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The effects of TikTok's COVID-19 content on anxiety in young adults

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1. Introduction

Between COVID-19's first appearance in late 2019 and March 2023, there have been over 760 million confirmed cases and 6.8 million deaths linked to the virus (World Health Organization, n.d.). The COVID-19 pandemic had numerous effects on global society including business and school closures, jobs switching to work-from-home modalities, social distancing to isolate and slow the spread of the virus, and travel restrictions (Singh & Singh, 2020). These factors, along with the underlying threat of illness and/or death stemming from COVID-19, created prime conditions for heightened states of loneliness and anxiety. Around the same time as COVID-19's initial spread, the social media platform TikTok experienced a surge of long-lasting popularity, garnering 315 million downloads in the first quarter of 2020 (Bhandari & Bimo, 2022). It retained more than 150 million active users in January 2022 across iOS and Android devices, with 43% of all TikTok users in that month being between the ages of 18 and 24 (Ceci, 2022). The near-simultaneous rise of both COVID-19 and TikTok led to the platform being used as a common outlet for users to share their thoughts and opinions on the pandemic while also feeding a growing audience in need of information and diversion. This led to positive effects, such as helping "users stay informed and take proper precautions" regarding COVID-19 (Li et al., 2021, p. 262). However, unpleasant or negative portrayals of COVID-19 similarly became prevalent on the platform. These include an emphasis on the unpleasant aspects of COVID testing (Basch et al., 2021) and hopeful videos receiving less views than videos that did not emphasize hope (Li et al., 2021).

As a result of the anxiety generated by the COVID-19 pandemic (Généreux et al., 2020; Singh & Singh, 2020), as well as the mixed portrayals of COVID-19 on TikTok, this experiment

set out to determine whether TikTok's COVID-19 content generates anxiety within young adults three years into the COVID-19 pandemic. Additionally, it contextualizes this data within potentially relevant demographics such as political affiliation, race/ethnicity, and vaccination status. The data was gathered from a sample of 107 young adults, ages 18-24, who were randomly sorted into two groups: a control group that was shown a compilation of trending TikToks not related to COVID-19, and an experimental group that was shown a compilation of top COVID-19 videos on the platform from the third quarter of 2022. Both groups were asked to fill out a questionnaire evaluating their anxiety levels before and after exposure to their assigned compilation, the data from which was then analyzed.

2. Literature Review

TikTok is a short-form video-sharing app that has risen to prominence in recent years. TikTok had more than 150 million active monthly users across iOS and Android devices in January 2022, with 43% of all users from this period being between the ages of 18 and 24. Additionally, 49.1% of global TikTok creators in September 2022 were between the ages of 18 and 24 (Ceci, 2022). Thus, using adults between ages 18 and 24 for the experiment matches the real-world context of TikTok's typical audience. TikTok allows users to create videos, often set to viral audios or songs, that can range from 2-180 seconds in length. Users can also livestream to the platform and "duet" existing content, recording a response to a video and placing it side-by-side with the original. The entire platform is based around an algorithm that determines what kinds of personalized content appears on a user's "For You" page (Bhandari & Bimo, 2022). This algorithm's core function is to display personally tailored content to each user's "For

You" page by analyzing their interactions and engagement with past videos (Klug et al., 2021). In other words, the algorithm presents a user with a video, analyzes how the user interacts with it, and then uses that data to determine what videos to present them in the future based on what is likely to receive the most engagement and/or interaction.

The coronavirus disease 2019, shortened to COVID-19, was first reported in Wuhan City, China in December 2019. In March 2020, as COVID-19 spread beyond China, the World Health Organization declared COVID-19 a pandemic (Liu et al., 2020). Symptoms of the virus can appear 2-14 days after initial exposure and include fever, cough, shortness of breath, fatigue, and a loss of taste and/or smell (Centers for Disease Control and Prevention, 2022). As of March 2023, there have been over 760 million confirmed cases of COVID-19 and 6.8 million deaths linked to the virus (World Health Organization, n.d.). Other consequences of the pandemic include millions of people losing their jobs in 2020, especially those with "precarious jobs in services, restaurants, transportation, and other fields that typically do not offer long-term contracts, decent wages, and health benefits" (Blustein & Guarino, 2020, p. 705). In other words, those who were already in precarious employment and/or financial positions were most likely to be among the millions to lose their jobs in the first year of the pandemic. Furthermore, more than 420 million children and youths impacted by school and university closings and social isolation procedures were enacted to slow the spread of the virus (Singh & Singh, 2020). Both factors uniquely impact the young adult demographic featured in this experiment; the COVID-19 pandemic all but deprived young adults of their traditional social settings and fundamentally altered the way education was approached. As many of the 18–24-year-olds featured in this experiment were between the ages of 15-21 when the pandemic was declared

in March 2020, their perspectives on COVID-19 are confounded by its sudden disruption of the high school and college settings that drastically influence the social, professional, and academic development of many young adults.

The COVID-19 pandemic raised levels of generalized anxiety worldwide. In June 2020, 19.6% of Canadians showed symptoms of generalized anxiety, 17.1% higher than the pre-pandemic level of 2.5% (Généreux et al., 2020). A 2020 study of parents found that "increased time spent on COVID-19 information per day, particularly from social media sites, could be associated with the development of anxiety symptoms" (Ebrahim et al., 2020, p. 6). A 2021 study similarly found that, regarding information about COVID-19, "exposure to digital media and personal contacts was positively associated with anxiety and depression" (De Coninck et al., 2021, p. 7). In May 2020, 17.4% of surveyed Kurdish adults said the dissemination of the number of COVID-19 infections was the leading cause of panic on social media, while 7.6% cited the dissemination of the number of COVID-related deaths as the leading cause of panic (Ahmad and Hersh, 2020). In each of these cases, the exposure to information related to COVID-19 through digital media revealed a positive correlation with anxiety.

