Project proposal

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Research Topic

A *real-time* survey on the psychological impact of *mild lockdown* for COVID-19 in the Japanese population.

paper: https://www.nature.com/articles/s41597-020-00714-9

data: https://doi.org/10.17605/OSF.IO/X9UPN

- While many countries were in lockdown with penalties for violations, Japanese policy for COVID-19 was distinguished as the government "requested" to refrain from going out except for emergencies and to close certain businesses without penalties for violations temporarily. This lockdown significantly transformed activity in Japan. For example, the number of monthly train users in April 2020 prominently decreased by 45.5% compared with the same month last year. The *mild lockdown* in Japan was not enforceable and non-punitive but still had a diverse range of influences on people's lives like in other countries, including changes in domestic circumstances due to teleworking or school closure and economic damage due to decreased income or job loss.
- The survey was conducted in *real-time* to minimize participants' recall bias. This means the survey was conducted during the lockdown period.

Intend of Study

- The project aims to study the psychological impact of the mild lockdown on participants for approximately one month or from the start of "mild lockdown", and the impact on various socio-demographic groups assumed to be vulnerable to the effects of the lockdown.
- Previous studies have already investigated the association between lockdown and psychological distress but these were enforceable lockdowns. However, no studies have investigated the effects of unenforceable mild lockdowns on psychological distress.
- This Analysis will be an effective provision of mental health services in future pandemic situations.

Data description

On 7 April 2020, the Japanese government declared a state of emergency over the COVID-19 outbreak for the seven cities (Tokyo, Kanagawa, Osaka, Saitama, Chiba, Hyogo, and Fukuoka) and was lifted in a phased manner on 14 May 2020.

Data was collected on 11th and 12th May 2020. (the period in the final phase of the state of emergency) via an online survey.

Data:

- Total participants: N = 11,333 (52.4% women, mean age = 46.3 ± 14.6 yrs, range = 18–89 yrs).
- These cities were assumed to be susceptible to mild lockdowns due to their large populations and the large number of cases reported in these areas. The number of responses collected in each city was determined according to the ratio of the number of people living in them. Tokyo (n = 2,783, 24.6%), Kanagawa (n = 1,863, 16.4%), Osaka (n = 1,794; 15.8%), Saitama (n = 1,484; 13.1%), Chiba (n = 1,263; 11.1%), Hyogo (n = 1,119; 9.9%), and Fukuoka (n = 1,027; 9.1%).
- Participant's **socio-demographic** information was collected, including age, sex, employment status, marital status, and annual household income.

- Other information was collected on whether the individual or a family member was a healthcare worker, whether the individual was currently being treated for a mental problem or severe physical disease, and whether the individual had a history of treatment for a mental problem or severe physical disease.
- The below image contains the survey questions. Items 19-26: Lifestyle and stress management during mild lockdown, Items 27-33: Stressors related to mild lockdown.

	Items	Comments
2	Residence	1 = Tokyo, 2 = Kanagawa, 3 = Saitama, 4 = Chiba, 5 = Osaka, 6 = Hyogo, 7 = Fukuoka
3	Sex	1 = male, 2 = female
4	Age	Age in responding the questionnaire
5	Age_Group	1 = ≥65 yrs., 2 = 40-64 yrs., 3 = 20-39 yrs., 4 = 18-19 yrs.
6	Job_Group	1 = employed, 2 = home maker, 3 = student, 4 = unemployed, 5 = others
7	Health_Worker_Self	"Are you a healthcare worker?" 1 = yes, 2 = no
8	Health_Worker_Family	"Is your family member a healthcare worker?" 1 = yes, 2 = no
9	Married	1 = single, 2 = married
10	Income	Annual household income (JPY), 1 = < 2 million, 2 = 2-4 million, 3 = 4-6 million, 4 = 6-8 million, 5 = 8-10 million, 6 = 10-12 million, 7 = 12-15 million, 8 = 15-20 million, 9 = ≥20 million, 10 = unknown
11	Current_Physical	Current treatment for severe physical illness, 1 = yes, 2 =no
12	Past_Physical	Past treatment for severe physical illness, 1 = yes, 2 =no
13	Current_Mental	Current treatment for mental problem, 1 = yes, 2 =no
14	Past_Mental	Past treatment for mental problem, 1 = yes, 2 =no
15	K6	Total score of the Kessler Psychological Distress Scale-6
16	PHQ9	Total score of the Patient Health Questionnaire-9
17	UCLA_LS3	Total score of the UCLA loneliness scale version 3
18	LSNS6	Total score of the abbreviated Lubben Social Network Scale
19	Exercise	"I exercised for my health (whether indoors or outdoors)." 1 = not at all, 7 = extremely
20	Healthy_Diet	"I took meals considering the nutrition balance. " 1 = not at all, 7 = extremely
21	Healthy_Sleep	"I kept regular awakening time and bedtime approximately. " 1 = not at all, 7 = extremely
22	Activity	"I engaged in activities such as hobbies with absorbing interest. " 1 = not at all, 7 = extremely
23	Interaction_Offline	"I interacted with my family or friends on a face-to-face basis (except work or class)." 1 = not at all, 7 = extremely
24	Interaction_Online	"I interacted with my family or friends online using chat or video calling (except work or class)." 1 = not at all, 7 = extremely
25	Preventive_Behaviors	"I spontaneously refrained from going out or altruistically took preventive behaviors (e.g. wearing a mask) to prevent coronavirus disease 2019 infection to my family or other people." 1 = not at all, 7 = extremely
26	Optimism	"I thought about the future positively. " 1 = not at all, 7 = extremely
27	Deterioration_Economy	"The family budget has tightened." 1 = not at all, 7 = extremely
28	Deterioration_Interact	"A personal relationship with a close person such as family or friends got worse." 1 = not at all, 7 = extremely
29	Frustration	"I have become easily annoyed or irate due to life-change." 1 = not at all, 7 = extremely
30	Covid_Anxiety	"I felt nervous or anxious when I watched news about coronavirus disease 2019." 1 = not at all, 7 = extremely
31	Covid_Sleepless	"I could not sleep because I worried about getting coronavirus disease 2019." 1 = not at all, 7 = extremely
32	Difficulty_Living	"My daily life was interrupted due to the shortage of materials relating to prevention for coronavirus disease 2019 infection (e.g. mask or thermometer) or other daily supplies." 1 = not at all, 7 = extremely
33	Difficulty_Work	"My work or schoolwork was interrupted due to life-change. " 1 = not at all, 7 = extremely

