

ORIGINAL ARTICLE

A prospective examination of COVID-19-related social distancing practices on suicidal ideation

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Funding information

There are no funding sources to disclose.

Abstract

Background: The COVID-19 pandemic has spurred the implementation of several public safety measures to contain virus spread, most notably socially distancing policies. Prior research has linked similar public safety measures (i.e., quarantine) with suicide risk, in addition to supporting the role of social connection in suicidal thoughts and behaviors; consequently, there is a need to better understand the relationship between widespread social distancing policies and suicide risk. The current study aimed to examine the prospective association between COVID-19-related social distancing practices and suicidal ideation.

Methods: Participants (N = 472) completed measures of suicidal ideation and impacts of social distancing practices at baseline and two weeks later.

Results: After controlling for general psychosocial distress (i.e., depression, social connectedness), cross-lagged regression models identified prospective, bidirectional relationships between perceived impacts of social distancing on one's mental health and both passive and active suicidal ideation. The impact of social distancing on work/social routine was not associated with suicidal ideation.

Conclusions: Overall, findings suggest the importance of an individual's perception regarding the effect of social distancing on their mental health, rather than the disruption to work or social routine, in suicide risk. Findings highlight potential targets for suicide risk prevention and intervention.

KEY WORDS

coronavirus, COVID-19, lockdown, social distancing, suicidal ideation, suicide risk

The COVID-19 pandemic has resulted in an overwhelming, and growing, number of deaths in the United States (Center of Disease Control & Prevention [CDC], 2020a); yet, the impact is greater than the death toll represents. COVID-19 and its associated societal, economic, and personal effects have had significant repercussions on individuals' mental health. Psychological distress and suicide risk secondary to previous epidemics have been well documented (Chan, Chiu, Lam, Leung, & Conwell, 2006; Taylor et al., 2008; Yu et al., 2005) and similar evidence

with regard to the current pandemic is mounting (i.e., Wang et al., 2020; Zhang et al., 2020). Indeed, research from the CDC suggests that in June 2020, U.S. adults were twice as likely to report active suicidal ideation over the past 30 days (10.7%) as compared to a 2018 survey assessing the prior 12 months (4.3%), with rates among young adults found to be even higher at 25% (Czeisler et al., 2020). These findings have also been coupled with speculations of rises in suicide rates as a result of the COVID-19 pandemic (e.g., McIntyre & Lee, 2020).

Ammerman and Burke contributed equally toward first authorship for this study.

Several theories of suicide may aid in our understanding of suicide risk in the context of the current pandemic. The Interpersonal Theory of suicide (Joiner, 2005) suggests that suicidal desire emerges from the confluence of the experience of thwarted belongingness, or social disconnection, and perceived burdensomeness. Although the COVID-19 pandemic has brought about a wide range of stressors, deserving of particular attention when considering the resultant effects on suicide risk is the impact of stay-at-home orders and social distancing policies. Such policies, while proven to be effective at minimizing virus transmission rates (Lewnard & Lo, 2020), significantly alter the day-to-day routines of a vast proportion of the population, in addition to directly influencing levels of social engagement and experiences of social connection. Given theoretical and empirical evidence demonstrating the prominence of social connection and well-being in suicide risk, as well as the widespread, often restrictive nature of stay-at-home orders (i.e., “lockdowns”) during the early stages of the pandemic and continued social distancing practices in place throughout the United States (Wu et al., 2020), there is an increasing need to better understand the impacts on mental health outcomes, specifically suicide risk.

Recent review articles have speculated on (i.e., Courtet et al., 2020), and cross-sectional research has demonstrated (i.e., Ammerman et al., 2021; Gratz et al., 2020), the link between COVID-19-related social distancing policies and suicidal ideation. Such findings are in line with studies that highlight heightened suicide risk as an unintended consequence of social distancing policies (e.g., Gunnell et al., 2020), as well as the well-established link between lack of social connection and suicidal ideation (for a review, see McClelland et al., 2020). While not all studies have supported the association between social distancing policies and worsening mental health outcomes (e.g., Bryan et al., 2020), this may be due to the overwhelmingly cross-sectional nature of research to date. Indeed, in one of the few longitudinal studies examining suicidal ideation prospectively, authors found increases in suicidal thinking among individuals under stay-at-home orders (Kilgore et al., 2020). Despite the potential implications of such findings for public health efforts, the directionality of the association between social distancing and suicidal ideation has yet to be considered. While social distancing policies may directly influence the onset or exacerbation of suicidal ideation, the experience of suicidal ideation itself could also result in greater perceived impact of social distancing (e.g., Williams & Broadbent, 1986).

