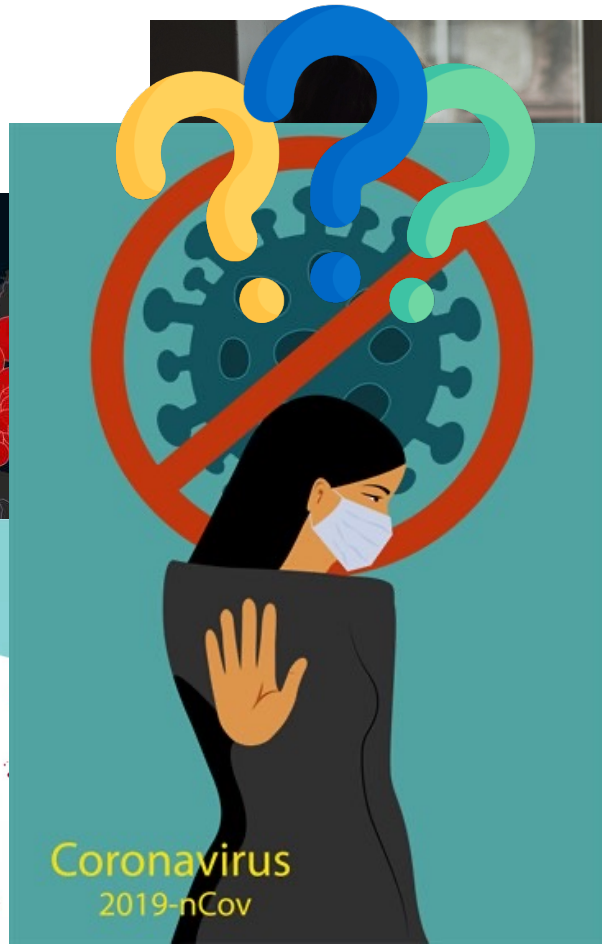


A decorative background featuring a network diagram with nodes and connecting lines. The nodes are represented by circles of varying sizes and colors, including light gray, dark gray, and blue. Some nodes are highlighted with a blue outline. The lines connecting the nodes are thin and light gray, creating a complex web-like structure. The diagram is positioned in the corners of the slide, with a larger concentration on the left side and a smaller one on the right side.

