Preliminary investigation of the association between COVID-19 and suicidal thoughts and behaviors in the U.S.

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A R T I C L E I N F O	A B S T R A C T
	Evidence suggests that the negative consequences of COVID-19 may extend far beyond its considerable death toll, having a significant impact on psychological well-being. Despite work highlighting the link between previous epidemics and elevated suicide rates, there is limited research on the relationship between the COVID-19 pandemic and suicidal thoughts and behaviors. Utilizing an online survey, the current study aimed to better understand the presence, and extent, of the association between COVID-19-related experiences and past-month suicidal thoughts and behaviors among adults in the United States recruited via Amazon Mechanical Turk ($n = 907$). Results support an association between several COVID-19-related experiences (i.e., general distress, fear of physical harm, effects of social distancing policies) and past-month suicidal ideation and suicide attempts. Further, a significant proportion of those with recent suicidal ideation explicitly link their suicidal thoughts to COVID-19. Exploratory analyses highlight a potential additional link between COVID-19 and suicidal behavior, suggesting that a portion of individuals may be intentionally exposing themselves to the virus with intent to kill themselves. These findings underscore the need for suicide risk screening and access to mental health services during the current pandemic. Particular attention should be paid to employing public health campaigns to disseminate information on such services to reduce the enormity of distress and emotional impairment associated with COVID-19 in the United States.

The COVID-19 (i.e., "coronavirus"; "novel coronavirus") pandemic has resulted in a staggering number of deaths (Center for Disease Control [CDC], 2020a). Unfortunately, these somber numbers reflect only a portion of the overall impact that COVID-19 has had on U.S. citizens. The COVID-19 pandemic has caused significant psychological distress (e.g., Panchel et al., 2020), stemming not only from uncertainty about the future and disruptions to social support networks, but also from significant economic hardships, physical safety concerns, and the illness and death among family and friends. Importantly, many of these factors have been linked to severe psychological distress resulting in suicidal thoughts and behaviors (Franklin et al., 2017).

Suicide is a leading cause of death worldwide (World Health Organization [WHO], 2019; CDC, 2020b). Death by suicide is estimated to occur every 11 min in the U.S., with many more people contemplating and/or attempting suicide each day (CDC, 2019), underscoring the need to identify factors that may proliferate suicide risk. In line with robust evidence of psychological distress secondary to past epidemics (e.g.,

National Health Commission of China, 2020; Wilson, 2008; Taylor et al., 2008; Yu et al., 2005) and the present pandemic (e.g., Wang et al., 2020; Zhang et al., 2020), evidence suggests that epidemics may have a profound downstream effect on suicide rates (Chan et al., 2006). Indeed, preliminary work has demonstrated potential increases in suicidal thinking since the beginning of the pandemic (Kilgore, Cloonan, Taylor, Allbright and Daily, 2020), with nearly 11% of adults reporting having seriously considered suicide in June 2020 (Czeisler et al., 2020). Despite this, there has been limited empirical investigations of this association (Gratz et al., 2020), which are needed to provide guidance on the development of targeted large-scale suicide prevention campaigns.

Beyond the aforementioned general psychological impact of epidemics, there is evidence suggesting that the specific effects of public health measures implemented to contain disease spread (e.g., quarantine) may have a particularly detrimental effect on psychological well-being, potentially extending to suicidal thoughts and behaviors. A recent review of the psychological impact of illness-initiated quarantine

indicated that quarantine measures are cross-sectionally and, in some studies, longitudinally associated with negative mental health outcomes (Brooks et al., 2020). Notably, there is early research to suggest a similar association between COVID-19-related public health measures enacted throughout much of the U.S. (i.e., social distancing, stay-at-home orders) and suicidal thinking (Gratz et al., 2020; Kilgore et al., 2020), supporting the documented relationship between social disconnection and interpersonal stress and suicide risk (e.g., Joiner, 2005; King and Merchant, 2008). However, these studies have largely focused on whether stay-at-home orders were in place, rather than the individual-level impact of the polices, leaving room to better understand the impact of the COVID-19 pandemic on suicide risk.

