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Making Science Education More Accessible: A Case Study of TikTok's Utility as a Science Communication Tool

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Abstract—Social media has revolutionized science communication, allowing for rapid dissemination of science-related content to the public. In recent years, video platforms like TikTok and Instagram have implemented recommendation algorithms that track users' interests and suggest personalized videos. As a result, these apps have become powerful tools for public messaging, facilitating access to audiences that are naturally curious about science. In 2020 I began uploading educational science videos to TikTok which have collectively accumulated more than 48 million views and 8 million "likes." Here I present an analysis of video metrics collected from the TikTok app for a random sampling of 150 videos, searching for factors that predict the number of views a video receives and the level of viewer engagement. Videos with higher view counts were liked and shared at higher rates and sustained viewer attention for longer. Properties like hashtags, sounds, and effects did not significantly influence video views. Interestingly, videos summarizing research papers received the highest levels of engagement, potentially reflecting high demand from lay audiences who are traditionally unable to access scientific literature. Finally, I present survey data demonstrating that 84% of users report feeling more trustful of science & scientists after following this account. Although the generalizability of these findings is limited, the results offer insights into the factors that drive video performance on TikTok and how users engage with scientific content on social media. These findings may help science communicators more effectively reach wider audiences and promote science literacy in new and innovative ways.

Key words: science communication, social media, outreach, TikTok, Instagram, science education.

INTRODUCTION

In recent years, social media platforms such as TikTok, Instagram, and YouTube have become popular tools for scientists and medical professionals to reach the public. TikTok is a video-based app that uses a recommendation algorithm to disseminate videos, providing each user with a continuous feed of personalized videos based on their behavior within the app. This user-customized experience has allowed TikTok to become incredibly popular, with 1 billion reported users as of September 2021 (Bursztynsky, 2021). Additionally, its recommendation algorithm has generated new opportunities for scientists and science communicators to connect with members of the public who are interested in learning about science. Arguably, recommendation algorithms have made it easier than ever to disseminate science to receptive, self-selected target populations.

TikTok's algorithm offers the unique opportunity for videos to "go viral" and reach vast audiences, even if uploaded by an account with relatively few followers. This feature may allow researchers to extend their messaging well beyond the scope of traditional channels such as academic lectures (Lowe-Calverley et al., 2022). By sharing evidence-based information, those trained in science & medicine can break down traditional barriers between science and the public, increasing accessibility and improving public understanding and interest (Yammine et al., 2018). This can also enable critical public health messaging, such as distributing information about COVID-19 vaccines (van Kampen et al., 2022) and mask usage (Basch et al., 2021). In addition, digital platforms like TikTok have proven to be valuable hubs for rallying experts to drive policy change and combat misinformation in times of need (Rein, 2022). As such, TikTok and other social media platforms have opened new avenues for public messaging and education.

Despite the great value of TikTok as a tool for science communication, it does not appear to be particularly popular among scientists, potentially due to a lack of guidance on how to use it effectively. Thus, drawing insights from existing science channels may be of use for the scientific community. In April 2020, I began uploading educational videos on TikTok, which have collectively received more than 48 million views and

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over 8 million "likes." (Rein) In the current case study, I present an analysis of video metric data collected from a random sampling of 150 of these videos, searching for factors that meaningfully drive TikTok's video distribution algorithm, and video properties that influence viewer interest and engagement.

On TikTok, only a small percentage of video views are generated organically through users clicking on the video or sharing to other users. Rather, most views are generated when a video is placed in a user's feed by the TikTok recommendation algorithm. As such, I searched for factors that could predict the number of views each video received, as this may be useful for science communicators hoping to reach broader audiences. I report that only three variables significantly correlated with video views: the rate of viewers who liked the video, the rate of viewers who shared the video, and the average percentage of the video each viewer watched. The number of hashtags used in the caption did not affect video views, nor did the use of sounds or video effects. Video length was negatively correlated with the average percentage of the video watched, and videos that were watched to a greater extent received a higher rate of likes from viewers. In an analysis of video topics, videos summarizing research papers received the highest number of views and shares, while videos sharing career and life advice received the lowest engagement. Finally, I conducted a survey of my Instagram followers and found that the vast majority reported feeling more connected with science and more trustful of scientists since following my page.

The current study is intended to help scientists identify effective strategies for engaging the public. However, it is important to note that the generalizability of these results is limited as all analyses were performed on videos from a single account. It is unknown whether these findings could be replicated using data from other accounts posting science-related content. Additionally, the survey data are likely influenced by selection bias, as responses were voluntary provided by users who already follow the account. The results thus reflect the opinions of highly engaged viewers, who may be more likely to respond favorably. Follow-up studies should evaluate whether the current findings can be replicated with data from other video creators, and whether similar survey results can be obtained from non-self-selected populations.

EXPERIMENTAL PROCEDURES

TikTok Video Data Collection. Between April 2020 and November 2022, more than 300 total videos were uploaded on the TikTok platform via the account @dr.brein. TikTok is a social media platform where users can create videos and view those posted by other users. The app includes a database of sounds and music that can be added to videos, and filters/effects that can be applied to videos as they are created. When using the app, users are presented with a feed of videos from other users. The app uses a recommendation algorithm to populate this video feed; that is, the app gathers information about user habits and preferences to present each user with videos tailored to their interests.

