Journal of
Epidemiology &
Community Health

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Journal:	*Journal of Epidemiology & Community Health*
Manuscript ID	jech-2019-213693.R1
Article Type:	Original research
Date Submitted by the Author:	12-Jun-2020
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Keywords:	DEPRESSION, Health inequalities, MENTAL HEALTH, PSYCHOLOGICAL STRESS, SOCIAL SCIENCE

Socioeconomic determinants of depression amid the anti-extradition bill protests in Hong Kong: the mediating role of daily routine disruptions

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Word count (main text): 3,351

What is already known on this subject?

- There is a socioeconomic gradient in population mental health in the face of potential traumatic events such as civil unrest
- Few studies have investigated the intermediary mechanisms of such a gradient
- Little research on this gradient has been conducted in an Asian setting

What this study adds?

- Daily routine disruptions may mediate the effect of low socioeconomic status on increasing depression risk amid social unrest
- This mediating effect appears stronger among participants of the anti-extradition bill protests in Hong Kong in Summer 2019 relative to non-participants
- Such disruptions to daily life should be mitigated

Abstract

Background

Previous research has suggested a socioeconomic gradient of mental health in the face of potential traumatic events (PTE). Nevertheless, few studies examined the intermediary mechanisms of this gradient. This study tested a hypothesized mediating effect of disruptions to daily routines (e.g., eating/sleeping habits) between socioeconomic status (SES) and depression among participants and non-participants of the anti-extradition bill protests in summer 2019 in Hong Kong.

Methods

A territory-wide telephone survey was conducted during the movement in the first three weeks of July 2019 to collect self-report data from 1,112 Cantonese-speaking Hong Kong citizens. Stratified by participation in the anti-extradition bill protests, logistic regression was conducted to examine the inverse relationship between SES and depression. Subsequently, path analysis was conducted to test the hypothesized indirect effect through daily routine disruptions.

Results

In total, 581 (52.2%) respondents participated in the anti-extradition bill protests. Logistic regression showed that higher educational attainment was protective of depression among both participants and non-participants, while the protective effect of household income level $40,000-$79,999 (compared with <$20,000) was only observed among participants. Path analysis showed that 50.3% of the socioeconomic gradient was explained by daily routine disruptions among participants, compared with 8.3% among non-participants.

Conclusions

Daily routine disruptions partially explain the association between low SES and depression, especially among participants of the anti-extradition bill protests. To improve population mental

health, such disruptions should be mitigated.

Keywords

Depression; health inequalities; mental health; psychological stress; social science

INTRODUCTION

The anti-extradition bill protests in Hong Kong, which broke out in June 2019, are the largest and longest-lasting in the city, and have now turned into a territory-wide pro-democracy movement [1]. At the time of writing, the protests have been ongoing for 12 months. Extensive use of riot-control measures including physical force, tear gas, rubber bullets, and bean bag rounds has been described as one of the worst humanitarian crisis Hong Kong has ever experienced [2]. Previous population-representative research has identified an increased prevalence of depression during and following pro-democracy movements [3–5] relative to periods without significant social or political dispute or upheaval [6,7]. Research has also shown that such population-wide movements or conflicts impact the mental health of the entire population, even including those who are not directly involved [4,5]. This is because other potentially traumatic events (PTE), such as unemployment, witnessing violence, or even loss of property or loved ones, typically arise for different population strata regardless of actual participation in the disputes [8,9]. Therefore, the mental health status of the entire population of Hong Kong may be at risk of a rapid deterioration.

One important factor closely related to depression in times of political upheaval is socioeconomic status (SES). Studies consistently demonstrate that depression risk is unevenly distributed across socioeconomic strata, with greater risk observed among people of lower SES [10–13]. A meta-analysis of 51 prevalence studies estimated that, with SES dichotomized, the odds of depression among individuals of lower SES are 81% greater than those of higher SES [12]. Likewise, higher SES is protective of depression in times of disasters and other PTE [11,14] such as political turmoil [2,5,15]. Nevertheless, mechanisms that explain the effect of socioeconomic status on depression may vary by exposure to PTE [16]. Previous studies identified a variety of psychological factors related to depression risk in face of PTE, such as emotional intelligence [17],

social connectedness [18], and optimistic personalities [19], the intermediary role of these factors is seldom tested [20]. Hence, it is unclear how the socioeconomic gradient in depression may operate differently in the presence of PTE.