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



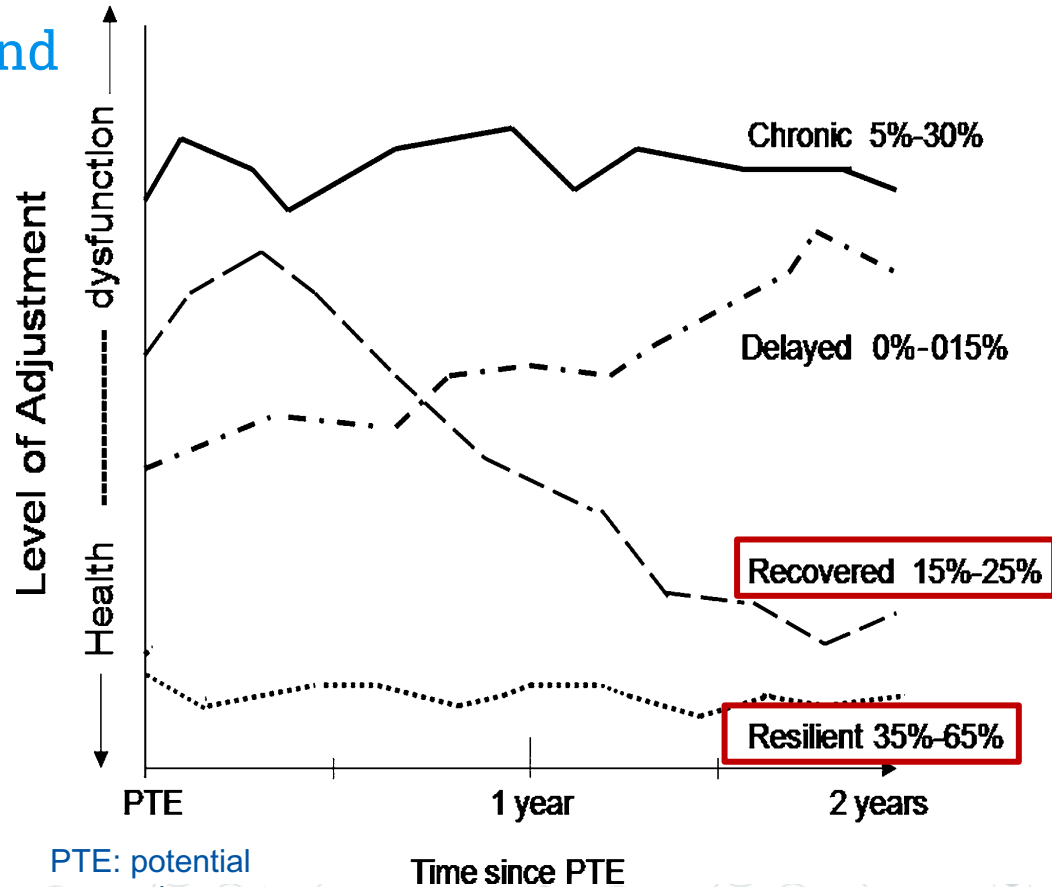
MGN

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

Added: depression and anxiety

Background



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

PTE: potential
traumatic events

Time since PTE

Bonanno et al., 2011

Background

- ◎ Social isolation <-> 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?

