# CSC110 Project Proposal: Your Anxiety During COVID-19

Fardin Faruk, Sharon Hsieh, Sinan Li, Jeffery Zhan

Friday, November 5, 2021

## Problem Description and Research Question

Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), commonly known for causing the illness COVID-19, spread wildly after its emergence in late 2019 (Britannica, T. Editors of Encyclopaedia, 2021). Following its discovery, society as we knew it was upended, and countries went into lockdown. Individuals were required to stay home to prevent the spread of the virus, restricting any socializing to very minimal interactions with others. Tested by working from home, unemployment, lack of social connections and many more challenges, many individuals found it challenging to adapt, making them especially vulnerable to mental health complications (World Health Organization, 2021).

While COVID-19 has proven challenging to combat, Canada has put forth their best efforts to prevent the spread of the virus, becoming one of the top vaccinated countries in the world (Mathieu et al., 2021). Despite social regulations having been eased, many of the psychological effects linger. In fact, mental health has become such a prominent concern due to the pandemic that analysts at The National Institute of Mental Health now describe online therapy as essential (Prout, 2021).

There is no doubt that the onset of the pandemic affected everyone differently — some found it easy to adjust, some struggled to do so, and many experienced some combination of the two — all for varying reasons. We would like to measure these differences quantitatively. Thus, we decided to research and answer the question: what is the relationship between one's identity and the degree to which COVID-19 has impacted their mental health?

Our research will examine various traits that the subjects of the survey have, such as their education level, marital status, gender, and age, then compare their surveyed response to the pandemic alongside their traits and identities to determine a relationship between certain identity groups and the socio-psychological effects COVID-19 has had on them. From the results, we will ascertain which types of people are more susceptible to psychological issues due to the pandemic. We believe that this data can be applied to strengthen mental health resources and allow for more specialized and efficient care.

# Dataset Description

COVIDiSTRESS Global Survey dataset on psychological and behavioural consequences of the COVID-19 outbreak (Yamada et al., 2020) is a survey which was organized by researchers in over 90 universities across the globe, investigating the mental health conditions and personal views surrounding COVID-19. It was conducted during the first major wave of the pandemic, and the responses of approximately 125,000 participants aged 18 and over, ranging across 42 countries, were recorded through this survey. The data is stored in a .csv file with each row containing information about a single person, including their gender, age, occupation status, marital status, and more. The file also includes each participant's responses to a broad range of questions posed on the survey about COVID-19. These questions range from questions about the individual's support systems to questions about how they obtain information about COVID-19. Most questions were answered through a six-point Likert scale, which will help us to quantify each participant's responses.

## Computational Plan

Our computational plan is composed of three stages:

• Stage 1: Read the data from the CSV file containing the test subject's information and responses

