


# Effectiveness of Social Video Platforms in Promoting COVID-19 Vaccination Among Youth: A Content-Specific Analysis of COVID-19 Vaccination Topic Videos on Bilibili

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**Background:** With the widespread promotion of the COVID-19 vaccination in China, videos about the vaccination have become increasingly available on social video platforms. With the User Generated Content model, different creators' interpretations of COVID-19 vaccines may influence the attitudes towards the vaccines and vaccination.

**Objective:** To explore the overview of COVID-19 vaccine-related videos on Bilibili, discussing the communication effects of COVID-19 topic videos and its influencing factors.

**Methods:** A content analysis was applied to the 202 video samples obtained through data mining regarding the creator's information, video presentation, and COVID-19 vaccine-related content.

**Results:** Individuals and medical professionals preferred VLOG videos, media chose to upload informational videos, and enterprises preferred to post showcase videos. Individuals were more likely to discuss the adverse reactions in their videos, while medical professionals were more likely to discuss the vaccination process for the COVID-19 vaccine. Videos with core issues positively influenced the video's dissemination breadth. The attitudes toward the COVID-19 vaccine in the videos positively influence the recognition of the videos. The richness of knowledge points related to the COVID-19 vaccine negatively affected the recognition and participation.

**Conclusion:** Social video platforms could play an active role in the vaccination promotion for the youth. Health promotion-related departments and individuals could strengthen agenda setting, grasp the characteristics of young groups, and express positive attitudes toward health issues to achieve better health (vaccine) promotion.

**Keywords:** COVID-19 vaccine, social media, Bilibili, health promotion, vaccination

## Introduction

Social media has become an essential platform for health communication and promotion, and it has great potential to provide health knowledge to the public.<sup>1-5</sup> Compared with traditional ways, social media has a vast audience base on the Internet, allowing health-related organizations to access a wider range of users<sup>6</sup> and instantly transmit health information to a wide range of mobile devices.<sup>7,8</sup> Social media also encourage users to upload and share health information content, making health-related content production creative and interesting.<sup>9</sup> Videos can transmit abstract and incomprehensible health information to audiences with low reading levels through easy-to-read ways such as storytelling and visual formats.<sup>10,11</sup> Therefore, video social platforms could present health knowledge in the form of videos and enhance the viewability of content to attract more audiences.<sup>12,13</sup>

The high usage of social media has made it an essential channel for health promotion organizations to disseminate health information and for users to search for health information.<sup>14,15</sup> As COVID-19 is a new virus, people urgently need to understand related information and its prevention and control methods.<sup>16</sup> With the massive amount of information and

convenient search and sharing functions, social media has become the preferred platform for users to seek information about the COVID-19 outbreak.<sup>17–20</sup> In the face of the global epidemic of COVID-19, vaccination is considered economical and practical.<sup>21</sup> Since the COVID-19 vaccine is a new type of vaccine, the short interval between its development and launch has led to concerns and questions about its safety and efficacy among the general public, with reports of side effects of previous vaccinations and the dissemination of misinformation.<sup>22–25</sup> This concern has been widely discussed on various social media platforms,<sup>26</sup> and videos related to the COVID-19 vaccine and vaccination have appeared on video social platforms such as YouTube.<sup>27–29</sup>

In terms of social media platform users, young people are the most widespread and active group.<sup>30–32</sup> Social media has become the primary platform for young people to get information related to COVID-19.<sup>33</sup> Meanwhile, young people are more likely to be vaccine hesitancy when faced with vaccination,<sup>34,35</sup> and vaccine promotion to young people becomes very important. Therefore, it is necessary to disseminate vaccine-related knowledge to the youth through appropriate channels, such as social media, to reduce vaccine hesitancy in this group and promote vaccination.<sup>33</sup>

Vaccine-related content on social video platforms is prevalent and has received scholarly attention, focusing on three main areas: assessment of video quality, exploration of video communication effects, and the impact of videos on health beliefs. Firstly, scholars generally focus on the content about vaccines disseminated on social video platforms and assess the quality of the content.<sup>36–38</sup> Secondly, scholars evaluated the dissemination effects of vaccine-related videos on YouTube using data such as views, likes, and dislikes.<sup>28,37</sup> Thirdly, some studies focus on the impact of vaccine videos, especially the dissemination of misinformation, on people's health (vaccination) beliefs.<sup>39</sup> Some scholars have pointed out that these effects may come from the video distributor, the distribution's content, and the communication's form.<sup>31,40</sup> Sangyeon et al have found that interfering with anti-vaccine videos on YouTube by placing links to related videos can reduce their impact.<sup>27</sup> Scholars have also focused on the issue of vaccine hesitancy on social video platforms, with studies focusing on the causes and effects of vaccine hesitancy and the monitoring and governance of vaccine hesitancy on these platforms. Regarding the causes and consequences of vaccine hesitancy, scholars have argued that anti-vaccine creators and vaccine conspiracy theorists are facilitated by the freedom to express their views on social video platforms.<sup>41–44</sup> As a result, the number of anti-vaccine videos on social video platforms has increased dramatically,<sup>29</sup> and the infodemic has become more prevalent,<sup>45</sup> exacerbating vaccine hesitancy.<sup>46</sup> Moreover, vaccine hesitancy can severely reduce people's willingness to vaccinate and create a crisis of confidence in health organizations and governments.<sup>17,26,47</sup> Regarding the monitoring and governance of vaccine hesitancy on video social platforms, scholars believe that monitoring these platforms helps public health institutions to form an overall knowledge of the causes of vaccine hesitancy.<sup>48,49</sup> In turn, communication strategies could be adopted to reduce vaccine hesitancy by using social media for health communication.<sup>26,40</sup>