Scholarship has also showed that TikTok's portrayal of COVID-19 information produced a particularly anxiety-inducing lens. On the app's "COVID-19 Information Hub," hopeful videos received less views than videos that did not emphasize hope, videos that emphasized alarm received more comments than those that did not, and videos that mentioned the susceptibility of contracting or being harmed by COVID-19 received more likes than those did not (Li et al., 2021). In June 2021, 71 of the 100 most viewed TikToks tagged with "#covidtesting" emphasized the negative or unpleasant aspects of COVID-19 testing (Basch et al., 2021).

Additionally, many accounts are built on stressful portrayals of COVID-19 and current events as a whole; an account named "Good Morning, Bad News", for example, has built a following of over 1.5 million users by intentionally focusing on stressful news (Suzdaltsev, n.d.). The success of Suzdaltsev's TikTok account, as well the popularity of TikToks that emphasize the unpleasant and stressful aspects of the pandemic, indicate that TikTok frames COVID-19 in an especially stressful light. Although this lens could be justified due to the relative recency of the COVID-19 pandemic and its significant number of associated deaths (Liu et al., 2020; World Health Organization, n.d.), the existence of an anxiety-inducing lens on the platform is well-documented.

COVID-19-related stress has been associated with higher levels of anxiety within people of color when compared to their white counterparts. According to a 2022 study, "For Black adults, experiencing COVID-19 stress was linked to increased anxiety regardless of age, and the reactivity for Black Americans was consistently stronger than that of White adults of all ages" (Pearman et al., 2022, p. e20). Additionally, "COVID-19 and racial trauma stress were higher among individuals who were not White or heterosexual most likely due to racism, xenophobia, and cis-heterosexism at the individual and structural levels" (Dush et al., 2022, p. 104). An academic review similarly noted that the varying quality of healthcare, education, and housing are some of the factors that influence heightened levels of COVID-19-induced mental stress within racial and ethnic minorities (Pandey et al., 2021). Given TikTok's notably stressful portrayal of COVID-19, and the heightened levels of stress experienced by racial and ethnic minorities regarding the virus, it reasons that exposure to COVID-19 content on TikTok would trigger especially high levels of anxiety within people of color.

Social factors, such as political affiliation, also have a connection to mental health in the context of COVID-19. Specifically, in the United States, "conservative people reported lower levels of COVID-19 anxiety and less use of health behaviors than liberal participants" (Olatunji et al., 2022, p. 5). A 2020 survey found that, regarding the initial response to the COVID-19 pandemic, "Conservatives (36.5%) were most likely to feel that people were overreacting while liberals (44.6%) were most likely to feel that people were under-reacting (p-value <0.001)." The study goes on to note that "Political ideology was the strongest factor associated with attitudes toward the COVID-19 response" and that "Those who were politically conservative were more likely (p-value <0.001) to say that the seasonal influenza was more deadly than COVID-19 (25.7%) compared to moderates (10.3%) and liberals (9.9%)" (Christensen et al., 2020, p. 10). Additionally, "The most important predictor of when states adopted social distancing policies is political: all else equal, states led by Republican governors were slower to implement such policies during a critical window of early COVID-19 response" (Adolph et al., 2021, p. 211). Given this difference in mindset between political parties, it can be reasoned that liberals hold stronger feelings of anxiety regarding the potential negative effects of COVID-19. Similarly, as conservatives tend to feel that people overreacted to the COVID-19 pandemic in 2020, they likely hold less anxiety about COVID-19 when compared to those with other political affiliations.

Vaccination is, similarly, a contributing factor towards COVID-19-related stress. Within a sample of Taiwanese healthcare workers, a 2022 study found that the "severity and frequency of PTSD were positively correlated with vaccine worries", therefore tying anxiety to vaccine hesitancy (Hsieh et al., 2022, p. 7). A 2020 academic commentary discussed how anxiety is used to propagate anti-vaccine sentiments:

> Analyses of anti-vaccination websites have shown that 76% to 88% of the websites studied leveraged emotional appeals (e.g., vaccines as a violation of civil liberties, dangers of vaccine side effects), and 20% to 50% of the websites underplayed the risk and severity of vaccine preventable diseases. (Chou & Budenz, 2020, p. 1719)

Although these studies tie anxiety to vaccine hesitancy and opposition, other sources have noted how "higher stress may increase the perceived severity of and susceptibility to infection, thus increasing people's willingness to take vaccine [*sic*]" (Zhang et al., 2022, p. 14). Given the link between vaccine worries and heightened anxiety, the emotionally charged nature of anti-vaccine websites, and the use of stress as a motivator in favor of vaccination, it reasons that vaccination against COVID-19 is closely tied with stress in the modern world in ways that seemingly both promote and condemn COVID-19 vaccinations.

3. Hypotheses and Research Question

Given the noted connection between COVID-19 and anxiety, along with ties between TikTok and unpleasant portrayals of COVID-19, this study set out to determine whether participants, aged 18-24, would experience heightened states of anxiety after exposure to COVID-19-related videos when compared with the pretest. Additionally, previously discussed literature connected COVID-19-related stress to political ideology, race/ethnicity, and COVID-19 vaccinations. Therefore, this study will also analyze whether anxiety felt by young adults after exposure to COVID-19 content from TikTok is affected by political affiliation, race/ethnicity, and COVID-19 vaccination status. As such, the following hypotheses and research question were put forward:

	Hypotheses and Research Question
H1	Participants exposed to TikTok content related to COVID-19 will experience heightened states of emotions associated with anxiety compared with those exposed to the control condition.
H2	Within the United States' political spectrum, participants that lean left politically will experience heightened states of emotions associated with anxiety compared with participants that lean right politically when exposed to TikTok content related to COVID-19.
H3	Non-white participants exposed to TikTok content related to COVID-19 will experience heightened states of emotions associated with anxiety compared with white participants.
RQ1	Does vaccination status affect anxiety felt by young adults after viewing COVID-19 content from TikTok?