While deaths and attempted death by suicide as a result of severe psychological distress typically occur utilizing one of only a few common methods (e.g., Lim et al., 2014; Centers for Disease Control and Prevention, 2020c), prior literature suggests there to be a much wider range of nontraditional suicide attempt methods, including the intentional exposure to potentially lethal disease. Indeed, case studies suggest that individuals experiencing suicidal ideation may attempt to contract diseases (such as human immunodeficiency viruses [HIV]) as a method of carrying out suicidal behavior (e.g., Frances et al., 1985; Papathomopoulos, 1989; Tompkins-Rosenblatt, 1997). Thus, as COVID-19 continues to spread, individuals who are experiencing severe psychological distress resulting in suicidal thinking, may have increased access to a potentially lethal means of suicide (i.e., COVID-19; WHO, n.d.). Such increased access is a well-cited predictor of deaths by suicide (e.g., Marzuk et al., 1992). Thus, there is a need to better understand if, and to what extent, the experience of intentional self-exposure to COVID-19 is occurring within the U.S., and, moreover, whether intentional exposure is engaged in with suicidal intent.

The current study's primary aim was to examine the association between COVID-19 and recent suicidal thoughts and behaviors among U.S. community members. More specifically, we aimed to better understand the specific aspects of COVID-19-related experiences that may contribute to suicidality. We hypothesized that greater COVID-19-related general distress, fear for one's physical safety, and perceived impacts of social distancing measures would be associated with the presence of recent suicidal ideation and suicide attempt(s). We further hypothesized that a significant proportion of individuals endorsing recent suicidal ideation would directly link their ideation, at least in part, to COVID-19. A secondary, exploratory aim of the present study was to assess the presence of intentional exposure to COVID-19, with the specific goal of evaluating the extent to which intentional exposure is engaged in with suicidal intent. Given the lack of previous research on this topic, we consider these analyses exploratory in natureand do not offer hypotheses.

1. Material and methods

1.1. Participants and procedures

Participants were recruited from Amazon Mechanical Turk (mTurk) as part of a larger online study that recruited a general mTurk population by advertising for a research study on well-being and social connection. Participants had to be located in the United States and have a 95% (or greater) mTurk approval rate. The study was approved by the first-author's Institutional Review Board for research ethics and all participants gave informed consent in accordance with the Declaration of Helsinki. Data were collected on April 3–4, 2020. To ensure valid and attentive responding, inclusion in the current analysis required: (a) passing an online bot-detection test (i.e., ReCaptcha), (b) passing at least 50% of the 12 included attention check items (i.e., "Please answer '3' on this item"), (c) passing the time completion attention check (i.e., completing the survey within three standard deviations of the mean completion time), and (d) providing a response on the study's primary outcomes (i.e., past-month suicidal ideation, past-month suicide attempt). The final sample consisted of 907 participants.

The mean age of participants was 36.43 years old (SD = 11.02, Range = 18–74). Overall, 56.30% of participants (n = 511) identified as a man, 42.60% (n = 387) identified as a woman, 0.40% (n = 4) identified as transgender or another gender, and 0.60% (n = 5) preferred not to answer. The majority of the sample identified as White (76.4%, n = 693), followed by African American/Black (12.0%, n = 109), Asian (7.0%, n = 63), more than one race (2.3%, n = 21), American Indian or Alaska Native (0.9%, n = 8), or other (0.9%, n = 8); a subset preferred not to answer (0.6%, n = 5). The majority of the sample identified as non-Hispanic/Latinx (83.6%, n = 758), with 14.1% (n = 128) identifying as Hispanic/Latinx and 2.3% (n = 21) preferring not to answer.

1.2. Measures

Suicidal thoughts and behaviors. The current study utilized two modified, face-valid items from the Self-Injurious Thoughts and Behaviors Interview (Nock et al., 2007) to assess for presence (*yes/no*) of general past-month active suicidal ideation (i.e., "In the past month, have you had thoughts of killing yourself?") and past-month suicide attempt (i.e., "In the past month, have you attempted to kill yourself?"). Those endorsing general past-month suicidal ideation were also asked, "How often have your thoughts of suicide/killing yourself been linked to coronavirus (i.e., COVID-19)?" (1 = *Have not been related*, 4 = *Related approximately half of the time*, 7 = *Related all of the time*).