In China, with 975 million online video users by 2021,<sup>50</sup> video is becoming a primary form of content output on the Internet.<sup>51</sup> As one of the video platforms, Bilibili has become famous for Chinese youth by its 86% share of young people under 35 years old.<sup>52</sup> After the COVID-19 outbreak, many videos about COVID-19 vaccination have also appeared on Bilibili, which has become an essential source for Chinese youth to access related knowledge. Hence, we focus on this platform to explore the characteristics and communication effects of the COVID-19 vaccine topic videos.

In summary, few existing studies have explored social media and health (vaccine) promotion from the perspective of young users. Until the paper's completion, we were unaware of any studies addressing COVID-19 vaccination or promotion-related topics on the Bilibili platform. This study focuses on the communication effects of the videos about the COVID-19 vaccine on Bilibili, which can fill the gaps in existing studies. At the same time, this study combines seven indicators on the Bilibili platform into three communication effect models to analyze the data results in more detail, which could provide specific communication strategies for vaccine promotion on social media, especially on social video platforms.

## Materials and Methods

### Samples

We used the keywords COVID-19 vaccine, COVID-19 virus vaccine, and Vaccine booster shots and set the period from February 9, 2020, to March 12, 2021, to collect the videos. February 9, 2020, was the earliest date for posting COVID-19

Vaccines-related videos on Bilibili, and March 12, 2022, was the start date of this study. We finally collected 351 videos, removing the ones with content utterly unrelated to the COVID-19 vaccine, with the remaining 202 videos being used for analysis. The basic information about the videos was also available, which contains title, URL, publisher, number of plays, number of retweets, number of comments, number of likes, number of favorites, number of bullet subtitles, and number of coins (a feature fans tip the video author).

## Coding

### Dependent Variable

The dependent variable in this study is the video communication effect. Referring to Chen et al,<sup>53</sup> this study divided the communication effect into three dimensions: communication breadth, communication recognition, and communication participation, as a way to measure the impact of each element of the video on the communication effect (Table 1). In social media research, “retweets” refers to reposts of other’s tweets and can indicate the amount of

**Table 1** Dependent Variable and Independent Variables

Types	Factor	Category	Description
Creator information	Type of creators	1=Individuals	According to the creators' homepage certification and profile information.
		2=Medical workers	
3=Media			
4=Corporate companies			
	Number of followers	Number of followers displayed on the homepage	
Video presentation	Video type	1=Vlog	Typical YouTube-style; the author mainly records in the form of the camera
		2=Showcase	The author's voice appears as a voice-over to comment and narrate the videos, pictures, data, and other materials appearing on the screen.
		3=Animation	Live paintings and various types of video animations.
		4=Interview	Videos with interviews, conversations, chats, and online interviews conducted by the host and interviewees.
		5=Short films	Short documentaries, microfilms, and other short films.
		6=News	News-style short films or TV news clips.
	Cover	0=No	Whether the video has a cover related to the video content, <sup>59</sup> includes but is not limited to graphic design, title-style cover, or a cartoon image.
		1=Yes	
	Visual effects	1=No	The presence of animation, mirroring, special effects, and other effects in the video can enhance video viewing. <sup>59</sup>
		2=Yes	
	Video duration	1= Less than 10min	According to the creators' homepage certification and profile information.
		2= 10min–30min	
		3= >30min and ≤ 60min	
		4= Greater than 60min	

(Continued)

Table 1 (Continued).

Types	Factor	Category	Description
COVID-19-related content features	Scientific basis	0=No	The content-related ted to the COVID-19 vaccine cites scientific basis, such as professional literature, books, and websites. It is shown in the video in the form of text and pictures, which the audience can retrieve.
		1=Yes	
	Core topic	0=No	Have a core topic related to the COVID-19 vaccine and be discussed in the video.
		1=Yes	
	Cues to action	0=No	The communicator advocated in the video to encourage the audience to vaccinate. <sup>33</sup>
		1=Yes	
	Vaccine attitude	1=Negative	Communicator's attitudes towards COVID-19 vaccination behavior in the video.
		2=Neutral	
		3=Positive	
	Knowledge points of COVID-19 vaccine	1. The type of vaccine	One point for each element covered in the video, for 7 points.
		2. The mechanism of action of the vaccine	
		3. Animal or human trials	
		4. The efficacy of the COVID-19 vaccine	
		5. The safety of the COVID-19 vaccine	
		6. The manufacturing process of the vaccine	
		7. Herd immunity (Immune barrier)	
	Issues related to COVID-19 vaccination	1. Contraindicated groups	One point for each element covered in the video, for 6 points.
2. Suitable groups			
3. Adverse reactions after vaccination			
4. Feelings about vaccination			
5. The brand of vaccination			
6. Procedures for vaccination			

(Continued)