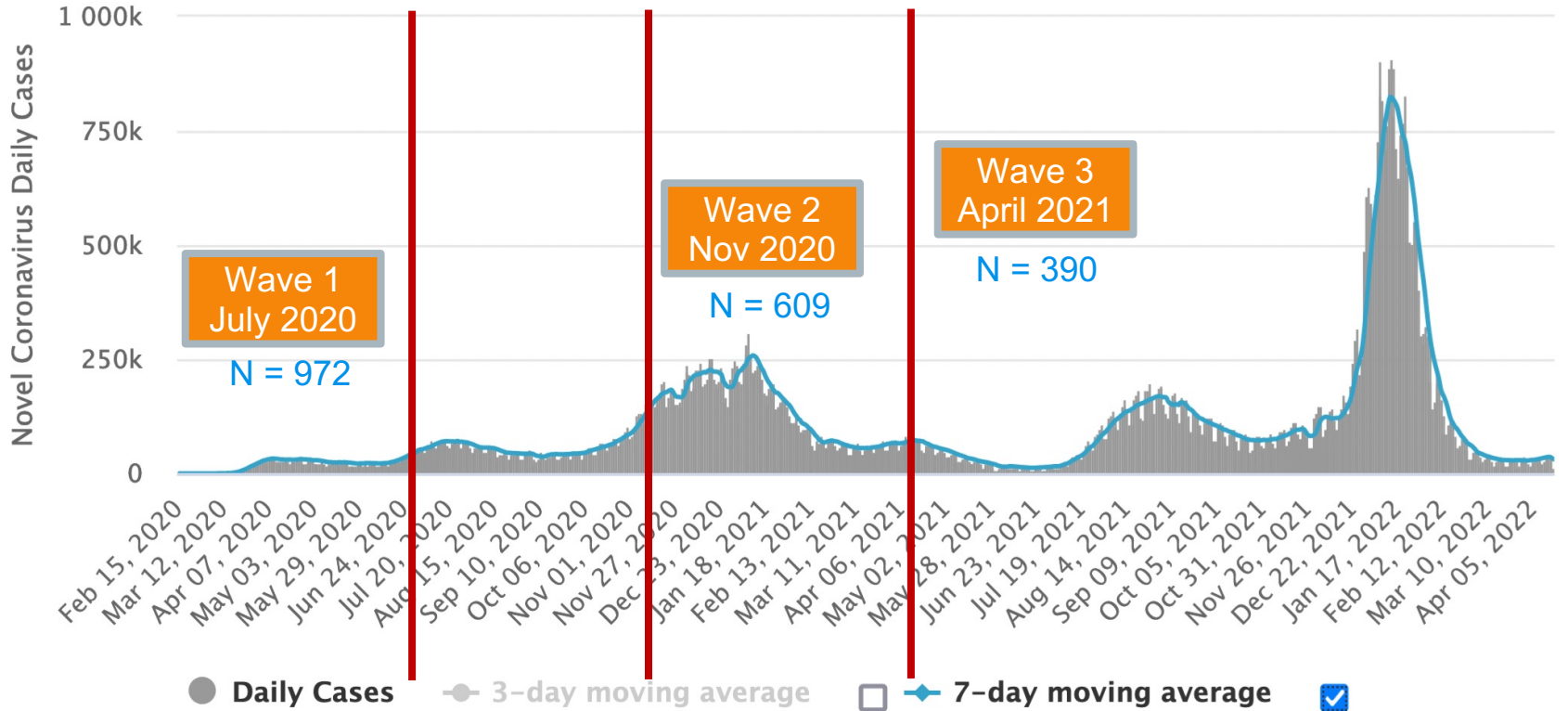
Hypotheses

- ⊙ 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



Competing hypotheses

Timeline



Participants

MTurk sample ($N = 972$)

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

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

Measures

Satisfaction with Life Scale (SWLS)

Positive and Negative Affect Schedule (PANAS)

Patient Health Questionnaire (PHQ-9)

Generalized anxiety disorder (GAD-7)



Subjective well-being

Proactive social isolation

---how much they proactively limited travel, social interaction, and more

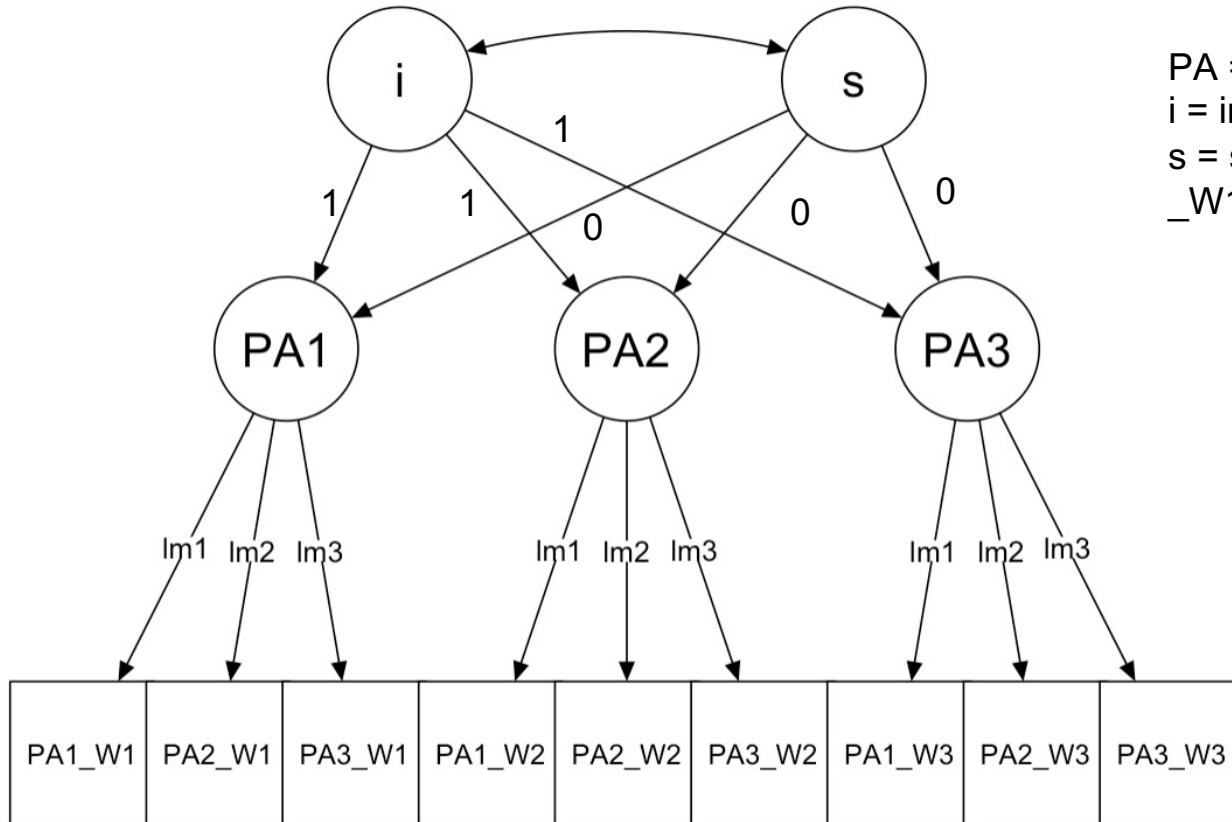
---how long they have been in self-quarantine