Recent studies highlight the importance of minimizing disruptions to daily routines for adaptive psychological functioning during and after political conflicts and violence [21,22]. An extension of the social ecological model suggest that psychological distress of conflict-affected people is dependent upon ongoing stressors as well as prior trauma exposure [23]. The population-wide conflicts can give rise to stressors of daily living even for those who are not directly involved in the conflicts [4,5]. These can include material stressors such as poverty, employment, and loss of possessions, and interpersonal stressors such as family conflict and violence and loss of social support networks. These stressors jointly contribute to poorer mental health and family functioning. Daily stressors lead to disruptions of primary daily routines, referred to as behaviors that are necessary for maintaining livelihood such as hygiene, sleep, and eating, and secondary daily routines, which refers to optional behaviors such as leisure, social activities, and work involvement [21]. It is postulated that the stronger the mechanisms of minimizing daily routine disruptions, the greater the capacity to minimize depression risk [22]. Such mechanisms are also significantly stronger among people free of financial strain [21], implying that people of higher SES are more capable of minimizing disruptions to their daily routines in the face of PTE. There is, nevertheless, little research comparing these mechanisms across various types of PTE, including those that arise from direct participation in population-wide social movements or conflicts and those that affect even people without direct participation.

This study hypothesized a socioeconomic gradient in depression risk and a mediating effect of daily routine disruptions between SES and depression. Since the PTE might differ between

participants and non-participants of the anti-extradition bill protests because of the different experience of, and exposures to, the movement, we stratified our analysis by the status of protest participation to test the hypothesized mediation among these two groups, respectively. Figure 1 shows a schematic representation of our conceptualization of the relationships among the study variables.

METHODS

Study Design

We adopted a cross-sectional telephone survey design, covering the period of July 5th – 16th 2019. The Centre for Communication and Public Opinion Survey of Chinese University of Hong Kong (CUHK) was contracted to conduct this survey upon ethics approval by the Human Research Ethics Committee (HREC), The Education University of Hong Kong (Ref: 2018-2019-0292).

Sampling

A dual-sampling frame of both landline and mobile phone numbers (50% each) was used. In Hong Kong, 87.7% of the households have landlines [24]. About 99% of people aged 15 years or above own at least one mobile phone [25]. Telephone numbers were randomly extracted from databases of telephone numbers released by the Hong Kong Communication Authority. Eligibility criteria included: (1) Hong Kong Chinese Citizenship, (2) 15 years of age or older, and (3) Cantonese-speaking proficiency. For landline calls, if more than one household members were eligible, the one whose birthday was closest to the date of interview was selected. Further attempts were arranged to dial-out numbers including “no answer,” “busy,” or “eligible respondent not available”. At the beginning of the telephone interview, verbal informed consent was obtained.

Outcome – Depression

We assessed depressive symptoms during the two weeks prior to the interview with the validated Chinese 9-item Patient Health Questionnaire (PHQ-9) [6] on a 4-point Likert scale (0 for "not at all", 1 for "on several days", 2 for "on more than half of the days", 3 for "nearly every day"). Higher scores (ranging from 0 to 27) indicated more depressive symptoms. High internal consistency of this questionnaire has been demonstrated ($\alpha > 80$) [6]. We followed previous studies and used 10 points or above as the threshold indicating depression [26]. Given the similar items on daily activities in both measures of depressive symptoms (PHQ-9) and daily routine disruptions, we replicated all analysis with depression defined by only the first two items of PHQ-9 (i.e., PHQ-2), "Little interest or pleasure in doing things" and "Feeling down, depressed, or hopeless," with a validated cutoff score of 3 [27] as a sensitivity analysis.

Independent Variable – Socioeconomic Indicators

We collected self-report data on four socioeconomic indicators. Following the recommendations by a previous review of research on socioeconomic determinants of health [28], we recognize the multifaceted nature of SES and the distinct information represented by each of the indicators and as such included all of them in the multivariable analysis. First, educational attainment of the respondents was categorized as "tertiary", "secondary", and "primary or below". Second, respondents' current employment status was dichotomized as "employed" and "unemployed/retired/housewife/student". Third, monthly household income was divided into "HK$80,000 or above", "HK$60,000-HK$79,999", "HK$40,000-HK$59,999", "HK$20,000-HK$39,999", "<HK$20,000". Fourth, marital status, which has often been adopted as one of the socioeconomic indicators in previous research on social determinants of health [29,30], was classified as "married" and "single/divorced/widowed". In addition, basic demographic

information including age (in years) and gender (male/female) were obtained as well.

Mediator – Daily Routine Disruptions

Daily routine disruptions, the hypothesized mediator in the analysis, were measured by two self-rated items, asking respondents to rate how much disruption they experience in maintaining healthy eating and sleep as well as socializing and leisure activities respectively since the political dispute started in June on a 10-point scale ranging from 0 for "no disruption" to 10 for "high level of disruption" [21]. Hence, the score of self-rated daily routine disruptions ranged from 0 to 20, with a higher score indicating worse disruptions and vice versa.