**Table 1** (Continued).

Types	Factor	Category	Description
Communication effect	Communication breadth (Logarithmic value)	Number of retweets	According to the video information on the website.
	Communication recognition (Logarithmic value of sum)	1. Number of plays	
		2. Number of likes	
		3. Number of favorites	
		4. Number of coins	
	Communication participation (Logarithmic value of sum)	1. Number of bullet subtitles	
		2. Number of comments	

information disseminated on Twitter or other social media spaces.<sup>54</sup> In this study, the communication breadth emphasizes the extent to which information is transmitted. Therefore, we use the number of video retweets to measure the breadth of video dissemination. Communication recognition reflects users' attitudes and acceptance. Referring to the existing literature,<sup>53</sup> we use the number of video plays, likes, coins, and favorites to measure communication recognition. Participation is defined as a user-initiated action in a broad sense.<sup>55</sup> Different social media platforms have various indicators for measuring participation, but the general understanding of participation can be interpreted in two forms: participation (active) and consumption (passive).<sup>56</sup> Since behavioral indicators of passive consumption (eg, reading comments) cannot be quantified, engagement in this study refers mainly to active participation. As a primary way of interacting with Bilibili videos, bullet subtitles are posted on the videos and traverse the video content, forming a different kind of information interaction from the traditional commenting mode. As studies have pointed out, the number of bullet subtitles and comments best reflect the active participation behavior of Bilibili users.<sup>53</sup> Thus, we choose the number of bullet subtitles and comments as indicators of communication participation.

### Independent Variables

Creator information, video presentation, and COVID-19-related content features were used as independent variables.

Referring to the existing literature,<sup>57</sup> we include the type of video creators as one of the indicators. In addition, considering the possible influence of the number of followers of the video producer on the video popularity (video popularity),<sup>58</sup> we also include the number of followers in the indicators. Therefore, the creator information consists of the types of creators and the number of followers (Table 1). According to the homepage certification and profile information, the creators are classified into four categories: individuals, medical workers, media (including traditional media, corporate media, and personal new media), and corporate companies. The number of followers was obtained from the creators' homepage. Video presentation includes four categories, video types, cover, visual effects, and video duration (Table 1). Six dimensions of scientific basis, core topic, cues to action, vaccine attitude, knowledge points, and issues related to COVID-19 vaccination were used to determine COVID-19-related content features (Table 1). The more knowledge points covered in the video, the higher the richness of Vaccine knowledge. Each knowledge point is scored as 1 point. The minimum score for the richness of Vaccine knowledge is 0, and the maximum score is 7. The more issues related to COVID-19 vaccination in the video, the higher the richness of Vaccine issues. Each issue related to COVID-19 vaccination scored 1 point, with a minimum score of 0 and a maximum score of 6 for the richness of Vaccine issues.

## Reliability Test

Before the formal coding, 50 video samples were randomly selected for pre-coding, and Holsti's method was used to test the reliability of coders.<sup>60</sup> Two coders completed the coding part. After two training sessions, the general coefficient of reliability between the two coders was 0.901, and the reliability between the two coders met the standard.<sup>61</sup>

## Statistical Analysis

Categorical variables are represented by frequency (%). A Chi-square test was used to examine the relationship between creator and video type, COVID-19 vaccine knowledge points, and COVID-19 vaccination-related issues. ANOVA was used to analyze the relationship between creator type, video type, other variables, and the dissemination effect. The hierarchical regression examined the relationship between the independent and dependent variables (communication effect). IBM SPSS Statistics 26.0 was used to process all coded data, and the level of statistical significance was set at  $p < 0.05$ .

## Results

### Overall Overview of the COVID-19 Vaccine Topic Videos

Among the 202 videos, media creators accounted for the highest proportion at 45.5%, followed by individual creators, accounting for 37.1%. Medical worker creators are relatively few, accounting for only 14.9%, and corporate company creators the least, accounting for only 2.5% (Figure 1).