In-app video metric data were manually retrieved from TikTok in November 2022 for a random sampling of 150 videos posted between those dates. Video data were manually collected from the "Analytics" tab for each video. Raw data provided by TikTok include total number of video plays, number of likes, number of comments, number of shares, video length, average watch time, and the percent of viewers who watched the full video. Measurements of engagement (likes, comments, shares) were subsequently standardized to percentages (i.e., total # comments / total # views = % comment; average watch time / video length = % watched). Other video properties such as the number of hashtags and use of sounds or effects were manually collected. The number of video views for the dataset failed all tests for normality ($p < 0.0001$ for Anderson-Darling, D'Agostino & Pearson, Shapiro-Wilk and Kolmogorov-Smirnov tests). Thus, video views were normalized via log transformation prior to all subsequent analyses. The full dataset including all raw video metric data has been uploaded to osf.io and is accessible at https://osf.io/axzyb/.

User Demographic Data Collection. Demographic data for followers of the accounts @dr.brein on TikTok and @doctor.brein on Instagram were manually collected through the TikTok and Instagram apps, respectively, in December of 2022. All data were manually extracted and presented here as offered through the application interface.

Statistical analyses. All statistical analyses were performed in GraphPad Prism with no pre-registered hypotheses. Experiments with two groups were compared using two-tailed unpaired *t*-tests. Experiments with more than two groups were subjected to one-way ANOVA with Tukey correction for multiple post-hoc comparisons. Simple linear regressions were performed to explore relationships between variables. All data are presented as mean ± S.E.M. In all figures, $*p < 0.05$, $**p < 0.01$, $***p < 0.0001$.

Survey Data Collection. Survey data were collected from users following @doctor.brein on Instagram. A series of Yes/No prompts were made available for 24 hours (June 16–17, 2022) using the "polls" feature on Instagram stories. 744 responses were collected from the first question while 684 were collected from the final question, indicating 8% attrition throughout the survey.

RESULTS

In April of 2020, I began uploading educational science-related videos on the social media platforms TikTok and Instagram via the accounts @dr.brein and @doctor.brein, respectively. The demographics of users who follow these accounts are provided in Table 1.

On the TikTok app, users are provided with analytics data regarding the performance of their uploaded videos. In November 2022, I manually retrieved all video metrics data for a random sampling of 150 videos uploaded between April 2020 and November 2022.

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Table 1. Follower demographics on TikTok and Instagram accounts, as of December 2022

	TikTok	Instagram
Username	@dr.brein	@doctor.brein
Total Number of Followers	702,100	115,200
Sex (%)		
	Female: 62	*Female*: 56.9
	Male: 38	*Male*: 43.1
Location (%)		
	USA: 57	*USA:* 44
	Canada: 5	*India*: 6.6
	UK: 5	*Canada*: 6.3
	Philippines: 5	*UK*: 6.2
	Australia: 3	*Australia*: 3.8
	Unknown: 25	*Unknown*: 33.1
Age (%)	*18–24:* 33	
	25–34: 38	*13–17*: 1.1
	35–44: 18	*18–24:* 20.2
	45–54: 8	*25–34:* 47.2
	55+: 3	*35–44*: 20.6
		45–54: 6.5
		55–64: 2.3
		65+: 1.7

Table 2 presents descriptive statistics for all video metrics analyzed. An excel spreadsheet containing all raw video metric data is accessible at https://osf.io/axzyb/.

The median number of video views was 54,100, while the median number of likes received was 8,124. Of the 150 videos analyzed, 100 (66.7%) received fewer than 100,000 views, while 35 (23.3%) received between 100,000 and 500,000 views. The remaining 15 (10%) received more than 500,000 views.

To explore relationships between all variables, all data were entered into a correlation matrix (Fig. 1(**A**)). Due to high variability in the raw number of video views (ranging from ~6,000 to 2,000,000; $p < 0.0001$ for all tests of normality), video view data were normalized via log transformation prior to conducting any analyses.

Of all the correlations observed, the largest Spearman rho value was found between the average percent of video watched and percent of viewers who watched the whole video ($r = 0.86$). This suggests that the data provided within the TikTok app are reliable, or at least consistent. The results of more detailed analyses exploring relationships between variables are presented in the following sections.

Viewer engagement and retention predict video views

When a video is posted on TikTok, the number of views that it receives is determined by a recommendation algorithm. Presumably, this algorithm takes into account factors like viewer engagement (i.e., likes, shares) and retention (i.e., watch time), though the exact factors that determine video performance are unknown. It is thus of interest to identify factors that are predictive of the number of views videos receive on TikTok.

Users on TikTok can engage with videos by liking, sharing, or commenting on the video. Linear regressions between each of these forms of engagement and video views revealed that higher rates of viewer liking (Fig. 1 (**B**); $R^2 = 0.14$, $p < 0.0001$) and sharing (Fig. 1(**C**); $R^2 = 0.09$, $p = 0.0001$) were predictive of higher video views. In contrast, the rate of viewer commenting was negatively correlated with video views (Fig. 1(**D**); $R^2 = 0.05$, $p = 0.007$). These results suggest that likes and shares, but not comments, contribute to algorithmically determined video views.

