Network Agenda Setting on Adolescent Depression: Distinctions Between Integrated and Professional Social Media Organizations

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Abstract. These days, it can be seen that an increasing number of people, especially the youth, are getting trapped by depressive disorders, and thus more and more attention has been paid to this topic. But to what extent media users’ attitude towards those adolescents are influenced by authority are still remains unclear. Based on the NAS (network agenda setting) theory, our study focused on the media and public users’ attitude towards adolescent depression on Sina-Weibo in order to explore this theory in the context of health communication. Furthermore, we captured hundreds of posts on this media platform using big data analytics and divided those accounts into three categories: (1) integrated media organizations, (2) professional media organizations, and (3) public users. Then we employed context-analyzing method to study them, and a network analysis was also conducted to examine our initial hypotheses by using the QAP. The research results reveal that media agenda correlate with the public users, and the two types of media mentioned above have different levels of impact.

Keywords: network agenda-setting · adolescent depression · social media · content analysis

1 Introduction

Depression is one of the leading causes of suicide. People with depression may get the constant feeling of helpless and hopeless. It is estimated 3.76% of the world’s population have to cope with this painful mental disorder [1], and the situation is likely to get worse due to the continued spread of COVID-19, with people feeling more isolated than ever before. Unlike other medical conditions, signs and symptoms of depression can be deficiently recognized, as many people may just simply label it as “feeling sad”. Especially for teenagers, an age group that are generally considered as sensitive, irritable or even uninhibited, their negative emotions are often underestimated or ignored by the peer.
society [2]. In such moments, media plays a particularly important role, not to mention social media—a form of communication that has influenced the entire world since its inception. Actions are taken by the integrated and professional media organizations from the online community to set the agenda on highlighting the seriousness of adolescent depression and fostering the public engagement on the topic. However, things are far from being perfect. Knowing that social media develops a wider range of audience, the target information that the official organizations try to illustrate is to some extent unattainable and uncontrollable, and the quality of its agenda-setting ability has been a concern of many researchers for years [3].

For several decades, scholars have been trying to study agenda-setting effects on different levels.

From the beginning, the birth of agenda-setting is marked by the seminal 1968 Chapter Hill study conducted by McCombs and Shaw (1972) [4], during which they proposed the first level of this paradigm, claiming that media can focus public attention on a small number of key issues and topics (McCombs, 2005) [4]. At that time, researchers mainly examined how the media set the agenda of public opinion and only public issues like elections were studied [5]. The second level of agenda-setting was also put by McCombs in 20th 70s, the core opinion of which is elements prominent in the mass media’s picture of the world influences those elements in the audience’s picture [6]. And in early 21st century, after examining it both empirically and theoretically, Mccombs and his team came to the third level of it, which is called network agenda setting (NAS), proposing that news media can bundle different sets of objects or attributes and make these bundles of elements salient in the public’s mind simultaneously [7].

After years of studying, agenda-setting theory has developed to three levels, and all of them demonstrate the key role social media plays in residents’ participation in public affairs.

These days, many scholars are trying to expand this theory by studying the third level of it. For example, Hong Vu and Lei Guo et.al (2014) [8] examined the NAS theory in a broader scale during a much longer periods of time. Using data on the Project for Excellence in Journalism (PEJ) and the public survey data given by the Gallup national polls, the team did a content analysis the most covered topics in reports during 2007 to 2021. Meanwhile, they examined the issues the public pay more attention to and did a correlation test to test the effect of the network agenda-setting. And Zhuo Chen, Chris Chao Su & Anfan Chen (2019) [9] study this theory in the context of Libya Evacuation by retriving posts from Weibo and doing content analysis based on them. The relevant literatures are immersed, but there are still some limitations in recent studies: until now, the topics of researches which are relevant to this theory are limited in the field of political communication, and there are few studies of health communication.

In respect of adolescent health, according to [10], the media health literacy is different form media literacy. The media health literacy comprises identification of health-related media, recognition of its effects on health behavior, critical analysis of the content, and action or intention to act on media message for one’s self or society [11]. In the review [11], the media health literacy was positively related to adolescents’ health behaviors. That is to say, the media health literacy serves as a tool which could decide adolescents’ health behavior. The [12] corroborated that social media was impactful in supporting and
improving public health. Therefore, we divide the media organizations on Sina-Weibo (hereinafter referred to as Weibo) into two types: the integrated media organizations which were composed of Party media, mainstream authoritative news media and University media and the professional media organizations which held by professional people or institute in healthy field. Some scholars also explored the perceptions of engaging with health information on social media in young adults [13]. However, the research [13] just investigated the youth for health information on social media instead of the contents themselves and the media organizations.

