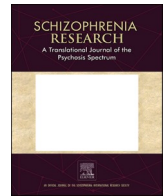




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Letter to the Editor

Adaptive and maladaptive consequences of increased social media and internet use during the COVID-19 pandemic in schizophrenia

The increased reliance on technology for social interactions due to the response to COVID-19 is thought to have both adaptive (Garfin, 2020) and maladaptive (Gao et al., 2020) consequences in the general population. It is unclear whether individuals with schizophrenia (SZ) have also engaged in greater internet and social media use during the pandemic and how that might influence their clinical presentation. On one hand, pre-pandemic studies demonstrate a link between greater internet/social media use and poorer clinical outcomes (Rekhi et al., 2019; Schrank et al., 2010). On the other hand, results from treatment studies suggest that social media-based interventions improve clinical outcomes (Naslund et al., 2020).

The current study evaluated the adaptive and maladaptive consequences of internet and social media use in SZ. The following hypotheses were made: (1) SZ and healthy controls (CN) would exhibit similar increases in internet and social media use during the pandemic; (2) pandemic-related increases in social media and internet use would be associated with pandemic-related increases in all symptom domains in SZ.

Participation occurred between July 9, 2020 and October 5, 2020.¹ Participants included 32 outpatients meeting DSM-5 criteria for schizophrenia or schizoaffective disorder and 31 CN. SZ and CN did not significantly differ in age, parental education, sex, or ethnicity; however, SZ had lower personal education than CN (see Strauss et al., 2021). Participants completed a series of Qualtrics questionnaires that covered a range of content (for both pre and during pandemic times), including: positive symptoms (Temporal Assessment of Positive Symptoms), general symptoms (The Scale of Psychiatric General Symptoms), and internet/social media use (COVID19 Internet and Social Media Scale, see Appendix A). Subsequently, participants completed an online clinical interview for the Brief Negative Symptom Scale (BNSS, Strauss et al., 2012). Pre-pandemic BNSS ratings had been obtained in prior studies.

Chi-square analyses were used to examine group and time effects for items 1 and 2 on the COVID19 Internet and Social Media Scale. Mixed-model ANOVAs examined the Group X Time interaction for items 3 through 10. Internal consistency value for items 3 through 10, which were scored dimensionally, was $\alpha = 0.51$ for pre pandemic, $\alpha = 0.52$ for during pandemic, supporting item level analysis rather than composite scores. Correlations were examined using during - pre pandemic difference scores calculated between the Internet/social media measure and symptom severity measures.

Chi-square analyses suggested similar patterns of technology and social media use between groups at both time points. Mixed-models

ANOVAs indicated that both groups spent more hours on the internet, $F = 58.22, p < .001$; and social media, $F = 36.19, p < .001$, during the pandemic. Both groups showed an increased number of people that they interacted with over the internet/social media during the pandemic, $F = 22.53, p < .001$. Similarly, both groups felt that their interactions through social media were more important during the pandemic, $F = 20.5, p < .001$. Self-reported negative experiences via social media increased during the pandemic for both groups, $F = 7.87, p = .007$; and SZ reported significantly more negative experiences than CN, $F = 5.10, p = .03$. Both groups also noticed more negative attitudes toward people with mental illness during the pandemic, $F = 4.97, p = .03$; and SZ reported that they have noticed more such attitudes than CN across both timeframes, $F = 4.30, p = .04$. SZ reported more social media related self-stigma than CN both pre and during pandemic, $F = 6.27, p = .02$; but neither group showed any significant change during the pandemic, $F = 3.35, p = .07$.