Next, linear regressions were performed between video views and various measurements of viewer retention (i.e., the average percentage of video watched, and the percentage of viewers who watched the entire video). The average percent of the video watched was modestly but significantly correlated with video views (Fig. 1(**E**); $R^2 = 0.03$, $p = 0.03$), suggesting that TikTok videos that more effectively retain viewers receive more views overall. However, this effect size was small, and the percent of viewers who watched the entire video was not significantly correlated with video views (Fig. 1(**F**); $R^2 = 0.017$, $p = 0.11$) suggesting that viewer retention contributes less meaningfully to video views than other measures such as engagement.

Many TikTok users have theorized that certain video properties – such as the number of hashtags used in the caption, the use of video effects, or the addition of background music – may influence video views. I thus explored the impact of these properties. Videos were separated based on the number of hashtags used, and it was found that the mean number of views received did not differ between videos with 0, 1, 2, or 3+ hashtags in the caption (Fig. 1(**G**); one-way ANOVA, $F = 1.863$, $p = 0.14$). Additionally, many TikTok videos use a "sound," such as background music, or an "effect," such as an augmented reality filter. In this dataset of 150 videos, it was found that neither the use of a sound (Fig. 1(**H**); unpaired two-tailed *t*-test, $t = 0.40$, $p = 0.69$) or an effect (Fig. 1(**I**); unpaired two-

Table 2. Descriptive statistics of metrics for the 150 TikTok videos analyzed in this study

Metric	Mean	Median	SEM	Min	Max
Number of views	186,658	54,100	27,297	6,350	2,000,000
Number of likes	31,624	8,124	5,091	478	398,000
Number of comments	608.8	208	106.9	17	10,700
Number of shares	941.2	121.5	224.4	1	23,600
Video length (s)	56.94	55.45	2.08	8.29	168.2
Average % watched	51.82	49.52	1.148	17.37	96.63
% Watch whole video	22.94	19.73	0.96	2.82	64.04

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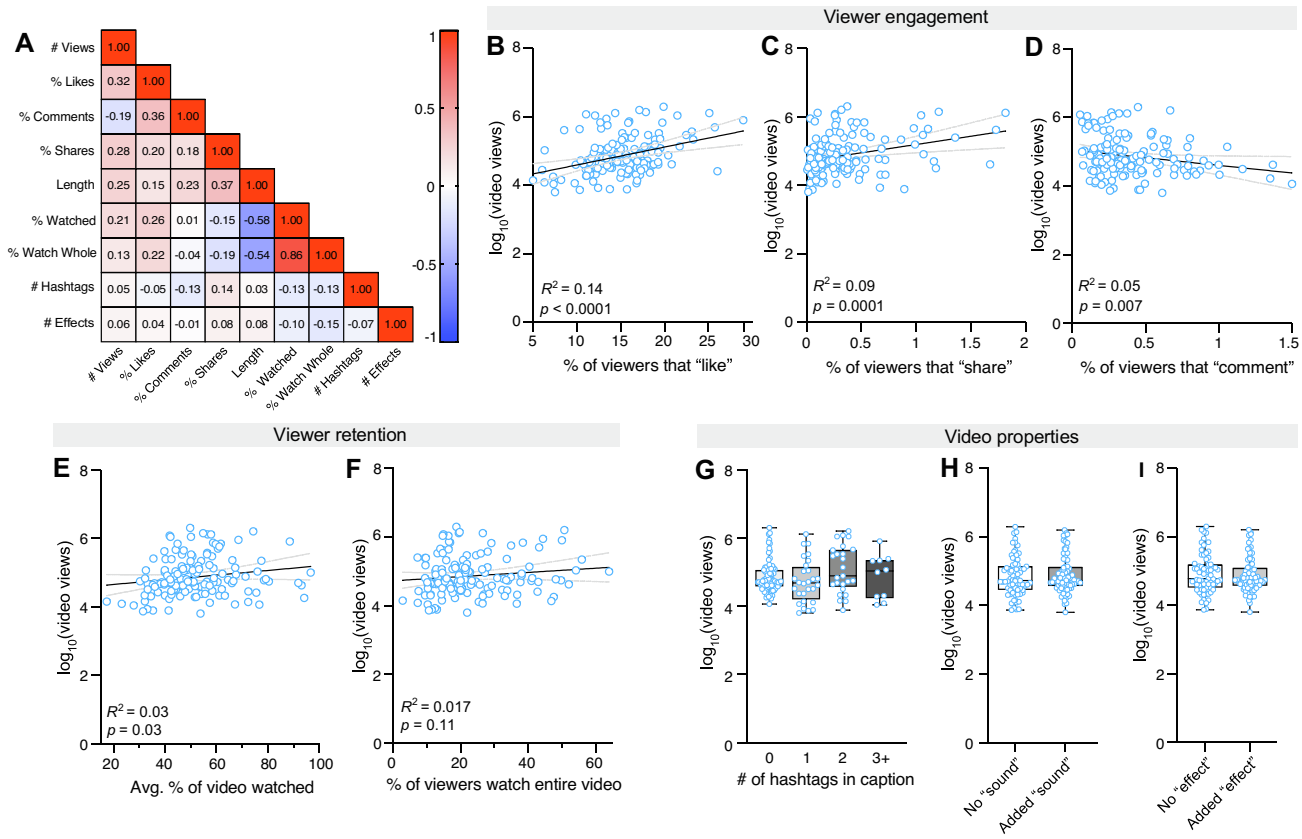