COVID 19-related experiences. The following items were developed for use in the current study. Four 7-point Likert scale items were utilized to assess for potential distress and disruption due to COVID-19: "How much are you concerned about your physical safety due to coronavirus (i.e., COVID-19)?" (1=*Not all concerned* to 7=*Extremely concerned*); "To what extent have you been affected by coronavirus-related social distancing practices/policies (i.e., no gatherings over 10 people; keeping 6 ft distance from others)?" (1 = *Not at all [my normal social/work routine has not been affected]* to 7 = *Very much so [my normal social/work routine has been strongly affected]*; "How much are social distancing practices/policies put into place due to coronavirus (i.e., COVID-19) impacting your mental health?" (1 = *No impact at all* to 7 = *Significant negative impact*); and "How much distress, in general, are you currently experiencing as it relates to coronavirus (i.e., COVID-19)?" (1 = *Not at all distressed* to 7 = *Extremely distressed*). Supporting the use of their independent analysis, correlations between COVID-19-related experiences were significantly, but moderately correlated (r's = 0.37-0.66, p's < 0.001).

Intentional COVID-19 exposure. Participants were asked one forced-choice (*yes/no*) question regarding intentional COVID-19 exposure, "Have you done anything in order to intentionally (on purpose) increase the chance that you would get coronavirus (i.e., COVID-19)?" Participants who reported intentional exposure were asked to rate the extent to which they exposed themselves to COVID-19 for five different reasons, assessing both passive and active forms of suicidal and non-suicidal self-injurious intents: "Wanted a break from life"; "Wanted to punish yourself"; "Wanted to hurt yourself (without wanting to die)"; "Didn't want to be alive anymore"; and "Wanted to kill yourself." All items were answered on a 1–5 Likert scale (1 = *Not at all* to 5 = *Extremely*). The item assessing "Wanted to kill yourself" as a reason for intentional exposure was used to delineate between those reporting no suicidal intent (1 on the 1–5 scale) and at least some suicidal intent (2 or greater on the 1–5 scale) associated with their intentional exposure. Supporting the use of their independent analysis, correlations between all reasons for intentional COVID-19 exposure were significantly, but moderately correlated (r's = 0.53-0.68, p's < 0.001).

1.3. Data analysis

Demographics (i.e., age, gender, race, ethnicity) were examined in relation to past-month suicidal ideation and suicide attempt(s). For any

analyses including gender, due to small sample sizes of other gender identities, only those identifying as a man or woman were included ($n = 898$). Demographics demonstrating significant group differences were included as covariates in primary analyses. To address the study's primary aim, four logistic regressions with the outcome of past-month suicidal ideation and four logistic regressions with the outcome of past-month suicide attempt(s) were conducted with the full sample.[2] Given the significant association between suicidal ideation and attempts (Ribeiro et al., 2016), past-month suicidal ideation was included as a covariate in models where past-month suicide attempt(s) was the outcome. To address the study's exploratory aim, univariate (i.e., chi-square, t-tests) and multivariate (i.e., MANOVA) group difference tests were utilized. Where applicable, effect sizes were reported (i.e., Cramer's V for chi-square, partial eta squared for MANOVA).

