

# I feel you: Mixed-methods study of social support of loneliness on Twitter

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## Extended Abstract

Loneliness has been acknowledged to be an ongoing epidemic in the US [3]. It has been linked to a myriad of health concerns, including high blood pressure, impaired cognitive performance, increased risk of Alzheimer’s disease, as well as psychological effects on mood, personality, and increase suicidal ideation [6, 11]. With the advent of social media and increased internet access, in recent years Social Networking Sites (SNS) became a new platform for the self-disclosure of feelings which may be otherwise stigmatized, and for the reception of social support and community affiliation [12]. The unique affordances of SNS, including anonymous profiles, ease of posting, and social feedback mechanisms may resolve the tension between revealing and concealing information about oneself to others [10]. Meanwhile, the unprecedented events surrounding COVID-19 pandemic prompted governments worldwide to resort to drastic measures by putting millions of people in a collective lockdown and enforcing strict physical social distancing rules. During these lockdowns, online discourse increasingly mentioned mental health effects of lockdowns [8], and younger adults were shown to be especially more likely to experience loneliness [9]. In this study, we employ both manual coding and automated filtering in order to curate a collection of 4 million tweets containing loneliness self-disclosures, spanning March 15, 2019 - March 14, 2021, and thus capturing a year before and year during the COVID-19 pandemic. We examined the extent to which different forms of social feedback have been received by these posts, and what kinds of self-disclosures were more likely to attract feedback, and what type of support was provided by the Twitter community.

The volume of self-disclosure captured in the Twitter data in the year before and year during COVID-19 pandemic shows the highest peaks to be around Valentine’s Day (February 14) in both years. Despite these fluctuations, we find a distinct increase in volume around the first period of physical isolation, as well as another wave during the winter 2020-2021 (see Figure 1). The an Interrupted Time Series analysis shows that at the beginning of the dataset on average 4,282 users posted per day ( $P < 0.0001$ ), this increased by 1,770 in the physical isolation period ( $P < 0.0001$ ). At the peak of the first wave, on March 27, 2020, 9,148 unique users posted loneliness self-disclosures.

To understand the kinds of user or message characteristics result in a reply, we turn to the rate of feedback including likes, retweets, and replies. We estimate that 25.5% of tweets before physical isolation measures received at least one reply, and 30.1% of tweets during them did so, with the difference being statistically significant at  $P < 0.0001$ . Interestingly, the number of retweets decreased from 14.3% having at least one retweet before isolation to 11.0% during ( $P < 0.0001$ ). However, the number of likes does not significantly change. Next, we check whether a user’s online *social capital* is related to the extent of replies [4]. We find that, indeed, many more replies were sent to self-disclosures by users with a far larger number of followers, at an average of 3,798 followers, before physical isolation and 3,492 during, compared to self-disclosures that did not receive any replies (1,618 and 1,359, respectively). Further, both before and during the period of physical isolation, tweets were much more likely to receive a reply if

they were directed to a particular other account, at 38.1% before physical isolation and 39.8% during, compared to 22.9% and 27.0% without a directed mention, respectively.

Next, we ask, what types of support is provided to people self-disclosing loneliness on Twitter before and during the periods of physical isolation? We manually code a random selection of 500 tweets in each time period for three characteristics: (1) type of support [5], (2) person-centeredness, which captures the effectiveness of the supportive communication [2, 7], and (3) *invisible* support that is apparent through non-verbal elements [1] (see Table 1). Because of deletions, account suspensions, etc. the remaining tweets with replies resulted in around 300 for each period. The most common type of supportive communication is emotional support (around 50% in both time periods). Although Zhang & Fox [12] hypothesized that lonely people would not be able to find much support they needed on SNSs, numerous types of emotional support was observed, including highly person-centered replies. For example:

Tweet: (before physical isolation): *I'm lonely :(*

Reply: *Believe it or not, I totally know how you feel. I promise that if you're patient, the right man will come along. Never settle for less than what you deserve. I know he's out there for you, but until then, take advantage of this time to grow. I love you!*

Network support and tangible support were the least common types of support, but were still observed. For instance, we found a pointer to a phone help line. Moderately person-centered emotional support messages was the vast majority of the replies. The most common reply to someone who is lonely is “*you are not alone*”, “*me too*”, “*mood*” or messages that offer companionship, either virtually or in “real life” such as “*I here if you want to talk*”, “*call me*”, “*want me to come over?*” Concerning the mode of expression, many emotionally supportive messages used nonverbal elements, such as gifs (animated images) and emojis (small in-text images, often of faces), sometimes even without text.