The goal of the present study was to disentangle the directionality of the relationship between social distancing policies and suicidal ideation by considering the impacts of social distancing policies on one's daily routine (see Tull et al., 2020) and the degree to which such policies have negatively impacted one's mental health. Further, to enhance our

understanding of these associations, we also considered the unique relationship with both passive suicidal ideation (i.e., desire to be dead) and active suicidal ideation (i.e., desire to kill oneself). In an effort to parse out the effects related to suicidal ideation specifically, we adjusted for the effects of depression symptoms, given the comorbidity with suicidal ideation (e.g., Sareen et al., 2005), as well as trait thwarted belongingness, due to ample theory and literature suggesting that trait levels of thwarted belongingness may be associated with both baseline and prospective perceptions of social distancing's impact and suicidal ideation (e.g., Chu et al., 2017; Van Orden et al., 2012). We hypothesized that social distancing impacts on daily routines and mental health would be positively, bidirectionally related to both passive and active suicidal ideation, after covarying depression symptoms and trait belongingness.

MATERIALS AND METHODS

Participants and procedures

Participants were recruited from an online community, Amazon Mechanical Turk (mTurk) as part of a larger online study, advertised as a research study on well-being and social connection. Participants completed a baseline assessment (April 3rd-5th, 2020) of COVID-19-related social distancing policies and suicidal ideation, in addition to measures of psychosocial distress. Coinciding with the enforcement of stay-at-home policies in most states (Luchetti et al., 2020), participants were invited to complete a follow-up two weeks later, which included measures of COVID-19-related social distancing policies and suicidal ideation. For results related to baseline findings, see [Ammerman et al., 2021]. Participants had to be located in the United States and have a 95% (or greater) mTurk approval rate. Inclusion in the current analysis required the following at each timepoint¹: (a) passing an online bot-detection test (i.e., ReCaptcha), (b) passing at least 50% of the 12 included attention check items,

¹With regard to data validity inclusion criteria, 5 participants were excluded from analysis based on baseline survey performance (1 due to not passing >50% of attention check items; 4 due to not completing the survey within three standard deviations of the mean completion time); 17 participants were excluded from analysis based on baseline survey performance (1 due to not passing >50% of attention check items; 16 due to not completing the survey within three standard deviations of the mean completion time). Attention check item completion was also examined across the entire sample (prior to initial exclusion criteria). On the baseline survey, the mean number of attention check items passed was 10.97, with a median of 11; on the follow-up survey, the mean number of attention check items passed was 10.91, with a median of 11. Data analysis was also conducted among a subsample of the participants who passed at least 11 of the 12 attention check items at each time point ($n = 462$) and the pattern of results remained that same.

and (c) completing the survey within three standard deviations of the mean completion time. 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. A total of 693 participants had complete baseline data; only participants who also had complete follow-up data (68.10%) were included in the final sample ($n = 472$)².

The mean age of participants was 37.50 years old ($SD = 11.55$, range = 19–74). Overall, 55.70% of participants ($n = 263$) identified as male, 43.40% ($n = 205$) identified as female, 0.20% ($n = 1$) identified as transgender, and 0.60% ($n = 3$) preferred not to answer. The majority identified as White (75.20%, $n = 355$), followed by African American/Black (10.4%, $n = 49$), Asian (9.5%, $n = 45$), or another race (4.2%, $n = 20$); a subset preferred not to answer (.6%, $n = 3$). The majority identified as non-Hispanic/Latinx (86.4%, $n = 408$), with 11.0% ($n = 52$) identifying as Hispanic/Latinx and 2.5% ($n = 12$) preferring not to answer.