4. Methodology

From November to December of 2022, a group of 107 participants was recruited via convenience sampling and automatically broken into two random, equal groups by Qualtrics XM. Recruitment consisted of a non-probability convenience sample constructed from personal contacts, current classmates, and the correspondents of participants and personal contacts willing to share the questionnaire with other young adults. This recruitment method was pursued to gather the largest number of possible participants without compromising the integrity of the data, as this project was an experiment rather than a survey. Additionally, the demographic of young adults, aged 18-24, was ideal for this experiment due the 43% of TikTok users and 49.1% of TikTok creators that fit within this demographic in 2022 (Ceci, 2022).

Two collections of popular TikToks were gathered, one filled with trending videos tagged with COVID-19-related hashtags and one filled with trending videos with no COVID-19-related hashtags. The videos in the control condition were selected by using TikTok's Creative Center webpage to discover the three most popular hashtags on the day the questionnaire was created: September 5th, 2022. The top three videos under each of these hashtags were then saved, compiled, and embedded within the questionnaire. Attribution was given to the TikToks' original creators through the app's automatically generated in-video watermarks. The COVID-19-related TikToks were found by selecting the top three videos under the "#covid", "#covid19", and "#coronavirus" hashtags on September 5th, 2022. Attribution was similarly provided through TikTok's automatic in-video watermarks. If a TikTok had multiple relevant COVID-19-related hashtags, it was only saved once and the next TikTok found at the top of the relevant hashtag was saved in place of the duplicate. Any video that would have qualified for inclusion in either compilation, but had downloads disabled by its original poster, was excluded from use and the next video under its relevant hashtag was included in its place. These videos were then compiled and embedded within the questionnaire as the experimental condition. Links to both compilations are available in **Appendix D**.

Those that were assigned the COVID-19 collection were part of the experimental group, while the those assigned the non-COVID-19 collection were part of the control group. As this was a between-subjects experiment, each participant was only shown the compilation relevant to their group. Prior to exposure, respondents were asked to provide basic demographic information such as age, race/ethnicity, and gender (Appendix A). Respondents were also asked to fill out a modified version of David Watson and Lee Anna Clark's PANAS-X scale (Watson &

Clark, 1999) before and after viewing their embedded TikTok compilation (Appendix A; Appendix D). This modified scale was used to ask participants to rank how strongly they felt emotions associated with anxiety included in the original PANAS-X scale – such as fright, irritability, and relaxation – on a five-point scale, with one being the least intense and five being the most intense. The questionnaire was entirely voluntary and could be quit at any time, a fact stressed in its embedded consent form (Appendix B) and during initial recruitment (Appendix C). Resources to various mental health services were also provided in both the consent form (Appendix B) and the end of the questionnaire.

A total of 107 respondents filled out the questionnaire. However, five responses were removed from the final dataset used in this analysis; one was removed due to the participant quitting the questionnaire before its completion, two were removed due to the participants being older than 24 years old, and two more were removed due to the participants either declining consent to take the questionnaire and/or being younger than 18 years old. These exclusions brought the number of respondents in the final dataset to 102, split evenly between the control and experimental groups.

5. Results

The similar pretest means between the experimental and control groups indicate little difference between the two, in terms of anxiety, before exposure to either of TikTok compilation. As noted in *Table 1*, the largest absolute difference between the pre-test groups was 0.33 in the "timid" condition, while the smallest was 0 in the "irritable" condition. The mean absolute difference across all conditions was 0.15. This data indicated that the

experiment and control groups were adequately sorted and had no clear partiality toward any of the tested emotions before the exposure to the compiled TikToks.

Table 1: Pre-Exposure Means and Comparison Between Experiment and Control Group

	Experimental Group	Control Group	Absolute Difference in Means
Relaxed	2.96	2.98	0.02
At ease	2.65	2.94	0.29
Calm	3.02	3.16	0.14
Confident	3.02	3.25	0.23
Irritable	2.10	2.10	0
Afraid	1.67	1.61	0.06
Timid	1.78	1.45	0.33
Upset	1.75	1.57	0.18
Nervous	2.10	1.96	0.14
Scared	1.41	1.35	0.06
Distressed	1.71	1.84	0.13
Frightened	1.35	1.14	0.21
N	51	51	

5.1. H1: Participants exposed to TikTok content related to COVID-19 will experience heightened states of emotions associated with anxiety compared with those exposed to the control condition.

The first hypothesis was only partially supported using all anxiety measures alone, as only the "frightened" condition showed significant changes from the pretest to the posttest on t-tests, which evaluates means.

Analysis of the pre- and post-exposure responses from the 51 participants sorted into the experimental group, laid out in *Table 2*, revealed an increased level of fright ($p < 0.05$) in the posttest, raising from a mean of 1.35 to 1.59 after exposure to the compilation of COVID-19

content from TikTok. This analysis also revealed a slight decrease in nervousness ($p < 0.1$) after exposure, lowering from a mean score of 2.10 to 1.84. However, the analysis did not reveal any clear differences between the other ten emotions tested, regardless of their positive or negative associations with anxiety, between the pretest and post-est. This lack of notable change, in tandem with the somewhat contradictory increase in fright and decrease in nervousness, indicated that anxiety in young adults was relatively unaffected by exposure to COVID-19 content from TikTok.