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

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

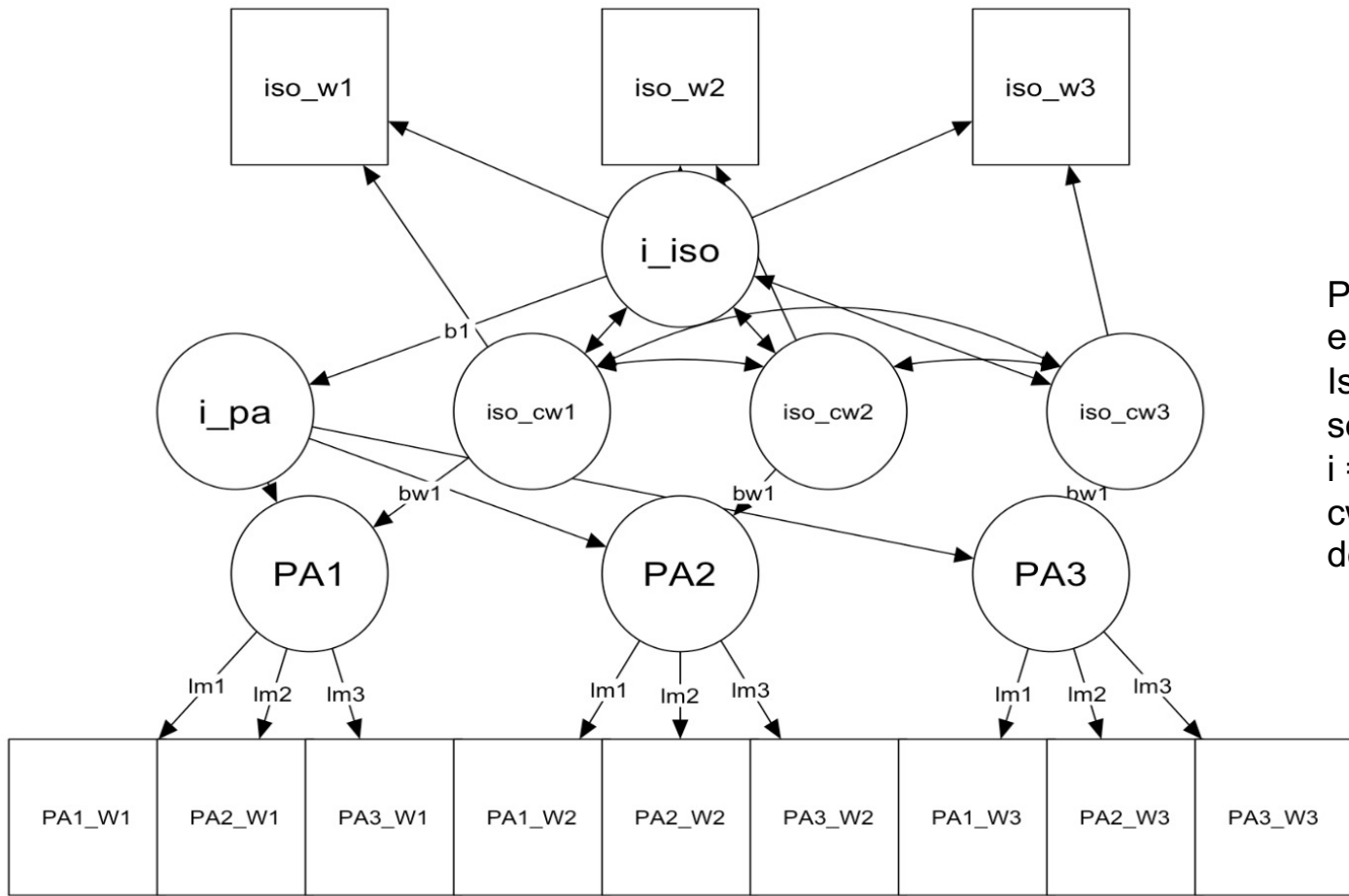
Latent growth curve model



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

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

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 \leftrightarrow higher level positive emotions, and lower levels of negative emotions, depression, and anxiety
 - Person of Color \leftrightarrow higher levels of negative emotions, depression, and anxiety
 - Income \leftrightarrow 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

