Subjective Well-being and Proactive Social Isolation during COVID-19: A 3-Wave Longitudinal Study across 1 year

Tingshu Liu, Rodica I. Damian, & David Francis
Background

Poor life satisfaction, negative emotions, higher depression, anxiety, and early mortality

Chair et al., 2021; Kahneman & Deaton, 2010; Larson, 1990; Tomono et al., 2021; Wister et al., 2019
Background

Subjective well-being (SWB) refers to people’s subjective happiness and good functioning
- life satisfaction
- positive emotions
- negative emotions

Different indicators of SWB can change in different patterns in response to a same traumatic event — most studies only included 1 or 2

Social isolation: sustained absence of social interaction or lack of or very few social contact/ties

Proactive social isolation: sustained refusal or limitation of one’s own normal social interaction/contact

Fischer et al., 2011; Hoppmann et al., 2021; Infurna, & Luthar, 2017; Lucas et al., 1996; Wilson, 1987
Background

PTE: potential traumatic events

Bonanno et al., 2011

Bachtiger et al., 2021; Fancourt et al., 2021; Groarke et al., 2021; Kuhn et al., 2021; McPherson et al., 2021; Megalakaki et al., 2021; Pieh et al., 2021; Quaglieri et al., 2021; Savage et al., 2021; Thygesen et al., 2021; van der Velden et al., 2021; Wang et al., 2021
Background

- Social isolation $\leftrightarrow$ a series of negative psychological consequences
- Proactive social isolation
  - Limited research
  - Solitude: higher life satisfaction and lower loneliness when actually desire to be alone
  - Sustained solitude?
  - Self-determination theory: autonomy
    - but relatedness?

Chua & Koestner, 2008; Leary et al., 2003; Ryan & Deci, 2000
Hypotheses

- H1: subjective well-being remained stable (resilience)
- H2: subjective well-being increased (recovery)
- H3: different subjective well-being indicators had different change patterns
- H4: higher levels of proactive social isolation would be associated with lower subjective well-being
  - (4a) at the between-person level
  - (4b) at the within-person level
- H5: younger people (H5a), women (H5b), minoritized groups (e.g., African Americans and/or Latinos) (H5c), and people with lower income (H5d) had lower SWB
Timeline

Wave 1
July 2020
N = 972

Wave 2
Nov 2020
N = 609

Wave 3
April 2021
N = 390
Participants

MTurk sample ($N = 972$)

- 58% male
- 38.61 years on average (SD = 11.83, range 18-78)
- $46,178 annual income on average

<table>
<thead>
<tr>
<th>Race/Ethnicity</th>
<th>Sample Race/Ethnicity</th>
<th>2020 US Census Race/Ethnicity</th>
</tr>
</thead>
<tbody>
<tr>
<td>White, not Hispanic/Latino</td>
<td>69.9%</td>
<td>60.1%</td>
</tr>
<tr>
<td>Black/African-American</td>
<td>15.4%</td>
<td>13.4%</td>
</tr>
<tr>
<td>Asian/Asian-American</td>
<td>7.3%</td>
<td>5.9%</td>
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<tr>
<td>Latino/Hispanic</td>
<td>5.1%</td>
<td>18.5%</td>
</tr>
<tr>
<td>Multi-race</td>
<td>1.5%</td>
<td>2.8%</td>
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<tr>
<td>Native American/Native Hawaiian/Pacific Islander</td>
<td>0.6%</td>
<td>1.5%</td>
</tr>
<tr>
<td>Other</td>
<td>0.2%</td>
<td>N/A</td>
</tr>
</tbody>
</table>
Measures

Satisfaction with Life Scale (SWLS)
Positive and Negative Affect Schedule (PANAS)
Patient Health Questionnaire (PHQ-9)
Generalized anxiety disorder (GAD-7)

Proactive social isolation
--- how much they proactively limited travel, social interaction, and more
--- how long they have been in self-quarantine

Demographics: age, gender, race/ethnicity, and income

Diener et al., 1985; Kroenke et al., 2001; Spitzer et al., 2006; Watson et al., 1988
Analyses