Measures

COVID-19 social distancing

Two questions were developed for use in the current study to assess the impact of COVID-19-related social distancing policies. The first assessed the impact on one's daily routine: "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]*). The second assessed the perceived negative impact on one's mental health: "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*). These questions were completed at baseline and follow-up.

²Differences in baseline COVID-19-related social distancing (SD) policy impacts, in addition to passive and active suicidal ideation (SI), were examined between participants who did versus did not complete the follow-up assessment. Participants who did not complete the follow-up assessment reported greater baseline SD daily impacts ($t(692) = 2.41$, $p = .02$, $d = .19$), SD perceived mental health impacts ($t(692) = 4.48$, $p < .001$, $d = .36$), passive SI ($t(692) = 6.96$, $p < .001$, $d = .54$) and active SI ($t(692) = 7.14$, $p < .001$, $d = .54$). The pattern and relative strength of correlations between SD daily impacts and SI did not significantly differ between groups at baseline (p 's = .16–.27); however, among those who did not complete the follow-up assessment, the correlations between SD daily impacts and SI were stronger (p 's = .02–.03), albeit demonstrating the same pattern.

Suicidal ideation

The Passive and Active Suicidal Ideation Scale (PASIS; Liu et al., under review) assessed passive and active suicidal ideation over the prior two-week period. The PASIS is a self-report questionnaire with eight items used to assess each form of suicidal ideation, with six-point Likert scale response options (0 = *Not in the past two weeks* to 5 = *Several times every day*). Example passive suicidal ideation items include, "I thought that life was not worth living" and "I wished I was dead." Example active suicidal ideation items include, "I wanted to kill myself" and "I thought about the ways I could kill myself." Higher scores indicate more severe suicidal ideation. The PASIS was completed at baseline and follow-up. The internal consistency was high for the passive and active suicidal ideation subscales, respectively, at baseline ($\alpha = 0.97$, 0.97) and follow-up ($\alpha = 0.98$, 0.98) in the present sample.

Psychosocial distress

The Patient Health Questionnaire-9 (PHQ-9; Kroenke et al., 2001) assessed past two-week depressive symptoms. The item assessing suicidal ideation was removed to avoid confounding the outcome variables (Kroenke et al., 2009). Higher scores indicate greater depressive symptomatology. Internal consistency was $\alpha = 0.91$. The Interpersonal Needs Questionnaire (INQ; Van Orden et al., 2012)—Thwarted Belongingness subscale was used to assess self-reported social (dis)connectedness, with higher scores indicating greater social disconnection. The internal consistency was excellent ($\alpha = 0.90$). Both measures were completed at baseline.

Data analysis

Cross-lagged regression models were utilized to examine the bidirectional influences of COVID-19-related social distancing (SD) policy on passive and active suicidal ideation (SI) at baseline (T1) and two weeks later (T2). All variables were treated as continuous. Four models were examined: two including passive SI and two including active SI. For both the passive SI and active SI sets of models, one model examined the bidirectional association with SD daily impacts and the other with SD perceived mental health impacts. Each model included concurrent residual covariances, within variable autoregressive parameters, and across variable cross-lag parameters; see Figures 1 and 2 (for overview, see Geiser, 2012). Each model included baseline depressive symptom severity and social (dis)connectedness as covariates. All analyses were conducted in Mplus Version 7.0 (Muthen & Muthen, 1998–2012) using maximum likelihood estimation.

