

CS171 Project Proposal:

Group Member: Guangyu Du, Lucy Yip, Runjia Tian

Project Name: A Lonely Story

Loneliness is a sad reality of modern societies. Whether voluntary into solitude or forced into loneliness, we live in a multi-dimensional space with numerous factors that influence our social connections. We hope to use this project as an opportunity to explore the multitude of the subject through referencing and comparing existing quantitative and qualitative research data.

This is subject to change.

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Abstract:

Modern day relationships exist in a multi-dimensional space, varying between orientations, levels of intimacy, legal arrangements, etc. We hope to use this project as an opportunity to explore the multitude of the subject through referencing and comparing existing quantitative and qualitative research data from numerous research publications as well as from open data platforms. [This is old]

Goal: To explore the trend in relationship systematization (focusing on the past decade) in relation to societal setting and affective manifestation. [This is old, too]

Initial Brainstorming Dataset:

Living / Family Arrangement Arrangement

- **America's Families & Living Arrangements** 2002 - 2017 (Source: United States Census Bureau)
 - <https://www.census.gov/data/tables/2016/demo/families.html> (replace "2016" with different years to get corresponding dataset)
- **Cohabitation rate and prevalence of other forms of partnership** Partnerships and cohabitation, 2011 Distribution (%) of people in private households by partnership status in current relationship and age group (Source: **OECD Family Database**)
 - <http://www.oecd.org/els/family/database.htm>

Relationship Formation / Structure

- Keyword trends, including **"Marriage"** **"Polyamory"** **"Loneliness"** (Source: **Google Trends**)
- **OSF Open Research Data-base:** Individual Demographic Differences of Individuals in Polyamorous and Monogamous Relationships (and related research)
 - <https://osf.io/6kbc5/>
 - Data (csv): <https://osf.io/6kbc5/>
 - Related: <https://osf.io/search/?q=Polyamorous&page=1>

Mental Health

- Mental Health & **Suicide** (Source **World Health Organization**)
 - https://www.who.int/mental_health/prevention/suicide/suicideprevent/en/
- Special Eurobarometer 248. Mental Well-being 2006 (Source: **Eu Open Data Portal**)
 - https://data.europa.eu/euodp/en/data/dataset/S502_64_4_EBS248
- **UK Over-65 Loneliness**
 - <https://data.gov.uk/dataset/0c6b32b4-2261-4820-9baf-843ae58f4ef4/loneliness-within-ls-0a>
- **Children's and young people's experiences of loneliness: 2018**
- **What characteristics and circumstances are associated with feeling lonely?**
 - <https://www.ons.gov.uk/peoplepopulationandcommunity/wellbeing/articles/lonelinesswhatcharacteristicsandcircumstancesareassociatedwithfeelinglonely/2018-04-10>

Team Agreement

Guangyu Du, Runjia Tian, Lucy Yip

- a. Although code will be written by individuals, all team members should be involved with the technical aspects of the project. All code should be documented well.
- b. Final design decisions will be discussed among all members; fair compromises should be made when necessary.
- c. Work hours should be split as evenly as possible (actual task output may differ based on individuals' ability / previous experience). This ensures not only fairness but also learning opportunity for everyone. We will keep each other accountable so that one person does not work too much / too little.
- d. Work will not necessarily be done together in person, but good communication via WeChat. Work may be done remotely as long as collaboration and communication are done well.
- e. To avoid variable conflicts, variables in code should be named using a prefix (initial).

Guangyu Du		11/09/2019
Print Name	Signature	Date

Lucy yip		11/09/2019
Print Name	Signature	Date

Runjia Tian		11/09/2019
Print Name	Signature	Date

Quote: Loneliness is defined as 'subjective distress'. It is the discrepancy between the social relationships you want and the social relationships you have.

Dilip V. Jeste, M.D.

New Abstract:

Loneliness is a sad reality of modern societies. Whether voluntary into solitude or forced into loneliness, we live in a multi-dimensional space with numerous factors that influence our social connections. We hope to use this project as an opportunity to explore the multitude of the subject through referencing and comparing existing quantitative and qualitative research data.

Goal: To raise awareness about the new global problem loneliness through exploring and systematizing it in modern day context, especially in relation to societal setting and affective manifestation.

WHY Loneliness - As a sad reality of modern societies, loneliness is a hidden yet **costly global problem**. Many countries have started to treat loneliness as an urban health issue, including the United Kingdom, the Netherlands, Australia, New Zealand, Ireland, Canada, the United States, Japan, and so on. Recently the United Kingdom even set up a new minister for loneliness to tackle isolation. According to Jo Cox Loneliness Commission, an estimated nine million Britons, fourteen percent of the population, are suffering from loneliness. The widespread of loneliness, faced by the children up to the elderly, has reflected the breakdown of social capital, initiated concern about our policy and social institutions, and challenged policy makers, planners, and builders to think about cities in new ways.