- **Psychological distress** was measured using the Japanese version of the Kessler Psychological Distress Scale-6 (K6) non-specific psychological stress scale, a six-item screening instrument measuring distress over the past 30 days. Each question was rated on a scale of 0 (none of the time) to 4 (all of the time); total scores ranged from 0 to 24. Owing to its brevity and high accuracy, the K6 is considered an ideal scale for screening for mental disorders in population-based health surveys.

- The **mental health** of participants was assessed by using the Japanese version of the Patient Health Questionnaire-9 (PHQ-9). Depressive symptoms during the past four weeks were reported by the participants, with a score of 0(not at all) to 3(nearly every day). We
  defined a score of ≥10, as recommended by previous studies, as a cutoff point, meaning that a person is more likely to have major depression.
- **Loneliness:** Japanese version of the UCLA loneliness scale version 3 (UCLA-LS3). The UCLA-LS3 consists of 10 items, each rated from 1 (never) to 4 (always). The scores range from 10 to 40, with higher scores indicating higher levels of loneliness.
- **Social networks:** Japanese version of the abbreviated Lubben Social Network Scale (LSNS-6). The LSNS-6 consists of three items related to the family network and three items related to the friendship network, and the number of people in the network is calculated using a six-point scale (0 = none to 5 = nine or more) for each item. The total score ranges from 0 to 30 points,
  with higher scores indicating a larger social network and <12 points indicating social isolation.

All participants voluntarily responded to the survey anonymously and provided informed
consent online before the survey. Participants received a clear explanation of the survey procedure and could interrupt or terminate the survey without explaining the reason.

Hypotheses

Hypothesis testing involves making a statement about a population parameter and then using sample data to assess the likelihood of the statement being true.

1. **Hypothesis:** People of different demographic* categories experienced different psychological impacts due to the mild lockdown of COVID-19.
2. **Hypothesis:** People of different demographic* categories showed varied levels of lifestyle and stress management during the mild lockdown during COVID-19.
   Example: The level of preventive behaviors taken to prevent COVID-19 transmission may be different between married and single individuals.
3. **Hypothesis:** Healthcare workers or people who have family members working in healthcare services exhibit lower levels of COVID-19 anxiety compared to the general population.
4. **Hypothesis:** Individuals currently undergoing physical or mental health treatment experience heightened stressors during a mild lockdown.

*demographic (Sex, age group, job group, married, income)

Analysis process

1. **Data Preprocessing:**
   - Filter the dataset to include only the relevant columns.
   - Clean the dataset by handling missing values, outliers, and inconsistencies.
2. **Descriptive Statistics:**
   - Calculate descriptive statistics for each relevant variable, including means, standard deviations, medians, and ranges.
3. **Visualization:**
   - Plot bar charts, box plots, or violin plots to visualize mean scores or distributions across different groups.

- Include error bars or confidence intervals to show variability.

4. **Normality Check:**
   - Conduct a normality test (e.g., Shapiro-Wilk test, Kolmogorov-Smirnov test) for continuous variables.
   - If the data are normally distributed, proceed with parametric tests. If not, consider non-parametric tests.
5. **Comparative Analysis:**
   - Calculate mean scores for relevant variables (e.g., COVID-19 anxiety, stress levels) between different groups (e.g., healthcare workers vs. general population, individuals undergoing treatment vs. not undergoing treatment).
   - Conduct independent samples t-test or Mann-Whitney U test to compare means between groups and calculate the p-value.
6. **Effect Size Calculation:**
   - Calculate effect sizes (e.g., Cohen's d for t-tests, eta-squared for ANOVA) to quantify the magnitude of differences between groups.
7. **Interpretation:**
   - Interpret the results in the context of the research question and hypothesis.
   - Discuss the practical significance of the findings, considering effect sizes and implications for practice or policy.

Other Analysis

- Correlation of various **stressors**(27-33 in image) with **Psychological distress, Mental health, Loneliness, and Social network.**
- Plot demographic attributes against **Psychological distress, Mental health, Loneliness, and Social network** to observe some pattern or difference.