This relative unaffectedness is furthered by results shown in *Table 3*, which indicates no statistically significant change in larger groupings of the positive and negative emotions related to anxiety within the experimental group. The positive emotions grouped under one variable were: relaxed, at ease, calm, and confident. The grouping of pre-exposure positive emotions within the experimental group had a Cronbach's Alpha 0.768, meaning that it forms a statistically reliable additive index, while the grouping of post-exposure positive emotions within the experimental group had a Cronbach's Alpha of 0.903. The negative emotions grouped under the simplified variables were: irritable, afraid, timid, upset, nervous, scared, distressed, and frightened. The grouping of pre-exposure negative emotions within the experimental group had a Cronbach's Alpha of 0.814, while the grouping of post-exposure negative emotions within the experimental group had a Cronbach's Alpha of 0.899. Given the lack of significant change in any of the larger groupings of emotions, and the mixed results found in the analysis of each individual emotion, there is no clearly defined pattern of anxiety influenced by exposure to COVID-19 content from TikTok.

Table 2: Pre- and Post-Exposure Means Within Experimental Group (Paired Samples T-Test)				
	Pre-exposure	Post-exposure	t	Sig. (One-Sided p)
Relaxed	2.96	3.02	-0.323	0.374
At ease	2.65	2.84	-1.237	0.111
Calm	3.02	3.00	0.131	0.448
Confident	3.02	3.02	0.00	0.500
Irritable	2.10	2.04	0.302	0.382
Afraid	1.67	1.61	0.477	0.318
Timid	1.78	1.65	1.124	0.133
Upset	1.75	1.76	-0.141	0.444
Nervous	2.10	1.84	1.565#	0.062
Scared	1.41	1.51	-1.00	0.161
Distressed	1.71	1.84	-1.155	0.127
Frightened	1.35	1.59	-2.128*	0.019
N	51			

= p < 0.1
* = p < 0.05

Table 3: Simplified Pre- and Post-Exposure Means Within Experimental Group (Paired Samples T-Test)				
	Pre-exposure	Post-exposure	t	Sig. (One-Sided p)
Positive	11.6471	11.8824	-0.533	0.298
Negative	13.8627	13.8431	0.030	0.488
N	51			

= p < 0.1
* = p < 0.05

5.2. H2: Within the United States' political spectrum, participants that lean left politically will experience heightened states of emotions associated with anxiety compared with participants that lean right politically when exposed to TikTok content related to COVID-19.

The second hypothesis was partially supported using anxiety measures, as the "afraid" condition and grouping of all negative emotions (negativePost) significantly decreased when travelling right along the United States' political spectrum. In other words, those with more right-leaning political beliefs within the United States tended to be less afraid and experience lesser overall negative emotions linked to anxiety after exposure to TikToks relating to COVID-19.

Participant responses to the demographic question regarding political affiliation (Q7 in Appendix A) were simplified to create larger groups and therefore provide more reliable data. Participants who identified themselves as "Independent Democrat", or farther left politically, were sorted into one "Democrat" variable. Participants who identified themselves as "Independent Republican", or farther right politically, were sorted into one "Republican" variable. Participants who selected "Independent Independent" were placed into the "Moderate" variable, while participants who selected "Other" were excluded from this analysis.

A one-way ANOVA of the post-exposure means for each emotion tested, analyzed across the political spectrum in *Table 4*, revealed a slight decrease in the "afraid" condition when travelling right across the political spectrum ($p < 0.05$). A significant decrease was found in the "distressed" condition when traveling right along the political spectrum ($p < 0.1$). None of

the other ten tested emotions revealed any significant change correlated with political affiliation.

Additionally, the groupings of posttest positive emotions (Cronbach's Alpha of 0.903) and posttest negative emotions (Cronbach's Alpha of 0.899) in *Table 5* reveal a statistically significant downward trend in negative emotions within the experimental group when travelling right along the political spectrum. The negativePost value for each participant was constructed by combining their reported scores on the five-point scale for all emotions with negative connotations on the posttest. The positivePost value for each participant was constructed in the same way by combining their reported scores for emotions with positive connotations on the posttest. The mean of the grouped negative emotions experienced by politically left-leaning participants, after being exposed to the COVID-19 content from TikTok, was 15.7083 compared to Republicans' mean of 11.5385. No significant trend was found regarding the grouped collection of positive emotions. This lack of clear trend from any specific or grouped positive emotion, combined with the significant decrease in the "afraid" condition and general negative emotions tied to anxiety when travelling right along the political spectrum, indicated that political ideology had some significance on anxiety felt by young adults after being exposed to COVID-19 content from TikTok. Specifically, those with more right-leaning beliefs tended to experience anxiety-linked emotions less severely than those with more left-leaning beliefs after being exposed to COVID-19 content from TikTok.

Table 4: Post-Exposure Means Across U.S. Political Spectrum Within Experimental Group (One-Way ANOVA)					
	Democrat	Moderate	Republican	F	Sig.
Relaxed	2.88	3.60	3.08	0.929	0.403
At ease	2.75	3.20	2.77	0.388	0.681
Calm	2.75	3.60	3.00	1.377	0.264
Confident	2.79	3.80	2.92	1.658	0.204
Irritable	2.29	1.80	1.92	0.615	0.546
Afraid	1.92	1.20	1.15	4.644*	0.016
Timid	1.92	1.40	1.31	2.037	0.144
Upset	2.04	1.40	1.46	2.443	0.100
Nervous	2.00	1.20	1.77	1.605	0.214
Scared	1.67	1.20	1.15	2.111	0.135
Distressed	2.08	1.40	1.54	2.462#	0.098
Frightened	1.79	1.20	1.23	2.405	0.103
N	24	5	13		

= $p < 0.1$
* = $p < 0.05$

Table 5: Simplified Post-Exposure Means Across U.S. Political Spectrum Within Experimental Group (One-Way ANOVA)					
	Democrat	Moderate	Republican	F	Sig.
positivePost	11.1667	14.2000	11.7692	1.376	0.265
negativePost	15.7083	10.8000	11.5385	3.503*	0.040
N	24	5	13		

= $p < 0.1$
* = $p < 0.05$

5.3. H3: Non-white participants exposed to TikTok content related to COVID-19 will experience heightened states of emotions associated with anxiety compared with white participants.