Variables	1	2	3	4	5	6	7	8	9
1 age	-								
2 Female	.19	-							
3 POC	-.24	-.12	-						
4 <u>Income ln</u>	.06	-.13	.03	-					
5 SWLS_M	.07	.03	-.09	.15	-				
6 PE_M	.06	-.01	-.01	.24	.72	-			
7 NE_M	-.21	.13	.01	-.01	-.42	-.36	-		
8 <u>Depression M</u>	-.20	.05	-.05	-.07	-.50	-.50	.80	-	
9 <u>Anxiety M</u>	-.24	.11	-.04	-.09	-.45	-.44	.89	.88	-
10 <u>Isolation M</u>	.14	.16	-.03	-.06	-.08	-.04	-.10	-.07	-.12

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

	Model	χ^2	<i>df</i>	<i>p</i>	RMSEA	90% CI	FI	CFI	Model Evaluation
Life Satisfaction	Configural/Pattern Invariance	1793.02	88	.000	.141	[.136, .147]	.828		
	Weak>Loading/Metric Invariance	1795.77	96	.000	.135	[.130, .140]	.828	.001	Pass
	Strong/Scalar/Intercept Invariance	1811.31	104	.000	.130	[.125, .135]	.828	.001	Pass
	Strict Invariance	1818.25	114	.000	.124	[.119, .129]	.828	.000	Pass
Positive Emotions	Configural Invariance	388.49	25	.000	.122	[.112, .133]	.941		
	Weak Invariance	393.58	29	.000	.114	[.104, .124]	.941	.000	Pass
	Strong Invariance	404.14	33	.000	.108	[.098, .117]	.940	.001	Pass
	Strict Invariance	410.02	39	.000	.099	[.090, .108]	.940	.000	Pass
Negative Emotions	Configural Invariance	221.31	25	.000	.090	[.079, .101]	.971		
	Weak Invariance	234.03	29	.000	.085	[.075, .096]	.970	.001	Pass
	Strong Invariance	238.59	33	.000	.080	[.071, .090]	.970	.000	Pass
	Strict Invariance	266.31	39	.000	.077	[.069, .086]	.967	.003	Pass
Depression	Configural Invariance	917.66	25	.000	.192	[.181, .203]	.875		
	Weak Invariance	960.80	29	.000	.182	[.172, .192]	.869	.005	Pass
	Strong Invariance	981.06	33	.000	.172	[.163, .182]	.867	.002	Pass
	Strict Invariance	1042.79	39	.000	.163	[.155, .172]	.859	.008	Pass
Anxiety	Configural Invariance	434.63	25	.000	.130	[.119, .141]	.937		
	Weak Invariance	452.59	29	.000	.123	[.113, .133]	.935	.002	Pass
	Strong Invariance	473.23	33	.000	.117	[.108, .127]	.932	.003	Pass
	Strict Invariance	505.82	39	.000	.111	[.103, .120]	.928	.004	Pass

Notes. These analyses used a FIML estimation based on $N = 972$. A relative model pass was determined based on ΔCFI being $< .01$