Fig. 1. Viewer engagement and retention predicts video views on TikTok. (A): Correlation matrix comparing video metric data for all 150 videos. Values represent Spearman r. Right: heat map key. (**B-D**): Linear regressions examining relationships between video views and rates of likes (**B**), shares (**C**), and comments (**D**). **E-F**: Linear regressions examining relationships between video views and average percent of video watched (**E**) and percent of viewers who watch the entire video (**F**). (**G-I**): Bar graphs displaying differences in video views based on the presence or absence of certain video properties such as the number of hashtags used in the caption (**G**), the addition of a "sound" such as background music (**H**), or an in-app "effect" such as an augmented reality filter (**I**). All data presented as mean ± SEM.

tailed *t*-test, $t = 0.49$, $p = 0.62$) significantly impacted video views. In summary, these findings suggest that video properties such as hashtags, sounds, or effects do not meaningfully influence video views, while direct measurements of viewer engagement and retention do.

Viewers disengage earlier from longer videos

TikTok is notorious for popularizing "short form" content, where videos typically span between 15 and 60 s. It has been postulated that this shortening of online content is negatively affecting users' attention spans (Koetsier). I thus wondered whether longer videos would display higher rates of viewer loss (i.e., users "swiping away" or disengaging from videos). A linear regression between video length and average video watch time revealed a strong positive correlation (Fig. 2(**A**); $R^2 = 0.72$, $p < 0.0001$), suggesting that users spend more time on average watching longer videos. However, when regressing video length with the average percentage of the video watched (% watch), a strong negative correlation was observed (Fig. 2(**B**); $R^2 = 0.34$, $p < 0.0001$). This suggests that when presented with longer videos on TikTok, viewers watched a lower proportion of the total video length. Consistent with this, there was also a significant negative correlation between video length and the percent of viewers who watch the whole video (Fig. 2(**C**); $R^2 = 0.26$, $p < 0.0001$).

I next explored whether users were more likely to engage with videos that they watched a greater proportion of. A linear regression between % watch and % like revealed that videos with greater viewer retention received higher rates of likes (Fig. 2(**D**); $R^2 = 0.06$, $p = 0.003$). However, the rates of shares (Fig. 2(**E**); $R^2 = 0.01$, $p = 0.29$) and comments (Fig. 2(**F**); $R^2 = 0.00$, $p = 0.96$) were not affected by increased watch time. This suggests that viewers may be more likely to like videos that they watch a greater proportion of, but not comment or share, which may have implications for how longer videos are treated by the recommendation algorithm.

Videos summarizing research articles perform well, while advice "flops"

Clearly there was substantial variability in the performance of these videos; so, which videos performed the best? What topics are the most

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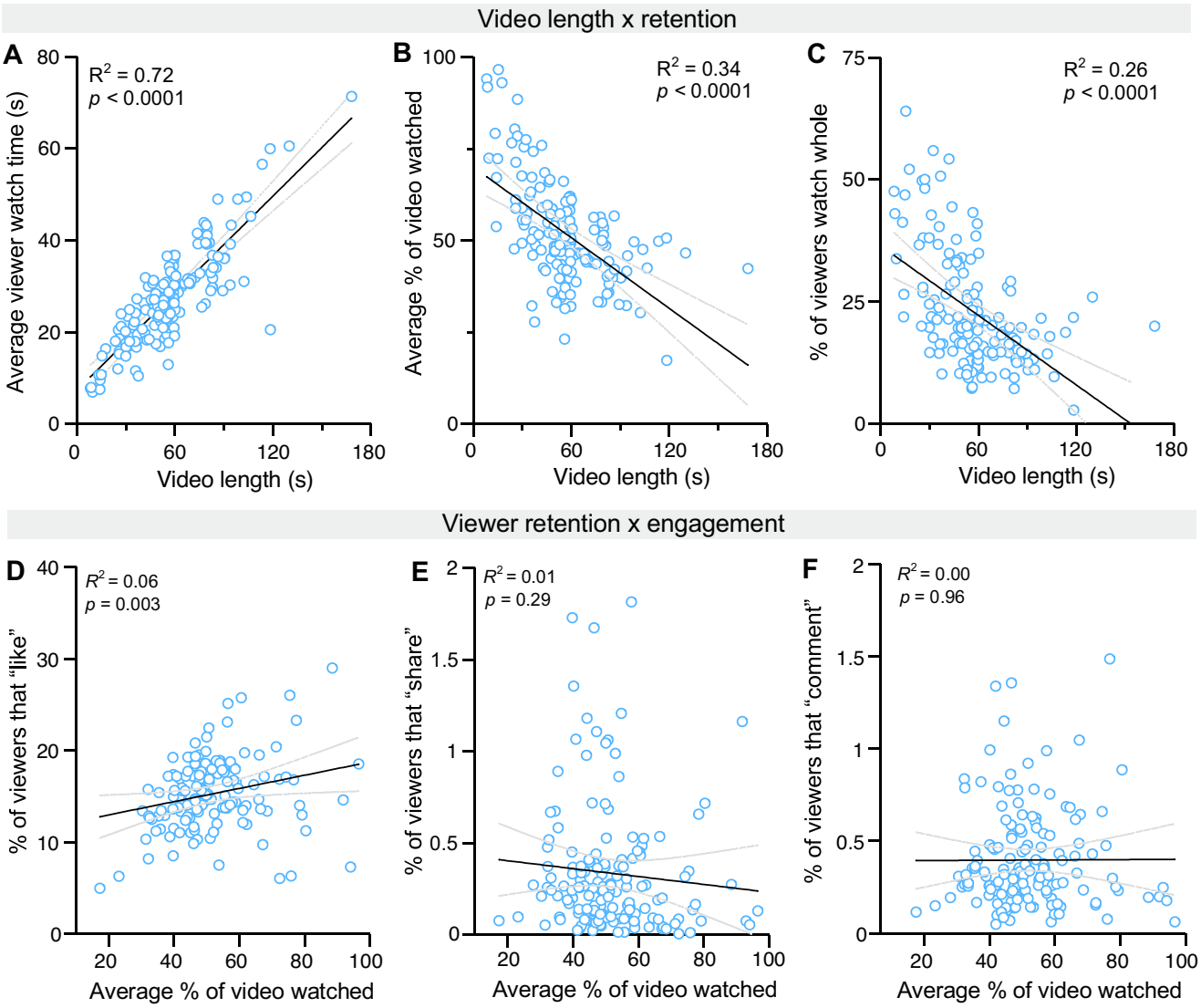