2. Results

2.1. Preliminary analyses

Overall, 159 participants (17.5%) reported general active suicidal ideation in the past month and 44 (4.9%) reported having attempted suicide in the past month. With regard to general past-month suicidal ideation, there were group differences on age ($t(905) = 2.82, p = .005$) and ethnicity ($x^2(1) = 19.20, p < .001$), but not on gender ($x^2(1) = 3.05, p = .08$) or race ($x^2(4) = 0.91, p = .92$). With regard to past-month suicide attempt, there were group differences on age ($t(905) = 2.35, p = .02$), gender ($x^2(1) = 7.83, p = .005$) and ethnicity ($x^2(1) = 53.48, p < .001$), but not race ($x^2(4) = 9.01, p = .06$). See Table 1 for descriptive information on COVID-19-related study variables.[3]

2.2. Primary analyses

Aim 1. After considering the influence of age and ethnicity, independent regression analyses demonstrated that physical safety concerns and general distress due to COVID-19 were significantly, positively associated with general past-month suicidal ideation, whereas daily routine impacts due to COVID-19 social distancing policies was

Table 1
Means, standard deviations, and bivariate correlations.

	1	2	3	4	M (SD)
1: Social Distancing Daily Impact	–				5.04 (1.78)
2: General Distress	.48*	–			4.20 (1.67)
3: Physical Safety Concerns	.37*	.66*	–		4.24 (1.89
4: Social Distancing Mental Health Impact	.39*	.66*	.51*	–	3.69 (1.92)
COVID-Linked Suicidal Thoughts+	.45*	.45*	.44*	.60*	3.27 (2.26)

*Note: *p < 0.01;+analysis sample n = 158, 1–5 response scale.*

significantly, negatively associated with general past-month suicidal ideation. Perceived effects of social distancing practices on one's mental health was not significantly associated with general past-month suicidal ideation. See Table 2.

After considering the influence of age, gender, ethnicity, and past-month suicidal ideation, independent regression analyses demonstrated that all four COVID-19-related experiences were significantly, positively associated with past-month suicide attempt(s). See Table 3.

Among those with general past-month suicidal ideation, on average, participants reported that their past-month suicidal thoughts were linked to COVID-19 nearly half of the time ($M = 3.27, SD = 2.26$, on 1–7 scale). See Fig. 1 for further descriptive information.

Exploratory Aim. Among those who reported intentionally exposing themselves to COVID-19 ($n = 83$, 9.2% of the overall sample), five reasons for exposure were explored. On average, individuals reporting intentional COVID-19 exposure endorsed moderate agreement with all five assessed reasons. See Fig. 2. The remaining analyses were among individuals who reported intentional exposure with suicidal intent (defined as reporting non-zero suicidal intent; $n = 67$, 7.4% of the overall sample), in comparison to those who did not report intentional exposure with suicidal intent ($n = 840$).

Individuals who intentionally exposed themselves to COVID-19 with suicidal intent were more likely to identify as a man ($x^2(1) = 9.27, p = .002$), Black or African American ($x^2(4) = 11.89, p = .02$), and Hispanic/Latinx ($x^2(1) = 74.88, p < .001$); there were no differences on age ($t(905) = 1.42, p = .16$). Individuals who intentionally exposed themselves to COVID-19 with suicidal intent were more likely to report past-month suicidal ideation ($x^2(1) = 76.84, p < .001, V = 0.29$) and past-month suicide attempt(s) ($x^2(1) = 288.58, p < .001, V = 0.56$). Further, among those with general past-month suicidal ideation, those who intentionally exposed themselves to COVID-19 with suicidal intent reported a greater link between their past-month suicidal thoughts and

Table 2
Independent logistic regressions predicting past-month suicidal ideation.

| Model 1	Cox & Snell R^2	OR	Wald	p	OR 95% CI
Predictors	039				
Age		.978	6.31	.012	[.960, .995]
Ethnicity		.387	18.49	<.001	[.251, .597]
Social Distancing Daily Impact		.856	9.93	.002	[.777, .943]
Model 2					
Predictors	.034				
Age		.975	7.37	.007	[.958, .993]
Ethnicity		.453	12.87	<.001	[.294, .698]
General Distress		1.14	5.44	.020	[1.02, 1.27]
Model 3					
Predictors	.035				
Age		.974	8.09	.004	[.957, 992]
Ethnicity		.470	11.59	.001	[.305, .726]
Physical Safety Concerns		1.14	6.82	.009	[1.03, 1.26]
Model 4					
Predictors	.031				
Age		.976	7.22	.007	[.958, .993]
Ethnicity		.451	12.70	<.001	[.291, .699]
Social Distancing Mental Health Impact		1.08	2.69	.101	[.985, 1.19]

Note: Analysis sample $n = 907$; 159 participants (17.5% of the overall sample) reported active suicidal in the past month.