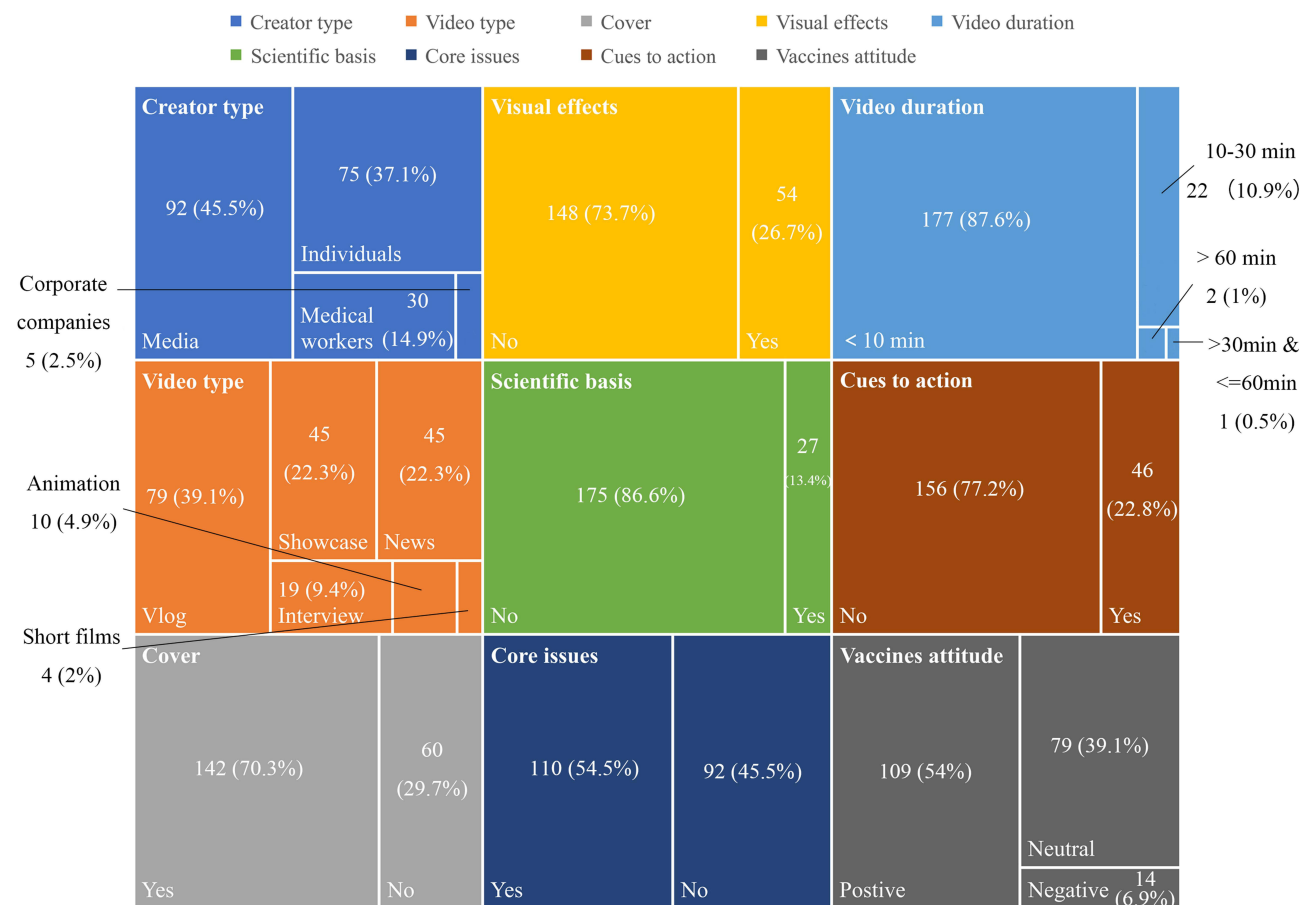


Figure 1 Overall overview of the COVID-19 vaccine topic videos.

In terms of video category, videos in the form of Vlogs accounted for 39.1%, showcases and news accounted for 22.3%, interviews accounted for 9.4%, and animation and short videos accounted for 4.9% and 2%, respectively. 70.3% of the videos were designed with a cover, most did not insert visual effects to enhance viewing (73.3%), and 87.6% were less than 10 minutes (Figure 1).

From the perspective of content, the vast majority of content related to the COVID-19 vaccine was not based on exact science and did not have a scientific source for viewers (86.6%). 54.5% of the videos had a core issue, and only 22.8% of videos explicitly presented action tips on COVID-19 vaccine vaccination. 54% of the creators expressed a positive attitude towards COVID-19 vaccination, 39.1% remained neutral, and only 6.9% had a negative attitude towards the vaccination (Figure 1).

The chi-square analysis shows that individual creators and medical workers prefer to create videos in the form of Vlogs, media prefer to create news videos, and corporate company creators choose to create display videos ( $p < 0.01$ ) (Table 2). In discussions on issues related to COVID-19 vaccination, different creators show different concerns. Videos made by individuals prefer to discuss the adverse reactions of COVID-19 vaccination ( $P = 0.045$ ), while those produced by medical workers more often mention the process of COVID-19 vaccination ( $P = 0.016$ ) (Table 3).

**Table 2** Chi-Square Analysis Results Between Creator Type and Video Type

Title	Name	Creator Type (%)				Total	$\chi^2$	p
		Individuals	Medical Workers	Media	Corporate Companies			
Video types	Vlog	41(54.67)	29(96.67)	9(9.78)	0(0.00)	79(39.11)	116.915	0.000**
	Showcase	18(24.00)	1(3.33)	24(26.09)	2(40.00)	45(22.28)		
	Animation	8(10.67)	0(0.00)	1(1.09)	1(20.00)	10(4.95)		
	Interview	3(4.00)	0(0.00)	15(16.30)	1(20.00)	19(9.41)		
	Short film	1(1.33)	0(0.00)	3(3.26)	0(0.00)	4(1.98)		
	News	4(5.33)	0(0.00)	40(43.48)	1(20.00)	45(22.28)		
Total		75	30	92	5	202		

Note: \*\* $p < 0.01$ .

**Table 3** Chi-Square Analysis Between Creator Types and Issues Related to COVID-19 Vaccination

Title	Name	Creator Type (%)				Total	$\chi^2$	p
		Individuals	Medical Workers	Media	Corporate Companies			
Issue 1	None	68(90.67)	26(86.67)	82(89.13)	5(100.00)	181(89.60)	0.971	0.808
	Yes	7(9.33)	4(13.33)	10(10.87)	0(0.00)	21(10.40)		
Total		75	30	92	5	202		
Issue 2	None	63(84.00)	18(60.00)	68(73.91)	4(80.00)	153(75.74)	7.047	0.07
	Yes	12(16.00)	12(40.00)	24(26.09)	1(20.00)	49(24.26)		
Total		75	30	92	5	202		
Issue 3	None	38(50.67)	22(73.33)	63(68.48)	4(80.00)	127(62.87)	8.06	0.045*
	Yes	37(49.33)	8(26.67)	29(31.52)	1(20.00)	75(37.13)		
Total		75	30	92	5	202		

