Anxiety Talking: Does Anxiety Predict Sharing Information about COVID-19?

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Abstract

Could anxiety play a functional role during the COVID-19 pandemic by driving greater information sharing about viral threats? To explore whether anxiety may serve as a unique emotional indicator of sharing information in response to COVID-19, we used a representative sample of the United States from the American Trends Panel ($N=9,188$) conducted April 20th-26th, 2020. Participants reported how they felt in the past week, where they got COVID-19 news from, and whether they had posted COVID-19 news on social media or discussed the pandemic with others. Controlling for other emotions, news sources, and demographic measures, feeling anxious—more so than other negative emotions—predicted greater information sharing on social media ($\beta = .05$, $p < .001$) and beyond ($\beta = .14$, $p < .001$). These findings are consistent with functionalist theories of emotion, which predict that fear plays a unique role in identifying and communicating threats to oneself and others.

The COVID-19 pandemic began as a public health emergency in Wuhan, China in late 2019. As the virus spread around the globe in 2020, so did the evidence for its negative effects on both physical and mental health (Gao et al., 2020). Setting aside the serious complications of the disease itself, evidence suggests that even the simple threat of the virus can lead to mental health issues and even neurological changes (Lu et al., 2020). In Wuhan, for example, Chinese citizens who were more exposed to the “infodemic” of public health news on social media were nearly twice as likely to have symptoms of anxiety disorders (Gao et al., 2020). Another study, which tracked 50 healthy volunteers from pre- to post-pandemic, showed increases in the size of the amygdala—a brain region that processes fear and anxiety (Solomon et al., 2020). But is some anxiety during a pandemic necessarily a bad thing?

From an evolutionary perspective, emotions play a functional role in survival (Ekman, 1992; James, 1884; Keltner & Lerner, 2010). Fear and anxiety, in particular, are elicited in response to perceived threats, driving people to avoid the threat (Keltner & Lerner, 2010; Raghunathan et al., 2006; Raghunathan & Pham, 1999). In a representative survey conducted in the United States during the critical early stages of the pandemic in March 2020 (American Trends Panel, 2020a), people who felt more anxious were more likely to practice social distancing (see Supplementary Online Material, SOM; Table S1). Within the context of a pandemic, where there is a real threat of sickness or death, fear and anxiety might play an adaptive role by driving people to take protective measures.

In social species, including humans, fear and anxiety further play a role in kin and group survival through sending alarm signals of potential threats to other members of the group (Barber, 1994; Gelfand et al., 2016; Richerson et al., 2016). In a pandemic, sharing information about the threat with others can thus serve an adaptive function. Humans, of course, are unique

in that we are able to share information with each other at scale via mass media—a handy ability in the face of a global viral disease. By broadcasting information about a threat to others, mass media should thus increase anxiety while also promoting behaviours to avoid the threat. Indeed, exposure to information on both mass media and social media has been associated with seeing COVID-19 public health risks as more severe and with a stronger intention to take protective measures (Lin et al., 2020). But in the age of social media, people not only can passively consume information, but can also actively spread information to their entire social networks, and beyond. In a deadly pandemic, therefore, we would expect greater consumption of accurate information about the pandemic to be associated with greater anxiety, which, in turn, should predict greater information sharing with others.

To explore whether anxiety may be a unique emotional indicator of information sharing during the COVID-19 pandemic, we used a representative sample of the United States from the American Trends Panel (American Trends Panel, 2020b). Participants were non-institutionalized adults residing in the United States ($N = 9,188$) surveyed between April 20th and April 26th, 2020—six weeks after the US government declared COVID-19 a national emergency. Participants reported how they had felt over the past week on a scale from 0-*Rarely or none of the time* to 3-*Most or all of the time*. The survey included a measure of feeling anxious—feeling *nervous, anxious, or on edge*—as well as measures of other negative emotions, such as feeling *depressed*, and feeling *lonely* (for descriptives, see Table 1).