Table 3

Independent logistic regressions predicting past-month suicide attempts.

Model 1	Cox & Snell R²	OR	Wald	p	OR 95% CI
Predictors	.116				
Age		.959	4.23	.040	[.922, .998]
Ethnicity		.208	17.47	<.001	[.100, .434]
Gender		.401	4.22	.040	[.168, .959]
Past-Month Suicidal Ideation		16.30	49.35	<.001	[7.48, 35.50]
Social Distancing Daily Impact		1.30	4.82	.028	[1.03, 1.63]
Model 2					
Predictors	.124				
Age		.955	4.74	.030	[.916, .995]
Ethnicity		.212	16.80	<.001	[.101, .445]
Gender		.361	5.20	.023	[.151, .867]
Past-Month Suicidal Ideation		14.38	45.20	<.001	[6.61, 31.27]
General Distress		1.55	11.42	.001	[1.20.1.99]
Model 3					
Predictors	.134				
Age		.952	5.12	.024	[.913, .993]
Ethnicity		.227	14.91	<.001	[.107, .482]
Gender		.334	5.79	.016	[.136, .816]
Past-month Ideation		14.87	44.57	<.001	[6.73, 32.825]
Physical Safety Concerns		1.79	17.52	<.001	[1.36, 2.35]
Model 4					
Predictors	.122				
Age		.955	4.78	.029	[.917, .995]
Ethnicity		.220	15.63	<.001	[.104, .466]
Gender		.391	4.45	.035	[.163, .936]
Past-Month Suicidal Ideation		14.45	45.67	<.001	[6.66, 31.34]
Social Distancing Mental Health Impact		1.37	8.43	.004	[1.11, 1.70]

Note: Analysis sample $n = 907$; 44 participants (4.9% of the overall sample) reported attempting suicide in the past month.

LINK BETWEEN PAST-MONTH SUICIDAL IDEATION AND COVID-19
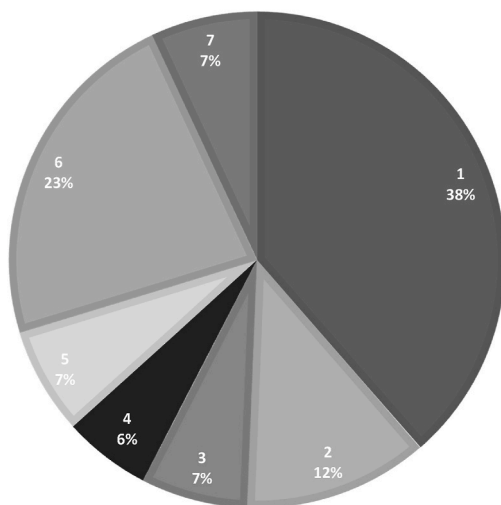
Fig. 1. *Note:* Answered on a 7-point Likert scale where, 1 = *Not at all related*, 4 = *Related half of the time*, and 7 = *Related all of the time*; 1 missing value; valid percentages reported; analysis sample $n = 159$ (only those who reported past-month active suicidal ideation).

COVID-19 ($M = 5.92$, $SD = 0.97$) compared to those who did not report intentional exposure ($M = 2.42$, $SD = 1.87$), $t (156) = -11.03$, $p < .001$.

Multivariate differences on COVID-19-related experiences between those who have and have not engaged in intentional COVID-19 exposure with suicidal intent were demonstrated, Wilks' lambda = 0.92, $F (4,890) = 19.23$, $p < .001$. Univariate statistics showed significant group differences on all four COVID-19-related experiences, such that those reporting having intentionally exposed themselves to COVID-19 exhibited higher scores on all experiences. See Table 4.