Supplement C: Latent growth curve models

Latent growth curve models		Intercept		Slope		Model Fit		
SWB indicator	models	Mean (<i>p</i> -value)	Variance (<i>p</i> -value)	Mean (<i>p</i> -value)	Variance (<i>p</i> -value)	$\chi^2(df, p\text{-value})$	RMSEA (90% CI)	CFI
Life	No growth	.20 (.001)	28.60 (.000)	N/A	N/A	1808.13(116, .000)	.123[.118, .128]	.829
Satisfaction	Linear growth	-.25 (.000)	32.12 (.000)	-.07(.282)	.14(.584)	1804.87(113, .000)	.124[.119, .129]	.829
	Latent basis	3.94 (.000)	52.54(.035)	-.07(.298)	.54(.300)	1804.77 (112, .000)	.125[.120; .130]	.829
Positive Emotions	No growth	.07(.133)	6.94 (.000)	N/A	N/A	409.12(43, .000)	.094[.085, .102]	.941
	Linear growth	.30 (.000)	7.45 (.000)	.06(.186)	.06(.526)	406.75(40, .000)	.097[.089, .106]	.941
Negative Emotions	Linear growth	.50 (.000)	10.44 (.000)	.04(.289)	.23(.051)	398.21(39, .000)	.097[.089, .106]	.942
	Latent basis	.10(.028)	7.98 (.000)	N/A	N/A	297.52(43, .000)	.078[.070, .087]	.963
Depression	Linear growth	.77 (.000)	8.94 (.000)	-.20 (.000)	.12(.177)	273.17(40, .000)	.077[.069, .086]	.966
	Latent basis	.28 (.000)	9.33 (.000)	-.23 (.000)	.18(.047)	270.24(39, .000)	.078[.069, .087]	.966
Anxiety	No growth	.02(.347)	.70 (.000)	N/A	N/A	1047.48(41, .000)	.159[.151, .168]	.859
	Linear growth	.04(.157)	.72 (.000)	-.05 (.000)	.004(.822)	1021.99(38, .000)	.163[.155, .172]	.862
	Latent basis	.10 (.000)	.73 (.000)	-.05 (.000)	.01(.738)	1021.73(37, .000)	.166[.157, .175]	.862
Anxiety	No growth	.28 (.000)	8.54 (.000)	N/A	N/A	509.21(43, .000)	.106[.098, .114]	.928
	Linear growth	.44 (.000)	11.09 (.000)	-.17 (.001)	.27(.033)	489.60(40, .000)	.108[.099, .116]	.931
	Latent basis	2.52 (.000)	10.10 (.000)	-.20 (.000)	.16(.228)	487.96(39, .000)	.109[.100, .118]	.931

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

Predictors	Life satisfaction		Positive emotions		Negative emotions		Depression		Anxiety	
	β	95% CI	β	95% CI	β	95% CI	β	95% CI	β	95% CI
isolation between person	-0.16	[-.23, -.09]	-0.14	[-.21, -.06]	-0.23	[-0.30, -0.16]	-0.20	[-0.26, -0.14]	-0.16	[-0.23, -0.09]
isolation within person	.00	[-.02, .03]	.04	[.02, .07]	-0.02	[-0.05, 0.00]	-0.04	[-0.06, -0.02]	-0.02	[-0.05, 0.00]
demographics										
age	.04	[-.02, .11]	.10	[.03, .17]	-0.09	[-0.15, -0.02]	-0.10	[-0.16, -0.03]	-0.12	[-0.19, -0.06]
female	.03	[-.03, .10]	-0.04	[-.11, .02]	.02	[-.04, .09]	-0.01	[-.08, .05]	.07	[.00, .14]
POC	.02	[-.04, .09]	.06	[-.01, .13]	.24	[0.18, 0.30]	.22	[0.15, 0.28]	.17	[0.10, 0.23]
income	.19	[.13, .25]	.21	[.15, .28]	-0.02	[-.08, .05]	-0.01	[-.07, .05]	-0.04	[-.10, .03]
Model fit	$\chi^2(df, p) = 2128.86(230, .000)$ CFI = .834 <u>RMSEA</u> [90% CI] = .093[.089, .097]		$\chi^2(df, p) = 635.22(113, .000)$ CFI = .933 <u>RMSEA</u> [90% CI] = .070[.064, .075]		$\chi^2(df, p) = 486.49(113, .000)$ CFI = .956 <u>RMSEA</u> [90% CI] = .059[.054, .064]		$\chi^2(df, p) = 1247.31(114, .000)$ CFI = .844 <u>RMSEA</u> [90% CI] = .102[.097, .107]		$\chi^2(df, p) = 753.40(113, .000)$ CFI = .920 <u>RMSEA</u> [90% CI] = .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

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

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)

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