- R and SPSS were used
- Principal Component Analysis (PCA) on proactive social isolation items
  - Multiple imputation for missing data
  - Extracted the first component
- All other missing data: FIML
- Well-being change patterns
  - measurement invariance across time (Configural, weak, strong, and strict)
  - latent growth curve models (No growth, Linear growth, and Latent basis)
- Proactive social isolation and well-being
  - Multi-level modeling, proactive social isolation as a time-varying covariate
  - separated between- and within-person effects
  - Demographic controls: age, gender, race/ethnicity, and income
Latent growth curve model

PA = positive emotions
i = intercept
s = slope
_W1 = wave 1

Kunzmann et al. (2002)
Results

Subjective well-being change during the pandemic
- Life satisfaction and positive emotions remained stable (resilience)
- Negative emotions, depression and anxiety decreased (recovery)
PA = positive emotions  
Iso = proactive social isolation  
i = latent mean  
cw = within-person deviation

Code followed Hamaker & Muthén, 2020
Results/discussion

◎ Multilevel models
  ○ Proactive social isolation $\leftrightarrow$ lower levels of all five well-being indicators
  ○ Consistent with the deactivation effect
  ○ When people change strategy to proactively isolate themselves more than the person-specific mean, they had more positive emotions and lower depression
Results/discussion

Multilevel models with demographics
- Age -> higher level positive emotions, and lower levels of negative emotions, depression, and anxiety
- Person of Color -> higher levels of negative emotions, depression, and anxiety
- Income -> higher levels of life satisfaction and positive emotions
- Gender: not a significant predictor
Limitations

◎ Did not have pre-pandemic data to compare with
◎ Did not have imposed isolation to compare with proactive isolation – but this could be the next step
◎ Only 3 waves of data
  ○ Ideally more than 3 waves are recommended to distinguish the between- and within-person differences while controlling for measurement errors
Thanks!

Any questions?

Contact me at:
suraliu22@gmail.com
Supplement A: Intercorrelations for the main variables

<table>
<thead>
<tr>
<th>Variables</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 age</td>
<td>-</td>
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<td></td>
<td></td>
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<td></td>
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<td>2 Female</td>
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<td>-</td>
<td></td>
<td></td>
<td></td>
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<td></td>
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<tr>
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<td>-</td>
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<td></td>
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<tr>
<td>4 Income _ln</td>
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<td>.03</td>
<td>-</td>
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<tr>
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<td>.15</td>
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<td>6 PE_M</td>
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<td>-.01</td>
<td>.24</td>
<td>.72</td>
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<td>7 NE_M</td>
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<td>-.01</td>
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<td>-.36</td>
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<td>-.10</td>
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</table>

Notes. These analyses used a FIML estimation based on N = 972. Bold indicates p < .05. Gender and race were dummy coded, 0 = male, 1 = female; 0 = White/European American, 1 = Person of Color (POC). _M means the average score across the three time points. _ln means log transformed. SWLS = life satisfaction; PE = positive emotions; NE = negative emotions; Isolation = proactive social isolation.
## Supplement B: measurement invariance across time

<table>
<thead>
<tr>
<th></th>
<th>Model</th>
<th>( \chi^2 )</th>
<th>( df )</th>
<th>( p )</th>
<th>RMSEA</th>
<th>90% CI</th>
<th>FI</th>
<th>CFI</th>
<th>Model Evaluation</th>
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<td><strong>Life Satisfaction</strong></td>
<td>Configural/Pattern Invariance</td>
<td>1793.02</td>
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<td>.141</td>
<td>[.136, .147]</td>
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<td>[.119, .129]</td>
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<td>[.098, .117]</td>
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<td><strong>Negative Emotions</strong></td>
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<td>.085</td>
<td>[.075, .096]</td>
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<td>.000</td>
<td>.080</td>
<td>[.071, .090]</td>
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<td>.192</td>
<td>[.181, .203]</td>
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<td>.000</td>
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<td>[.172, .192]</td>
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<td>.000</td>
<td>.163</td>
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<tr>
<td><strong>Anxiety</strong></td>
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<td>.000</td>
<td>.130</td>
<td>[.119, .141]</td>
<td>.937</td>
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<tr>
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<td>Weak Invariance</td>
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<td>.000</td>
<td>.123</td>
<td>[.113, .133]</td>
<td>.935</td>
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<td>Strong Invariance</td>
<td>473.23</td>
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<td>.000</td>
<td>.117</td>
<td>[.108, .127]</td>
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<td>.111</td>
<td>[.103, .120]</td>
<td>.928</td>
<td>.004</td>
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</tbody>
</table>