Stratification – Participation in anti-extradition bill protests

We asked respondents to report whether they participated in the anti-extradition bill protests in the following forms: encampment/occupying; demonstration; showing up at protest scenes; confrontation with police; and using social media to engage. Those who reported participation in any of these were categorized as participants of anti-extradition bill protests and other respondents as non-participants.

Statistical Analysis

Stratified by participation of the anti-extradition bill protests, we conducted logistic regression analysis to examine the association between socioeconomic indicators and the odds of depression (PHQ-9 scores ≥ 10). Two models were implemented. First, adjusted for age and gender, only socioeconomic indicators were included as independent variables. Second, in addition to variables in the first model, daily routine disruption scores were further included. The two models were compared to examine any changes (typically attenuation) of odds ratios associated with socioeconomic indicators that might suggest potential mediating effect of daily routine disruptions between socioeconomic indicators and depression.

With reference to the SES indicators correlated with depression in the logistic regression analysis, we then conducted stratified path analysis for both participants and non-participants of the anti-extradition bill protests to further test the mediating effect of daily routine disruption scores between those socioeconomic indicators and depression. The path analysis was implemented using the 'lavaan' package in the R statistical programming environment [31], and weighted least square mean and variance adjusted (WLSMV) estimator was used. Socioeconomic indicators that were found statistically significant in the logistic regression were specified to exert indirect effect on depression through daily routine disruption scores. Model goodness-of-fit was jointly assessed based on root mean square error of approximation (RMSEA), standardized root mean squared error (SRMR), comparative fit index (CFI), and Tucker-Lewis index (TLI). All missing values (< 1%) were replaced with multiple imputation procedures using IBM SPSS Statistics (Version 21) [32].

RESULTS

In total, 36,074 telephone numbers were attempted, 20,010 (55.4%) were ineligible for inclusion (i.e., invalid, non-resident/business telephone, fax numbers, no eligible respondent) and the eligibility of another 14,520 (40.3%) was unconfirmed. Among 1,544 (4.3%) eligible numbers, interviews were successfully conducted for 1,112 (72.0%); 378 (24.5%) refused and 54 (3.5%) did not complete the interviews. Hence, a 43% response rate was recorded together with a 74.6% cooperation rate. The sampling error was ±2.9% at 95% confidence level.

Table 1 shows the sociodemographic information of the sample stratified by participation in the anti-extradition bill protests. Among the 1,112 respondents who completed the interview, 581 (52.2%) reported participating in the anti-extradition bill protests since June 2019 (through

social media, demonstration, protests, and confrontation with police). On average, respondents who participated (37.79±15.25) were younger than those who did not (49.52±16.23). Nearly 60% of the non-participants were female, compared with 48.9% among participants. One-third of the non-participants were single/divorced/widowed, compared with more than half among participants. Those who participated in the anti-extradition bill protests reported higher levels of education and household income relative to non-participants ($p < .001$). Also, a higher proportion of those who have participated in the protests reported to be employed (65.9% versus those who did not participate in the protests 54.6%). Significantly higher self-rated daily routine disruptions were found among participants than among non-participants ($p < .001$). Significantly more participants (26.5%) than non-participants (20.5%) were classified as being depressed according to PHQ-9 scores.

Table 1. Sociodemographic information of study sample stratified by participation in anti-extradition bill protests

	Non-participants	Participants	*p* -value
n	531	581	
Age (SD)	49.52 (16.23)	37.79 (15.25)	<.001
Sex (%)			.001
Male	218 (41.1)	297 (51.1)	
Female	313 (58.9)	284 (48.9)	
Marital status (%)			<.001
Single/divorced/widowed	181 (34.1)	309 (53.2)	
Married	350 (67.4)	272 (47.6)	
Educational attainment (%)			<.001
Primary or below	54 (10.3)	6 (1.0)	
Secondary	271 (51.9)	209 (36.1)	
Tertiary	197 (37.7)	364 (62.9)	
Household income in HK dollars (%)			<.001
<$20,000	129 (27.9)	52 (9.6)	
$20,000-$39,999	135 (29.2)	152 (28.2)	
$40,000-$59,999	98 (21.2)	158 (29.3)	
$60,000-$79,999	35 (7.6)	65 (12.1)	
$80,000 or above	66 (14.3)	112 (20.8)	
Employment status (%)			<.001
Unemployed/retired/housewife/student	241 (45.4)	198 (34.1)	
Employed	290 (54.6)	383 (65.9)	

Self-rated daily routine disruptions (SD)	4.53 (4.52)	6.94 (4.46)	<.001
Depression (PHQ-9 ≥ 10)			.016
Non-depressed	422 (79.5)	425 (73.1)	
Depressed	109 (20.5)	156 (26.9)	

Note. *p*-value lower than 0.05 indicates statistical significance of the difference of sociodemographic stratification between participants and non-participants.