The third hypothesis was only partially supported using anxiety measures, as only the "nervous" condition showed notable change from the pretest to the posttest. Participants were

grouped into one of two variables, white or non-white, based on their response to a race/ethnicity demographic question (Q3 in Appendix A). This was done due to a low turnout of participants of color, with all non-white racial/ethnic identities having between zero and nine individual participants compared to 85 white participants. These numbers are even lower in the experimental group, with nine persons of color participating compared to 42 white participants.

Independent samples t-tests of the posttest means between white and non-white respondents, detailed in *Table 6*, revealed a significant increase in nervousness within recipients of color when compared to their white counterparts ($p < 0.05$). On a five-point scale, the mean "nervousness" score reported by white participants was 1.83 while the mean score for non-white participants was 1.89. No other tested emotions, positive or negative, had significant differences between white and non-white participants. Similarly, analysis of the groupings of posttest positive emotions (Cronbach's Alpha of 0.903) and posttest negative emotions (Cronbach's Alpha of 0.899) within the experimental group in *Table 7* revealed no significant difference between white participants and participants of color after exposure to COVID-19 content from TikTok.

Table 6: Post-Exposure Means in White and POC Respondents Within Experimental Group (Independent Samples T-Test)				
	White	POC	t (equal variances assumed)	Sig.
Relaxed	3.02	3.00	0.052	0.277
At ease	2.86	2.78	0.180	0.371
Calm	3.02	2.89	0.303	0.282
Confident	3.05	2.89	0.355	0.129
Irritable	1.98	2.33	-0.844	0.387
Afraid	1.57	1.78	-0.623	0.205
Timid	1.57	2.00	-1.256	0.744
Upset	1.76	1.78	-0.046	0.257
Nervous	1.83	1.89	-0.158*	0.031
Scared	1.43	1.89	-1.367	0.725
Distressed	1.83	1.89	-0.158	0.329
Frightened	1.55	1.78	-0.647	0.240
N	42	9		

= p < 0.1
* = p < 0.05

Table 7: Simplified Post-Exposure Means in White and Non-White Respondents Within Experimental Group (Independent Samples T-Test)				
	White	People of Color	t (equal variances assumed)	Sig.
positivePost	11.9524	11.5556	0.958	0.332
negativePost	13.5238	15.3333	0.689	0.410
N	42	9		

= p < 0.1
* = p < 0.05

5.4. RQ1: How does vaccination status affect anxiety felt by young adults after viewing COVID-19 content from TikTok?

After exposure to COVID-19 content from TikTok, higher levels of vaccination against COVID-19 were associated with stronger anxiety-linked emotions. Among participants with

higher levels of vaccination against COVID-19, the "relaxed" condition significantly decreased while "afraid", "distressed", and the grouping of all negative emotions (negativePost) significantly increased after exposure to COVID-19 content from TikTok.

To create larger groups and therefore more reliable data, participants in the experimental group who selected that they were either "Unvaccinated" or "Partially Vaccinated" against COVID-19 on Q10 of the questionnaire (Appendix A) were grouped into one variable. A one-way ANOVA of the post-exposure means for each emotion tested revealed numerous statistically significant trends. The higher level of vaccination that respondents had against COVID-19, the less relaxed ($p < 0.05$) and calm ($p < 0.1$) they tended to be. Additionally, higher levels of vaccination against COVID-19 were associated with higher levels of the "afraid" and "distressed" conditions ($p < 0.05$), as well as higher levels of the "scared" and "frightened" conditions ($p < 0.1$). Following this trend, in those with higher levels of vaccination against COVID-19, analysis of the groupings of posttest positive emotions (Cronbach's Alpha of 0.903) and posttest negative emotions (Cronbach's Alpha of 0.899) within the experimental group in *Table 9* revealed lower feelings of generalized positive emotions ($p < 0.1$) and higher feelings of generalized negative emotions ($p < 0.05$). These trends, with both specific and grouped positive emotions decreasing while specific and grouped negative emotions increasing among those with higher levels of vaccination, indicate a clear trend of anxiety increasing with higher levels of vaccination against COVID-19.

Table 8: Post-Exposure Means Across Various Vaccination Statuses Within Experimental Group (One-Way ANOVA)					
	Unvaccinated / Partially Vaccinated	Fully Vaccinated	Fully Vaccinated + Boosted	F	Sig.
Relaxed	3.58	3.19	2.44	3.857*	0.028
At ease	3.25	2.95	2.44	1.864	0.166
Calm	3.50	3.10	2.56	2.481#	0.094
Confident	3.42	3.05	2.72	1.209	0.307
Irritable	1.58	2.38	1.94	2.016	0.144
Afraid	1.00	1.67	1.94	4.674*	0.014
Timid	1.33	1.86	1.61	1.232	0.301
Upset	1.58	1.71	1.94	0.586	0.560
Nervous	1.42	1.86	2.11	2.023	0.143
Scared	1.00	1.62	1.72	2.602#	0.085
Distressed	1.25	1.95	2.11	3.549*	0.037
Frightened	1.08	1.62	1.89	2.712#	0.077
N	12	21	18		