Dunation, in on Personal Cube Union Co.	ton our from number	Seri, edu	Sen, edu, mare	Name and Advanced	Contra Sea S	and From whole	Own merioblehin	Own do Com cistama	New Address	From to From 1	nde All pain	African Africano Busin Million Co.	N I THAN BEEN LIVE A	A free MINA OF A	Torre BERN 1971 A	A Bree Mills of a	Total BEEN LIVE A	A free man or a 1	Total BERN INTA B	Budy Mills 107 h	The BEST OF A 10	hade M CM II	Seek BOW 5		2000 march 1 00	TO words I Office book	officer I COOK hardle
1 100 2021-05-00 22-47-77 GMD	29 Female	College degree, bachelor, master	Some College or equivalent	Scramphood	Aspetine yes	Sourcin	Single	0.70	boined	4		NA NA	5	1	5	4								1.7	94. 794.	194	50
₽ 8100 2024-05-29 28:00-15 UR	20 Male	Gollege degree, bachelor, master	None	Shurlant	Pakistan yes	40-0622E-0600	- Groje	0 Yes	Life carries an with minor changes	NA NA	Program A I		3	8	1	4	2	5 4					- 1	3	3	46	5
9 127 2929-06-90 22.4035 SAR	47 Female	Sums Cathiga, short continuing education or equivale	ford: Stome Curtings or equivalent.	Set-engitived	Aspetina no	CGrados	Single	0 No	board		2 NA 2		NA.	NA .	NA.	NA .	NA.	M	NA.	NA .	NA.	e .	101. 1	94. N	94. 194.	. NA	NA
4 1710 2020-06-2032-4717 86	79 Male	College degree, bachelor, master			Sulpeta no	Levenh	Disynatividesed	0 Vm	Life services are with minor changes			Program D. No.	3	4	3	8	3	5 2			4			- 4	4		9
5 2229 2525-05-25-22-4230 SAR	Of Female			Retired	Argentina no	Mendosa	Manadomoting	0 No.	board		2 Program A 1	NA. No. Present B. No.	3	9	z NA.		3 194.	5		MA.			1 1	94.			
6 1331 3020-06-39-31-36-09 IT	SI Male 29 Other house contract over	College diagner, banhalar, master say: Some College, what continuing education or equivale	College degree lant Some College or equivalent		Rely no	Sparie Chubut	Other or would safely set on	0 144	Life series on eith miner shanges	- 1	1 Program A 1		1	9	3	4	4	9 4									- 1
8 162 203 05-25212557 585	29 Ottomica cratical no.	So to 12 maps of school	Up to 12 years of school			Drive Size	Married substition	1 %	Life samples are with minor observers.			Power 2 No		2												- 1	
8 100 000 000 11 to 0	20 Female	Outrage despise, beathers, mader		Full time employed		Panent	Managompho		The tartes or with more changes		2 Program III 1		1									- 1		- 1	- :	- 1	-:-
18 144 202-05-20-20-41 5MD	20 Permis	College degree, bachelor, marker			America on	La Tirria	Manageoraphy	1 %	brieferi			Person D. Net sure		4	5		1	5 2	- 1			- 1		5 10	94 194		NA.
55 600 2020-03-00 20 14 00 SWI	42 Female	Other more, buttery, mater	Victo 12 years of exhed	Full time amplicated	Aspetine no	Contribute	Manadomotro	1.16	normal	4	2 Program A 1	Mr. No	2	2	2	2	2	2 5						2.79	95. 795.		,
12 1365 2025-05-29-20-18-15 SWN	31 Female	College dagree, bachelor, master		Full time ampliqued		Terra del Sego	Single	0 16	bristed		2 Program S I	NA. No.	2		4	4	3	5 3						3	4	4	
19 2271 2509-05-90 2022/30 SAN	42 Female	Up to 8 years of school		Full time ampliqued		Fanene	Manadonioting	4 10	M	NA NA	101	NA NA	3		3	9	s										
64 965 2020-06-20 10-66-60 SW1	40 Female		land. Up to 12 years of school			Baria Fe	Single	2 No.	Life sarries on with minor shanges	9	3 Program II I		1	9	2	4	4	2 4						- 1			
15 504 2020-05-30 10-47-45 SAG	35 Female	College degree, bachelor, mader	None	Not employed	Parama no	NA .	Maniedonioting	2 %s	board			Program 6 No	3	2	3	4	3	4 5	- 6		,			3 H	94. 194.	. NA	NA NA