Logistic Regression Analysis

Among respondents who did not participate in the anti-extradition bill protests, logistic regression analysis (Table 2) showed that compared with having only primary education or below, attaining secondary or tertiary education were associated with 58% and 72% reduced odds of depression respectively (Model 1). After including daily routine disruption scores (Model 2), the protective effect of secondary education weakened and became non-significant (p = .155) and the protective effect of tertiary education, albeit significant, also weakened slightly. A one-point increase in daily routine disruption scores was associated with 23% elevated odds of depression.

Among respondents who participated, logistic regression (Model 1) showed that secondary and tertiary education were associated with 85% and 86% reduced odds of depression respectively, and household income $40,000-$59,999 and $60,000-$79,999 with 56% and 64% reduced odds of depression. After including daily routine disruption scores (Model 2), all protective effects of education and income weakened and became non-significant (p > .05), with 28% elevated odds of depression associated with a one-point increase in daily routine disruption scores. In both models, being one-year older was associated with 2% reduced odds of depression.

Among the socioeconomic indicators, only household income and education attainment were significantly associated with depression. Therefore, mediating effects of daily routine disruptions were specified in the associations of income and education levels with depression in the subsequent path analysis.

Table 2. Adjusted odds ratio of depression (PHQ-10 ≥ 10) associated with socioeconomic factors

	Non-participants		Participants	
	Model 1	Model 2	Model 1	Model 2
Age	1.00 (0.98, 1.01)	1.00 (0.98, 1.02)	0.98 (0.96, 1.00)*	0.98 (0.96, 1.00)*
Female (Male as referent)	0.81 (0.50, 1.32)	0.75 (0.44, 1.27)	1.13 (0.76, 1.69)	1.18 (0.76, 1.83)
Married (Single/divorced/widowed as referent)	1.00 (0.60, 1.67)	0.91 (0.51, 1.59)	1.01 (0.62, 1.67)	1.00 (0.58, 1.72)
Education attainment (primary or below as referent)				
Secondary	0.42 (0.21, 0.86)*	0.56 (0.26, 1.24)	0.15 (0.02, 0.96)*	0.26 (0.03, 2.68)
Tertiary	0.28 (0.12, 0.65)*	0.30 (0.12, 0.75)*	0.14 (0.02, 0.86)*	0.19 (0.02, 2.06)
Household income in HK dollars (<$20,000 as referent)				
$20,000-$39,999	0.90 (0.49, 1.66)	0.64 (0.33, 1.26)	0.56 (0.27, 1.14)	0.72 (0.33, 1.56)
$40,000-$59,999	0.74 (0.35, 1.57)	0.63 (0.28, 1.42)	0.44 (0.21, 0.92)*	0.49 (0.22, 1.09)
$60,000-$79,999	1.22 (0.47, 3.18)	1.10 (0.39, 3.12)	0.36 (0.14, 0.89)*	0.53 (0.20, 1.44)
$80,000 or more	0.61 (0.24, 1.52)	0.57 (0.22, 1.50)	0.55 (0.25, 1.21)	0.64 (0.27, 1.49)
Employed (Unemployed/retired/housewife/student as referent)	1.00 (0.59, 1.69)	1.05 (0.59, 1.86)	1.31 (0.83, 2.07)	1.48 (0.90, 2.43)
Self-rated daily routine disruptions		1.23 (1.16, 1.29)*		1.28 (1.20, 1.35)*

Note. * denotes statistical significance ($p \leq .05$).

Path Analysis

As shown in Figure 2, with excellent goodness-of-fit (RMSEA = .000, 95% CI: .000-.015; SRMR = .000; CFI = 1.000; TLI = 1.010), path analysis showed that among respondents who did not participate in anti-extradition bill protests, protective effects of secondary education (p = .004) and tertiary education (p = .044) on depression were significantly mediated by decreased daily routine disruptions, while paths leading from any income category to depression through self-rated daily routine disruptions were non-significant (p > .05). Based on the specified model, 8.3% of the socioeconomic effects on depression was mediated through decreased daily routine disruptions.

Among participants of the anti-extradition bill protests, the path model also achieved excellent goodness-of-fit (RMSEA = .039, 95% CI: .000-.084; SRMR = .000; CFI =.966; TLI = .992). Protective effects of secondary education (p < .001), tertiary education (p < .001), and household income level $40,000-$59,999 (p = .008) were significantly mediated by decreased daily routine disruptions. These indirect effects accounted for about half (50.3%) of the total

socioeconomic effects on depression. A multi-group comparison showed that such indirect effects (all paths added up) were stronger among participants than among non-participants (z = 3.61, p<.001, two-tailed).

