Average share and comment count by media category.

	China Media	China-Supporting Media	China Critical Media
Average <i>share</i> count per political post	14.9	63.3	251.9
Average <i>comment</i> count per political post	26.2	150.2	250.3

The emotions associated most strongly with political post sharing differ among the three categories: On China-critical media, it is wow ($r = 0.9473$, $p < 0.0001$) and sad ($r = 0.9166$, $p < 0.0001$); on China-supporting media, it is care ($r = 0.7585$, $p < 0.0001$) and love ($r = 0.6826$, $p < 0.0001$), which also apply to China media except in a different order (love $r = 0.8489$, $p < 0.001$; care $r = 0.8013$, $p < 0.01$) (Table 5).

Where commenting on political news is concerned, the association with anger is again the strongest among China-critical media, more so than China-supporting media, whereas among China media the two are not related. H4a and H4b are supported. However, among China-critical media, it is love that is most strongly correlated with political news com-

menting ($r = 0.9030$, $p < 0.0001$), but among China-supporting media, it is care ($r = 0.8694$, $p < 0.0001$), and among China media it is haha ($r = 0.84189$, $p < 0.05$) (Table 5).

Table 5. Pearson’s correlation coefficients of reaction count and share/comment count in political posts.

Emotional Reaction	China Media		China-Supporting Media		China-Critical Media	
	Share	Comment	Share	Comment	Share	Comment
love	0.8489 ***	0.7583 **	0.6826 ****	0.8608 ****	0.8404 ***	0.9030 ****
care	0.8013 **	0.6996 *	0.7585 ****	0.8694 ****	0.7674 **	0.78418 **
haha	0.6552 *	0.8418 *	0.4885 **	0.7849 ****	0.4197	0.2671
wow	0.3743	0.2279	−0.0586	−0.0849	0.9473 ****	0.8184 **
sad	0.3460	0.2647	0.5776 **	0.5360 **	0.9166 ****	0.7653 **
angry	0.3900	0.3814	0.6628 ***	0.6472 ***	0.8724 ***	0.7804 **
All reactions	0.7828 **	0.7411 **	0.7091 ****	0.8160 ****	0.8869 ***	0.7941 **

**** $p < 0.0001$, *** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$.

8. Discussion and Conclusions

Relying on 52 public pages of Hong Kong news media on Facebook, which we group into three categories, we find that China media, and to a lesser extent, China-supporting media, reported far less political news than China-critical media on Facebook, although China-supporting media were as active as China-critical media in publishing news posts. The limited coverage of politics in news published by China and China-supporting media is consistent with the Chinese leadership’s vision for Hong Kong as an economically driven city rather than a politically charged one.

Comparing political news published by the three media categories, China media fetched the fewest emotional reactions, shares, and comments, while China-critical media fetched the most. As said above, sentiment analysis methods would not provide a reliable measure of the emotions embedded in the political posts, therefore making it impossible to check how they might correlate with the audience’s emotional reactions. In such absence, the first author conducted a qualitative reading of a large subsample of the most reacted-to posts published by the three media categories but did not detect a noticeable difference in the amount of emotional content in the posts between the media categories. Since emotions relate to news sharing, the very different levels of emotional reactions towards political news published by the three media categories would mean that political news published by China-critical news providers is shared much more often than that of China-supporting media or China media. The differences are further underpinned by the larger numbers of followers of the top pages in the China-critical media category. However, in the news ecology of Hong Kong as a whole, the greater number of China-supporting news providers may compensate for the shortfall.

The high level of anger found among pro-democracy China-critical media provides a contrast, under different political contexts, to studies in the US and Europe, where partisan right-wing media are the angriest. However, on pages of different political positions in Hong Kong, anger, the most common emotional reaction across the three media categories, is directed towards different targets, in alignment with the news provider’s political position. For example, the post that drew the largest number of angry reactions in the China-critical media category is about a policeman stamping on a man’s calf while arresting him. In contrast, a post about the Hong Kong Lawyers’ Association condemning the physical attack of a lawyer who argued with rioters blocking the road solicited the most angry reactions on the China-supporting page speakouthk. These examples support the interpretation that the angry emotional reactions on the pages serve to express the users’ feelings about the events reported in the news. A non-representative survey conducted in Hong