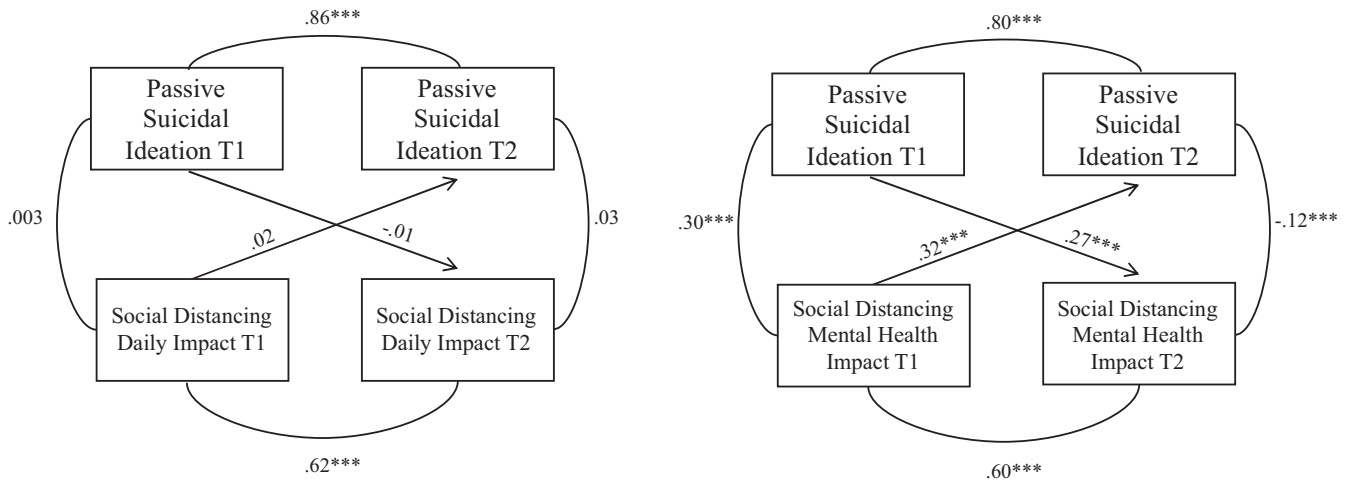


FIGURE 1 Passive Suicidal Ideation Models. * $p < .05$, ** $p < .01$, *** $p < .001$; standardized estimates presented

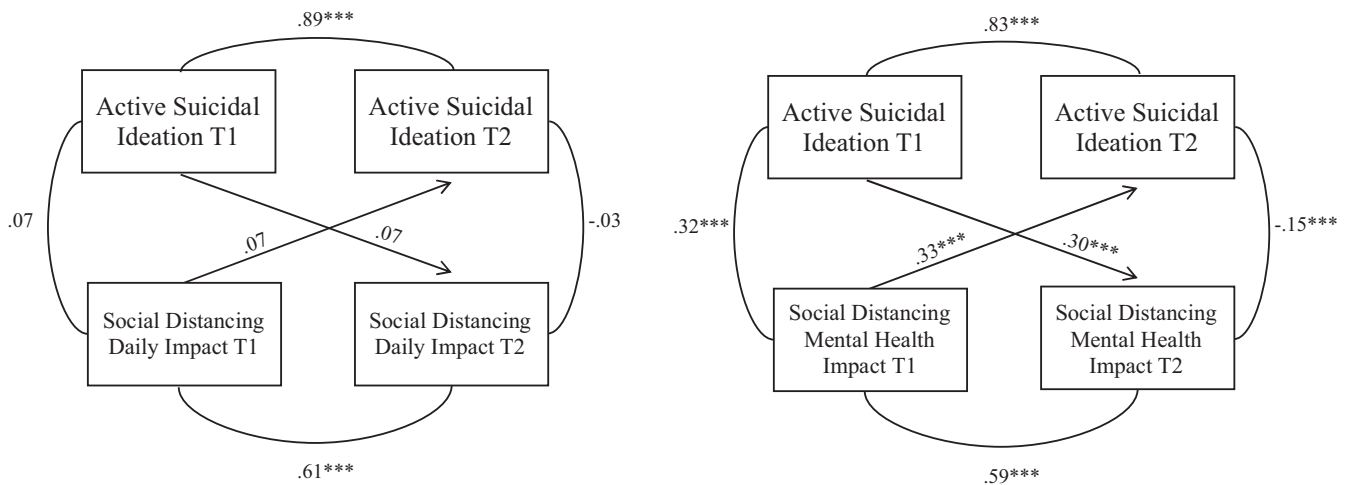


FIGURE 2 Active Suicidal Ideation Models. * $p < .05$, ** $p < .01$, *** $p < .001$; standardized estimates presented

RESULTS

Preliminary analysis

At baseline, 35.4% ($n = 167$) of participants reported any passive SI and 25.8% ($n = 122$) reported any active SI. At the two-week follow-up, 34.3% ($n = 162$) reported any passive SI and 27.3% ($n = 129$) reported any active SI. See Table 1 for correlations, means and standard deviations for all study variables.