Results

Information consumption. As a measure of information consumption, participants indicated how often (1-*Never* to 4-*Often*), they *got news and information about the coronavirus outbreak on social media*, $M(SD) = 1.30(1.10)$. This passive consumption of news on social

media predicted feeling more anxious, $r = .17$, 95%CI[0.15; 0.19], $p < 0.001$, as well as more depressed, $r = .14$, 95%CI[0.12; 0.16], $p < 0.001$. Participants also indicated where they got their news about the coronavirus on a scale from 0-*Not a source* to 2-*Major source*; options included local, national, and international news organizations, elected officials and public health organizations, and friends and family. As shown in Table 1, consuming information about the pandemic was associated with feeling more anxious and depressed across all but one of those sources: People who got their news about the pandemic from *Donald Trump and his coronavirus taskforce* felt both less anxious, $r = -.12$, 95%CI[-0.10; -0.14], $p < 0.001$, and less depressed, $r = -.11$, 95%CI[-0.09; -0.13], $p < 0.001$. Getting news from the White House predicted less anxiety ($\beta = -.12$, $p < .001$) even after controlling for all other news sources (see Table S2).

Information sharing. Participants indicated whether they had *posted or shared news and information about the coronavirus outbreak on social media* (“Active Social Media”; 1-*Yes*, 0-*No*). Participants also reported how often they had discussed the coronavirus outbreak with others *whether online, in person, or over the phone*, (“Interactive Info Sharing”; 0-*Never*, 2-*Sometimes*, 4-*All the time*). The same news sources that predicted feeling more anxious also predicted greater sharing of information: both in person and online (Table 1). In contrast, the news source that predicted feeling less anxious—the White House—was not associated with greater information sharing about the outbreak (see Table 1).

Consistent with the functionalist theories of fear, people who felt more anxious were more likely to actively share information about the outbreak on social media, $r = .12$, 95%CI[0.10; 0.14], $p < 0.001$, and discuss the pandemic with others, $r = .21$, 95%CI[0.19; 0.23], $p < 0.001$. As shown in Figure 1, people who discussed the pandemic frequently were much more likely to also report feeling anxious than people who rarely discussed the pandemic.

Does anxiety play a unique role in information sharing? Anxiety was associated with both consuming and sharing information about the COVID-19 outbreak, but so were other negative emotions, such as feeling depressed or lonely (Table 1). But functionalist accounts of emotion postulate that it should be feeling anxious (fear), rather than feeling depressed (sadness), that predict communication of threat about the virus. Unlike fear, sadness is associated with perceptions of helplessness and a tendency to withdraw from others (Cryder et al., 2008; Lazarus, 1991; Shaver et al., 1987). Thus, we next separately regressed active and interactive information sharing onto feeling anxious, feeling depressed, other emotions, as well as a range of other variables including news sources, political orientation, and demographics (Table 2). Even after controlling for all these measures, anxiety continued to predict both active (OR= 1.13, $p < .001$) and interactive information sharing ($\beta = .14$, $p < .001$). In contrast, feeling depressed did not (active: OR= .99, $p > 0.05$; interactive: $\beta = -.004$, $p > 0.05$).

Discussion

In a large representative sample of the United States, we found that feeling anxious may not be such a bad thing during a pandemic. Consuming information about COVID-19 was predictably associated with feeling more anxious and depressed. It was feeling anxious—but not feeling depressed, that uniquely predicted greater sharing of information: in person and online. Although our findings are consistent with functionalist theories of emotion, our correlational data do not allow us to establish a causal role of fear and anxiety during the pandemic. We simply established that feeling anxious is indeed a unique indicator of threat communication during a viral pandemic—above and beyond other negative emotions and a range of other factors.

We also found that the source of news does matter: People who got their coronavirus news from the White House were less anxious. This pattern of results may be due to the White

House's response to the pandemic. Though privately recognizing the real threat of the coronavirus (Woodward, 2020), President Trump has publicly minimized the threat of the virus to "avoid panic" (U. S. White House, 2020a; U. S. White House, 2020b; U. S. White House, 2020c; U. S. White House, 2020d). But while people who got their coronavirus news from the White House felt better, they were also less likely to communicate about the threat of the pandemic compared to people who consumed information from all other sources.