3. Discussion

The present study suggests that the public health ramifications of COVID-19 are far broader than its documented toll on physical health. Findings present initial evidence that several COVID-19-related experiences are associated with recent suicidal thoughts and behaviors among community members in the U.S. Further, through exploratory data analyses, we demonstrate that intentional exposure to COVID-19 is surprisingly common in our sample and, moreover, that some individuals may be enacting suicidal behavior through intentional exposure to COVID-19.

Findings from the current study highlight that several COVID-19-related experiences may contribute to past-month suicidal thoughts and behaviors. Indeed, specific experiences of general distress and physical safety concerns due to COVID-19 may be associated with suicidal ideation. However, the overall pattern of findings suggests that the impact of COVID-19-related experiences may be more strongly linked with suicide attempts than suicidal ideation. Indeed, all four of the assessed COVID-19-related experiences were associated with past-month suicide attempt(s) and these associations were larger in magnitude than associations with general suicidal ideation. We found that increased perceived impact of social distancing public health policies (both on social/work routines and on mental health) are associated with past-month suicide attempt(s). Interesting, though, is that while the perceived impact of social distancing on daily (social/work) routine was positively associated with greater likelihood of past-month suicide attempt(s), it demonstrated a negative association with suicidal thinking. It is possible that, for some individuals, while there was a disruption in social/work routines due to COVID-19, they were able to maintain or increase their connection and support (e.g., Tull et al., 2020), thus buffering against ideation onset, but not the transition from thinking about suicide to acting on such thoughts. Although the association between perceived impact of social distancing and past-month suicide attempt(s) was relatively small, this finding may still well have significant implications given the extent to which social distancing policies are currently practiced to prevent the spread of COVID-19.

We also observed stronger associations between general distress and concerns about physical safety due to COVID-19 and past-month suicide attempt, which supports prior work highlighting acute increases in distress and anxiety as risk factors for suicidal behavior (Kerkhof and van Spijker, 2011). It is possible that the acute distress and anxiety due to COVID-19, combined with the social routine disruption and disconnection of distancing policies, may result in a pernicious blend of risk factors for suicidal behavior. Given the relevance of these findings when weighing the costs and benefits of extending the current and/or implementing future (Ferguson et al., 2020) social distancing policies, it will be important for researchers to replicate and expand upon our results.

Findings also provide direct evidence of the association between COVID-19 and suicidal thoughts and behaviors. Upwards of 45% of community members endorsing general past-month suicidal thoughts reported their thoughts were explicitly linked to COVID-19 at least half of the time and approximately 65% reported this to be the case at least some of the time. Future research is needed to explore this link further to aid in our understanding of how and for whom the COVID-19 pandemic is influencing suicide risk. Prospective research, such as ongoing studies that have assessed suicidal thoughts and behavior *prior to* the onset of the COVID-19 outbreak and then again during the pandemic, should investigate these important questions directly.

A surprising proportion of individuals - 9% of our sample - reported

Endorsement of Reasons for
Intentional COVID-19 Exposure
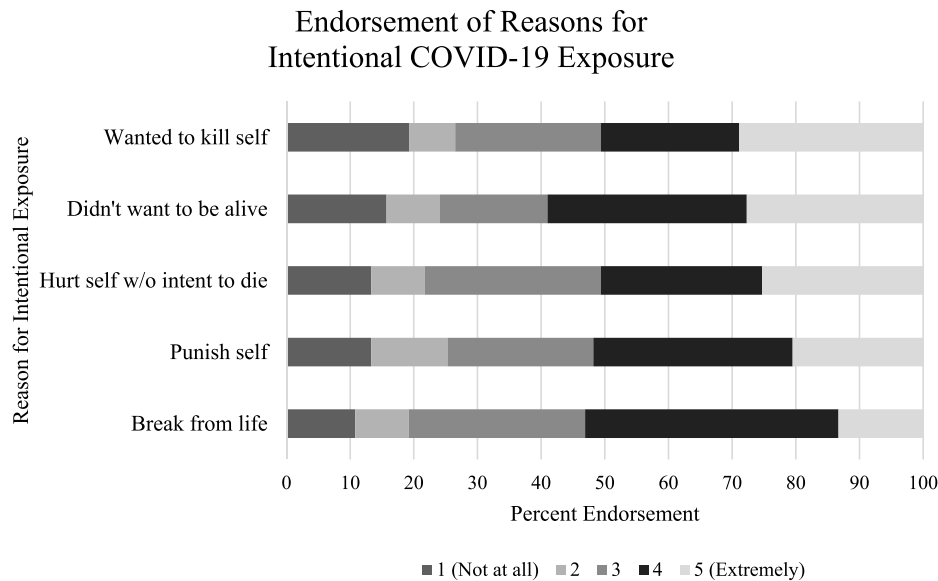
Fig. 2. *Note:* Valid percentages presented; analysis sample *n* = 83 (only those who reported engaging in intentional COVID-19 exposure).