Predicting passive suicidal ideation

In the model examining SD daily impacts, baseline SD daily impacts did not significantly predict passive SI at follow-up ($B = 0.08$, $SE = 0.25$, 95% $CI = -0.42, 0.57$), nor did baseline passive SI predict SD daily impacts at follow-up

($B = -0.001$, $SE = 0.01$, 95% $CI = -0.02, 0.02$). See Figure 1.

In the model examining SD perceived mental health impacts, baseline SD mental health impacts significantly and positively predicted passive SI at follow-up ($B = 1.60$, $SE = 0.23$, 95% $CI = 1.14, 2.06$). Baseline passive SI also significantly and positively predicted SD mental health impacts at follow-up ($B = 0.05$, $SE = 0.01$, 95% $CI = 0.03, 0.07$). See Figure 1.

Predicting active suicidal ideation

In the model examining SD daily impacts, baseline SD daily impacts did not significantly predict active SI at follow-up ($B = 0.35$, $SE = 0.25$, 95% $CI = -0.14, 0.84$), nor did baseline active SI predict SD daily impacts at follow-up ($B = 0.01$, $SE = 0.01$, 95% $CI = -0.01, 0.04$). See Figure 2.

TABLE 1 Correlations between study variables

	1	2	3	4	5	6	7	8	9	10
1. T1 (Dis) Connectedness	--									
2. T1 Depression	0.57 ^{***}	--								
3. T1 SD Impact on Daily Routine	-0.18 ^{***}	-0.01	--							
4. T1 SD Impact on Mental Health	0.21 ^{***}	0.43 ^{***}	0.38 ^{***}	--						
5. T1 Passive SI	0.39 ^{***}	0.69 ^{***}	-0.09	0.28 ^{***}	--					
6. T1 Active SI	0.28 ^{***}	0.60 ^{***}	-0.03	0.29 ^{***}	0.92 ^{***}	--				
7. T2 SD Impact on Daily Routine	-0.17 ^{***}	-0.02	0.59 ^{***}	0.28 ^{***}	-0.09	-0.02	--			
8. T2 SD Impact on Mental Health	0.20 ^{***}	0.42 ^{***}	0.33 ^{***}	0.65 ^{***}	0.25 ^{***}	0.26 ^{***}	0.38 ^{***}	--		
9. T2 Passive SI	0.38 ^{***}	0.66 ^{***}	-0.07	0.31 ^{***}	0.85 ^{***}	0.81 ^{***}	-0.05	0.29 ^{***}	--	
10. T2 Active SI	0.26 ^{***}	0.59 ^{***}	-0.03	0.29 ^{***}	0.83 ^{***}	0.88 ^{***}	-0.02	0.27 ^{***}	0.91 ^{***}	--
Mean (SD)	26.95 (12.74)	6.53 (5.90)	4.84 (1.86)	3.49 (1.87)	5.12 (9.42)	4.00 (8.70)	4.78 (1.87)	3.44 (1.82)	5.22 (9.51)	4.03 (8.82)

Note: T1, Time 1; T2, Time 2; INQ-TB, Interpersonal Needs Questionnaire – Thwarted Belongingness subscale; PHQ-8, Patient Health Questionnaire – 8 (suicidal ideation item omitted); SI, suicidal ideation; SD, social distancing.

* $p < .05$; ** $p < .01$; *** $p < .001$.

In the model examining SD perceived mental health impacts, baseline SD mental health impacts significantly and positively predicted active SI at follow-up ($B = 1.58$, $SE = 0.23$, $95\% CI = 1.13, 2.03$). Baseline active SI also significantly and positively predicted SD mental health impacts at follow-up ($B = 0.06$, $SE = 0.01$, $95\% CI = 0.04, 0.08$). See Figure 2.

DISCUSSION

The present study sought to examine the bidirectional relationships between the impact of COVID-19-related social distancing (SD) policies and passive and active suicidal ideation (SI). Findings partially supported our hypotheses. We found significant and positive bidirectional associations between the perceived negative mental health impacts of SD and both passive and active SI. However, contrary to our hypotheses, bidirectional relationships were non-significant between the impacts of SD on daily social/work routine and SI.