Previous studies on the agenda-setting theory are mainly based on the comparison between traditional media and social media: Shapiro and Hemphill [14], who work on analyzing the association between the New York Times articles and US’s politicians’ Twitter posts. Later-on research organized by Fan and Sun [15] narrow down the research object to the context of social media. However, what they are interested in is the difference between the effect of agenda led by mainstream media organization and that of individual opinion leader [15], who may not be professional about the subject matter. The absence of comparing the agenda-setting effects of news reports and professional reports in the context of social media.

In this article, using adolescent depression as a case study, we endeavored to delineate the different types of media organizations which are the integrated media organizations and professional media organizations have varying degrees of network agenda-setting effect on public across social media.

**H1**: The issue network of public users is positively correlated to that of the integrated media organizational accounts in case of the adolescent pressure.

**H2**: The issue network of public users is positively correlated to that of the professional media organizational accounts in case of the adolescent pressure.

**H3**: When comparing the influence on network of public users between the integrated media organizations and professional media organizations, the integrated media organizations will be more impactful.

### 2 Method

This article used the Weibo as its source of news. On Weibo, an extremely popular social media platform in China with around 516 million active users at the end of 2019 [16], both public and news media can express opinions on every topic, which offers us the data accessibility. This research employed large-scale data harvesting by using Python to collect adolescent depression related Weibo posts and classified them into three types: the news reports, professional reports and public discussions. By using the big data analytics, content analysis and network analysis, we examined the network agenda-setting and determine which type of network agenda between integrated media organizations and professional media organizations is more resultful in term of the adolescent depression.
Table 1. The Network Agenda of Integrated Media Organizations

<table>
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<tr>
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<th>A</th>
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<td>C</td>
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<td>44</td>
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<td>175</td>
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<tr>
<td>D</td>
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<td>G</td>
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Note. A = Sequelae; B = Comorbidity; C = Treatments; D = The causes of adolescent depression; E = Negative emotions; F = Symptoms of Adolescent Depression; G = Social appeals; H = Current social situation

2.1 Data Collection

To answer the research questions, we collected content posted on Weibo from October 1, 2021 to December 1, 2021. Using combinations of keywords “adolescent” and “depression” and their variations in Chinese to identify correlative contents, 5,641 posts and their user profiles were retrieved using Python for further analysis. Weibo also classifies verified users with different labels like individual and official organizations, which were also involved in dataset.

To establish a better dataset for this research, we preprocessed the data. First, based on the labels the whole posts were categorized under two headings: the media organization and public. Secondly, we classified the media organization as the integrated media organizations and professional media organizations by scanning their publish contents. The professional media organizations just focus on health. The process eventually divided the data into three groups: 2,335 articles posted by the integrated media organizations, 691 articles posted by the professional media and 2,651 articles posted by ordinary users.

2.2 Content Analysis

To build network agenda constructions in integrated media’s posts, professional media’s posts and public discussions, we created content analysis which is a term for abundant strategies used to analyse text [17]. Content analysis is designed to describe the characteristics of the contents by systematic coding and categorizing, and explore the trends and patterns of words used [18]. The procedure of data analysis in content analysis is suggested by [19]. We used open coding to formulate a general description of the research topic. Firstly, authors were immersed in the whole posts to obtain the content overview and then created preliminary categories depending on the previous researches and the sense of whole. During the coding, a sample of 100 posts was selected randomly from the overall dataset. Two coders obeyed the rules of opening coding and discussed for several rounds. After sorting, reviewing and adjusting those codes, a total
of eight issue topics were defined including: 1. Sequelae (post-traumatic symptoms) [20], 2. Comorbidity [21], 3. Treatments (like psychosocial treatment, medication and so on) [22], 4. The causes of adolescent depression (including growth environment and personal habits) [23], 5. Negative emotions (for the news media, depression itself, etc.), 6. Symptoms of adolescent depression, 7. Social appeals, 8. Current social situation. Furthermore, those two coders read another 100 posts to test the inter-coder reliability. We used SPSS to calculate the inter-coder reliability which reached an average of .8987 based on Krippendorff’s α measure.

For the formal content analysis, around 40% of posts were randomly selected from the three groups of data, yielding a sample of 2,000 posts. In the sample, the chosen data matched with the whole dataset, therefore the 800 posts were from integrated media organizations, 200 posts were from professional media organizations and 1,000 posts came from ordinary users. Next, each of the coders coded 1,000 different new posts independently.