*Notes. These analyses used a FIML estimation based on \( N = 972 \). A relative model pass was determined based on \( \Delta CFI \) being < .01*
# Supplement C: Latent growth curve models

<table>
<thead>
<tr>
<th>Latent growth curve models</th>
<th>Intercept</th>
<th>Slope</th>
<th>Model Fit</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean (p-value)</td>
<td>Variance (p-value)</td>
<td>Mean (p-value)</td>
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<td>SWB indicator</td>
<td>No growth</td>
<td>Linear growth</td>
<td>Latent basis</td>
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<td>Life</td>
<td>.20 (.001)</td>
<td>28.60 (.000)</td>
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<td>Satisfaction</td>
<td>-.25 (.000)</td>
<td>32.12 (.000)</td>
<td>-.07 (.282)</td>
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<td>Positive</td>
<td>.07 (.133)</td>
<td>6.94 (.000)</td>
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<td>Emotions</td>
<td>.30 (.000)</td>
<td>7.45 (.000)</td>
<td>.06 (.186)</td>
</tr>
<tr>
<td>Negative</td>
<td>.10 (.028)</td>
<td>7.98 (.000)</td>
<td>N/A</td>
</tr>
<tr>
<td>Emotions</td>
<td>.77 (.000)</td>
<td>8.94 (.000)</td>
<td>-.20 (.000)</td>
</tr>
<tr>
<td>Depression</td>
<td>.28 (.000)</td>
<td>9.33 (.000)</td>
<td>-.23 (.000)</td>
</tr>
<tr>
<td>Anxiety</td>
<td>.02 (.347)</td>
<td>.70 (.000)</td>
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<td></td>
<td>.04 (.157)</td>
<td>.72 (.000)</td>
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<td>.10 (.000)</td>
<td>.73 (.000)</td>
<td>-.05 (.000)</td>
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<td>Anxiety</td>
<td>.28 (.000)</td>
<td>8.54 (.000)</td>
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<td>.44 (.000)</td>
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<tr>
<td></td>
<td>2.52 (.000)</td>
<td>10.10 (.000)</td>
<td>-.20 (.000)</td>
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</tbody>
</table>

*Note.* These analyses used a FIML estimation based on \( N = 972 \). Bold indicates statistical significance at \( p < .01 \), because as pre-registered, we adjusted the \( p \) value upon the plan to fit 5 comparisons.
Supplement D: Multi-level models with social isolation as a time-varying covariate

<table>
<thead>
<tr>
<th>Predictors</th>
<th>Life satisfaction</th>
<th>Positive emotions</th>
<th>Negative emotions</th>
<th>Depression</th>
<th>Anxiety</th>
</tr>
</thead>
<tbody>
<tr>
<td>isolation between person</td>
<td>-0.16 [-0.23, -0.09]</td>
<td>-0.14 [-0.21, -0.06]</td>
<td>-0.23 [-0.30, -0.16]</td>
<td>-0.20 [-0.26, -0.14]</td>
<td>-0.16 [-0.23, -0.09]</td>
</tr>
<tr>
<td>isolation within person</td>
<td>0.00 [-0.02, 0.03]</td>
<td>0.04 [0.02, 0.07]</td>
<td>-0.02 [-0.05, 0.00]</td>
<td>-0.04 [-0.06, -0.02]</td>
<td>-0.02 [-0.05, 0.00]</td>
</tr>
<tr>
<td>demographic race/ethnicity</td>
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<td></td>
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</tr>
<tr>
<td>age</td>
<td>0.04 [-0.02, 0.11]</td>
<td>0.10 [0.03, 0.17]</td>
<td>-0.09 [-0.15, -0.02]</td>
<td>-0.10 [-0.16, -0.03]</td>
<td>-0.12 [-0.19, -0.06]</td>
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<tr>
<td>female</td>
<td>0.03 [-0.03, 0.10]</td>
<td>-0.04 [-0.11, 0.02]</td>
<td>0.02 [-0.04, 0.09]</td>
<td>-0.01 [-0.08, 0.05]</td>
<td>0.07 [0.00, 0.14]</td>
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<tr>
<td>POC</td>
<td>0.02 [-0.04, 0.09]</td>
<td>0.06 [-0.01, 0.13]</td>
<td>0.24 [0.18, 0.30]</td>
<td>0.22 [0.15, 0.28]</td>
<td>0.17 [0.10, 0.23]</td>
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<tr>
<td>income</td>
<td>0.19 [0.13, 0.25]</td>
<td>0.21 [0.15, 0.28]</td>
<td>-0.02 [-0.08, 0.05]</td>
<td>-0.01 [-0.07, 0.05]</td>
<td>-0.04 [-0.10, 0.03]</td>
</tr>
</tbody>
</table>