Fig. 2. Viewers attrition occurs with increasing video length. (A, B, C): Linear regressions examining relationships between video length and average viewer watch time in seconds (**A**), average % of video watched (**B**), and % of viewers who watch the whole video (**C**). **D-F** Linear regressions examining relationships between the average percentage of the video watched by viewers and the percent of viewers that like (**D**), share (**E**), and comment (**F**).

interesting to the public? To address these questions, videos were classified into one of eight categories and viewer engagement was compared between categories. The eight video categories were: 1) *paper summaries* (quick summaries of research papers for the lay public), 2) *research methods* (descriptions of research techniques like fMRI or optogenetics), 3) *debunking* (fact checks of videos on TikTok containing misinformation (Muhammed and Mathew, 2022) 4) *neuroscience lessons* (general lessons one might find in a textbook), 5) *about me/my research* (personal videos about my journey in science) 6) *career/life advice* (tips for students in science and more general, non-career advice), 7) *current news/topics* (timely topics like COVID-19) and 8) *theoretical* (speculative videos exploring ideas and theories in neuroscience).

As shown in Fig. 3, videos in the *paper summaries* category received the highest number of video views, while videos comprising the *career/life advice* category received the fewest views (Fig. 3(**A**); one-way ANOVA, $F = 7.71$, $p < 0.0001$). A similar trend was observed in the rate of likes: videos in the *career/life advice* category received significantly fewer likes on average than several other video categories (Fig. 3(**B**); one-way ANOVA, $F = 4.25$, $p < 0.001$). *Paper summaries* were shared at significantly higher rates than several other types of videos (Fig. 3(**C**); one-way ANOVA, $F = 4.20$, $p < 0.001$), potentially explaining the increased number of views, as the rate of shares is significantly predictive of video views (Fig. 1(**C**)). Of note, despite receiving low rates of views and likes, *career/life advice* videos were shared at similar rates to other categories (Fig. 3(**C**)). One potential explanation is that science career advice is not relevant to most TikTok users, resulting in these videos receiving a lower rate of likes; however, viewers may still share these videos with friends who could benefit from the advice. Interestingly, there were no differences in the rate of viewer comments between