Table 4
Differences on COVID-19-related experiences between individual with and without intentional COVID-19 exposure with suicidal intent.

	Intentional Exposure Mean (SD)	No Intentional Exposure Mean (SD)	η²
Social Distancing Daily Impact	5.54 (1.05)	5.01 (1.82)	.01***
General Distress	5.52 (1.04)	4.19 (1.67)	.05*
Physical Safety Concerns	5.64 (1.11)	4.13 (1.90)	.04***
Social Distancing Mental Health Impact	5.43 (1.08)	3.54 (1.90)	.07***

Note: *** $p < .001$, ** $p < .01$, * $p < .05$; analysis sample $n = 907$; 83 participants (9.2% of the overall sample) reported engaging in intentional exposure.

intentionally exposing themselves to COVID-19, and, moreover, approximately 50% who intentionally exposed themselves indicated their reason for doing so was strongly-to-extremely due to wanting to kill themselves. Further supporting the link between intentional COVID-19 exposure and suicidality, results demonstrated a moderate to strong association between intentional exposure with suicidal intent and general past-month suicidal ideation and suicide attempt(s), and between intentional exposure with suicidal intent and explicitly associating suicidal ideation with COVID-19 concerns. The finding that intentional exposure to COVID-19 may be used as a nontraditional suicide method aligns with numerous case reports of individuals exposing themselves to infectious diseases (e.g., HIV) as a means to enact suicidal behavior (e.g., Frances et al., 1985; Papathomopoulos, 1989; Tompkins-Rosenblatt, 1997). However, to our knowledge, the current findings are the first to empirically examine this potential suicide method as it applies to COVID-19.

Preliminary support for the phenomenon of people engaging in intentional COVID-19 exposure during the initial stages of the pandemic likely has potential public health implications. First, the ongoing spread of COVID-19 provides increasing access to a potentially lethal means for suicide. Prior research indicates that access to means is associated with death by suicide (Marzuk et al., 1992), suggesting that as access to the virus increases through its own proliferation, intentional deaths due to COVID-19 may also increase. However, this will be difficult to track. Deaths resulting from intentional COVID-19 exposure are unlikely to be

(accurately) documented as a suicide by medical examiners, skewing our understanding of suicides linked to COVID-19 exposure. The repercussions of likely mischaracterization are twofold. It is plausible that this may increase the attraction to this method of suicide, given the heightened stigma associated with suicide versus other causes of death (e.g., Pitman et al., 2016). Second, this finding is relevant to the primary public health goal of virus mitigation via inhibiting the spread of the disease. COVID-19 is highly contagious (WHO, 2020), suggesting that essentially any degree of intentional exposure, no matter how limited, could have a meaningful impact on virus spread. Given the preliminary nature of the current study, and the potential implications of this behavior, it will be important for future research to replicate our findings.