As can be seen in Table 1, several significant Pearson correlations were observed between internet/social media use difference scores and symptom difference scores in SZ: (1) Greater increase in internet use during the pandemic was associated with more sleep difficulties and a reduction in asociality; (2) Greater increase in social media use during the pandemic was associated with a greater increase in anxiety; (3) Greater increase in anxiety were associated with a greater increase in the number of people interacted with over the internet/social media during the pandemic; (4) Feeling increasingly closer to people interacted with via electronic media during the pandemic was associated with decreased severity of sleep problems, depression, and delusions; (5) Placing increased importance on social media use during the pandemic was associated with decreased severity of sleep difficulties, mania, and delusions, but increased anxiety; (6) Greater likelihood of people noticing negative attitudes toward those with mental illness during the pandemic was associated with increased anxiety; (7) Greater increases in self stigma were associated with pandemic related increases in hallucinations.

Collectively, the results suggested that using social media to obtain or maintain meaningful social ties during the pandemic may be an adaptive means of fighting off potential increases in a wide variety of clinical symptoms during the pandemic in SZ.

Certain limitations should be considered. First, all measures except for BNSS were collected during the pandemic, which makes symptom reports based more closely on the participants' subjective impression of their symptom changes than objectively measured changes over time.

¹ The state of Georgia issued an executive order on 4/20/2020 requiring all residents and visitors to "shelter in place within their homes or places of residence, meaning remaining in their place of residence and taking every possible precaution to limit social interaction to prevent the spread or infection to themselves or any other person (Kemp, B., Governor of the State of Georgia, 2020)".

Table 1

Pearson correlations between social media/Internet use and clinical outcomes in schizophrenia.

	Sleep	Depression	Anxiety	Mania	Distress	Anhedonia	Avolition	Asociality	Blunted affect	Alogia	Delusion	Hallucination
How many hours per day did you spend on the Internet?	0.39*	0.26	0.29	0.29	−0.19	−0.12	−0.13	−0.44*	−0.02	−0.05	0.25	0.09
How many hours per day did you spend on social media?	0.34	0.13	0.40*	0.08	−0.16	−0.07	−0.08	−0.36	0.10	−0.07	0.07	0.17
How many people per day did you interact with through electronic media?	0.02	0.06	0.45*	−0.10	−0.09	0.09	−0.07	−0.01	0.22	0.05	−0.20	0.22
How close did you feel with the people you interacted with through electronic media?	−0.45**	−0.35*	0.35*	−0.27	−0.21	−0.02	−0.32	−0.08	0.00	−0.03	−0.50**	−0.26
How important were your interactions with others through electronic media?	−0.40**	−0.33	0.51**	−0.41	−0.30	−0.16	−0.22	−0.04	0.09	−0.09	−0.43*	−0.23
How often did you feel like people were thinking negatively about you, harassing you, or bullying you over electronic media?	0.10	−0.09	0.26	−0.28	−0.06	0.03	0.11	0.25	−0.09	0.08	−0.29	0.06
How often did you notice negative attitudes on the Internet/SM toward people with mental illness?	−0.05	0.16	0.37*	−0.28	−0.04	−0.06	0.09	−0.01	0.11	0.02	−0.38*	0.17
How often did the negative attitudes you saw on Internet/SM toward mental illness make you feel bad about yourself?	0.25	0.21	0.00	−0.03	−0.03	−0.06	−0.1	−0.27	0.15	−0.12	0.15	0.47**

Note:

* $p < .05$.** $p < .01$.

Second, several participants who were invited to participate declined the invitation and the sample had more females and higher functioning participants than what would be typical for a study conducted by our lab during normal times. It is therefore unclear how well these findings generalize to all SZ. Third, to enable examination of the key pandemic-related questions of interest and reduce participant burden, new measures were developed specifically for this study. Although preliminary analyses of the psychometric properties of these measures were favorable and they produced clinically meaningful results, these questionnaires have not been extensively validated.

Given the widespread increase in internet and social media use throughout the world during the COVID-19 pandemic, online interventions are becoming increasingly relevant and are more accessible in times where health precautions and social restriction policies are in place. Increasing the number of meaningful social contacts individuals have over social media and electronic platforms may be beneficial to individuals with SZ.

