Happy post COVID-19 lockdown? The impact of COVID-19 related distress, mood inertia and everyday loneliness on mental health during a post-lockdown phase

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Abstract

Background: The first wave of the COVID-19 pandemic 2020 increased mental health problems. However, little is known about mental health problems during a low incidence phase without strict public health measures.

Objective: We focused on a vulnerable population, who experienced at least mild COVID-19 related distress and loneliness. The goal was to investigate how COVID-19 related distress, COVID-19 case numbers, mood regulation and loneliness may affect mental health after a strict lockdown has ended.

Methods: During a post-lockdown period in Germany (between 8. August 2020 and 01. November 2020), we conducted an ecological momentary assessment (EMA). To estimate moment-to moment and day-to-day negative mood inertia, we conducted a three-level autoregressive (AR) model.

Results: We found that information exposure and active daily COVID-19 cases did not have an impact on negative mood amid a post-lockdown. However, we found a day-to-day carry over effect of negative mood. Moreover, worrying about COVID-19, feeling restricted by COVID-19, and feeling lonely increased negative mood.

Conclusions: Mental health of a vulnerable population is impacted by COVID-19 related stressors, even under a lenient lockdown. This study highlights the need to protect mental health during a post-pandemic phase.

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Happy post COVID-19 lockdown? The impact of COVID-19 related distress, mood inertia and everyday loneliness on mental health during a post-lockdown phase

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KEYWORDS:

COVID-19; Mental health, loneliness; mood inertia; COVID-19 stressors

Introduction

The COVID-19 pandemic and its associated socio-economic consequences increased mental health problems [1, 2]. Negative mental health outcomes are associated with strict public health measures (e.g., physical distancing or closing of public places) [3-5]. But if strict lockdown measures are not in place anymore, will the negative impact of COVID-19 stressors on mental health decrease? To investigate this, we set up an ecological momentary assessment (EMA) study in Germany between August and November 2021, during post-lockdown times. We focus on a subpopulation,

experiencing at least mild psychological distress and sometimes feeling lonely amid the COVID-19 pandemic. We hypothesize a carry-over effect of negative mood from one measurement to the next (mood inertia). Additionally, based on previous findings [6], we hypothesize that momentary COVID-19 related worry and loneliness and daily reported COVID-19 cases increase momentary negative mood.

Methods

Study Design and Sampling

We conducted an EMA study from 08 August 2020 to 01 November 2020 in Germany during a post-lockdown phase. In this time the restrictions were lenient (e.g., no private or public meeting restrictions, reopening of most leisure facilities, bars and catering facilities, see Appendix A). Participants were recruited via online advertisements on Universities' websites, Twitter and ebay classifieds. We targeted vulnerable individuals who reported at least mild psychological distress and sometimes felt lonely amid the COVID-19 pandemic. We used the COVID-19 Peritraumatic Distress Index (CPDI [7]; cut-of score = 29) questionnaire and the short-form of the UCLA Loneliness Scale (ULS-8 [8]; cut-of score = 16), respectively. The CPDI was designed for evaluating changes related to anxiety, depression, specific phobias, cognitive skills, avoidance and compulsive behavior, physical symptoms, and loss of social functioning due to the COVID-19 pandemic [7]. A score between 28 and 51 indicates mild to moderate distress, and a score above 52 indicates severe distress [7].

Data collection

We used a smartphone application "*movisensXS*" (movisens GmbH, Karlsruhe, Germany) to conduct EMA. Participants completed a 20-minute baseline assessment, followed by 7 consecutive days in which they received 8 randomized prompts between 8 am and 10 pm. The study procedure was approved by both Ethics Committee of Charité – Universitätsmedizin Berlin (ref: EA2/143/20) and Ethics Committee of Freie Universität Berlin (ref: 030/2020).

Measurements

To quantify COVID-19 related distress, we measured worries about the COVID-19 pandemic, perceived restrictions by COVID-19, COVID-19 information exposure and feelings of loneliness. Finally, we measured respondents' momentary negative mood (Anxiety, Depression, Fatigue, Stress and Unhappiness). All questions were measured on a visual analogue scale ranging from 0 (not at all) to 100 (very much). To account for the steady increase in COVID-19 active cases in Germany during the time of measurement (ref: https://www.worldometers.info/coronavirus/country/germany), we included daily COVID-19 cases as a predictor in our analyses.

Our smartphone study consisted of a socio-demographic assessment (i.e., age, gender, years of education) and the EMA. We used EMA to measure participants' experiences in real time and in natural environments. Such an assessment minimizes recall bias, maximizes ecological validity and approximates temporal causality [9].