Kong soon after the passing of the NSL found that anger was the most experienced emotion (80.5%) (Cheng et al. 2022). At the same time, making an angry emotional reaction can be a social act as a public display of defiance in a relatively safe space among people with a shared interpretation of politics, and which cannot be done elsewhere without substantial risks in Hong Kong's changed political environment. Further, angry emotional reactions can be a strategic act of political mobilization, as emotions have long been recognized as a motivation for people to join social movements (Jasper 1998). In this light, the differential levels of user engagement are indicators of the level of online activism associated with different political positions. Such differentials are consistent with the differential strengths in the offline mobilization of the China-critical versus the China/China-supporting camp, as evidenced in the scale and duration of protests and riots against the Hong Kong-China government in 2019–2020.

We foresee that the frequent acts of emotional reactions reinforce the emotional bond between users on the Facebook pages, fortify their shared emotional interpretation, and strengthen their shared cognitive interpretation of political news. The shared emotional and cognitive orientations in the networks lay the cornerstone of a discursively constructed affective counter-public that contests hegemonic discourses disseminated by the China media and China-supporting media.

This study makes the first attempt to compare the audience's emotional responses to political news in Hong Kong in the post-NSL period. We have found systematic differences in the level and structure of emotions expressed by audiences over political news among three media categories differentiated by their political-economic relationship with the Chinese Party-state. We also found different types of emotion correlated most strongly with audience sharing and commenting of political posts. The results provide evidence that the political position acts as a dimension of differentiation of emotional cultures of engagement on Facebook in the same news ecosystem. The correspondence between the results of classifying the emotional profiles of individual Facebook pages and the manual categorization of news outlets demonstrates the usefulness of the notion of "emotional profile" that we propose, as it enables comprehension and comparison of news products at the reception end, beyond description based on audience demographics or analysis at the production end based on news content.

The news ecology on Facebook is changing rapidly. Since this study was conducted, six news providers included in the China-critical category of our sample, *hk.nextmedia*, *nextmagazinefansclub*, *standnewshk*, *hkcnews*, *maddogdailyhk*, and *post852*, have ceased operation under pressure of the NSL. In post-NSL Hong Kong, even sharing a public Facebook post can become liable to criminal prosecution (Cheng 2022); large numbers of public Facebook pages have closed (Creery 2020). These changes will undermine the political consequences of user engagement on Facebook. On the other hand, Facebook has demoted political content in the platform's algorithm since early 2021 (Horwitz et al. 2023). While such a move might help to mitigate polarization in the north American context, it is likely to further limit public expression and dissemination of China-critical political content in places such as Hong Kong.

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Conflicts of Interest: The authors declare no conflict of interest.

Notes

- ¹ *Ta Kung Pao*, *Wen Wei Po*, and *Hong Kong Commercial Daily* are widely recognized as Chinese-language official newspapers of the Chinese Party-state in Hong Kong (called local Party papers here). The three papers have been indirectly owned by the Chinese government's Liaison Office in Hong Kong (CLO). *Lion Rock Daily* is a free newspaper co-owned by *Ta Kung Pao* and *Wen Wei Po*; *Dot Dot News* is owned by the top personnel of *Ta Kung Pao* and *Wen Wei Po*. *Orange News* is indirectly owned by CLO.
- ² For an explanation of China's United Front work, see <https://thediplomat.com/2018/02/chinas-united-front-work-propaganda-as-policy/> (accessed on 5 May 2023).
- ³ From the "list of registered newspapers", the "list of analogue sound broadcasting services in Hong Kong" and the "list of licensed broadcasting services in Hong Kong", we excluded English-language newspapers, business media, and other specialist media, and non-domestic television service operators. We identified four China-supporting news providers outside the government lists. Hk01.com is the largest digital native news provider in Hong Kong, and is generally considered pro-China. Hk01.com ran two separate Facebook pages on society and politics, both of which we included in our comparison.
- ⁴ Differences between China media and China-critical media for the haha reaction and between China media and China-supporting media for the care reaction are not significant.
- ⁵ Differences between China media and China-supporting media for the wow reaction is significant at the 0.01 level, and between China media and China-critical media for the care reaction is not significant.

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