Our finding of a prospective, bidirectional relationship between perceived mental health impacts of SD and SI replicates and extends cross-sectional research suggesting that SD, and particularly the subjective perceptions of SD (Benke et al., 2020), may negatively impact mental health (Wu et al., 2020) and increase suicide risk (Gratz et al., 2020). Our results provide strong evidence of the role SD has in SI, as we not only considered the concurrent and prospective associations between these constructs, but also adjusted for well-established psychosocial correlates of SI (i.e., depressive symptoms, trait belongingness) in addition to the impact of SI on SD's perceived mental health impacts. The present findings are in line with the Interpersonal Theory of Suicide (Joiner, 2005), suggesting that the downstream impacts of social disruption on mental health may be central in the onset or exacerbation of suicidal ideation. While speculative, it may be that evaluating individuals' subjective experience of SD impacts on their mental health may represent a more comprehensive, and thus more accurate, evaluation of the impact of SD than evaluating its influence on more objective domains (i.e., impact on daily work routine). Indeed, this assessment allows individuals to consider the influence of numerous SD-related changes, ranging from reduced social connection (i.e., church service attendance, limited community event) and physical activity opportunities, to limited access to mental health treatment, while also taking into account potential protective factors (e.g., increased digital social engagement). Future research employing a broader assessment of SD impacts may help to clarify this postulation. Nevertheless, the present findings suggest that a potential COVID-related risk factor for the recent sharp increases in SI observed among U.S adults (Czeisler et al., 2020) is the perceived negative impact that SD has had on one's mental health.

Our finding of a bidirectional relationship between SD impacts on mental health and SI is in line with prior work that highlights a negative inferential style (i.e., the propensity to infer negative consequences when experiencing negative life events, and to make internal, stable, and global attributions about their causes) is a central cognitive vulnerability underlying suicidal thinking (e.g., Burke et al., 2016; Smith et al., 2006). Indeed, the more severe the SI experienced, the more negative or rigid an inferential style may be, which, in turn, may increase the perceived negative impact of SD. Although this association is not surprising, it is concerning, as it suggests these negative experiences may feed off one another, ultimately escalating the chronicity and severity of SI over time. Further, this bidirectional pattern of results holds for both passive and active SI, each associated with significant psychiatric comorbidity and risk for suicidal behavior (Liu et al., 2020). Given this, it will be important for research to explore the longer-term relationship between perceived impacts of SD on mental health and suicidal thoughts and behaviors, with a focus on examining the persistence or potential changes in this association as the pandemic unfolds.

The impact of SD on daily social/work routine was not associated with SI unidirectionally nor bidirectionally. While contrary to study hypotheses, these findings support recent evidence demonstrating that individual's perceptions of the influence COVID-19 has had on their daily life was not associated with depressive symptoms and demonstrated limited negative impacts on feelings of loneliness (Luchetti et al., 2020; Tull et al., 2020). The authors postulate that those experiencing significant changes in the way they live their lives may also experience increased connection and support due to experiencing a shared tragedy (Tull et al., 2020), which may, in turn, buffer against the effects of COVID-19 SD. Our findings may also imply that while some individuals had a disruption in social/work routines, they may have been able to maintain connection through physically distant means. For example, use of teleconferencing software has seen significant growth (Iyengar, 2020), potentially mitigating the negative effects of SD's impact on daily routine, particularly during the early period of the pandemic. Still, too, is the possibility that for some, changes to work/social routine may have been experienced as positive (e.g., more time with family, less time commuting, reduced work/social expectations), potentially confounding the results for these models.