CRedit authorship contribution statement

Luyu Zhang: Writing - Original draft, Writing - Review & Editing, Formal Analysis. Gregory P. Strauss: Writing - Review & Editing, Conceptualization, Funding acquisition, Supervision.

Declaration of competing interest

Gregory P. Strauss is one of the original developers of the Brief Negative Symptom Scale (BNSS) and receives royalties and consultation fees from ProPhase LLC in connection with commercial use of the BNSS and other professional activities; these fees are donated to the Brain and Behavior Research Foundation. Dr. Strauss has received honoraria and travel support from ProPhase LLC for training pharmaceutical company raters on the BNSS. In the past two years, Dr. Strauss has consulted for and/or been on the speaker bureau for European Archives of Psychiatry and Clinical Neuroscience 1 3 Minerva Neurosciences, Acadia, and Lundbeck pharmaceutical companies. Luyu Zhang has no conflicts to report.

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Appendix A

COVID19 Internet and Social Media Scale:

1. Which type of technology did you use?
2. What types of electronic social communication did you use?
3. How many hours per day did you spend on the Internet?
4. How many hours per day did you spend on social media?
5. How many people per day did you interact with through electronic media?
6. How close did you feel with the people you interacted with through electronic media?
7. How important were your interactions with others through electronic media?
8. How often did you feel like people were thinking negatively about you, harassing you, or bullying you over electronic media?
9. How often did you notice negative attitudes on the Internet/SM toward people with mental illness?
10. How often did the negative attitudes you saw on Internet/SM toward mental illness make you feel bad about yourself?

Temporal Assessment of Positive Symptoms (TAPS):

1. How often did you see things that other people couldn't/don't see?
2. How often did you hear things that other people couldn't hear, like noises, people talking?
3. How often did you taste something out of the blue, when you hadn't had anything to eat or drink?
4. How often did you feel strange sensations on your skin or body (e.g. electricity, burning, being touched, something crawling)?
5. How often did you smell things that other people didn't notice?
6. On a scale of 0–100, how upsetting was it to hear, see, smell, taste, or feel these things?
7. How often did you feel that you were being monitored, watched, followed, or plotted against?
8. How often did you feel that you did something terrible and deserved to be punished in some way?
9. How often did you get the feeling that you were especially talented or had a special ability that others don't have?
10. How often did you think you had a secret admirer? Please select most days.
11. How often did you worry that something was seriously wrong with your body or health, like you had a life-threatening disease?
12. How often did you get the feeling that something on the radio, TV, billboard, or on someone's clothing was meant to send you a message?
13. How often did you believe that someone else can read your mind or you can read other people's minds?
14. How often did you feel like thoughts were being put into your head or taken away?
15. How often did you think that you were not real or the world was not real?
16. How often did you believe you were being controlled by an outside force?

17. On a scale of 0–100, how upsetting were there thoughts and experiences?

The Scale of Psychiatric General Symptoms (SPGS):

1. Had sleep problems (sleeping more or less than usual, difficulty falling asleep, waking up earlier than you wanted, feeling tired during the day time)?
2. Gone to bed later than usual?
3. Been concerned about your physical health?
4. Felt sad, down, or depressed?
5. Lost interest in things you used to enjoy?
6. Thought that you had nothing to look forward to?
7. Felt worried, anxious, or nervous?
8. Felt intense fear that came out of nowhere, along with physical symptoms like a racing heart, shortness of breath, sweating, shaking, or chest pains?
9. Felt so happy, excited, or energetic that you didn't seem like your normal self?
10. Felt like your thoughts were racing?
11. Been so active with projects that your friends or family became worried about you?
12. Been socially withdrawn? Please select every day.
13. Felt like any of the above disrupted your life (made it much harder to do work, socialize, or take care of yourself)?

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Luyu Zhang, Gregory P. Strauss*

Department of Psychology, University of Georgia, USA

* Corresponding author at: University of Georgia, Department of Psychology, 125 Baldwin St., Athens, GA 30602, USA.
E-mail address: gstrauss@uga.edu (G.P. Strauss).