Our findings contribute to a growing literature on the functional role of negative emotions (Forgas, 2013; Kashdan & Biswas-Diener, 2015). Our findings should not, however, be misinterpreted as evidence for a 'bright side' of mental illness, such as Major Depression or Generalized Anxiety Disorder (GAD). Indeed, our measures were neither intended nor capable of diagnosing mental illness; rather, they were simply indicators of fear-related emotional states, like feeling nervous or anxious, and sadness-related states, like feeling down, depressed, or lonely. Mental disorders by definition involve disturbances in normal emotional functioning, and we would not expect that anxiety due to GAD would play the same functional role in specific adaptive behaviours. GAD and other mental illnesses should be treated as the serious public health issue that they are—and even more so during the COVID-19 pandemic (Gao et al., 2020; Torales et al., 2020; Li et al., 2020; Pfefferbaum & North, 2020).

Our findings do help to contextualize research on the impact of the pandemic. It is easy to assume, for example, that growing amygdalae indicate a negative consequence of the pandemic simply because the amygdala processes negative emotions (Solomon et al., 2020). Our findings suggest that growing a bigger amygdala might simply be an adaptation that allows us to respond appropriately when threats to our safety suddenly increase—not least by making COVID-19 a topic of our conversations in person and online.

Methods

Participants. Participants were a nationally representative sample of non-institutionalized adults residing in the United States ($N = 9,188$) who were members of the American Trends Panel at the time of the survey. 46.1% of participants were male, 89.2% lived in an urban area, 65.6% had an annual family income over \$50,000, and 38.3% considered themselves politically moderate.

Panel participants were recruited through three random-digit-dial surveys and two national address-based random sample surveys, conducted by the American Trends Panel. For full information on panel participant recruitment, see <https://www.pewresearch.org/methods/u-s-survey-research/american-trends-panel/>. On April 20th and 21st, 2020, participants received either an email or SMS invitation to complete the April survey. Survey responses were recorded between April 20th and April 26th, 2020. All participants received post-paid incentives ranging from five dollars to \$20. Full methodological details are available on the Open Science Framework (OSF): https://osf.io/6425d/?view_only=015b906a691e4c9c9ce57a5b4e72d857.

Measures. Participants reported how often (0-*Rarely or none of the time* to 3-*Most or all of the time*), they felt nervous, anxious, or on edge (“Anxious”), depressed (“Depressed”), lonely (“Lonely”), hopeful (“Hopeful”), had trouble sleeping (“Bad Sleep”), or experienced a physical response such as nausea, headaches, or a fast heartbeat when thinking about COVID-19 (“Psychosomatic Anxiety”).

COVID-19 information source variables were measured on a three-item scale indicating major and minor news sources (0-*Not a source* to 2-*Major source*). Participants reported their consumption of news from international (“International News”), national (“National News”), and local (“Local News”) news organizations; news from President Donald Trump and the White

House Coronavirus Task Force (“News from White House”) and from the Joe Biden presidential campaign (“News from Biden Campaign”); news from elected officials (“News from State Officials”) and public health organizations (“News from Health Officials”); and news from friends and family (“News from Friends and Family”), listservs (“News Listservs”), and news forums (“News Forums”). To measure social media news consumption, participants indicated how often (1-*Never* to 4-*Often*), they got news and information about the coronavirus outbreak on social media (“Passive Social Media News”). To measure information sharing, participants indicated whether they had posted or shared news and information about the coronavirus outbreak on social media (“Active Social Media”; 1-*Yes*, 0-*No*) and how often they discussed the coronavirus outbreak with others whether online, in person, or over the phone (“Interactive Info Sharing”; 0-*Never*, 2-*Sometimes*, 4-*All the time*).

Urban location was coded from county-level FIPS codes (1-*Metropolitan*, 0-*Non-Metropolitan*). Sex (1-*Male*, 0-*Female*), liberal views (0-*Very conservative* to 4-*Very liberal*), and religious service attendance (0-*Never* to 5-*More than once a week*) were all self-reported. Participants’ education level (0-*Less than high school* to 5-*Graduate degree*), family income (0-*Less than \$10,000* to 8-*\$150,000 or more*), and age (0-18-29 to 3-65+) were also self-reported, then bracketed to create groups. For a full list of measures administered, see https://osf.io/6425d/?view_only=015b906a691e4c9c9ce57a5b4e72d857.

Exclusion criteria. We made an a priori decision to exclude all observations with missing answers for any of our variables. The original sample size was $N = 10,139$ for the April 2020 dataset.