= p < 0.1
* = p < 0.05

Table 9: Simplified Post-Exposure Means Across Various Vaccination Statuses Within Experimental Group (One-Way ANOVA)					
	Unvaccinated / Partially Vaccinated	Fully Vaccinated	Fully Vaccinated + Boosted	F	Sig.
positivePost	13.7500	12.2857	10.1667	2.937#	0.063
negativePost	10.2500	14.6667	15.2778	3.229*	0.048
N	12	21	18		

= p < 0.1
* = p < 0.05

6. Discussion

The results of this experiment indicated that COVID-19 content on TikTok does not have a substantial impact on anxiety in young adults regardless of race, ethnicity, or political affiliation. However, they did indicate that vaccination status played a large role in anxiety felt by young

adults after exposure to COVID-19 content from TikTok. High stress led to higher fears of infection and motivates vaccination against COVID-19 (Zhang et al., 2022). However, as indicated by the results of this experiment, vaccination does little to reduce the underlying fear itself. Further research is needed on this relationship between COVID-19 content from TikTok and anxiety as it relates to vaccination status. However, a potential explanation for this relationship is that those who fear contracting COVID-19 will continue to do so even if the likelihood of infection and/or death is significantly reduced. In other words, in individuals who fear contracting COVID-19, vaccination does not resolve the underlying worries that may encourage vaccination but instead reduces the odds that their fears will come true.

The results of this experiment indicate a general disconnect between COVID-19 and anxiety in individuals with lower levels of vaccination against COVID-19. Many anti-vaccination websites downplay the risks associated with vaccine preventable diseases (Chou & Budenz, 2020). With fear of infection as a notable motivating factor for vaccination (Zhang et al., 2022), the results of this experiment support the idea that individuals with lower levels of vaccination against COVID-19 possess less fear of the virus and therefore have less anxious reactions to COVID-19 content from TikTok.

A degree of separation exists between the results of this experiment and the height of the COVID-19 pandemic. At the time of this experiment's conclusion, almost three years have passed from the World Health Organization declaring COVID-19 a pandemic. This disconnect reasonably extends to the emotions generated within young adults by both COVID-19 and TikTok; both have existed as core parts of the young adult world for several years and have therefore had time to be processed and internalized. It is, therefore, likely that this experiment

would conclude in different results if conducted at a time where anxiety was at a peak due to the COVID-19 pandemic, such as when Canadians showed a 17.1% increase in generalized anxiety symptoms in June 2020 compared to pre-pandemic levels (Généreux et al., 2020). At a time like this, where more anxiety is present within individuals at a baseline, it reasons that more anxiety would also be present after exposure to COVID-19 content from TikTok. It also reasons that, since COVID-19's portrayal on social media was frequently reported as a stressor in early years of the pandemic (Ahmad and Hersh, 2020; De Coninck et al., 2021; Ebrahim et al., 2020), the effects of the COVID-19-related TikTok compilation would be amplified within members of the experimental group if exposed in this more emotionally taxing time. Additionally, young adults may have felt 'pandemic fatigue' after nearly three years of COVID-19-related talks.

Regardless of this passed time and potentially dulled emotional response to COVID-19, the results of this experiment show that demographics play an important role in a young adult's response to COVID-19 content from TikTok. The experimental group, as a whole, showed few significant changes in anxiety after viewing the compilation of COVID-19-related TikToks. Vaccination status being the only significant determiner of anxiety discovered in this experiment indicates a connection between anxiety triggered by COVID-19 content on social media and specific demographics, rather than a connection between this anxiety and the content itself. Therefore, it reasons that TikTok's COVID-19 content alone doesn't cause anxiety within young adult participants, but rather the content in tandem with pre-existing beliefs and demographics dictates the level of experienced anxiety.

These ideas likely reflect on the general effects of TikTok on young adults. Specifically, emotions sparked by TikTok are not provoked in a vacuum but rather in pre-existing emotional contexts. In this sense, users will likely seek out and/or respond to social media content that reinforces their pre-existing beliefs. In this way, the manner in which TikTok's algorithm personally tailors content for each user's "For You" page likely feeds into this preference; those that fear COVID-19 would be more likely to engage with TikTok content that validates their concerns, thus prompting the algorithm to present similar fear-promoting content in the future. This idea is supported by this experiment's findings regarding RQ1, where participants that were likely to view COVID-19 as a notable health risk and receive higher levels of vaccination against COVID-19 responded to TikTok's COVID-19 content with more anxiety than those who were less likely to perceive the virus with the same level of caution. In other words, pre-existing beliefs and anxieties were a determining factor in how much anxiety was experienced after being exposed to COVID-19 content from TikTok, a connection that could reasonably influence what type of content TikTok displays to members of this demographic.

6.1. Future Research

This potential relationship between pre-existing beliefs and anxieties triggered by COVID-19 content on social media could be a strong direction for future research. Despite the established connection between anxiety and COVID-19 content on social media (Ahman and Hersh, 2020; Ebrahim et al., 2020), the exact nature of what social, psychological, or demographic factors influence this anxiety are not well defined. Analyzing how these factors, such as the anxieties associated with COVID-19 vaccinations (Chou & Budenz, 2020; Hsieh et al., 2022; Zhang et al.,

2022), evoke anxiety could reveal valuable information about how humans process traumatic events. For example, given that the results of this experiment indicate that pre-existing beliefs strongly influence how young adults respond to TikTok's COVID-19 content, future research could analyze whether COVID-19 content on social media reignites underlying and/or past anxieties within young adults or if they evoke more current and ongoing fears.

Given the association between TikTok's COVID-19 content and anxiety experienced almost exclusively within specific demographics, research into how TikTok's content generates emotions within other societal contexts could also be justified. Given that this experiment found that vaccination status is a determining factor in how strongly anxiety is felt by young adults in response to this type of content, conducting further research into how emotions are tied to TikTok content within specific demographics would likely yield significant results.