### 2.3 Network Analysis

The network agenda-setting model is to regard both the media agenda and the public agenda as networks composed of different information elements related to each other. Based on the data from the content analysis and manual coding described above, we identified all possible unordered pairs of issues which are treated as ties in network [24]. For instance, if one post contained the attributes of Sequelae and Comorbidity simultaneously, in that way we consider there is a tie between Sequelae and Comorbidity. All ties were summed up to generate the matrix of agenda networks that is 8 × 8 matrix, symmetrical and weighted. The same design approach was made to generate three agenda
network matrices of different user’s account genres. Table 1 provides an example which illustrates the network agenda of integrated media organizations.

We used the quadratic assignment procedure (QAP), a method which compares the similarities of the ties in the two matrices and calculates the correlation coefficient between two matrices [25, 26], to statistically test the research hypotheses by using the UCINET 6.56. QAP do not require an assumption of independent observations.

When preliminary results indicated a significant correlation between the two matrices, we further performed multiple regression-QAP test (MRQAP), which is formulated as an extension of the bivariate QAP model [27], via Double-Dekker Semi-Partialling (DSP) to study the regression relationship between a matrix of dependent variables and independent variable matrices.

3 Results

The results from the methods described above confirmed the NAS effect. According to the network analysis, the effect varied from the different genres of media content.

Figure 1 illustrates the relationships between 8 issue topics in three types of social media accounts. Each network is a collection of nodes and connections between nodes. The nodes of the graphs denote the issue topics and the edges indicate the degree of association between each couple of topics. The size of each node related to the Degree Centrality which is the most direct and simplest measure to characterize point centrality in network analysis. Moreover, the QAP was used to test the correlations between the network of public users and networks of two types of social media. The QAP explained that the network of the public users was positively correlated with the network of the integrated media organizations \( r = .972, p < .001 \), which proved that H1 holds. In addition, the network of the public users was significantly correlated with the network of the professional media organizations \( r = .959, p = .001 \), which supported the H2.

In respect to H3, the results (see Table 2) of MRQAP-DSP indicated that the model in which the network of public users acted as the dependent variable and the networks of integrated media organizations and professional media organizations were independent fitted very well (R-Square = .947, p = .001). However, the effect of professional media organizations was not statistical significance \( (\beta = .19, p > .10) \) which indicated that the professional media’ matrix cannot predict the public users’ matrix or the public users were not affected by the professional media organizations, while the integrated media organizations affected public users significantly \( (\beta = .78, p < .005) \). As a result, H3 was supported.

REGRESSION COEFFICIENTS describes the results of non-standardized regression coefficients, normalized regression coefficients, and statistical significance tests for each independent variable.

4 Discussion

4.1 An Overview of the Discussion Topics of Adolescent Depression on Weibo

The education of adolescent depression has long been absent in China. It can be hard to tell the difference between ups and downs of being a teenager and the symptoms
**Table 2.** Results of MRQAP-DSP Analysis

<table>
<thead>
<tr>
<th>MODEL FIT</th>
<th>REGRESSION COEFFICIENTS</th>
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<tr>
<td></td>
<td>R-Square</td>
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<td>0.947</td>
<td>0.945</td>
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<td>professional</td>
<td>0.30276</td>
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*Note.* MODEL FIT describes how the model fits of adolescent depression. These kinds of negative feelings may always be labelled as weakness and pretentiousness, because these are no doubt contrary to the ideal child in the eyes of Chinese parents. Furthermore, it is understandable that no one wants to admit that their beloved one is suffering from such a painful illness and they tend to ignore it or let the illness go away on its own, which is certainly an unscientific approach. As time passes, adolescent depression becomes a sensitive or even untouchable topic, which may leave little expertise in the hands of the public.

It has proved by the psychological and philosophical experts that as human beings, our mental representations are graphical, meaning that people can draw out the correlations of objects and attributes as a network-like picture based on all the elements they have [28]. This inspired the idea of a third level of agenda-setting, pointing out that the news media can convey the salience of relationships between a group of elements to the public, leading them to carry out similar topic discussion and element association. In other words, media become the “paintbrush” for drawing the central element of the picture in the public’s mind and those elements that are most closely related [8].

In our research, the construction of online topics on adolescent depression by integrated media organizations and professional media organizations may affect the discussion of public users. All three agenda networks (public users, integrated media organizations and professional media organizations) exhibited similar patterns. Degree centrality, as the most direct measure, describes node centrality in network analysis. The greater the degree of a node is, the higher the degree centrality of the node is, and therefore, the more important the node is in the network [29]. Symptoms, Current social situation and Social appeals, which are connected in a triangular form, are the three most commonly mentioned topics of all parties, as well as the largest sizes of degree centrality. At present, both integrated media organizations and professional media organizations intend to let the public grasping the real situation of adolescent depression in China, so as to improve people’s awareness of depression among teenagers. Take a news article from the People’s Daily as example, which noted that “the detection rate of depression among teenagers in China is around 24.6%, and the detection rate increases with grade”. In addition, as another frequently mentioned topic, the symptoms of adolescent depression have long been an intellectual blind spot for the Chinese public, with many people lacking understanding and having misunderstanding of its main symptoms. Hence, the media choose to remedy existing social problems by setting the agenda with
high frequency and strong connection. Finally, since 84% of the previous studies found a strong association between social support and absence of depression [30], the media highlighted the importance of social guidance and advocacy in addressing depression among adolescents.