OBJECTIVES

We hope to raise awareness about the new global problem loneliness through our storytelling and data visualizations. Firstly, we would like to show the widespread loneliness across the world, and how it has increased since the past years (We are lonelier than before). We will also present key facts about loneliness regarding population characteristics and different regions. Secondly, we want to explore what are the reasons behind the loneliness in modern societies. We know that it's hard to weigh an emotion, especially when it does not have antonyms. So we choose to show the multitude of related factors and how they manifested in different countries. Thirdly, by comparing the lifestyles of those who report loneliness and ordinary people, we try to give some recommendations for alleviating loneliness. Finally, we present the global efforts (global funding, support centers) on loneliness so as to call for future actions.

DETAILED TASKS

- 1) Define loneliness and show worldwide key facts, characteristics (KFF Dataset, consider also combining EU data).
- 2) Show the phenomenon/trend that we are lonelier than before. (Economist. Snell, K. (2017))
- 3) Provide detailed insights regarding loneliness among multiple demographics (ESS EU-Dataset)

- 4) Compare the lifestyles of lonely group with ordinary group so as to give recommendations for alleviating loneliness.
- 5) Show global efforts (funding + promoting healthy social engagement)

Narrative Structure:

WHAT IS IT	WHY IS THAT	HOW DO WE DEAL
Definition [KEY FACTS] Population characteristics [POP] Phenomenon : Lonelier than before [DEVELOPMENT]	Reasons [DEMO] [WHERE & HOW MANY & HOW MUCH]	[Government Actions] Tips and Suggestions [Cigna]

Datasets:

EUROPEAN SOCIAL SURVEY DATASET

Centre for Comparative Social Surveys, City University London

format: csv

Source: <https://www.europeansocialsurvey.org/downloadwizard/>

Statistic Parameters:

Media use and trust

Politics, including: political interest, efficacy, trust, electoral and other forms of participation, party allegiance, socio-political orientations

Subjective well-being, social exclusion; religion; perceived discrimination; national and ethnic identity

Gender, age and household composition

Socio-demographic profile, including: type of area, education and occupation, union membership, income, marital status

Human values scale

Region

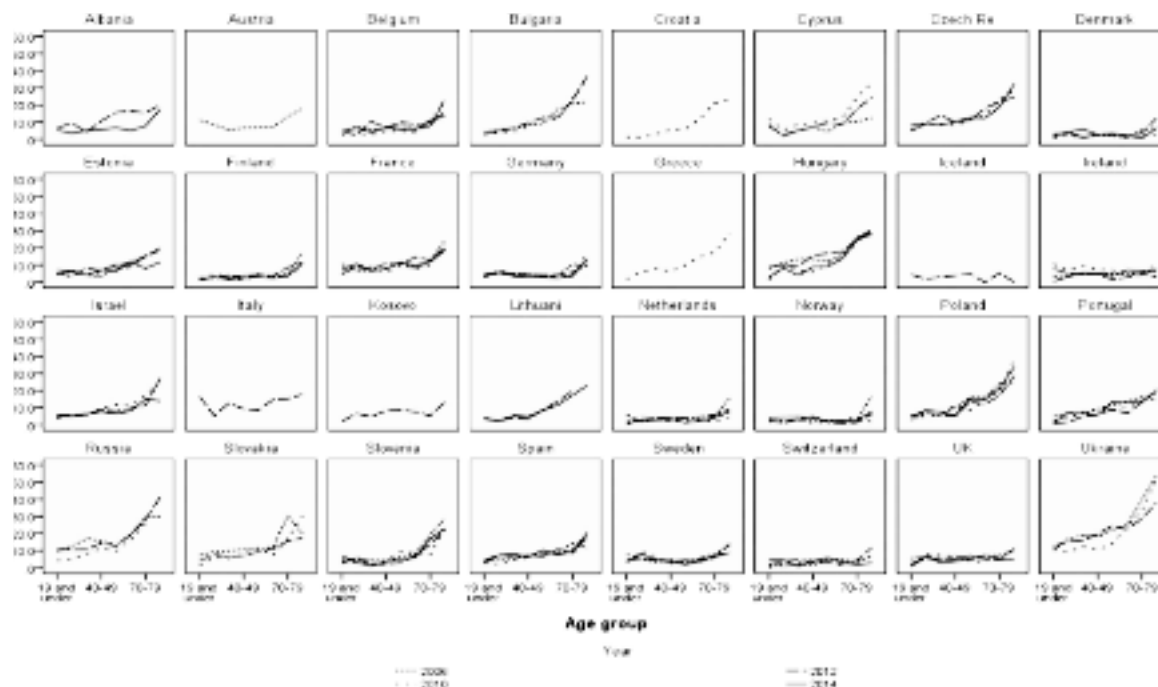
Administrative variables; interview time, administration of split ballot