Open-source tools. We used the open-source software R and Jamovi in the analysis. The American Trends Panel data that support the findings of this study are available from the Pew

Research Center. For the American Trends Panel March 2020 survey dataset, see <https://www.pewsocialtrends.org/dataset/covid-19-late-march-2020/>. For the American Trends Panel April 2020 survey dataset, see <https://www.journalism.org/dataset/covid-19-late-april-2020/>.

Tables and Figures

Table 1. *Correlations between emotion, information consumption, and information sharing.*

	M(SD)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1. Anxious	1.11(1.00)	—																	
2. Depressed	0.73(0.90)	.637*	—																
3. Lonely	0.68(0.90)	.441*	.588*	—															
4. Hopeful	1.63(0.96)	-.241*	-.265*	-.190*	—														
5. Bad Sleep	1.08(1.05)	.437*	.434*	.347*	-.184*	—													
6. Psychosomatic Anxiety	0.23(0.57)	.401*	.373*	.265*	-.137*	.275*	—												
7. International News	0.95(0.75)	.077*	.069*	.036*	-.048*	.049*	.048*	—											
8. National News	1.55(0.63)	.068*	.033†	-.001	-.034†	.019	.029†	.271*	—										
9. Local News	1.33(0.69)	.041*	.015	.010	.020	.028†	.043*	.101*	.243*	—									
10. News from White House	0.92(0.80)	-.115*	-.114*	-.087*	.156*	-.073*	-.038*	-.109*	-.045*	.077*	—								
11. News from Biden Campaign	0.23(0.49)	.062*	.064*	.050*	-.049*	.051*	.075*	.210*	.164*	.153*	-.055*	—							
12. News from State Officials	1.24(0.70)	.054*	.021‡	.009	.018	.023‡	.051*	.135*	.187*	.289*	.090*	.161*	—						
13. News from Health Officials	1.49(0.64)	.102*	.048*	.041*	.001	.044*	.060*	.244*	.255*	.169*	-.048*	.152*	.326*	—					
14. News from Friends/Family	0.81(0.64)	.074*	.068*	.074*	.014	.050*	.060*	.048*	-.007	.114*	.079*	.163*	.074*	.008	—				
15. News Listservs	0.36(0.59)	.030†	.033†	.016	.000	.026‡	.070*	.154*	.047*	.178*	.066*	.247*	.153*	.118*	.224*	—			
16. News Forums	0.46(0.65)	.072*	.086*	.077*	-.035*	.038*	.071*	.136*	-.025‡	.059*	.072*	.180*	.047*	.050*	.230*	.251*	—		
17. Passive Social Media News	1.30(1.10)	.173*	.136*	.123*	-.066*	.113*	.119*	.079*	.001	.057*	.021‡	.079*	.048*	.063*	.188*	.138*	.349*	—	
18. Active Social Media	0.25(0.43)	.116*	.097*	.083*	-.040*	.073*	.105*	.081*	.018	.008	-.010	.063*	.046*	.080*	.055*	.074*	.187*	.456*	—
19. Interactive Info Sharing	2.53(0.85)	.213*	.140*	.107*	-.060*	.105*	.126*	.135*	.176*	.095*	.001	.109*	.139*	.162*	.167*	.090*	.114*	.199*	.166*

Notes. ‡ $p < .05$, † $p < .01$, * $p < .001$. Items 1-6 were all measured on the same four-item scale indicating frequency over the past week (0-Rarely or none of the time to 3-Most or all of the time). Items 7-16 were measured on the same three-item scale indicating major and minor news sources (0-Not a source to 2-Major source).

Table 2. *Anxiety predicts interactive and active information sharing even when controlling for other negative emotions, news consumption, and demographics.*