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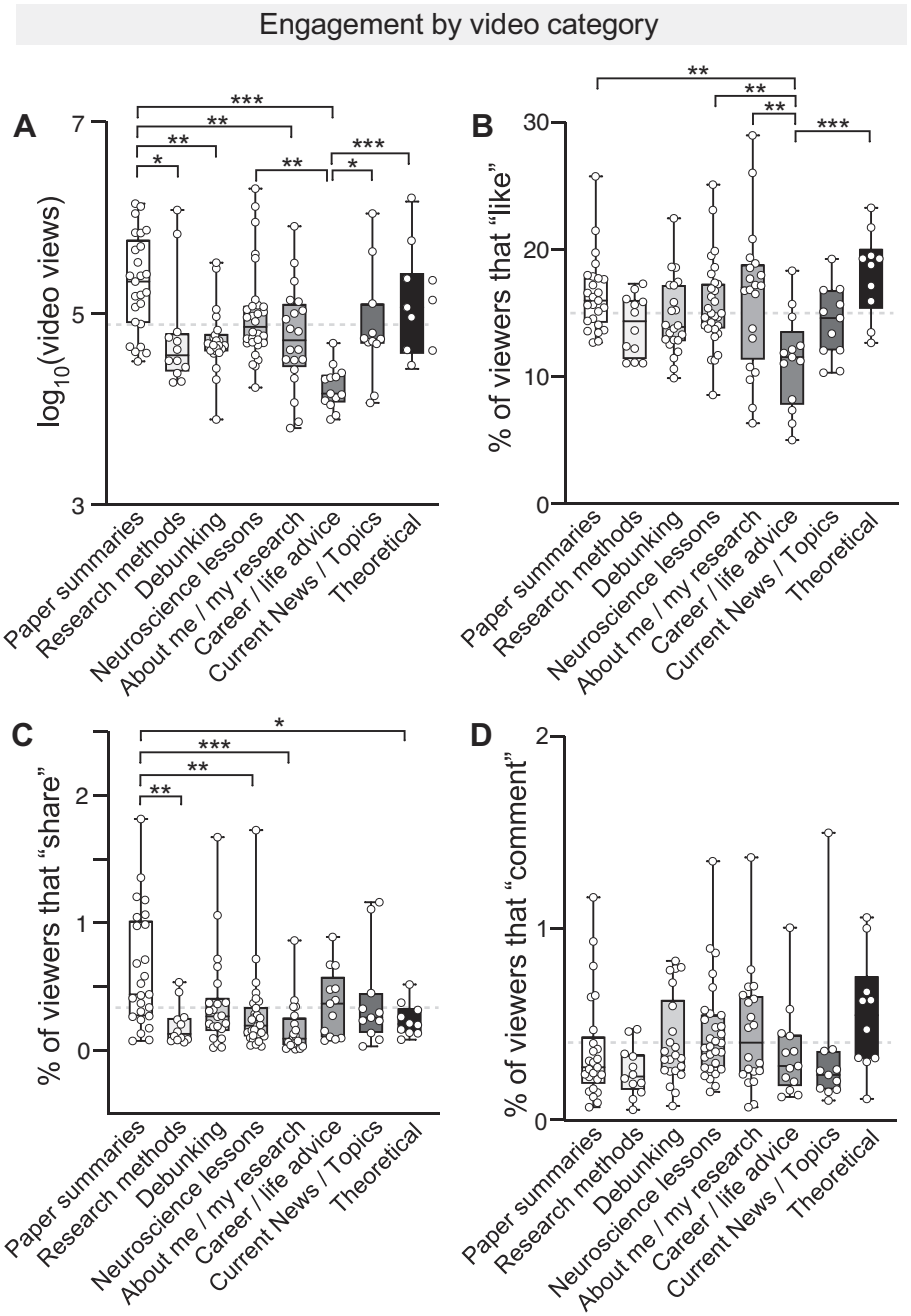

Fig. 3. User engagement by video category. (A): Bar graph comparing log-transformed video views by video category. (**B**): Bar graph comparing the rate of viewers who liked the video by category. (**C**): Bar graph comparing the rate of viewers who shared the video by category. (**D**): Bar graph comparing the rate of viewers who commented on the video by category. Asterisks indicate significant differences between groups as determined by one-way ANOVA post-hoc *t*-tests with Tukey correction for multiple comparisons. *$p < 0.05$; **$p < 0.01$; ***$p < 0.0001$. All data presented as mean ± SEM. Horizontal dotted lines represent combined average of all groups.

video categories (Fig. 3(**D**); one-way ANOVA, $F = 1.45$, $p = 0.19$). Overall, these results suggest that videos summarizing research papers perform well on TikTok, while videos containing advice do not.

Short-form educational videos can drive learning and improve sentiment toward science

In addition to being uploaded on TikTok, these videos are also shared on Instagram. This platform offers more robust tools for interacting directly with audiences through features like surveys and questionnaires. To evaluate the impact of science-related videos on viewer attitudes, I surveyed my Instagram followers using the ‘‘polls” feature. The results are presented in Fig. 4. Of note, the questions were presented sequentially, and viewers were able to exit the survey (‘‘swipe away”) at any time, which resulted in varying response rates across questions. Additionally, since responses were collected from followers, the results may be positively influenced by selection bias as these users are inherently most likely to view and engage with my content.

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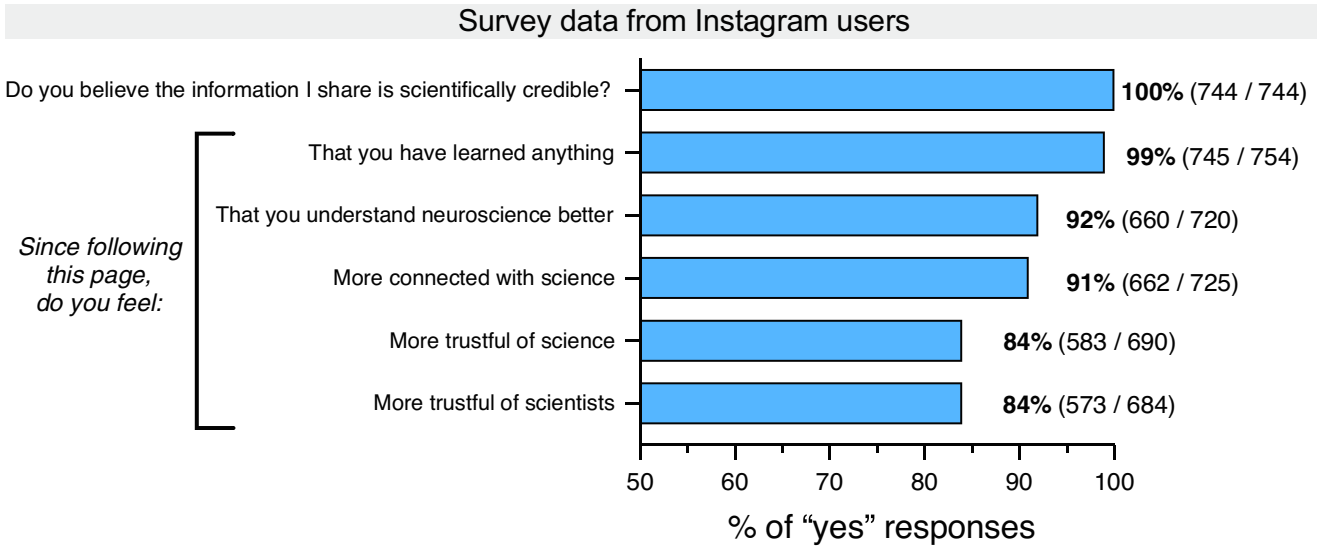