(Continued)

**Table 3** (Continued).

Title	Name	Creator Type (%)				Total	$\chi^2$	p
		Individuals	Medical Workers	Media	Corporate Companies			
Issue 4	None	60(80.00)	29(96.67)	79(85.87)	5(100.00)	173(85.64)	5.75	0.124
	Yes	15(20.00)	1(3.33)	13(14.13)	0(0.00)	29(14.36)		
Total		75	30	92	5	202		
Issue 5	None	42(56.00)	19(63.33)	42(45.65)	3(60.00)	106(52.48)	3.623	0.305
	Yes	33(44.00)	11(36.67)	50(54.35)	2(40.00)	96(47.52)		
Total		75	30	92	5	202		
Issue 6	None	52(69.33)	18(60.00)	77(83.70)	5(100.00)	152(75.25)	10.323	0.016*
	Yes	23(30.67)	12(40.00)	15(16.30)	0(0.00)	50(24.75)		
Total		75	30	92	5	202		

**Notes:** Issue 1: contraindicated groups for COVID-19 vaccination; Issue 2: suitable groups for COVID-19 vaccination; Issue 3: adverse reactions after COVID-19 vaccination; Issue 4: the Feeling of Vaccination; Issue 5: brands of COVID-19 vaccine; Issue 6: procedures for COVID-19 vaccination. \*p<0.05.

The ANOVA results show that the videos of media creators have a better communication breadth, communication participation, and communication recognition ( $P<0.01$ ) (Table 4).

## The Communication Effect of COVID-19 Topic Videos and Its Influencing Factors

Tables 5–7 shows the results of the bivariate correlation analysis between the communication effect and its influencing factors. Significant correlations exist between creator type, the number of followers, core issues (with), and video communication breadth. There are significant correlations between creator type, number of followers, core issues (with), and the breadth of communication. And there are significant correlations between creator type, cover (with), video type, number of followers, vaccine knowledge points, vaccine attitude, and communication recognition. Also, there are

**Table 4** Analysis of ANOVA Results

	Creator Type (M ± SD)				F	p
	Individuals (n=75)	Medical Workers (n=30)	Media (n=92)	Corporate Companies (n=5)		
The richness of Vaccine knowledge	2.19±1.70	2.03±1.40	1.85±1.58	2.60±1.14	0.855	0.465
The richness of Vaccine issues	1.69±1.28	1.60±1.28	1.53±1.10	0.80±0.84	0.985	0.401
Vaccine attitude	3.83±1.28	4.20±1.00	3.93±1.31	4.20±1.10	0.709	0.547
Communication breadth	1.89±1.07	2.28±0.97	2.49±0.80	1.99±0.89	5.913	0.001**
Communication recognition	3.98±1.01	3.84±0.96	4.45±0.60	3.63±1.09	7.012	0.000**
Communication participation	2.07±0.94	2.01±0.89	2.47±0.59	1.44±1.22	6.274	0.000**

**Note:** \*\*p<0.01.



**Table 5** Bivariate Correlation Analysis Between Video Spread and Other Variables

	Breadth of Dissemination	Creator Type	Cover (With)	Video Type	Video Duration	Professional Basis (With)	Number of Followers	Core Issues (With)	The Richness of Vaccine Issues	The Richness of Vaccine Knowledge Points	Cues to Action (With)	Vaccine Attitude
Creator type	0.256**	I										
Cover (with)	0.125	-0.159*	I									
Video type	0.116	0.502**	-0.296**	I								
Video duration	-0.03	-0.118	0.022	-0.141*	I							
Professional basis (with)	0.072	-0.116	0.096	-0.224**	0.296**	I						
Number of followers	0.359**	0.364**	-0.089	0.380**	-0.012	0.017	I					
Core issues (with)	0.270**	-0.112	0.297**	-0.204**	0.06	0.242**	0.065	I				
The richness of Vaccine issues	-0.107	-0.091	0.1	-0.088	0.042	-0.095	0.03	0.006	I			
The richness of Vaccine knowledge points	0.04	-0.074	0.124	-0.019	0.193**	0.169*	0.089	0.413**	-0.061	I		
Cues to action(with)	-0.049	0.011	0.017	0.002	-0.102	-0.005	-0.02	0.117	0.041	0.023	I	
Vaccine attitude	0.077	0.044	0.143*	0.049	-0.092	0.007	0.108	0.084	-0.023	0.021	0.367**	I

Note: \* $p < 0.05$  \*\* $p < 0.01$ .