Predictors	Interactive Info Sharing					Active Info Sharing (Social Media)				
	b	SE	β	t	p	b	SE	Odds Ratio	Z	p
(Intercept)	2.533	0.008	0.000	307.8	< .001	-1.470	0.177	0.230	-8.300	< .001
Anxious	0.117	0.011	0.138	10.21	< .001	0.123	0.034	1.131	3.610	< .001
Depressed	-0.005	0.014	-0.005	-0.336	0.737	-0.012	0.040	0.988	-0.300	0.769
Lonely	0.016	0.012	0.018	1.427	0.154	0.032	0.034	1.033	0.952	0.341
Hopeful	-0.010	0.009	-0.011	-1.052	0.293	-0.008	0.028	0.992	-0.303	0.762
Bad Sleep	0.007	0.009	0.009	0.772	0.440	0.027	0.027	1.027	0.990	0.322
Psychosomatic Anxiety	0.044	0.016	0.030	2.724	0.006	0.167	0.045	1.181	3.735	< .001
International News	0.051	0.012	0.046	4.254	< .001	0.119	0.037	1.126	3.249	0.001
National News	0.145	0.015	0.108	9.836	< .001	0.004	0.046	1.004	0.081	0.936
Local News	0.013	0.013	0.010	0.958	0.338	-0.113	0.040	0.893	-2.801	0.005
News from White House	0.063	0.012	0.060	5.252	< .001	0.025	0.036	1.026	0.699	0.484
News from Biden Campaign	0.046	0.018	0.026	2.475	0.013	0.011	0.053	1.011	0.199	0.843
News from State Officials	0.059	0.013	0.048	4.452	< .001	0.062	0.040	1.064	1.554	0.120
News from Health Officials	0.080	0.015	0.060	5.515	< .001	0.181	0.046	1.199	3.983	< .001
News from Friends/Family	0.168	0.014	0.127	12.29	< .001	-0.013	0.041	0.987	-0.315	0.752
News Listservs	0.013	0.015	0.009	0.820	0.412	0.046	0.045	1.047	1.041	0.298
News Forums	0.073	0.014	0.056	5.303	< .001	0.550	0.039	1.734	14.14 0	< .001
Urban (v. Rural)	0.060	0.027	0.022	2.225	0.026	-0.187	0.080	0.829	-2.338	0.019
Male	-0.090	0.017	-0.050	-4.949	< .001	-0.276	0.053	0.759	-5.246	< .001
Age	-0.040	0.009	-0.049	-4.716	< .001	-0.102	0.028	0.903	-3.716	< .001
Education	0.030	0.007	0.049	4.328	< .001	-0.003	0.020	0.997	-0.163	0.871
Political ideology	0.040	0.010	0.054	4.321	< .001	0.068	0.030	1.070	2.281	0.023
Religiosity	0.004	0.005	0.007	0.651	0.515	0.018	0.017	1.018	1.073	0.283
Family Income	0.026	0.004	0.070	6.346	< .001	-0.021	0.012	0.979	-1.703	0.089

Note. Urban location was coded from county-level FIPS codes (1-Metropolitan, 0-Non-Metropolitan). Sex (1-Male, 0-Female), political ideology (0-Very conservative to 4-Very liberal) were both reported by participants. See Supplementary Online Material for model diagnostics (Table S3).

Figure 1. *Relationship between different levels of anxiety and interactive info sharing. The majority of participants who felt anxious, nervous, or on edge three or more days in the previous week discussed the coronavirus pandemic most or almost all of the time. In contrast, the majority of participants who felt no anxiety or only some anxiety in the previous week discussed the pandemic sometimes or hardly ever. A very small proportion of participants (81 participants, or 0.09%) reported that they never discussed the pandemic.*

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Supplementary Online Materials

Anxiety Talking: Does Anxiety Predict Sharing Information about COVID-19?

Does Anxiety Predict Social Distancing Intentions?

We wanted to see how participants' anxiety related to social distancing, which was not assessed in the April 2020 survey data that contained data on information sharing—the main focus of our research. The panel's comfort with doing various errands and social activities was assessed, however, in the American Trends Panel March 2020 survey. We used this measure of discomfort with social contact as an approximate indicator of social distancing. For consistency with the main manuscript, we only included participants who also completed the April 2020 survey. We found that March anxiety indeed predicted March social distancing, $r = .29$, 95% CI[0.27; 0.31], $p < 0.001$. March anxiety still predicted March social distancing ($\beta = .26$, $p < .001$) after controlling for other March well-being measures (see Table S1).

Participants. Participants were a nationally representative sample of non-institutionalized adults residing in the United States ($N = 11,537$). We made an a priori decision to exclude all observations with missing answers for any of our variables, and all participants who did not also complete the April 2020 survey. Thus, we analysed data from $N = 8,223$ participants who also completed the American Trends Panel April 2020 survey. In this subsample for March 2020, 46.7% of participants were male, 89.3% lived in an urban area, 66.8% had an annual family income over \$50,000, and 38.0% considered themselves politically moderate.