Fig. 4. Short-form educational videos on social media can positively influence public sentiment toward science. Instagram "stories" were used on the account @doctor.brein to collect survey data from followers. The percentage of responders who replied "yes" is indicated.

All responders (100%; 744/744) reported that they believe the information I share is scientifically credible. Additionally, 99% (745/754) reported that they have learned something since following my account, and 92% (660/720) reported that they understand neuroscience better. Remarkably, 91% (662/725) reported feeling more connected with science since following my account, and 84% reported feeling more trustful of science (583/690) and scientists (573/684). These results are incredibly encouraging and provide compelling evidence that short-form educational content posted on social media can improve public sentiment toward science.

DISCUSSION

The current study investigated the performance of educational science-related videos on TikTok, and factors that influence their reach and impact. It is important to note that all data were collected from a single account, which greatly limits the scope and generalizability of the results. Whether these findings apply to other social media accounts remains to be determined and should be the focus of future studies.

In searching for factors predictive of video views, I observed that the percentage of viewers who like the video and share the video were positively correlated with video views, while the percentage of viewers who comment was negatively correlated with views. It is sensible that videos which are liked and shared at higher rates would receive more views overall, as TikTok's overall goal is to entertain viewers and maintain user attention. It is thus in the app's best interest to promote videos that are likeable and shareable – particularly as highly shared videos may recruit new users to the app. In contrast, the negative correlation between video views and comments came as a surprise as it was anticipated that any form of viewer engagement, including comments, would positively influence video performance. The negative correlation observed may simply reflect a dilution of interested viewers: as videos receive more views (often into the millions), the segment of viewers who are interested enough to leave a comment may diminish, resulting in lower rates of commenting. Additionally, comments do not necessarily indicate positive engagement with a video, as they can be negative or irrelevant.

It was also observed that viewer retention (average % of video watched) was a significant predictor of video views, suggesting that videos that more effectively retain viewer interest are algorithmically favored. This is expected, as a major goal of any social media platform is to keep users on the app for as long as possible. Other video properties such as the number of hashtags used, the addition of a sound (such as background music), or the use of a video effect had no significant impact on video views. This is noteworthy, as TikTok began as a music app called Musical.ly (Musical.ly), and continues to emphasize the importance of using sounds (TikTok). It has been theorized that pairing a sound with TikTok videos is important for success, and one survey found that 90% of TikTok users claim that sound is the key to the TikTok experience (Molenaar). The finding that videos without sounds perform as well as those with sounds suggests that sound may not be as important as proposed. However, it is also possible that science-related videos are less meaningfully influenced by sounds than other styles of videos, again highlighting the importance of replicating these findings with data from other accounts. Collectively, these findings indicate that certain measurements of viewer interest and engagement (% like, % share, and % watched) impact video viewership, while others do not.

TikTok is notorious for popularizing incredibly short-form content, with videos sometimes as brief as 5

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seconds long. Here I observed that as video length increased, viewers watched a smaller proportion of the total video length. This finding corresponds with a previous study reporting that students taking online classes watched a higher percentage of educational videos that were shorter (Guo et al., 2014). The results of the current study may have important implications for experts performing public health messaging in times of dire need: if longer videos are more likely to lose viewer attention at an earlier point, it may be important to place important details early in the video. It was also observed that videos that more effectively sustained viewer attention received higher rates of likes, but not comments or shares. This intriguing finding may imply that users are more inclined to like an educational video as they watch a greater proportion of it, potentially indicating an appreciation for the knowledge gained. It also may suggest that shorter videos – which displayed higher viewer retention – may be more likely to receive likes, which could positively influence video views.

I also explored how video topic affected viewer behavior. It was observed that videos summarizing research papers received the highest level of viewer engagement. This fascinating finding may reflect an appreciation for the accessibility of this scientific information, which is typically challenging to access and interpret. Under the current publishing system, scientific research papers are held behind paywalls and are full of scientific jargon, making public access extremely limited. By offering a brief, interpretable, and interesting summary of scientific articles, these educational videos provide the public with unprecedented access to scientific research. It is thus encouraging and meaningful to see high levels of viewer engagement on these videos, as it may suggest that there is high demand for more accessible scientific literature.

In contrast, videos comprising career/life advice displayed the lowest levels of viewer engagement. This comes as no surprise, as the vast majority of TikTok users are ostensibly not studying science in academic settings. These videos thus offer little value to most users, which can explain their low level of engagement. However, these videos can still be incredibly useful for a subset of users pursuing careers in science. As such, their low engagement should not be viewed as cause to discontinue such videos.