18 TH 2020-00-20 TO-ET DE TANK 19 1005 2021-05-30 TO-20-40 GME	60 Male 60 Ferrale	PiG/Decimile PiG/Geometre	Some Callege or reproduct Onlings degree	Full time employed Retired	Aspertina NA	Serie Fe Ouded de México	Manied scholating Manied constiting	0 No.	Life series on with minor shariges.  Life-content on an usual	- 1	2 NA I	Pegan S No NA Not our	3	3	4	4	3	4 1						- 4	-		
NP 1005 2021-05-00 10:00-05 GAS	00 Female 10 Female	PhD/Ecctorate Up to 12 years of solved	College degree Up to 9 years of school	Retired	Mexico yes	NA NAME OF THE PARTY OF T	Manadonabing	2 Not sure	Life contine on an unual Life contine on with minor changes	- 1	2 Program II I		1		1	6	5					- 1	1	- 1	- 16	- 4	- 19
18 20 200 TOTAL TOTAL SHE	00 Female	Spring St pears of exhaut	Spite Fyeen of exheat		Aspetitos no	Contribute	Overselvitered	2 701 001	Life-carries on with minor changes			10. 10. No.	*			*						- '	. 1				
20 TET 2020-06-20 MATES 500	Si Pemie	Up to 12 pages of school	Up to 12 years of school		Aspendia in	Selte	Other or email selver not so	0.00	Life series on with minor changes			Propert D No	1														4
E1 1940 2020-05-00 10:01:29 SAN	20 Female	Pricitoctorate	Some Cortege or equivalent		Meso ro	Estado-de Ministra	Single	1 10	borne	- 1	8 Program A 1	96 96 96	195	50	194	50	194	50	196.	50	196.		100.	e. 19	96. 196.	. 196	10
29 YOAT 2020-00-20 YOAT OF SAME	60 Female	PiG/Darlanda	Up to 6 years of school	Related	Mexico no	Citation de México	Disposed historical	0 Vm	Indianal	- 1	2 101	Propert S. No.	1	5	3	4	4	1 2						- 1		16	
ES 1004 2509-05-09 10:00:27 FR	29 Female	PhD boctonie	Up to 9 years of school			No de France	Maniedronibiting	0 No	Life-carries an with minor changes		8 Program A 1		3	4		4		9 4						3		9	
24 265 2020-06-26 17-27-10 2650	67 Female	Some Callege, what continuing education or equivals			Mexico res	CONOX	Divorant/solonant	1.16	Installed in residual bacility of stroke lineals		2 NA I	Pegan S Net sure NA NA	2	2	2	4		2 8				- 1		- 1			2
BS 1427 2929-05-29 17:05:09 SAR	60 Female	College degree, bachelor, master	Up to 12 years of school		Argentine no	anthe rice	Maniedronibiting	0 Yes	Life-carries an with minor changes				1	2	t .	4	4	2 4			2				16	,	19
N 616 2020-06-30 163666 SAN	65 Persole	PiC/Doctorale			Messo yes	Apanointes	Married substiting	2 %	Indialed			Propert D. Relieure	4	3		4	1	3 4				-	- 4	- 1			10
8P 1000 2029-05-90 10:00:02 GWN	49 Female	84	Up to 9 years of school			Neugum	Single	2 No	Life-carries an with minor changes	2	1 Program A I		3	2		4	4	2 5						- 1			
26 UTD 2024-04-29 M-00-29 SAN 26 907 2025-05-30 T0-28-9 SAN	55 Female 66 Female	College degree, banholor, master Some College, short continuing education or equivale	Up to 9 years of select			Panané Córéite	Marketinohelding Other or would rather rad as	5 16	Life contex on with minor changes		4 Program A I					4	4						- 1				-
29 907 2020-05-00 10:00:00 SAR 30 147 2020-06-00 16:20:40 SAR	64 Female 55 Female	Some Callege, what continuing education or equivale Some Callege, what continuing education or equivale			Argentina no Argentina no	Controls Controls	Other or would rather rad as Married inchesting	1 16	between in with mino charges	- 1	2 NA 1	Proport No.	100	*			100				2			1			- 1
m 100 200-0-0 120-0 00	00 Female	Orlege degree, bachelor, mader	Up to 12 years of school		Supporting no		Discontinuously Discontinuously	9 760	Life-carries on with minor changes		8 Program 0 1	NA. 104 MA				4			-	-		-	-	- 8	- 14		
32 1013 2020-00-20 TA-41-00 TA-91	SS Mar	College dayree, bachelor, master	State 12 years of school			No.	Marindonhaldina	2 %	hister	2	1 10	Propert C No	2		2	a						- 1	2	2	- 1		- 1