4.2 The Media Environment and Form of Netizens in China

Compared with traditional media, agenda-setting subjects in the Internet are diversified. Sometimes the setting of an agenda is achieved through the joint action of multiple subjects. Among these subjects, in addition to websites as mass communicators, there are also organizations, groups or individuals in other communication channels, and of course, personalized push “algorithms” may also play a role. But here, the news media took an unassailable importance in the social media environment. As H1 and H2 demonstrated, the public agenda revealed great similarity to the two types of news agenda, specifically, it showed a high degree of connection ($\beta = .78$, $p < .005$) to the integrated media agenda.

In terms of the regression analysis, this research found that the public users were influenced mostly by integrated media organizations. What makes it happen? We consider that the media environment and form of netizens in China are worth discussing, they may be the key pieces of this puzzle. First of all, it is necessary to clarify the meaning of integrated media organizations in China. In this study, integrated media organizations include University media in China, Communist Party of China institutional media and mainstream authoritative news media. Under the political background of China, these news media are generally led by the government, that is, they serve the Communist Party of China. Therefore, integrated media organizations have irreplaceable position and strong influence to the network agenda-setting, which to a large extent explains why the agenda networks of professional media organizations (media with comprehensive knowledge and expertise on adolescent depression) and public users exhibited similar patterns.

Besides, the form of Chinese netizens is also an integral part for answering this question. Tang and Wu (2018) figured out the basic types of Chinese netizens under the background of China’s construction of a network power. According to the different attitudes of public opinion behind users’ behaviors, the authors roughly divided three types of netizens, including the “retelling or paraphrasing type”, “interpretation type” and “ridicule type” [31]. Netizens belonging to the “retelling or paraphrasing type” are accustomed to reposting official or authoritative statements without any comments or clips, which are possibly motivated either by unconditional trust in the media or simply to make their voices heard and seen more easily (as their attitudes are in line with official ones, hence they are easier to present on social media platforms). The “interpretation type” netizens, who usually appear in the public domain in a form of discourse acceptable to the authorities, while hiding their real and secret views. Finally, the “ridicule type” netizens show a cynical attitude towards official discourse and often hold a negative attitude towards the official content [31]. According to the data we collected from Weibo, we found that the public users who participated in the discussion of adolescent depression are mostly belonged to the “retelling or paraphrasing type”. In some situations, especially when people are facing with a topic that is unfamiliar or
completely unknown, they are often in a state of “aphasia” and passivity. Their self-awareness is not yet aroused, meaning that they may easily be driven by the media or influential people, and do not dare to share their opinion. This may bring us to the Spiral of Silence Theory, which suggests that the fear of separation or isolation in a social setting can lead people to remain silent. Since they don’t want to be rejected by others, they may fear that their views are contrary to others, and therefore, choosing to hide their own thoughts [32].

5 Conclusion

This study explored the agenda-setting theory on its third level and tried to empirically analyze how people’s opinion upon the adolescent depression were influenced by the media’s description in a Chinese media context, which has never been done before. We also extended the application of this theory to some extent by connecting the field of health communication and network agenda setting (NAS) theory. To answer this research question, we used big data analytic to collect and preprocess posts on Weibo. Context analysis and network analysis were conducted with a sample of adolescent depression related posts from relatively innovative categories involving integrated media organizations, professional media organizations and public users. In the case of most past studies focused on formal organizational media, we examined the influence of different types of media on network agenda setting. QAP also offered the correlation analysis and regression analysis for social network analysis among two types of media organizations and public accounts. Our results provide evidence for the intertwined relationship between the media users’ network agenda and the public network agenda. So, somehow this study improved NAS theory in various aspects and illustrates the predictive power of the third level of agenda-setting. Compared to other researches about the NAS theory, ours still has some limitations and space for improvement. The data collected by us is limited to one social platform, Weibo. So, whether our results can be applied to other nations still need to be examined.

It is without doubt that this theory can be enriched in various aspects in the future. In order to acquire a further understanding in this field, may be future studies can study network agenda setting at a much more microscopic level rather than study the public as a whole. Plus, researchers can make a comparison between different social platforms, and the research perspectives can be expanded to a large variety of topics and social issues.

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