Finally, Supplemental Tables S1 – S3 show the results of the replicated logistic regression and path analysis with depression defined by PHQ-2 (≥3), which are highly consistent with the main findings.

DISCUSSION

Amid the escalating social unrest in Hong Kong society in Summer 2019, our findings point to the potentially different mechanisms of socioeconomic influence on depression between participants and non-participants of the anti-extradition bill protests. Higher educational attainment was protective for depression among both protest participants and non-participants, whereas the protective effect of household income level $40,000-$79,999 (compared with lower levels) was observed among protest participants, suggesting different mechanisms of socioeconomic influence on mental health between the two groups. Our analysis also suggests protective socioeconomic effects were at least partially mediated by daily routine disruptions, with stronger indirect effects observed among those who participated in the anti-extradition bill protests than those who did not (50.3% versus 8.3%). Our results suggest that disruptions to daily routines was a significant mediator in the socioeconomic gradient of mental health during massive civil unrest.

Relationship with Existing Literature

Existing studies have suggested that ongoing social unrest is potentially detrimental to population mental health [4,5]. For example, according to a population-representative survey

conducted during and after the Umbrella Movement in 2014, the estimated prevalence of depression was significantly higher than in other periods without social movements [5]. Nevertheless, there have only been few studies focusing on the socioeconomic gradient of depression. Our findings provide preliminary evidence for more focus on socioeconomic determinants in current theoretical models of psychological adaptation to political unrest [33]. In particular, the observation of an increased importance of the mediating effect of self-rated disruptions to daily routines among those with a greater likelihood of facing PTE (participants) highlights the plausible mechanisms of socioeconomic determinants of mental health in the presence of PTE, which have not yet been explored extensively in the existing theories [34].

Interpretation of Findings

An obvious interpretation of the key results of the current study is that in face of PTE, minimal daily routine disruptions may explain why people of higher SES have lower depression. In the context of the extradition bill dispute in Hong Kong, it is indeed not surprising that people of higher SES who were more deeply involved in the dispute had the capacity to minimize the disruptions to their daily life compared with those with lower SES but a similar level of involvement in the dispute. We suggest that this is at least partly because people of higher SES have more resources at their disposal [35]. For example, persons of higher SES have more stable jobs with established welfare policies, e.g. paid annual leave [36]. They were, on average, in possession of more savings to handle various adversities related to their involvement in the dispute, e.g. prosecution and legal charges, such that their daily life would not be significantly impacted.

Besides more economic resources, people of higher SES have better social networks [37]. As their daily routines, including their work and social life, are embedded in a well-developed interpersonal environment, they are better protected from significant disruptions caused by their

participation in the anti-extradition bill protests [33].

These strong mechanisms that minimize daily disruptions to routines among people of higher SES may account for the minimal impact from their involvement in the political dispute on daily life, as the impact could be absorbed easily [22]. In other words, people of higher SES may potentially find it easier to live a normal life during or shortly after the occurrence of PTE than those of lower SES. In the absence of economic resources, it is possible that once a breakpoint is reached after prolonged disruptions to daily routines, a drastic decline of the capacity to maintain good mental health status would occur, leading to a significant increase of the risk of mental disorders [22]. This is supported by a body of empirical evidence [38,39].

Limitations

Several study limitations should be noted. First, our findings are context-specific and may not generalize to other populations or other types of PTE. Specifically, daily disruptions to routines may manifest differently if a different population is observed or if a different type of PTE is examined [11,14]. In fact, between the two categories of people being affected by this society-wide movement, i.e. participants and non-participants of the anti-extradition bill protests, we already observed potentially different mechanisms, plausibly due to different exposures to PTE. Therefore, to construct a general theory to explain the nature of associations among SES, daily routine disruptions, and psychiatric symptoms across different populations and types of PTE, this analysis should be replicated on other population-representative samples and in different settings. Second, as we adopted a cross-sectional design, our observations only provide a snapshot of the mediating effects that usually emerge over time. Longitudinal data would provide additional support to the current model and the potentially causal associations observed. Third, depression was not diagnosed by medical professionals. However, the threshold of ≥10 in PHQ-9 has been

shown to be highly sensitive and specific in distinguishing between people with and without major depression disorder [26]. Moreover, because of the low rate of professional help-seeking among Chinese people at risk of depression [40], using an established self-report scale, i.e. PHQ-9, should ensure better sensitivity in identifying people with depression than only using clinical records. Fourth, without data collected prior to the onset of the protests, we were not able to assess the full impact of this territory-wide social movement. It would, therefore, strengthen the literature significantly if future studies include longitudinal data collected at different time points (including the beginning) of massive conflicts or social movements and investigate how population mental health changes as a function of ongoing social movements. Fifth, the low response rate of the phone survey may reduce the representativeness of the results despite the high operational efficiency this data collection method entails. Last, there is potential self-report bias in our data, especially regarding protest participation given an increasingly unstable sociopolitical context.