3.1. Strengths and limitations

The present study's findings must be interpreted with consideration of design limitations. First, this study is cross-sectional and, as a result, none of the associations presented should be interpreted as causal. Future longitudinal research is necessary to draw conclusions about the temporal relationship between COVID-19-related distress and suicidality. Second, we utilized a mTurk sample in order to recruit a large adult community sample in a short period of time. While there are notable concerns regarding mTurk samples (e.g., generalizability, valid responding), research suggests mTurk participants are reliable and attentive and may be more socioeconomically and racially diverse than other convenience samples (Buhrmester et al., 2016; Casler et al., 2013). Importantly, however, the majority of our sample identified as White and thus limits our ability to examine the effect of race on outcomes. This is a notable study limitation given mounting evidence that the virus disproportionately affects African Americans (Stafford et al., 2020). The goal of the present study was not to produce results that can generalize to the U.S., but rather was to provide preliminary evidence of the impacts of COVID-19 on suicidality, so it will be important for future research to replicate the current findings in a larger, nationally representative sample across age ranges. Third, the majority of the measures employed were developed for the purpose of this study and thus are not psychometrically validated. Fourth, our data were limited in scope. They do not permit examination of the role of virus symptoms in suicidal thinking or behavior; we would expect the virus to affect people very

differently and, moreover, that psychological distress would increase as virus symptom severity increases. Relatedly, although we assessed and adjusted for the effect of age (an important correlate of COVID-19 mortality; CDC, 2020d) on suicidal thoughts and behaviors, we did not evaluate the presence of comorbid physical conditions, another central mortality correlate (CDC, 2020d), or other relevant COVID-19-related experiences (i.e., resultant financial hardship). Fifth, although we assessed several reasons for intentional COVID-19 exposure (e.g., nonsuicidal self-injury, self-punishment), we did not assess all potential reasons, nor did we consider all potential demographic (i.e., occupation) or psychiatric (i.e., lifetime experience of suicidal thoughts or behaviors) factors that may have impacted intentional exposure. Understanding the full range of motivations for such exposure and associated personal characteristics may be important in order to mitigate this form of disease spread. Notwithstanding the aforementioned limitations, this study has numerous strengths, the most central of which is being one of the few studies to assess the association between COVID-19 and suicidal thoughts and behaviors, and the first, to our knowledge, to provide preliminary information regarding the presence and correlates of intentional exposure to this infectious virus.

3.2. Clinical implications

The current study underscores a significant need to increase suicide risk screening efforts, as it is essential to identify those at risk to implement interventions. Consistent with current recommendations, mental health clinicians and general health workers alike should strongly consider screening all patients for suicide risk. However, it may be important to introduce a more systematic screening process. While widespread screening may be difficult to carry out due to social distancing and stay-at-home policies, one potential opportunity to facilitate large-scale risk identification is to integrate suicide risk screenings into the protocol at COVID-19 testing sites. With millions of Americans likely to be tested over the coming months, a one or two question screener that would result in a follow-up phone call to facilitate care connection, if suicide risk is indicated, may allow a significant number of individuals to be reached, with a limited resource expenditure. Regardless of screening modality, our findings suggest that in addition to directly assessing imminent suicide risk, it might be important to assess thoughts about engaging in intentional exposure to COVID-19. It is possible that detecting those at risk for this method of suicidal behavior and encouraging treatment could not only reduce suicide risk but also may prevent virus spread.

The present study also suggests a need to increase access to intervention for those experiencing psychological distress related to COVID-19. Currently, although mental health resources such as coping tips and self-help skills are being widely offered online (i.e., Suicide Prevention Lifeline; American Foundation for Suicide Prevention), such resources may not be adequate to help individuals who are already in crisis. Thus, there is a need for alternative, creative approaches as many traditional professional help services have suspended in-person activities and transitioned to fully remote phone or online video session formats to reduce COVID-19 spread. Other states may consider adopting initiatives similar to those of New York State, which has demonstrated initial success in offering free online support services for those who need it by way of psychiatrists, psychologists, and licensed clinical social workers volunteering their time (Carlisle, 2020).

If the present findings are replicated, it may be useful for nationwide campaigns to highlight the profound impact of epidemics on mental health and that advertise the expansion of remotely accessible crisis services. As national suicide prevention programs have been effective more broadly (Lewitzka et al., 2019), raising public awareness during particularly trying times may be pertinent, as suggested by the current findings and as relevant under current circumstances.

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