Statistical Analysis

To consider the hierarchical data structure and autoregressive parameters, we performed model selection using autoregressive (AR) multilevel models with the dependent variable negative mood. We followed the approach by by Haan-Rietdijk et al. [10], details about the model selection

procedure can be found in the supplement and online on https://osf.io/58xqd/.

Results

We recruited 156 participants. Sixteen participants aborted the study, 8 participants reported that the app did not work or did not have an Android mobile device. No participant filled in less than 50% of the daily questionnaire, on average 0.1% of the daily questionnaires were missed. The final sample size was 131 (65% female; Sample characteristics shown in Table 1).

	CPDI Score	ULS-8 Score	Education (in years)	Age
Mean (SD)	48.42 (16.31)	22 (4.03)	15.08 (3.66)	31.62 (10.76)

Table 1. Demographics and sample characteristics.

We used a lag-1 three-level AR model, which allows to separate the variance of negative mood scores into variance at the person level (level 3), variance at the day level (level 2), and variance at the questionnaire level (level 1). We created two lagged variables, a within-day centered predictor at questionnaire level, and a within-person centered lagged predictor at the day level. The first day and the first questionnaire of each day were excluded from the analysis to exclude carry over-effects resulting from effects prior to the study and from the night. This model includes both mood inertias, COVID-19 worries, COVID-19 information seeking, perceived restrictions and loneliness during the last hour, as well as daily active COVID-19 cases as random effects. The momentary negative mood score was built by averaging momentary feelings of fatigue, anxiety, depression, unhappiness, and stress. A graphical check indicated a positive skew of negative mood; therefore, we performed a square root transformation on this variable. The analysis script can be found online on https://osf.io/58xqd/.

Loneliness, b = .022, t(3713.83) = 18.68, P < .0001, COVID-19 feelings of restriction, b = .005, t(129.84) = 3.65, P = .0004, and COVID-19 related worry, b = .005, t(132.74) = 2.87, P = . 001 and day-to-day mood inertia, b = .078, t(134.58) = 3.96, P = . 0001, statistically significantly increase negative mood scores. Active daily COVID-19 case numbers, b < .0001, t(92.17) = -0.27, P = .8, COVID-19 related information seeking, b < .0001, t(88.41) = .73, P = .5, as well as moment-to-moment inertia, b = .015, t(42.19) =.17, P = .9, did not statistically significantly predict negative mood scores (see *Figure 1*).