99 211 2929-05-90 10:00:00 EN	47 Female	Vip-to 12 years of school	Up to 12 years of school	Screngisped	Remarks yes	NA.	Ovocadividened	5 No	Life-carries an with minor changes	NA NA	NA 1	164. 164. 504	NA.	NA.	NA.	NA.	NA.	MA.	NA.	NA .	164.		166. 1	e. 16	94. 194.	NA.	MA
SM 690 2020-08-29 16-08-12 KD	33 Female	College degree, bashelor, master	Cultrar dwares	Full time employed	United States yes	Stema, Vegeta	Single	0 No	Life sardes an with minor changes	NA NA	NA I	Pagan 2 Notare	3	3	3	3	2	2 4					4	4			3
96 1171 2929-05-29 10 11 29 GME	00 Female	PiO/Soctorite	Up to 6 years of school	Full time ampliqued	Parama yes	universidad santan	x Single	0 No	bolated	0	8 Program 0 I	NA. No.		0	1	5	s	2 5			2			- 1	- 6		
36 TEST 2008-08-30 TE-10-69 SWFI	T3 Persole		land. Op to 9 years of school		Aspetina no	Mendias	Mantedoutsbilling	1 %	Life-santes an with minor changes			Program C Ro	3	3	3	3	3	2 3					- 4	- 4		,	4
Nº 1775 2929-05-90 1509-27 00	At Female	Up to 12 years of school	Up to 12 years of school		Sulgaria no		Manadonabing	1 No	bolesd		8 Program 6 I			4	s	0		0 2								8 164	
38 1031 2008 06-09 16-68-20 185 39 807 1979-75-39 14-68-20 180	50 Female 52 Semale	College dayree, banhalor, master	Some College or equivalent		Bilgaria no	NA .	Manied inchesions Manied completing	1 No.	AA. Life range or with minor changes	1 50	Program III		3	9	3	4	4	2 2					2	2 10	u.	3 166	MA
88 807 2020-05-05 14-84-78 5467 88 902 2020-05-28 14-82-20 78-88	52 Female 55 Female	Some Carlege, where continuing education or equivale Carlese discress, basiness, master	Serie Curings or equivalent Series Europe of series			Sans Fe	Manadonabing Other or equal safety and as		Life carries on with minor changes Life carries on with minor changes		Program A 1	NA No Propert D Yes	4	9	4	4	3	9 9									
# 60 200 0 11 12 10 10 10 10 10 10 10 10 10 10 10 10 10	All Personale All Males	Orlinge diagree, bashelor, master (MCNOchaste)	Up to 6 years of school (in to 12 years of school		America co	Sarra to	Other or annual nativer and so Observative forward	3 %	Life savies on with minor changes.	- 5	B Browner A 1		2		3	4									,	-	-
# 100 200-00-01 1435-00 (MH	60 Persola		top to 12 years of school and Starto 12 years of school			Lincia	Districtioned	1 100 sure	Life carries an with minor changes	2	I NA I		100	2		*	*										
48 1155 2029-05-29 14:00:04 00	00 Ferrale	Up to 12 years of school	Up to 9 years of school			4348421-51968		9 No	Life-carries an with minor changes			Pagan P Net aus	4			4								,	,		
66 100 200 00-01 H 30-01 SM	60 Persole	College degree, bashelor, marker	State 12 years of subset			BETADO DE MERO		2.76	Life cardes an eith money changes		2 Propert A 1		2	2		2		2 4				-		2		1.76	
45 0540 2021-05-30 14:50:09 540	60 Female	Vip.to 9 years of school		Believi	Aspertine no	NA.	Ovorsethideset	1 No	University or with minor changes		8 Program A I	NA. No.	3			5		4 5				-		4	6	2	
48 1000 2020-00-29 14 15-08 SMS	00 Male	PIC/Doctorde		Full time employed		Teraprus	Manadoutsburg	3 %	balled		2 101 1	Pagan 2 No	3	2	2	4	4	2 4						- 1	,		
4P 1990 2929-05-29 14 15:00 GAG	40 Male	PhDrioctuste	Up to 8 years of school	Full time ampliqued	Panama no	Fanene	Manadonabing	9 No	Life carries an with minor changes		1 Program 0 I		3	0	3	5	4	9 4							- 5		9
48 821 2020-00-20 TA-63-00 SANS	SS Male	PiG/Doctorale	Up to 12 years of solved	Full time employed	Persona no	Panama	Marindisshubiling	3 101	Life samles an with minor shanges		3 NA 1	Program D. No.	1		3	4		1 4					1	- 1	,		2