Furthermore, the potential relationship between heightened anxiety and COVID-19 content on other social media platforms is worthy of de exploration. Although this experiment focused on how TikTok's COVID-19 content affects anxiety in young adults, ties between heightened anxiety and exposure to COVID-19 content on non-specific social media platforms have been well established (Ahmad and Hersh, 2020; Ebrahim et al., 2020). Given that this experiment found significant associations between heightened anxiety and exposure to TikTok's COVID-19 content, based on certain demographic factors like vaccination status, it can be hypothesized that similar trends are present within young adults when exposed to COVID-19 content from other social media platforms. As such, experiments similar to this one that are focused on other social media platforms could be conducted to better identify the specific aspects of social media influence anxiety in relation to COVID-19 content. For example, while TikTok's algorithm

may promote anxiety by capitalizing on existing fears and worldviews, platforms such as Twitter or Facebook may have entirely different means of interaction with these same anxieties and perspectives.

6.2. Limitations

This experiment was limited by its sampling. A relatively small sample size of 107 participants took part in the experiment, with five of these being excluded from the final data analysis. Additionally, only nine persons of color were included in the experimental group, thus limiting data regarding the interactions between race/ethnicity and TikTok's COVID-19 content. Additionally, a probability sample of young adults would have allowed for the gathering of more accurate and widely representative data.

Another limitation came from the representation of TikTok content shown to participants. TikTok's algorithm dictates what personalized content will appear on a user's "For You" page (Bhandari & Bimo, 2022). Given that the TikToks included in this experiment were gathered without users' personalized "For You" pages, instead using trending hashtags and the videos that first appeared under them, the compilations created an experience centered around popular, yet depersonalized, content. Additionally, the ever-changing trends found on social media platforms and the ability to scroll passed content one would does not care for are absent from the assembled TikTok compilations. These limitations culminate in a viewing experience defined by popular videos but not fully indicative of an average user's experience with TikTok.

Additionally, a question within the distributed questionnaire (Q13 in Appendix A) was formatted incorrectly in Qualtrics and was not presented to any participants regardless of their

answers to other questions. Although data from similar questions (Q5, Q8, Q13 in Appendix A) was ultimately not used in this analysis, any conclusions stemming from Q14's potential data could not be conducted regardless.

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Appendix A: TikTok Anxiety Questionnaire

TikTok Anxiety Questionnaire

Start of Block: Block 1

Q1

- ○ I am at least 18 years of age, have read and understand the information above, and want to participate in the study. (1)
- ○ I do not wish to participate in the study, or I am younger than 18 years of age. (2)

Skip To: End of Survey If = I do not wish to participate in the study, or I am younger than 18 years of age.

End of Block: Block 1

Start of Block: Default Question Block

Q2 How old are you?

- ○ 18 (1)
- ○ 19 (2)
- ○ 20 (3)
- ○ 21 (4)
- ○ 22 (5)
- ○ 23 (6)
- ○ 24 (7)
- ○ Older than 24 (8)

Skip To: End of Survey If How old are you? = Older than 24

Q3 To which racial or ethnic identity do you most identify?

- ○ American Indian or Alaska Native (1)
- ○ Asian (2)
- ○ Black or African-American (3)
- ○ Hispanic or Latino (4)
- ○ Multiracial (5)
- ○ Native Hawaiian or Other Pacific Islander (6)
- ○ White (7)
- ○ Other (8)

Q4 To which gender identity do you most identify?

- ○ Male (1)
- ○ Female (2)
- ○ Non-binary / third gender (3)
- ○ Other (4)

Q5 Are you currently enrolled in college?

- ○ Yes (1)
- ○ No (2)

Q6 Are you currently employed/working?

- ○ Yes (1)
- ○ No (2)

Q7 On the following scale, what is your political stance?

- ○ Strong Democrat (1)
- ○ Weak Democrat (2)
- ○ Independent Democrat (3)
- ○ Independent Independent (4)
- ○ Independent Republican (5)
- ○ Weak Republican (6)
- ○ Strong Republican (7)
- ○ Other (9)

Page Break

Q8 What is the highest level of school you have fully completed, or the highest degree you have received?

- ○ Less than high school diploma (3)
- ○ High school diploma or GED (5)
- ○ Associate's degree (9)
- ○ Bachelor's degree (10)
- ○ Master's degree (11)
- ○ Doctorate degree (13)

Q9 Are you immunocompromised / Do you have a weakened immune system due to an ongoing treatment or chronic condition?

- ○ Yes (1)
- ○ No (2)

Q10 What is your vaccination status in regards to COVID-19?

- ○ Unvaccinated (1)
- ○ Partially vaccinated (2)
- ○ Fully vaccinated (3)
- ○ Fully vaccinated and boosted (4)

Q11 Have you ever tested positive for COVID-19?

- ○ Yes (1)
- ○ No (2)

Q12 On an average day, how much anxiety does COVID-19 cause you?

- ○ Very little or none at all (1)
- ○ A little (2)
- ○ A moderate amount (3)
- ○ Quite a bit (4)
- ○ An extreme amount (5)

Display This Question:

If Are you currently enrolled in college? = Yes

Q13 What is your current college major?

_____

Display This Question:

If What is the highest level of school you have fully completed, or the highest degree you have rece... = Associate's degree

And What is the highest level of school you have fully completed, or the highest degree you have rece... = Bachelor's degree

And What is the highest level of school you have fully completed, or the highest degree you have rece... = Master's degree

And What is the highest level of school you have fully completed, or the highest degree you have rece... = Doctorate degree

Q14 What is the specific major(s) of the highest degree you have received?

_____

Display This Question:

If Are you currently employed/working? = Yes

Q15 Are you working full-time or part-time?