Public Health Implications

Our findings suggest that public health measures focused on reinforcing sustainment of daily routines might be effective in improving population mental health in face of political upheaval, especially among those with lower SES. These measures could focus on one specific or a variety of daily activities to help the affected population develop mechanisms to enhance mental health through regularizing daily routines during social unrest. Further community-based intervention programs should be trialed to test this speculation.

CONCLUSION

We identified significant socioeconomic gradients among participants and non-participants of the anti-extradition bill protests in Hong Kong, with a much stronger mediating effect of daily

routine disruptions between higher SES and lower odds of depression observed among participants. Population-based public mental health programs could mitigate the mental health consequences of social upheaval through interventions or psychoeducation on awareness and maintenance of daily routines.

Funding

Internal Research Grant (RG84/2018-2019R) and Individual Research Fund (R6410), The Education University of Hong Kong, Hong Kong SAR, China (Wai-Kai Hou)

Competing Interests

None declared.

Ethics approval

This study has been approved by the Ethics Committee of the Education University of Hong Kong (Ref: 2018-2019-029).

Data availability statement

No data are available.

Contributorship statement

FL and WH conceived the idea for the study, designed the study, contributed to the statistical analysis plan, drafted the initial manuscript and approved the final manuscript as submitted. LL contributed to the study design and statistical analysis plan, conducted the statistical analysis, reviewed and revised the manuscript, and approved the final manuscript as submitted. BH and SG contributed to the study design and statistical analysis plan, reviewed and revised the manuscript, and approved the final manuscript as submitted.

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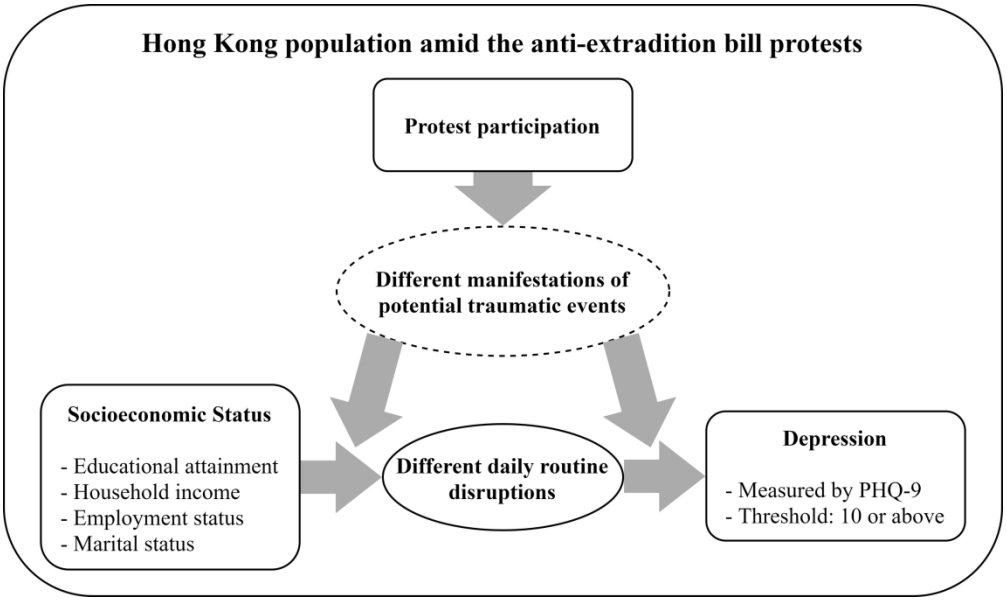
Figure legends

Figure 1. Schematic representation of the conceptualized relationships between the observed variables in this study

Figure 2. Path models (probit link for binary outcome) illustrating the specified and estimated mediation processes of protective socioeconomic effects on depression through lesser self-rated daily routine disruptions (other covariates omitted graphically) among participants of the anti-extradition bill protests and non-participants



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229x135mm (300 x 300 DPI)