**Table 6** Bivariate Correlation Analysis Between Video Communication Approval and Other Variables

	Communication Identity	Creator Type	Cover (With)	Video Type	Video Duration	Professional Basis (With)	Number of Followers	Core Issues (With)	The Richness of Vaccine Issues	The Richness of Vaccine Knowledge Points	Cues to Action (With)	Vaccine Attitude
Creator type	0.208**	1										
Cover (with)	0.151*	-0.159*	1									
Video type	0.158*	0.502**	-0.296**	1								
Video duration	-0.115	-0.118	0.022	-0.141*	1							
Professional basis (with)	-0.029	-0.116	0.096	-0.224**	0.296**	1						
Number of followers	0.364**	0.364**	-0.089	0.380**	-0.012	0.017	1					
Core issues (with)	-0.028	-0.112	0.297**	-0.204**	0.06	0.242**	0.065	1				
The richness of Vaccine issues	-0.047	-0.091	0.1	-0.088	0.042	-0.095	0.03	0.006	1			
The richness of Vaccine knowledge points	-0.190**	-0.074	0.124	-0.019	0.193**	0.169*	0.089	0.413**	-0.061	1		
Cues to action (with)	-0.064	0.011	0.017	0.002	-0.102	-0.005	-0.02	0.117	0.041	0.023	1	
Vaccine attitude	0.219**	0.044	0.143*	0.049	-0.092	0.007	0.108	0.084	-0.023	0.021	0.367**	1

Note: \*p<0.05 \*\*p<0.01.

**Table 7** Bivariate Correlation Analysis Between Video Communication Engagement and Other Variables

	Communication Engagement	Creator Type	Cover (With)	Video Type	Video Duration	Professional Basis (With)	Number of Followers	Core Issues (With)	The Richness of Vaccine Issues	The Richness of Vaccine Knowledge Points	Cues to Action (With)	Vaccine Attitude
Creator type	0.168*	1										
Cover (with)	0.217**	-0.159*	1									
Video type	0.095	0.502**	-0.296**	1								
Video duration	-0.092	-0.118	0.022	-0.141*	1							
Professional basis (with)	0.054	-0.116	0.096	-0.224**	0.296**	1						
Number of followers	0.397**	0.364**	-0.089	0.380**	-0.012	0.017	1					
Core issues (with)	0.047	-0.112	0.297**	-0.204**	0.06	0.242**	0.065	1				
The richness of Vaccine issues	0.03	-0.091	0.1	-0.088	0.042	-0.095	0.03	0.006	1			
The richness of Vaccine knowledge points	-0.167*	-0.074	0.124	-0.019	0.193**	0.169*	0.089	0.413**	-0.061	1		
Cues to action (with)	-0.015	0.011	0.017	0.002	-0.102	-0.005	-0.02	0.117	0.041	0.023	1	
Vaccine attitude	0.223**	0.044	0.143*	0.049	-0.092	0.007	0.108	0.084	-0.023	0.021	0.367**	1

Note: \*p&lt;0.05 \*\*p&lt;0.01.

significant correlations between the number of followers, vaccine knowledge points, vaccine attitude, and communication participation.

Based on the bivariate correlation analysis, this study conducted stratified regression analysis. The number of followers of the video creators significantly and positively influenced the communication effect of the videos ( $p < 0.01$ ), making it the most important factor affecting the communication effect among the creator factors (Tables 8–10). From the results of the stratified regression between video communication forms and communication effects, only the cover(with) positively and significantly affected the communication participation of videos ( $B = 0.231$ ,  $p < 0.05$ ) (Table 10). In contrast, the communication forms of video types, visual effects, and video duration were unrelated to communication effects.

Having a core issue significantly increased the communication breadth of the video when information about the COVID-19 vaccine was mentioned in the video ( $B = 0.499$ ,  $p < 0.01$ ) (Table 8). When the video showed a more positive attitude towards vaccines, the identification degree of the video was better ( $P < 0.05$ ) (Table 9). However, the more questions related to COVID-19 vaccination in the video, the more limited the communication breadth ( $B = -0.122$ ,

**Table 8** Results of the Stratified Regression Analysis with the Dependent Variable Being Communication Breadth

	Model 1		Model 2	
	B	SE	B	SE
Constant	1.292**	0.26	0.268	0.388
Creator type	0.282**	0.078	0.094	0.075
Cover (with)	0.322*	0.149	0.036	0.137
Animation special effects (with)	0.386**	0.148	0.22	0.154
Video type	0.008	0.039	-0.013	0.038
Video duration	-0.018	0.111	-0.006	0.103
Professional basis (with)			0.003	0.182
Number of followers			0.342**	0.049
Expression of interest			0.023	0.058
The degree of storytelling			-0.007	0.051
Core issues (with)			0.499**	0.145
The richness of vaccine issues			-0.122*	0.061
The richness of vaccine knowledge points			-0.047	0.063
Cues to action (with)			-0.095	0.147
Vaccine attitude			-0.021	0.051
R <sup>2</sup>	0.125		0.37	
Adjusted R <sup>2</sup>	0.102		0.323	
F	F (5196)=5.589, p=0.000		F (14,187)=7.853, p=0.000	
ΔR <sup>2</sup>	0.125		0.245	
ΔF	F (5196)=5.589, p=0.000		F (9187)=8.098, p=0.000	
Dependent variable	Communication breadth			

Note: \* $p < 0.05$  \*\* $p < 0.01$ .