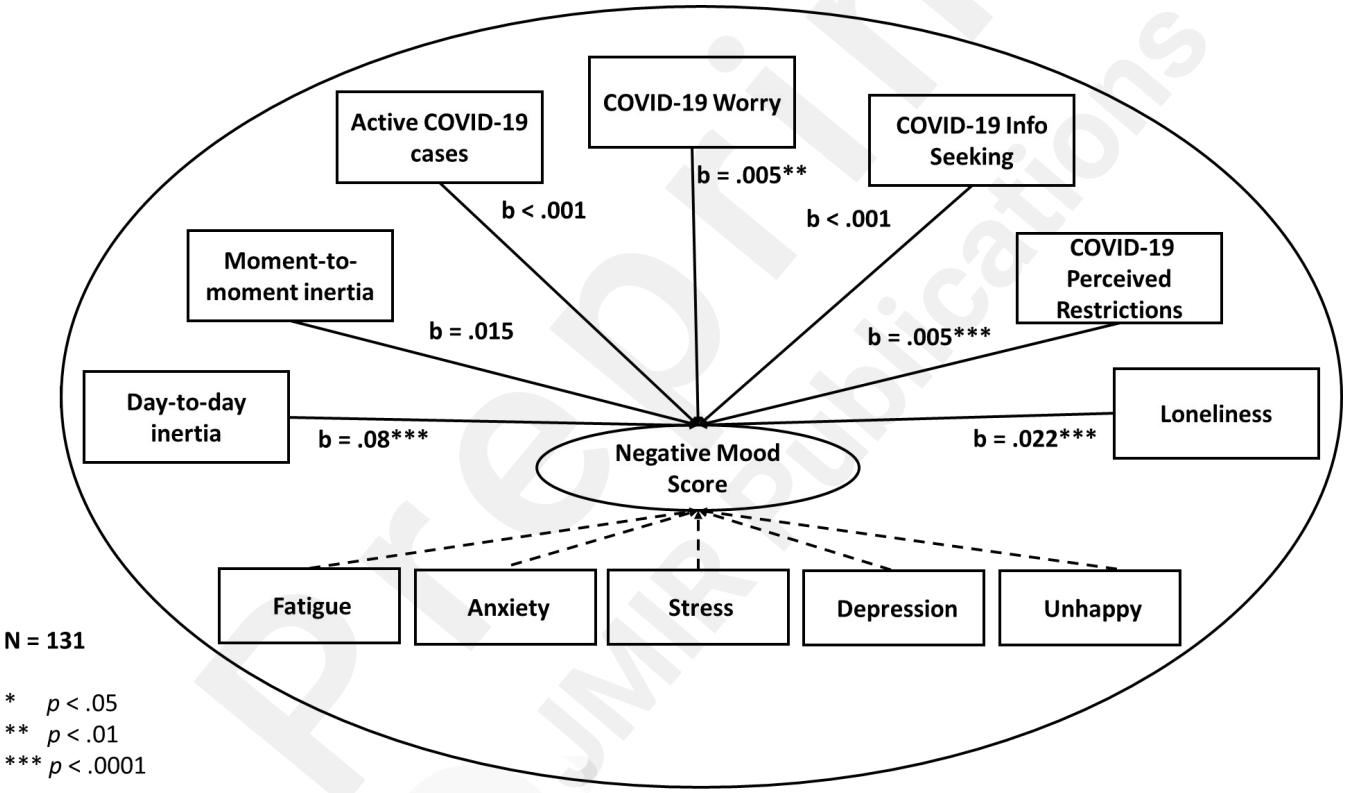

Figure 1. Loneliness, COVID worries, feelings of restriction as well as day-to-day mood inertia increased negative mood. *P < 0.05, **P < 0.01, *** P < 0.0001 (two-tailed). Moment-to-moment mood inertia, active COVID-19 cases and COVID-19 information seeking did not predict negative mood.

Discussion

Principal Findings

The COVID-19 pandemic and the associated public health policies have unprecedented socio-economic consequences, challenging mental health worldwide [1, 2]. We investigated whether COVID-19-related stressors also decrease mental health during a more lenient “post-lockdown” phase. In line with findings from the first COVID-19 wave [6, 11-13], we found that loneliness, worrying about COVID-19, and perceived restrictions increased negative mood. Thus, COVID-19-related stressors can affect mental health across lockdown stages.

Furthermore, we found a negative carry-over effect of mood between days (mood inertia), indicating dysfunctional mood regulation [5]. Taquet et al. [5] suggested that restrictive policies during the COVID-19 pandemic impact mental health, due to impaired mood homeostasis (i.e., failure to positively regulate mood via mood-modifying activities). Therefore, even when the acute threat and restrictive measures are less pronounced, negative daily mood inertia remains.

Neither COVID-19 information seeking, nor active COVID-19 cases increased negative mood. This contrasts with previous findings from strict lockdown phases. For example, an EMA study during the first lockdown in Germany and Austria, reported increased perceived COVID-19-related restrictions that were positively associated with increased daily news consumption, especially in individuals living alone [14]. Also, an EMA study from New Jersey, USA during April 24 to May 26, 2020 showed that undergraduates felt more anxious about COVID-19 on days when the number of new cases and deaths due to COVID-19 were higher [4]. Our opposing finding might be caused by the relatively low domestic case numbers and associated news during the post-lockdown phase. Moreover, negative COVID-19 news might have less impact on mood over the course of the pandemic because people get accustomed to them.

Limitations

There are several limitations in our study. We did not make explicit comparisons to participant status before the COVID-19 outbreak or to an assembled control group, which limits generalizability. Additionally, we did not measure positive mood.

Conclusions

Even when incidences are low and lockdown policies are lenient, mental health is negatively affected by COVID-19-related stressors. While information exposure to COVID-19 and COVID-19 case numbers had no impact on mood, we found a day-to-day carry-over effect of negative mood. Moreover, COVID-19 related restriction, worry about COVID-19 and loneliness increased negative mood. Thus, most negative impacts of the COVID-19 pandemic on mental health persisted in post-lockdown times.

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Abbreviations

COVID-19: coronavirus disease

EMA: ecological momentary assessments

CPDI: COVID-19 Peritraumatic Distress Index

ULS-8: short-form UCLA Loneliness Scale

AR: autoregressive

Conflicts of Interest

None declared.

Appendix A

Summary of measures to counteract the pandemic in Germany between August 2020 and 01 November 2020 (https://www.deutschland.de/en/news/german-federal-government-informs-about-the-corona-crisis)

1. Nationwide, a distance of at least 1.5 meters must be maintained, hygiene rules must be observed, and masks must be worn in shops and on public transport. There was no general restriction on public meetings.
2. Institutions and leisure facilities (i.e., theatres, concert halls, cinemas and fitness studios) opened.
3. Sports and recreational activities indoor and outdoor were permitted.
4. Restaurants, bars, pubs, cafés and other catering establishments opened.

All of above-mentioned policies must act in strict compliance with hygiene and infection control regulations

5. Governmental financial aid for those that suffered economic losses during the time of the pandemic.

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Supplementary Files