## 1457 2503-05-29 10-40-45 0G	50 Female	Sp-to 12 years of school		Self-employed		45-8422-5-848	Maniedronibiting	1 16	Life-carries an with minor changes			Paganit Nittaus M	164.	SA.	NA.	SA.	HA.	NA .	NA.		5		100. 1	et N	64.		2
86 714 2020-00-20 13 14:00 80 84 644 2020-05-30 12:05-13 540	10 Persula 20 Ferrula	Op to 9 years of subsoil	Cultege degree	Belt-employed	Bulgaria yes	ALIGHT HARMON		0 %m	Life carries on with minor changes Life carries on with minor changes	3 NA	Program A 1 9 NA 1		1	4	4	3	3	2 4				-	-	- 4	-		
81 014 2021-05-00 12:00:19 040 82 2690 2021-05-09 12:00:00 1840	25 Female 25 Mars	Some College, when continuing education or equivale College degree, backetor, master	Serie College degree	Student	Aspetine no	Oneco	Strope Managiouspidino	0 No.	Life-comins on with minor changes Life-comins on with minor changes		3 NA I	Pegan 9 No	1			2		4 8						- 1		- 1	
50 500 203-05-05 13.00 5A8 50 500 203-05-05 13.00 5A	St Male No Ferrois	College degree, backets, mader Sin in 17 years of school	Up to 8 years of exhaut			NA NA	Manadourubitro	0.00	Life carries an with minor changes.		1 No I		1		3	4		2 8	- 1			- 1		- 1	- :	- :	
W NEW TOTAL TOTAL II	25 Female	Other degree, buthelis, mader		Full time employed		Basses	Manadomono	2.70	Life-sames an with more changes	10 10	Program A 1		,											- 1	- :	-	
55 1165 203LOS-29 12 2016 THE	67 Female	Colons downs, burbalos master			Shinete yes	AND THUS DO	Discountivitement	0.30	bristed			Page 2 No.	3	4		Á						-					,
M 617 2001-01-00 12.21 07 SM1	Of Female	Spring 12 years of mateur		Full time employed	Aspettre no	Security	Manadomotro	2.76	Life-carries art with minor changes	2.30	101	70. 70.	2		9			2 2	,					- 4		-	
5P 675 2929-05-90 12:01.00 GME	29 Female	PiOrSoctorite	College degree	Full time ampliqued	Parama no	101	Single	NA No	Life-contine on an around	NA NA	NA I	Pagan 9 No	t		3	4	4									,	2
M 315 2009-08-30 13-00-79 5MF	61 Male	PiC/Distance		Full time employed		Clinbile	Mantedischsbring	0 Yes	bilded			NA NA NA	196.	M	NA.	M	NA.	M	NA.	M	NA.	a	101 1	9. N	94. 194.	. 194	M
58 1994 2929-05-29 12 1951 DG	52 Female	Vip-to 12 years of school	Up to 12 years of school			454849-54940		0 No	Life-carries an with minor changes			Pagan 6 Notava	1	0		0		9 4					4		4	16	19
88 NOT 2020-00-20 11.06.18 SWY	61 Persola 50 Ferrola	Same Callege, short continuing education or equivale	and Op to 12 years of school	Mind	Aspetina no	Drive Nice	Single	0 Ym	Life santes an eith mone changes	- 1	3 Program A 1		1	2	1		1	2 1					1	- 1	,		
84 08457 2024-05-20 10:21:57 GME 82 900 2023-03-20 11:20-42 SME	SS Female SS Male	Up to 12 years of school	None Sume Cultige or equipment.	Self-employed	Nation no Parama no	Nemona medico	Manusionaping Manusionaping	4 Yes	boland	- 2	4 Program A I		3	4		6	4	5 5						,		- 4	19
62 909 2020-03-01 11.29+0 SAN 60 2020-05-29 11.02+5 SG	All Farmers	PRO/Doctorate College degree, barheler, master	Some College or equivalent Some College or equivalent	Bet-englished	Persona no	ALERYA-ILERA	Manadomotro	3 No.	Life carries on with minor changes Life carries on with minor changes		1 50 1	Propert Str.	1	2	3	5	4	2 4					1			- 1	
M 90 200-0-211223 F	20 Female	Other depre, bather, mater	Store College or equipment		Guigara no		Manadomono	3.50	Life-carries an with minor changes	NA .	1 Program A 1		:											- :		- :	-:-
66 003 203-05-01-12-29 H	55 Person		Store Cultege or equivalent. lant. Up to 6 years of school		America co	Buence-kines	Manadonabay	1 %	heart	1.0		Pagan S No	2			4							1	3		- 1	
98 SM 2000-00-10-0007 FI	30 Female	Some College, what continuing education or equipals	and So to 12 years of school	Full time employed	Friend no	Unimee	Tirque	0.96	Life savies an eith minor changes		2 Program A 1		2	2	2	4		4 2				-		- 1		,	