**Table 9** Results of Stratified Regression Analysis with the Dependent Variable Being Communication Recognition

	Model 1		Model 2	
	B	SE	B	SE
Constant	3.504**	0.238	1.919**	0.328
Creator type	0.164*	0.072	-0.021	0.063
Cover (with)	0.384**	0.136	0.187	0.116
Animation special effects (with)	0.239	0.135	0.207	0.13
Video type	0.05	0.036	0.021	0.032
Video duration	-0.136	0.101	-0.083	0.087
Professional basis (with)			-0.041	0.154
Number of followers			0.364**	0.041
Expression of interest			0.032	0.049
The degree of storytelling			0.066	0.043
Core issues (with)			-0.011	0.122
The richness of vaccine issues			-0.067	0.051
The richness of vaccine knowledge points			-0.125*	0.053
Cues to action (with)			-0.151	0.124
Vaccine attitude			0.092*	0.043
R <sup>2</sup>	0.112		0.457	
Adjusted R <sup>2</sup>	0.089		0.417	
F	F (5196)=4.927, p=0.000		F (14,187)=11.252, p=0.000	
ΔR <sup>2</sup>	0.112		0.346	
ΔF	F (5196)=4.927, p=0.000		F (9187)=13.229, p=0.000	
Dependent variable	Communication recognition			

Note: \*p<0.05 \*\*p<0.01.

P<0.05) (Table 8). Similarly, the richness of the knowledge of the COVID-19 vaccine in the video also negatively affects communication recognition and communication participation (P<0.05) (Tables 9 and 10).

## Discussion

This study explored the communication effect of the video social media platform when promoting vaccines to youth groups through a content analysis of the COVID-19 vaccine-themed videos on the Bilibili platform. The results showed that for youth groups, the users of video platforms, the content of the video, and the vaccine belief of the creators significantly impact the videos' communication effect. In contrast, the communication forms of video have a limited impact on the communication effect.

**Table 10** Results of Stratified Regression Analysis with the Dependent Variable Being Communication Participation

	Model 1		Model 2	
	B	SE	B	SE
Constant	1.585**	0.224	0.011	0.304
Creator type	0.144*	0.068	-0.048	0.058
Cover (with)	0.464**	0.129	0.231*	0.108
Animation special effects (with)	0.167	0.128	0.119	0.12
Video type	0.032	0.034	0.005	0.03
Video duration	-0.104	0.096	-0.078	0.081
Professional basis (with)			0.149	0.143
Number of followers			0.372**	0.038
Expression of interest			0.032	0.046
The degree of storytelling			0.033	0.04
Core issues (with)			0.043	0.113
The richness of vaccine issues			0	0.047
The richness of vaccine knowledge points			-0.115*	0.049
Cues to action (with)			-0.051	0.115
Vaccine attitude			0.069	0.04
R <sup>2</sup>	0.108		0.474	
Adjusted R <sup>2</sup>	0.085		0.434	
F	F (5196)=4.723, p=0.000		F (14,187)=12.023, p=0.000	
ΔR <sup>2</sup>	0.108		0.366	
ΔF	F (5196)=4.723, p=0.000		F (9187)=14.457, p=0.000	
Dependent variable	Communication participation			

Note: \*p<0.05 \*\*p<0.01.

## Social Video Platforms and Vaccine Promotion for Youth Groups

This study shows that the number of followers of the video creators significantly influenced the communication effect of COVID-19 vaccine-themed videos. Studies have indicated that social media influencers, who have many followers on social media, have become online opinion leaders who influence their audiences' attitudes, perceptions, and behaviors.<sup>62</sup> Initially, the significant influence of social media influencers was widely used in commercial promotion.<sup>63</sup> With health issues becoming popular on social media, social media influencers also impact other users after participating in health issues. Their positive attitudes toward vaccines also positively influenced other users' attitudes toward vaccines.<sup>40</sup> For young people, social media is an important channel and approach for their media use.<sup>64</sup> After establishing emotional bonds with social influencers during long-term media use,<sup>65</sup> their attitudes are easily influenced.<sup>66</sup> It offers useful ideas for youth-oriented health promotion, including vaccine promotion.

The results indicate that only 14.9% of the COVID-19 vaccine-themed videos were produced and uploaded by medical workers, a relatively low percentage of the creators. Similar results could also be found in other studies. For

example, medical organizations and doctors account for less than one-third of creators of COVID-19 vaccine-related videos on YouTube.<sup>67</sup> The reason is related to the existing social media content production mechanism.

Social media platforms with a UGC mode encourage user creation, allowing creators of all types to disseminate information, including health information,<sup>68</sup> forming a multi-subject, inter-professional health communication situation.<sup>69</sup> Health organizations and health workers are responsible and obligated to transmit correct knowledge and information to the public during public health emergencies.<sup>70</sup> The question of taking advantage of professionals' health information communication on social media needs further exploration.

## Video Content and Vaccine Promotion for Youth Groups

This study concludes that the presence or absence of core issues in COVID-19 vaccine-themed videos significantly influenced the communication effect, mainly regarding the core issues' ability to stimulate users' retweeting behavior. The users' retweeting behavior reflects that the relevant content has a particular value and needs to be re-distributed to highlight the importance of the content.<sup>71</sup> These videos focus on possible adverse reactions to the COVID-19 vaccines, the brands of COVID-19 vaccines, and the safety and effectiveness of COVID-19 vaccines, which are all core topics of public concern when facing COVID-19 vaccines. This finding illustrates the need for targeted agenda setting based on an understanding of the focus of public attention when conducting health promotion. The core of agenda-setting is to influence the audience to repeatedly feel and think about an issue by constantly showing a message in the media,<sup>72</sup> which is considered an important way for media information to influence the public.<sup>73</sup> Similarly, social media agenda-setting on health topics could impact young people's health promotion. Meydan et al revealed that the youth users exposed to COVID-19 and COVID-19 vaccine information on social media for a long time would increase their willingness to vaccinate.<sup>74</sup>

This study shows that the richness of the COVID-19 vaccine knowledge and issues about the COVID-19 vaccination contained in the videos were negatively correlated with the communication effect. The result is similar to the findings of Moon and other scholars on YouTube videos about COVID-19. The videos with better content and more information that the creators believe to be helpful to the audience fail to have a good communication effect.<sup>59</sup> Although some scholars have suggested that health promoters should provide more information to promote COVID-19 vaccination among young people,<sup>73</sup> still needs to consider the information dissemination platform and its audience's needs. Studies have indicated that excessive information knowledge or valuable content in a single media product on social media would limit its communication effect on the platform.<sup>75</sup> Therefore, a certain level of information redundancy needs to be maintained for individual works.