Finally, I conducted a survey of my Instagram followers and found that 100% of responders believe the information is scientifically credible, while 99% reported that they have learned something. Furthermore, 92% reported that they understand neuroscience better, 91% reported feeling more connected with science, and 84% reported feeling more trustful of science and scientists. These results are incredibly encouraging, as they suggest that simple, short videos posted on social media can play a significant role in increasing public understanding and appreciation of science. However, the data may have limited bearing as they were collected from the followers of a single Instagram account and may not generalize to other platforms or audiences. Those who responded to this poll are inherently more likely to engage with my content, as they voluntarily took the survey. This selection bias may result in responders rating the content more favorably. Future research should explore whether similar sentiment can be obtained from randomly selected participants who are not self-selected. To this point, a recent study presented TikTok-style videos (including one video from the account analyzed here) to American participants recruited through a survey platform (Barghava et al., 2023). Barghava et al. found that after being shown videos in which experts debunked false claims, participants were significantly less likely to believe in the false claims (Barghava et al., 2023). While this addresses a different research question than the survey presented here, it provides some validation that educational TikTok videos can be effective even when presented to audiences that aren't self-selected by content interest.

It is also worth noting that none of the individual variables were particularly strong predictors of video views (greatest R^2 value observed = 0.14), suggesting that the relationship between these variables and video views may be more complex than can be extracted from a single linear regression model. Additionally, TikTok's algorithm likely changes over time, and since the data collected for this study spanned nearly two years, the results may be confounded by changes made to the algorithm during that span. Furthermore, these analyses are limited by the lack of temporal information provided in TikTok's video metric data. It is possible that as videos accumulate views, user engagement rates are constantly calculated and used to update and fine tune video views in real time. The current analysis lacks the ability to investigate this, as the data used here were "snapshot" averages provided by TikTok at the time of manual collection from the app.

Overall, this study may provide valuable insights for scientists and educators looking to use social media for disseminating educational content. By understanding the factors that influence the reach and impact of their content, experts can better tailor their videos to maximize reach. Future studies should include data from a larger sample of social media accounts to confirm and expand upon the findings of this study.

CONFLICT OF INTERESTS

The author has no competing interests to disclose.

REFERENCES

Barghava P, Katie M, Christie N, Hause L, Gordon P (2023) How effective are TikTok misinformation debunking videos? Harv Kennedy Sch Misinformation Rev 4(2). https://doi.org/10.37016/mr-2020-114.

Basch CH, Fera J, Pierce I, Basch CE (2021) Promoting mask use on TikTok: descriptive, cross-sectional study. JMIR Public Health Surveill 7(2):e26392. https://doi.org/10.2196/26392.

Bursztynsky J. TikTok says 1 billion people use the app each month. *CNBC*. Published September 27, 2021 https://www.cnbc.com/2021/09/27/tiktok-reaches-1-billion-monthly-users.html

Please cite this article in press as: Rein B. Making Science Education More Accessible: A Case Study of TikTok's Utility as a Science Communication Tool. Neuroscience (2023), https://doi.org/10.1016/j.neuroscience.2023.08.021

Guo P, Kim, J, Rubin R. How video production affects student engagement: an empirical study of MOOC videos. *Proc First ACM Conf Learn Scale Conf*. Published online March 4, 2014.

Koetsier J. Digital crack cocaine: the science behind TikTok's success. *Forbes*. Published online January 18, 2020 https://www.forbes.com/sites/johnkoetsier/2020/01/18/digital-crack-cocaine-the-science-behind-tiktoks-success/?sh=6b3ca56678be

Lowe-Calverley E, Barton M, Todorovic M (2022) Can we provide quality #MedEd on social media? Trends Mol Med 28 (12):1016–1018. https://doi.org/10.1016/j.molmed.2022.08.002.

Molenaar K. How (and why) you should use TikTok sounds in 2023. *Influ Mark Hub*. Published online January 23, 2023. https://influencermarketinghub.com/tiktok-sounds/

Muhammed TS, Mathew SK (2022) The disaster of misinformation: a review of research in social media. Int J Data Sci Anal. 13 (4):271–285. https://doi.org/10.1007/s41060-022-00311-6.

Musical.ly. Wikipedia. https://en.wikipedia.org/wiki/Musical.ly

Rein B. @dr.brein. www.tiktok.com/@dr.brein

Rein B (2022) Harnessing social media to challenge scientific misinformation. Cell 185(17):3059–3065. https://doi.org/10.1016/j.cell.2022.07.001.

TikTok. The importance of sounds. https://www.tiktok.com/creators/creator-portal/en-us/tiktok-creation-essentials/the-importance-of-sounds/

van Kampen K, Laski J, Herman G, Chan TM (2022) Investigating COVID-19 vaccine communication and misinformation on TikTok: cross-sectional study. JMIR Infodemiol 2(2):e38316.

Yammine SZ, Liu C, Jarreau PB, Coe IR (2018) Social media for social change in science. Science 360(6385):162–163. https://doi.org/10.1126/science.aat7303.

Please cite this article in press as: Rein B. Making Science Education More Accessible: A Case Study of TikTok's Utility as a Science Communication Tool. Neuroscience (2023), https://doi.org/10.1016/j.neuroscience.2023.08.021