Panel participants were recruited through three random-digit-dial surveys and two national address-based random sample surveys, conducted by the American Trends Panel.

Survey responses were recorded between March 19th and March 24th, 2020. All participants received post-paid incentives ranging from five dollars to \$20.

Measures. To measure social distancing, we created a five-item index of variables with binary responses (0-*Uncomfortable doing this*, 1-*Comfortable doing this*). Participants reported their comfort with visiting friends, going to a restaurant, attending a crowded party, going to the grocery store, and going to a polling place to vote ($\alpha = 0.71$). Emotion variables were all measured with the same items as in the April 2020 survey. Participants reported how often (0-*Rarely or none of the time* to 3-*Most or all of the time*) they felt nervous, anxious, or on edge (“Anxious”), depressed (“Depressed”), lonely (“Lonely”), hopeful (“Hopeful”), had trouble sleeping (“Bad Sleep”), or experienced a physical response such as nausea, headaches, or a fast heartbeat when thinking about COVID-19 (“Psychosomatic Anxiety”).

More information about the methodology is available at https://osf.io/6425d/?view_only=015b906a691e4c9c9ce57a5b4e72d857.

Supplementary Tables

Table S1. *Anxiety predicts social distancing intentions in March 2020 even after controlling for related measures.*

Predictor	b	SE	β	t	p
(Intercept)	0.652	0.003	0.000	212.62	< .001
Anxious	0.072	0.004	0.259	19.30	< .001
Depressed	-0.018	0.005	-0.056	-3.73	< .001
Lonely	-0.007	0.004	-0.021	-1.65	0.098
Hopeful	-0.021	0.003	-0.071	-6.36	< .001
Bad Sleep	0.010	0.003	0.036	3.00	0.003
Psychosomatic Anxiety	0.046	0.006	0.096	8.28	< .001

Table S2. *In April 2020, getting news about the COVID-19 pandemic from the White House predicts lower anxiety, even after controlling for all other news sources, including news consumption on social media.*

Predictor	b	SE	β	t	p
(Intercept)	1.108	0.010	0.000	109.386	< .001
International News	0.027	0.015	0.020	1.807	0.071
National News	0.055	0.018	0.034	3.111	0.002
Local News	0.013	0.016	0.009	0.801	0.423
News from White House	-0.146	0.013	-0.117	-11.291	< .001
News from Biden Campaign	0.029	0.022	0.014	1.280	0.201
News from State Officials	0.030	0.016	0.021	1.891	0.059
News from Health Officials	0.099	0.018	0.063	5.636	< .001
News from Friends/Family	0.077	0.017	0.049	4.594	< .001
News Listservs	-0.030	0.019	-0.018	-1.599	0.110
News Forums	0.014	0.018	0.009	0.822	0.411
Passive Social Media News	0.143	0.010	0.157	14.403	< .001

Table S3. *Collinearity statistics between predictors of information sharing in Table 2.*

	Variance Inflation Factor	Tolerance
Anxious	1.94	0.52
Depressed	2.23	0.45
Lonely	1.60	0.63
Hopeful	1.13	0.89
Bad Sleep	1.34	0.75
Psychosomatic Anxiety	1.25	0.80
International News	1.22	0.82
National News	1.26	0.79
Local News	1.21	0.83
News from White House	1.37	0.73
News from Biden Campaign	1.21	0.83
News from State Officials	1.24	0.80
News from Health Officials	1.25	0.80
News from Friends/Family	1.14	0.88
News Listservs	1.19	0.84
News Forums	1.17	0.86
Urban	1.03	0.97
Male	1.09	0.92
Age	1.15	0.87
Education	1.34	0.75
Liberalness	1.66	0.60
Religiosity	1.22	0.82
Income	1.33	0.75

Supplementary Figures

Figure S1. *Q-Q plot for interactive information sharing regressed onto anxiety, other emotions, news consumption, and demographics (see Table 2 for details). The standardized residuals do not deviate from the diagonal, suggesting that the assumption for normality of residuals is not violated.*