Strengths and limitations

Strengths of this study include its use of a large sample with significant levels of psychopathology and the use of cross-lagged analyses that permit examination of bidirectional associations. Additionally, this study was conducted in the early stages of the pandemic (April 3-20th, 2020), during

which widespread stay-at-home orders, or lockdowns, were common throughout much of the United States, thus limiting geographically based SD heterogeneity. However, there are a number of limitations that should be considered. Foremost, we did not collect data on respondents' geographic location or the specific parameters of their area's stay-at-home orders, which could have influenced participants' SD experiences. At the time of data collection, all but eight states had statewide stay-at-home orders in place (Wu et al., 2020), but we did not obtain information on the specific extent of these orders and the objective impact on their daily experiences. For example, many states (and counties within states) were not consistent in definitions of essential businesses/workers, resulting in differing working conditions for similar employment positions across the United States. Similarly, some statewide orders placed restrictions on all non-essential activities, including outdoor recreation, whereas other states permitted outdoor activities, which may have had a substantial effect on subjective perceptions of SD impacts on mental health. It is possible that such state-by-state distinctions, which may have had a differential impact on one's daily working and social routines, may account for discrepant findings in prior studies (i.e., Bryan et al., 2020; Gratz et al., 2020) and likely impacted the current findings as well. The current study was also limited in its assessment of participant compliance with such stay-at-home orders. This may be particularly important to consider moving forward as research has demonstrated independent associations between stay-at-home order status and one's own compliance or perceived compliance with SD-related mental health outcomes, such as depression and anxiety (Marroquín et al., 2020; Zhao et al., 2020), which may also extend to suicide risk.

It is important to note that single items were developed for the purpose of this study to assess the impact of SD. While similar single items have been used in prior research (Tull et al., 2020), we are limited in our ability to assess psychometric characteristics of the items employed. We also utilized a mTurk sample and thus our findings may not be generalizable to community or clinical populations, requiring replication. Further, while our retention rate across assessments was comparable to mTurk-based research (i.e., Schleider & Weisz, 2015; Shapiro et al., 2013), it may have impacted our findings. Third, our measure of SD impact on daily routine did not distinguish between impacts on work and social routines; future studies may consider measuring these domains separately, as it is possible that individuals may not have observed any impact on their work routines despite significant changes to their social routines (i.e., essential workers). Our short-term prospective design may be considered both a strength and a weakness of this study. Although the short follow-up facilitated our understanding of the proximal risk relationship between SD and SI over a brief period of time during which the pandemic was perhaps at its height of uniformity

across the United States in terms of lockdown measures, it may also be considered a limitation. Indeed, it is possible that the impact of SD on SI may change over extended periods of time; future research should examine whether the present findings replicate over longer follow-up periods. Finally, as some theories of suicide (i.e., Fluid Vulnerability Theory; Rudd, 2006) suggest that underlying vulnerabilities, or one's baseline suicide risk, may interact with acute environmental factors to augment suicide risk, it will be important for future research to consider the role of pre-existing trait level vulnerabilities in the associations with suicide risk found in the current analysis. While the present study did not consider trait vulnerabilities as moderators of the relationship between SD impacts and SI, this work may be valuable for suicide prevention and intervention efforts.

CONCLUSIONS

Overall, our pattern of findings suggests that it may be more important to assess an individual's perception about the effect of SD on their mental health, rather than more objective measures of work/social routine changes, when assessing suicide risk. Current findings highlight the importance of widespread access of mental health care, despite ongoing SD policies and restrictions. While the impact of daily routines may be lessening as stay-at-home orders are lifted, SD may still negatively impact individuals' mental health, thus increasing risk for passive and active SI. Beyond expanding mental health care opportunities (i.e., individual and/or group teletherapy), and targeting populations with prior mental health difficulties for such services, community organizations (e.g., gyms, churches) may also consider creative ways to offer activities that may instill a sense of social connectedness (e.g., outdoor yoga class, small group services). These efforts, and attempts to re-engage community members, will continue to be important after stay-at-home orders expire and SD policies relax as many at-risk individuals may have difficulty reconnecting with those around them.

CONFLICT OF INTEREST

None of the authors have a conflict of interest to report.

DATA AVAILABILITY STATEMENT

The data for this project are available upon request from the corresponding author.

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How to cite this article: Ammerman, B. A., Burke, T. A., McClure, K., Jacobucci, R., & Liu, R. T. (2021). A prospective examination of COVID-19-related social distancing practices on suicidal ideation. *Suicide and Life-Threatening Behavior, 51*, 969–977. <https://doi.org/10.1111/sltb.12782>