MP 1001 2001-05-29 10-47-09 0G	55 Female	Some College, short continuing education or equivale	ant. Up to 12 years of school	Student	Outparis no	43480-5494	b Dispendividened	NA No	Life-parties on an anual	NA NA	NA I	Pagan 9 Notava		0		4		2 5									9
88 868 2020-08-30 10.34.29 PM	66 Persole	College degree, bachelor, mader	Cultege degree	Sci engloyed	Resis no	NA .	Divorsed indused	2 %	billed		1 Pogun A 1	195. The	3	4	3	4	2	3 4				-	4				
88 6001 2028-05-30 12:15:25 60G	75 Female	Gollege diagner, bachelor, master	College degree	Set employed	Brigaria no	4040421-44400		0 No	bolesd	0	9 NA 1	164. 164. 504	164.	NA.	164.	NA.	164.	M	164.	MA.	164.	e.	166.	94. N	64. 164.	. 164	NA
76 700 2000-00-20 00 State 800	18 Persole	Op to 12 years of exhaut			Sulperia no		Other or would rather red as	0 %	Life-carries an with minor changes		2 Pogram A 1		3	2	3	4	3	4 3					1	3		_	
2N 1165 2024-05-20-05-41 SAR 72 000 2020-05-00-00-42 SAR	A2 Female 07 Female	Gologe degree, barhelor, master 10:10:12 ream of echool		Full time ampliqued Retired	Mexico no Aspetina no	Cluded de México Contribu	Single Managomptino	0 No.	board board	1 10	9 NA I	Pagan S Net sus	3	2	3	6	s	4								-	
75 900 2008-00-30 00:34 AZ SARI 79 155 2008-05-30 00:300 5MR	67 Female 68 Female	Op to 12 years of school		Mind	Aspetina no	Contrate	Standoniotry	7 No.	board			10. No. No.	4	2	9		1 100	2			4					5	- 1
N 100 200 00 00 00 00 00 00 00 00 00 00 00	ST Male	Oping System of school Opings degree, bachelor, marker	None Up to 12 years of school		Macco yea	Michigan	Single Single	0 10	Life-carries on with minor changes		2 Program A 1		-	NA.	na.	NA.	na.	NA .	na.	MA.	na.		run I	w. N	. 14	164.	NA.
N 00 200 00 00 00 00 00	AD Female	PG/Desirate	Some College or equivalent			Bring Nam	Single Single	2 %	Life carries on with minor changes			Person D. M. M.	100.	MA.	166.	No.	166	MA .	166	No.	166.		100		u '		NA.
N 100 200 0 200 0 20	00 Person	Outros despes bashelos mader	Some College or equipment			1010071-151000		NA NATION	M	10 10	Program A 1		,	2	1									1 10	9.	-	10
27 0000 2004-05-30-08-09-55 540	AT Male	Some College, short continuing education or equivale	and 10p to 12 years of school	Part time ampliqued		Serials	Manadonabiling	4 16	boland	1		Program 9 No	e .		4	5	s							1 10	64. 164.	164	NA.
TW MY 2009-09-07-60-68 SAN	25 Female	Cuttege dagree, bachelor, master	Cultings degree	Bet-engityed	Minoso no	James	Manadomotro	0.764	board		2 Pogun A 1	19A 76a	3	5	3	2	3	2 4					4	4		**	
79 900 2024-05-30-67-05-09 90	56 Female	Some College, short continuing education or equivale	lant Some College or equivalent	Patitine amplique	d Sulgaria no	40.041-45-000	Manadionabiling	2 No	bolated		9 NA 1	Propert C No	3	8	3	4	3	4 4							4		
88 1347 2028-00-30 0130-030	ST Female	Outrige degree, bushelur, mader	Up to 12 years of school	Shows	Sulpeta no	4U-0497-4U-0408	Manadomotro	0 Yes	Life-carries an with minor changes		3 Pogram A 1		3	2	3	5	4	2 5									5
84 A30 2024-05-29-01-06-05 BIG	58 Female	College degree, banhelor, master	College degree	Shudeni	NA no	-U-84WU-844	V Single	A No	Life series on with minor changes	0		Propers C. No.	2	2	3	8	4	2 3				a	3	3	3	3	4
M2 1340 2020-06-06-07-7036 06	Of Female	PiOrtocardo	Up to 12 years of school		Sulgaria no	-U-0421S+048		9 Yes	Life-carries an with minor changes	9	2 NA 1	Program 2 No	3	2	3	5	3	2 5								16	
82 811 2020 OF 30 00 40 67 58F	26 Female 65 Semale	Up to 12 years of school	Up to 12 years of school	Not employed Extrins employed	Aspetina no	Contentes	Single	0.00	Life series on with minor shanges	- 1		NA. NA.	4	4		9	2	3 3			- 4	- 4				- 1	4