From the perspective of content preferences of different creators, this study indicates that compared with other types of creators, medical workers prefer to discuss procedures of COVID-19 vaccination. In contrast, individual creators choose to discuss topics such as adverse reactions and emergency treatment after the COVID-19 vaccination. It reflects the difference in the identity of different creators concerned with vaccination for COVID-19. Introducing the operational points of the vaccination process, such as appointment methods, site selection, and mixed vaccination, is a cue to action for health workers. Doctors' social media recommendations could encourage users to vaccinate.<sup>76</sup> The choice of topics by individual creators, to some extent, represents the focus of public attention on the COVID-19 vaccine. For new vaccines, the public often pays attention to their safety, and the concern about the safety of vaccines is an essential reason for public hesitancy about vaccines.<sup>77,78</sup> Reasonable explanations of adverse reactions could eliminate vaccination concerns of the public,<sup>79</sup> but excessive disclosures would instead exacerbate public hesitancy about vaccines.<sup>80</sup>

The result suggests that although social media platforms emphasize the content production of multiple creative subjects, their content preferences still reflect identity characteristics. Therefore, it is essential to consider taking advantage of the creators' identity to promote health.

## Communicator Attitudes and Vaccine (Health) Beliefs Among Youth Groups

This study indicates that creators' positive attitudes toward covid-19 vaccine significantly affect the video's communication effect, and videos with more positive attitudes receive more plays, likes, favorites, and coins from viewers. It has been shown that social media creators' attitudes and views on health information affect and change users' perspectives.<sup>42</sup>

Regarding vaccine hesitancy, both positive and negative emotions play a role in communication, and there are differences in the outcome of the emotions.<sup>81</sup> In health communication, positive content is likelier to be liked by the audience.<sup>82</sup> In terms of vaccine-related content communication, positive emotions of the communicators could improve users' attitudes towards vaccines and thus promote vaccination.<sup>40,83,84</sup> For young people, when receiving health information, both positive and negative emotions could be identified by perception.<sup>81</sup> Therefore, when conducting vaccine (health) promotion for youth groups through social media, it is necessary to play the role of positive emotions to convey the correct health concepts to youth groups.<sup>85</sup>

## Mode of Transmission and Vaccine Promotion Among Young People

This study discovered that the form of communication of COVID-19 vaccine-related videos had a limited impact on communication effectiveness. In many forms of communication, only the video cover impacts the communication breadth. As for the importance of covers for videos on social media, Moon et al believe that designing video covers could increase users' clicks.<sup>59</sup> This study concludes that video covers as an essential form of carrying information could also gain more user retweeting behavior on video social platforms.

Previous studies have also indicated that video formats, visual effects, and other communication forms could lead to better communication effects on video social platforms,<sup>59,86,87</sup> which is somewhat different from the results of this study. For young people, the knowledge and science in the videos are more critical when acquiring knowledge about the COVID-19 vaccination through social media platforms, and the form of communication does not directly affect their decision-making for vaccination. In other words, this finding reflects young people's preference for information needs of health issues. It also suggests that young people's information needs should be considered for health promotion.

There were some limitations in this study. First, although this study found that the COVID-19 vaccine information richness caused counter-effects, as well as video formats, visual effects, and other forms of communication, failed to get better communication effects, the reasons were not further investigated. Second, the coding table entries were not exhaustive in covering all aspects of the videos, and further revisions and additions are needed for subsequent related studies. Moreover, we only analyzed seven indicators, such as the number of plays and likes, when measuring the effectiveness of the videos. Subsequent studies will consider including specific content that could directly express viewers' opinions, such as viewers' comments and bullet subtitles, to evaluate the communication effect indicators in more depth.

## Conclusion

This study provides a perspective on health promotion for youth groups by recognizing the role of video social platforms. Content creation could be based on the core issues of health-related content when communicating health information through agenda-setting. Likewise, the youth group audience's characteristics should be considered to grasp the redundancy of information and optimize the format of video communication. In addition, positive attitudes towards health topics should be expressed in the communication process to promote better health (vaccination).

## Abbreviation

COVID-19, coronavirus disease 2019.

## Ethics Approval

This study did not involve human subjects and was approved by the Biomedical Research Ethics Committee of Nanjing Normal University (the Biomedical Research Ethics Committee) to be exempt from its ethical review application.

## Author Contributions

All authors made a significant contribution to the work reported, whether that is in the conception, study design, execution, acquisition of data, analysis, and interpretation, or in all these areas; they took part in drafting, revising, or critically reviewing the article; gave final approval of the version to be published; have agreed on the journal to which the article has been submitted; and agree to be accountable for all aspects of the work.



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