Content that was labeled as low person-centered messages varied in the degree of appropriate responses. Some were ignoring or invalidating a person’s feelings, however on the more extreme end, some of these might not fit the definition of supportive communication, as there is no way to know if the sender of the message realized that the lonely person might have been seeking support. Low-centered messages that criticize, insult or invalidate the feelings of the sender do not fit the definition of supportive communication or, perhaps due to the affordances of Twitter, become malicious and borderline bullying.

Overall, we do not see a drastic change in the distribution of reply characteristics between the before and during physical isolation periods, suggesting that the norms around the responses to loneliness self-disclosure did not substantially change during the lockdowns, at least in terms of this categorization, person-centeredness, and non-verbal expression. However, we do observe several explicit mentions of loneliness associated directly with the lockdowns, with responses showing commiseration about the situation and suggestions of TV shows to watch as a distraction.

Considering possible psychological and physiological correlates of loneliness, it is imperative that the issue is not ignored by the public health authorities. In the current data, we found no instances of official help being suggested to those disclosing the feelings of loneliness, with mostly only emotional support provided by other users. Links to community organizations, mentorship opportunities, and even mental health and suicide prevention resources, may provide these individuals with help beyond the SNS. Special attention needs to be paid to the potential cyberbullying that those expressing their feelings on SNS may provoke.

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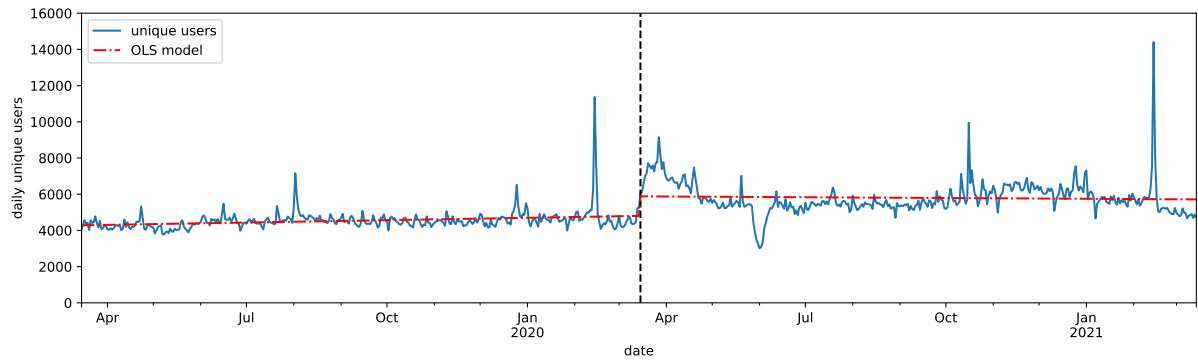


Figure 1: Number of unique users posting loneliness self-disclosure per day (blue solid line). The Interrupted Time Series (OLS) model is shown as a red dotted line.

		Before COVID n=279	During COVID n=232	Example
Type of Support	Emotional	149 (53%)	114 (49%)	i love u ! im always here for you! <gif of a hug>
	Esteem	14 (5%)	12 (5%)	Hey you're not a garbage person! Come interact with me! Don't be lonely. Show what you're doodling and I'll show you mine :)
	Information	5 (2%)	10 (4%)	I don't know you. Saw this through the magic of Twitter. I feel this. Have lived this and continue to live with this. Please keep going. It's TEXT, not a phone call. Easier sometimes. You have value and are loved. <Red heart>
	Network	3 (1%)	0 (0%)	way back I found this obscure website made by a mum in the US, and she had collected all this information, petitioning for proper medical attention. She was my hero. Just found her site, it's much bigger now <URL>
	Tangible	3 (1%)	4 (2%)	<Crying face> well, you just let me know what games you want to play and I'll look into buying some so we can play. Ff14 is already on that list. <Thumbs up>
Non-verbal Support	Verbal	165 (59%)	122 (53%)	We have been isolated so long that even being an introvert doesn't save you from the pains of isolation. I can't wait until this is over so I can finally go to University campus and meet my lecturers in person.
Person Centered Support	Nonverbal	25 (9%)	23 (10%)	<gif "sending virtual hug">
	Both	83 (30%)	83 (36%)	Come to your friendly Canadian cousins
	Highly	24 (9%)	12 (5%)	Craving a mutual loving relationship while ashamed and about your own appearance, fearing rejection and loneliness is a breeding ground for abuse. You must love yourself first.
	Moderate Low	172 (62%) 72 (26%)	160 (69%) 58 (25%)	same here if you need someone to talk to Said every person on Twitter

Table 1: Reply typology coding statistics and examples (rephrased for anonymization).