84 1014 2020-05-05 CT-02-78 06 85 850 2020-05-70 05-00-70 580	65 Female 50 Female	College degree, bachelor, master  College degree, bachelor, master			America co	Serta Fa	Chocadividosed Spok	0.10	Life-carries on with minor changes beliefed	2	2 NA I	Program 9 No No. No.	1	2				z 5			,	- 1	-	- 1		- 1	- 1
# 60 2010 2000 000 000	50 Female 30 Female	Orlege degree, barheler, mader	None		Aspertine no	Serio Fe	Single Single	0 No	bolated bolated		3 Program A I		1	1		2								5			
# 115 105-03-01-013734 EA	20 Female 23 Male	Some College, blackets, mader  Some College, what continuing physicism or proving			America on	Mentions	Disperior	1 %	Life carries on an areast	- 1	2 Property I		1									- 1		- 1			- 1
# 207 203-01-20 1227 Set	20 Female	Some College, shall continuing advantage or agurant				Contribute	Stron	1 %	Solding of the sound			Prepared MA MA	100		100		104				104						
B	30 Person	Some College, shart continuing education or equivale				Sole	Marindonnestro	2 Ye	Life carries or with minor changes	10 10		NA NA	4 796	MA.	166		2	4 2		MA.	166			g. 16	9. 19.		NA.
M 947 2020-00-00 1040 96	45 Female	Some Curlege, what continuing education or equivale				43-04715-040		2 %	borne			10. 10. NO	11	5 50		2	7 794		795.	10				9.		,	
BH 681 2020-06-29-06-07-68 CM	67 Male	Same Callege, when continuing education or equivale	land. Up to 12 years of school	Full time employed	Deman yes	Homens	Managinehabiling	0 Vm	Life service on with minor changes	NA NA	NA I	Propert D. No.	3	5	3	4	4	2 1						- 1			10
NO 506 2929-06-30-64-20-83 GG	50 Female	Some Callege, short continuing education or equivale	late NA	Student	Shitparts no	-U-0410S-040	Divocadividored	0 Yes	Life-carries an with minor changes	0	8 Program A 1	NA NEEDO	3	6	3	5	4	9 4	NA.						- 5		9
82 667 2020-06-30-04-26-47 504N	18 Female	Some Callege, when continuing education or equivale	land Stome College or equivalent	Dustri	Aspetina no	Saurain	Single	0 Yes	Life series on with minor shanges	4	2 141 1	Program D. Van	4	4		2	2	6 2							3	1	
M 2270 2929-05-29-04-52:30 DG	62 Female	College degree, bachelor, matter	College degree	Scramphood		-0.400-5-040	ti Ovorset/widowed	0 No	Life-carries an with minor changes	0		Program 8 Yes		2	1	6	4	2 4						- 1	- 4	6	
96 074 2004-06-30 04-27+9 DG	04 Female	Some College, short continuing advocation or equivale	ant College degree	M.	Sulgeria no	40-8420-41-94E		0 Yes	boleted	2	3 Program ()		3	2	s	8	3	4 2					- 4	4			19
97 1300 2008-06-28 04-27-29 29-8 97 1300 2008-06-20-61 5865	22 Female	Cottege degree, bachetor, mader	Up to 9 years of exhaut	Student	Oliva no	-U-856-U-556	Manadomoting	0 Yes	Life-carries an with minor changes	4	2 Pogram A 1		3	2	4	9	3	4 3			4						19
87 1320 2024-05-30 04-20-15 (SW) 88 200 2028-05-30 02-4007 (SN	52 Male	Some College, short continuing education or equivale	land. Up to 6 years of school	Full time amploped	Aspetine no	Dwee	Single	1 16	boleted		2 101 1	Pegan S No. NA. NA.	2	1	3	4	4	5 5					- 1				
M 100 100 CO CO CO CO CO	55 Female 31 Female	College degree, bachelor, master College degree, bachelor, master	Ochego degree Some College or equivalent			Country Fernance/Chij Nape		MA NO	Life-carries an with minor changes			NA NA NA Properti No	TAK.	MA.	NA.	MA.	NA.	M.	NA.	MA.	NA.		NR. 1	e. N	W. 194	194.	MA .
98 100 200 00 00 00 00 98 100 200 00 00 00 00 00	SI Ferrale SI Semale	Sales Orlege, short-ordering education or equivale					Single	2 %	bristed bristed	- 2	8 Brown D 1		1									- 1				- :	