Model fit:

- $\chi^2(df, p) = \chi^2(df, p) = \chi^2(df, p) = \chi^2(df, p) = \chi^2(df, p) =\$
- $2128.86(230, .000) = 635.22(113, .000) = 486.49(113, .000) = 1247.31(114, .000) = 753.40(113, .000) =\$
- $CFI = .834 = CFI = .933 = CFI = .956 = CFI = .844 = CFI = .920 =\$
- $RMSEA[90% CI] = RMSEA[90% CI] = RMSEA[90% CI] = RMSEA[90% CI] = RMSEA[90% CI] =\$
- [.093, .089, .097] = [.070, .064, .075] = [.059, .054, .064] = [.102, .097, .107] = [.077, .072, .082] =\$

Notes: These analyses used a FIML estimation based on $N = 955$. Latent levels were included as outcomes in the models. Race/ethnicity was dummy coded: 0 = White/European American, 1 = Person of Color (POC). Bold indicates statistical significance at $p < .01$, because it was adjusted to fit a total of 5 regression models as pre-registered. Isolation = proactive social isolation.
Supplement E: Attrition analysis

No difference in racial composition, income, positive emotions, or anxiety

People who dropped out

- Were younger ($\Delta M = 3.90$, $t = 4.96$, $p < .001$, $d = .33$)
- Were more likely to be men ($\Delta M = .10$, where male = 0, female = 1, $t = 3.10$, $p = .002$, $d = .21$)
- Had higher life satisfaction ($\Delta M = .23$, $t = 3.44$, $p < .001$, $d = .23$)
- Had higher depression ($\Delta M = .39$, $t = 8.38$, $p < .001$, $d = .54$)
- Had higher negative emotions ($\Delta M = .46$, $t = 7.74$, $p < .001$, $d = .49$)
Supplement F: Measures

Satisfaction with Life Scale
- 5-item scale to measure global life satisfaction: strongly disagree (1) to strongly agree (5)
- E.g., “In most ways my life is close to my ideal”
- Internal reliability .92-.93

Positive and Negative Affect Schedule (PANAS)
- 20 items to measure positive and negative emotions: very slightly or not at all (1) to extremely (5)
- E.g. excited, nervous
- Internal reliability
  - Positive emotions .93-.94
  - Negative emotions .93-.95

Diener et al., 1985; Watson et al., 1988
**Supplement F: Measures**

**Patient Health Questionnaire (PHQ-9)**
- 9 items to measure depression: *not at all* (0) to *nearly every day* (3)
- E.g., “Feeling tired or having little energy”
- Internal reliability .90-.93

**Generalized anxiety disorder (GAD-7)**
- 7 items to measure anxiety: *not at all* (0) to *nearly every day* (3).
- E.g. “Feeling nervous, anxious, or on edge”
- Internal reliability .93-.94

Kroenke et al., 2001; Spitzer et al., 2006
Supplement F: Measures

Proactive social isolation

Over the past few months, since COVID-19 was declared a pandemic, how often have you engaged in the following behaviors? (slider: “0% of the time” to “100% of the time”)

◎ 1. Limited travel using public transport
◎ 2. Moved social interactions (with people who live outside my household) to online/social media instead of in-person
◎ 3. Avoided crowds of people
◎ 4. Avoided contact with people who were sick

5. Approximately how many weeks have you been in self-quarantine (i.e., stayed home, except for essential errands like buying food, exercising away from others, medical appointments)? _____ [enter “0” weeks if you did not self-quarantine at all]
Supplement F: Measures

Demographics

- Age
- Gender: 0 = male, 1 = female
- Race/ethnicity: 0 = White/European American, 1 = Person of Color (POC)
- Annual household income
  - US dollars reported (log-transformed)
Major references