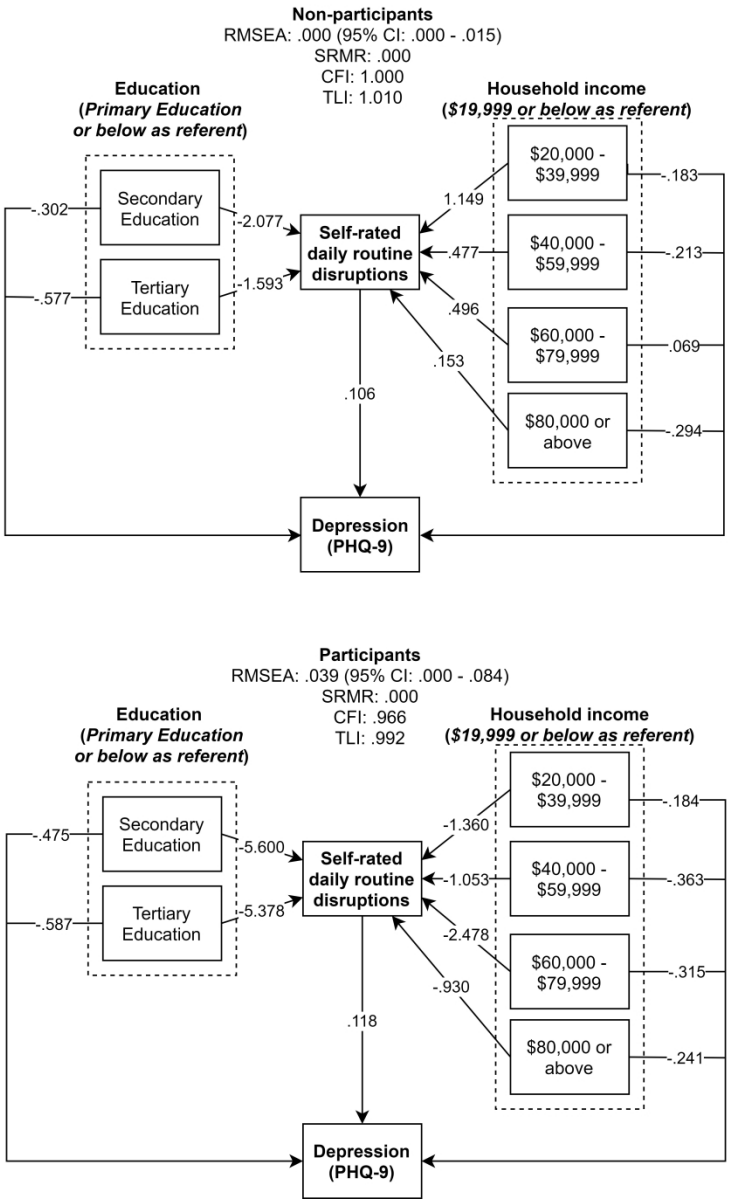

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Table S1. Adjusted odds ratio of depression (PHQ-2 ≥ 3) associated with socioeconomic factors

	Non-participants		Participants	
	Model 1	Model 2	Model 1	Model 2
Age	1.01 (0.99, 1.02)	1.01 (0.99, 1.03)	0.98 (0.97, 1.00)*	0.99 (0.97, 1.00)*
Female (Male as referent)	1.09 (0.69, 1.73)	1.08 (0.66, 1.76)	0.83 (0.57, 1.20)	0.82 (0.56, 1.20)
Married (Single/divorced/widowed as referent)	1.08 (0.66, 1.78)	1.00 (0.59, 1.70)	0.99 (0.63, 1.58)	0.98 (0.61, 1.58)
Secondary education (primary or below as referent)	0.70 (0.34, 1.43)	0.97 (0.44, 2.13)	0.23 (0.04, 1.37)	0.37 (0.05, 2.71)
Tertiary education (primary or below as referent)	0.66 (0.29, 1.50)	0.81 (0.34, 1.95)	0.23 (0.04, 1.40)	0.36 (0.05, 2.65)
Income range $20,000-$39,999 (<$20,000 as referent)	0.93 (0.51, 1.71)	0.74 (0.39, 1.42)	0.72 (0.36, 1.44)	0.84 (0.41, 1.71)
Income range $40,000-$59,999 (<$20,000 as referent)	0.99 (0.49, 2.01)	0.94 (0.44, 1.99)	0.85 (0.42, 1.72)	0.95 (0.46, 1.98)
Income range $60,000-$79,999 (<$20,000 as referent)	0.74 (0.27, 2.04)	0.66 (0.23, 1.90)	0.44 (0.18, 1.06)	0.57 (0.23, 1.41)
Income range $80,000 or more (<$20,000 as referent)	1.00 (0.44, 2.27)	1.01 (0.43, 2.40)	0.92 (0.43, 1.96)	1.03 (0.47, 2.24)
Employed (Unemployed/retired/housewife/student as referent)	1.24 (0.75, 2.07)	1.31 (0.76, 2.25)	0.98 (0.64, 1.48)	1.00 (0.65, 1.54)
Sustainability of Living Index score		1.18 (1.12, 1.24)*		1.14 (1.09, 1.19)*

Note. * denotes statistical significance ($p \leq .05$).