- Full-time (1)
- Part-time (2)

Display This Question:

If Are you currently employed/working? = Yes

Q16 In a few words, what is your job?

_____

End of Block: Default Question Block

Start of Block: Block 2

Q17 To what extent are you feeling the following emotions at the present moment?

	Very slightly or not at all (1)	A little (2)	Moderately (3)	Quite a bit (4)	Extremely (5)
Relaxed (1)	○	○	○	○	○
At ease (2)	○	○	○	○	○
Calm (3)	○	○	○	○	○
Confident (4)	○	○	○	○	○
Irritable (5)	○	○	○	○	○
Afraid (6)	○	○	○	○	○
Timid (7)	○	○	○	○	○
Upset (8)	○	○	○	○	○
Nervous (9)	○	○	○	○	○
Scared (10)	○	○	○	○	○
Distressed (11)	○	○	○	○	○
Frightened (12)	○	○	○	○	○

End of Block: Block 2

Start of Block: Block 3

Q18 Please watch the following compilation of TikToks. If the video does not appear immediately, please wait up to a minute for it to load.

End of Block: Block 3

Start of Block: Block 4

Q19 Please watch the following compilation of TikToks. If the video does not appear immediately, please wait up to a minute for it to load.

End of Block: Block 4

Start of Block: Block 5

Q20 Please (briefly) summarize the content of a TikTok you just watched.

_____

Q21 Having watched the compilation of TikToks, to what extent are you feeling the following emotions?

	Very slightly or not at all (1)	A little (2)	Moderately (3)	Quite a bit (4)	Extremely (5)
Relaxed (1)	○	○	○	○	○
At ease (2)	○	○	○	○	○
Calm (3)	○	○	○	○	○
Confident (4)	○	○	○	○	○
Irritable (5)	○	○	○	○	○
Afraid (6)	○	○	○	○	○
Timid (7)	○	○	○	○	○
Upset (8)	○	○	○	○	○
Nervous (9)	○	○	○	○	○
Scared (10)	○	○	○	○	○
Distressed (11)	○	○	○	○	○
Frightened (12)	○	○	○	○	○

End of Block: Block 5

Appendix B: Embedded Consent Form

INFORMED CONSENT

The Effects of TikTok's COVID-19 Content on Anxiety in Young Adults

You are being invited to participate in a research study about anxiety generated by viewing COVID-19-related information on TikTok. This study is being conducted at the University of Tennessee at Chattanooga (UTC) by Nicholas Fontaine and faculty sponsor Dr. Michael McCluskey. Nicholas Fontaine may be contacted at nicholasdavidsonfontaine@gmail.com or 423-876-8417. Dr. McCluskey may be contacted at Michael-McCluskey@utc.edu or 423-425-4400.

The questionnaire will take about 10 minutes to complete.

We do not expect you to benefit from your participation in this study. Information gained from this research may benefit others in the future. Videos used in this study are among the most popular found on TikTok. Depending on your life experiences, thinking about some of the questions in this survey may be stressful. This could result from potential exposure to offensive or distressing content, language, and/or images within the videos. It could also result from exposure to inaccurate or false information presented by media embedded within the survey.

You may skip any question you find too uncomfortable to answer, and you have the right to withdraw from the study at any time. If you become uncomfortable or distressed and need assistance, the following resources are available (the list is also provided at the end of the survey):

- Substance Abuse and Mental Health Services Administration: (800)-662-4357
- National Suicide and Crisis Lifeline: 988
- Crisis Text Line: Text HOME to 741741
- UTC Counseling Center: 423-425-4438

This survey is anonymous. Do not include your name or any of your contact information in your responses to the survey. Your responses to the survey will not be linked to your computer, email address or other electronic identifiers. No one will be able to identify you or your answers.

Your participation in this study is voluntary. You are free to stop answering questions at any time or to decline to answer any question you do not wish to answer for any reason. If you stop the survey before the end, your previous answers will be automatically discarded. After you submit the survey, we cannot remove your responses because we will not know which answers came from you.

This research protocol has been approved by the UTC Institutional Review Board. Address questions or problems regarding these activities to Dr. Susan Davidson, UTC IRB Chair, email: susan-davidson@utc.edu; phone: (423) 425-1387.
Please indicate your decision regarding participation in this research by selecting a response below:

- I am at least 18 years of age, have read and understand the information above, and want to participate in the study.
- I do not wish to participate in the study, or I am younger than 18 years of age.

Appendix C: Recruitment Material

Hello!

I'm a senior COMMs student working to complete my undergraduate thesis. My research is aiming to examine potential connections between COVID-19-related information on TIkTok and heightened anxiety in young adults.

I'm hoping to survey around 100 people, aged 18-24. Participation should take around 10 minutes and consists of providing basic demographic information, watching a collection of provided TikToks, and sharing your emotional state before and after viewing the TikToks.

Please keep in mind that, although this research has been approved by UTC's Institutional Review Board and every video provided has been deemed suitable for TikTok, some content and language within the provided TikToks might be distressing in the context of your life experiences.

If you're interested in participating, you can find the brief survey (and an embedded consent form with more details) at this link: https://utk.co1.qualtrics.com/jfe/form/SV_086P6vCMUxedgLY

If you have any questions, you can reach me at 423-876-8417 or nicholasdavidsonfontaine@gmail.com. Alternatively, you can reach the faculty advisor for this study, Dr. Michael McCluskey, at 423-425-4400 or Michael-McCluskey@utc.edu. The Institutional Review Board of the University of Tennessee at

Chattanooga (FWA00004149) has approved this research project # 22-101. The UTC IRB may be reached at irb@utc.edu.

Thanks for your time!

Best,
Nick Fontaine

Appendix D: Links to TikTok Compilations

Link to experimental condition.

Link to control condition.