Figure 1: Sample Data

- Create dictionaries categorizing each identity group (e.g. gender, age, etc). The keys are strings representing each identity group (e.g. 'Male', 'Female', or '15to19', '20to29', ...), and the value is an integer that measures an identity group's average level of anxiety. For now, initialize the values to zero.
- Read the data from the CSV file row by row.

### • Stage 2: Compute the data

- For each row, use the responses to calculate an anxiety score for the entry. Then, go through all dictionaries of every identity group, and add the total score of the entry to the corresponding identity groups. Keep track of the population of each identity group in separate variables.
- When all rows have been inputted, calculate the average score for each identity group using the total anxiety scores of the group divided by the population of the identity group.
- Find the maximum and minimum anxiety scores from every possible combination of identity groups, label them  $s_{\text{max}}$  and  $s_{\text{min}}$  respectively. Then calculate their difference,  $\Delta s = s_{\text{max}} s_{\text{min}}$ . This is the scale of anxiety levels based on the entire population.

#### • Stage 3: Display the data

- We will first represent the average anxiety level of each category of identity groups using a series of graphs. A user will be able to select which graph they would like to see using a drop-down menu. Attributes such as gender, education, and marital status will be visualized using bar graphs, while age will be displayed using a histogram.
- To make the program and experience more engaging for the user, allow the user to select certain identity groups from the menu. The user will be able to compare their mental wellness to not only the overall population, but also to the specific identity group(s) selected, which will be done through separate calculations.
  - \* To calculate the wellbeing of the individual, first calculate the individual's anxiety score by taking the mean of the anxiety scores of all identity groups relevant to the individual. Label the score  $s_{usr}$ . Then, the individual's relative mental well-being, r, can be calculated using the formula r = r

- $\left(1 \frac{s_{\text{usr}} s_{\text{min}}}{\Delta s}\right) \times 100\%$ . Display the output "You are less / more (depending on the percentage) likely to be anxious than r % of the population." Such ranking can be displayed graphically using a gauge.
- \* From a drop-down list, allow the user to select from all his/her identity groups, which allows the user to see his/her relative ranking in a certain identity group. For example, "You are less likely than  $r_2$  % of males in terms of being anxious.", where  $r_2$  can be calculated in a similar fashion to r, except excluding all other identities in the same group when finding  $s_{2,\text{max}}$  and  $s_{2,\text{min}}$ , essentially narrowing the calculations down to just the selected trait; e.g. if the user selects 'Male', the Female score is ignored in the calculations. Such data can be displayed using a progress bar indicating one's level of anxiety relative to the rest of the selected population.

An external library we will be using is PyQt5, a python package providing high-level APIs for the creation of cross-platform programs with a graphical user interface (Riverbank Computing Limited., 2021). Using the signal-slot design pattern, this Python variation of the C++ Qt library allows us to create interactive programs, which can take input from the user in a graphically interactive way – this fulfils the need of our purpose. Through this project, we will be using the QWigit class provided by this python package, with its subclass QPushButton as interactive buttons, QLabel as text display, QLineEdit as one-line text input, and many more to make the displayed interface organized and engaging. To plot the data, we will be using PyQtGraph, a graphing library designed for PyQt5 (pyqtgraph, 2021). Compared to other mainstreaming plotting libraries, this library provides a fast refresh speed for rapid plot updates, which allows the user of our program to experience low latencies when navigating between the plotted data of different identity groups. This graphing library was designed for scientific purposes, allowing the creation of various kinds of professional-looking graphs. All these properties serve the needs of our program. We will potentially be using the pyqtgraph.PlotWidget().plot(x, y) function to plot the data we want, or use similar functions depending on the type of graphs that need to be created.

### References

- Britannica, T. Editors of Encyclopaedia (2021, August 31). coronavirus. Encyclopedia Britannica. https://www.britannica.com/science/coronavirus-virus-group
- Government of Canada. (2021). https://health-infobase.canada.ca/covid-19/epidemiological-summary-covid-19-cases.html
- Mathieu, E., Ritchie, H., Ortiz-Ospina, E., Roser, M., Hasell, J., Appel, C., Giattino, C., & Rodés-Guirao, L. (2021). A global database of COVID-19 vaccinations. *Nature Human Behaviour*, 5(7), 947-953. https://doi.org/10.1038/s41562-021-01122-8
- Prout, T. (2021, July 8). The importance of mental health during a pandemic. *National University*. Retrieved November 3, 2021, from https://www.nu.edu/resources/the-importance-of-mental-health-during-a-pandemic/pyqtgraph. (2021). *PyQtGraph* (version 0.12.3) [Computer software]. https://www.pyqtgraph.org/
- Riverbank Computing Limited. (2021). PyQt5 (Version 5.15.6) [Computer software]. https://pypi.org/project/PyQt5/World Health Organization. (2021). #HealthyAtHome Mental health. https://www.who.int/campaigns/connecting-the-world-to-combat-coronavirus/healthyathome/healthyathome—mental-health
- Yamada, Y., Ćepulić, D.-B., Coll-Martín, T., Debove, S., Gautreau, G., Han, H., Rasmussen, J., Tran, T. P., Travaglino, G. A., Blackburn, A. M., Boullu, L., Bujić, M., Byrne, G., Caniëls, M. C. J., Flis, I., Kowal, M., Rachev, N. R., Reynoso-Alcántara, V., Zerhouni, O. . . . Consortium, C. O. G. S. (2021). COVIDiSTRESS Global Survey dataset on psychological and behavioural consequences of the COVID-19 outbreak. *Scientific Data*, 8(1), 3. https://doi.org/10.1038/s41597-020-00784-9