Table S2. Path analysis results among participants of the anti-extradition bill protests

Path analysis coefficients	Estimate	Std.Err	*p*(>|z|)
Depression (PHQ-2 ≥ 3) ~			
Age	-0.009	0.005	0.059
Female (Male as referent)	-0.115	0.116	0.323
Daily routine disruptions	0.073	0.011	0.000
Secondary education (primary or below as referent)	-0.510	0.532	0.338
Tertiary education (primary or below as referent)	-0.521	0.537	0.332
$20,000-$39,999 (<$20,000 as referent)	-0.098	0.214	0.647
$40,000-$59,999 (<$20,000 as referent)	-0.021	0.221	0.923
$60,000-$79,999 (<$20,000 as referent)	-0.309	0.263	0.240
$80,000 or more (<$20,000 as referent)	0.017	0.237	0.943
Married (Single/divorced/widowed as referent)	-0.004	0.145	0.976
Employed (Unemployed/retired/housewife/student as referent)	-0.018	0.129	0.888
Daily routine disruptions ~			
Secondary education (primary or below as referent)	-5.600	1.164	0.000
Tertiary education (primary or below as referent)	-5.378	1.187	0.000
$20,000-$39,999 (<$20,000 as referent)	-1.360	0.743	0.067
$40,000-$59,999 (<$20,000 as referent)	-1.053	0.797	0.187
$60,000-$79,999 (<$20,000 as referent)	-2.478	0.921	0.007
$80,000 or more (<$20,000 as referent)	-0.930	0.833	0.264
Indirect effects through daily routine disruptions			
Secondary education (primary or below as referent)	-0.410	0.108	0.000
Tertiary education (primary or below as referent)	-0.394	0.108	0.000
$20,000-$39,999 (<$20,000 as referent)	-0.100	0.057	0.079
$40,000-$59,999 (<$20,000 as referent)	-0.077	0.060	0.197
$60,000-$79,999 (<$20,000 as referent)	-0.182	0.074	0.014
$80,000 or more (<$20,000 as referent)	-0.068	0.062	0.272
Total effects	-2.820	1.263	0.026

Note. RMSEA = 0.039, 95% CI: 0.000-0.084; SRMR = 0.000; CFI = 0.900; TLI = 0.975

Table S3. Path analysis results among non-participants of the anti-extradition bill protests

Path analysis coefficients	Estimate	Std.Err	*p*(>|z|)
Depression (PHQ-2 ≥ 3) ~			
Age	0.001	0.001	0.383
Female (Male as referent)	0.014	0.042	0.733
Daily routine disruptions	0.031	0.005	0.000
Secondary education (primary or below as referent)	-0.01	0.079	0.896
Tertiary education (primary or below as referent)	-0.035	0.085	0.683
$20,000-$39,999 (<$20,000 as referent)	-0.048	0.056	0.396
$40,000-$59,999 (<$20,000 as referent)	-0.016	0.063	0.796
$60,000-$79,999 (<$20,000 as referent)	-0.067	0.08	0.406
$80,000 or more (<$20,000 as referent)	-0.006	0.067	0.933
Married (Single/divorced/widowed as referent)	0.014	0.046	0.766
Employed (Unemployed/retired/housewife/student as referent)	0.038	0.044	0.395
Daily routine disruptions ~			
Secondary education (primary or below as referent)	-2.077	0.861	0.016
Tertiary education (primary or below as referent)	-1.593	0.947	0.093
$20,000-$39,999 (<$20,000 as referent)	1.149	0.644	0.074
$40,000-$59,999 (<$20,000 as referent)	0.477	0.673	0.478
$60,000-$79,999 (<$20,000 as referent)	0.496	1.051	0.637
$80,000 or more (<$20,000 as referent)	0.153	0.763	0.841
Indirect effects through daily routine disruptions			
Secondary education (primary or below as referent)	-0.050	0.031	0.109
Tertiary education (primary or below as referent)	-0.065	0.028	0.022
$20,000-$39,999 (<$20,000 as referent)	0.036	0.021	0.091
$40,000-$59,999 (<$20,000 as referent)	0.015	0.021	0.486
$60,000-$79,999 (<$20,000 as referent)	0.015	0.033	0.641
$80,000 or more (<$20,000 as referent)	0.005	0.024	0.842
Total effects	-0.157	0.24	0.512

Note. RMSEA = 0.000, 95% CI: 0.000-0.025; SRMR = 0.000; CFI = 1.000; TLI = 1.020