Rotating modules

Cross-module replicated questions

Data Overviews:

PERCENTAGE OF 'FREQUENTLY LONELY' BY AGE GROUP, YEAR AND COUNTRY IN EUROPE



Yang, Keming. Loneliness (Routledge Advances in Sociology) (p. 50). Taylor and Francis
Source: ESS Dataset

KAISER FAMILY FOUNDATION/ECONOMIST THREE-COUNTRY SURVEY DATASET

Centre for Comparative Social Surveys, City University London

format: pdf

Source:

<https://www.kff.org/other/press-release/survey-one-in-five-americans-report-loneliness-social-isolation/>

Statistic Parameters:

- Status of happiness
- Satisfaction of current status
- Personal support network(relatives and friends)
- Membership of social group/organization
- Frequency of social activities
- Participation in health or wellness group
- Frequency of feeling loneliness
- Intimate confidant
- Meaningful connections
- Family belongings
- Friendships
- Awareness of loneliness as a public health issue

CIGNA LONELINESS AT EPIDEMIC LEVELS IN AMERICA DATASET

Cigna Corporation

format: pdf

Source:

<https://www.cigna.com/about-us/newsroom/studies-and-reports/loneliness-epidemic-america>

Statistic Parameters:

Total Average Loneliness Score
Loneliness and related traits /indicators of different Generations : GenZ,
Millennials, GenX, Boomers, Greatest
Regional profiles of major cities in US

[KEY FACTS / POPULATION CHARACTERISTICS]

Loneliness and Social Isolation in the United States, the United Kingdom, and Japan: An International Survey (KFF) [Bianca DiJulio, Liz Hamel, Cailey Muñana, and Mollyann Brodie]

- Representing international data
- <http://files.kff.org/attachment/Report-Loneliness-and-Social-Isolation-in-the-United-States-the-United-Kingdom-and-Japan-An-International-Survey> or
- <http://files.kff.org/attachment/Topline-Kaiser-Family-Foundation-The-Economist-Survey-on-Loneliness-and-Social-Isolation-in-the-United-States-the-United-Kingdom-and-Japan>

Overall Demographics Data for US Specific [Specific Facts]

- [4] New Cigna Study Reveals Loneliness at Epidemic Levels in America
- https://www.multivu.com/players/English/8294451-cigna-us-loneliness-survey/docs/IndexGraphics_1525138674329-1850684297.pdf ; A more extensive version:
https://www.multivu.com/players/English/8294451-cigna-us-loneliness-survey/docs/IndexReport_1524069371598-173525450.pdf

[WHAT]

common symptoms?

[WHO]

Who are vulnerable?

[WHEN]

How often? (48 days/ year)

What age/period across the lifetime?

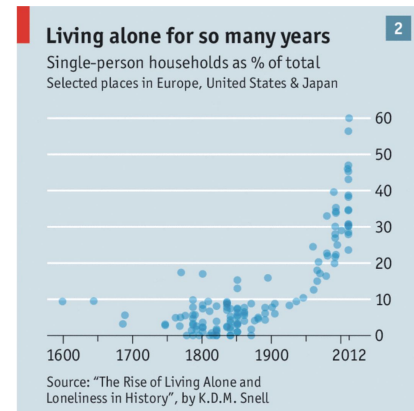
[3] Loneliness peaks at three key ages: 20s, mid-50s, 80s

Let people draw a line depicts the loneliness and the age, then show the actual line

What special occasions/ events? E.g. loses someone (Maybe text/images)

[DEVELOPMENT]

- What's the trend from past to present? 2010 2012 2014 ESS
 - [Loneliness: A Social Problem by Keming Yang]
- Snell, K. (2017). The rise of living alone and loneliness in history. Social History, 42(1), 2-28.
https://hollis.harvard.edu/primo-explore/fulldisplay?docid=TN_informaworld_s10_1080_03071022_2017_1256093&context=PC&vid=HVD2&search_scope=everything&tab=everything&lang=en_US
- Cities or countryside?
 - Loneliness: a social problem . P136



[WHERE & HOW MANY & HOW MUCH]

Which countries?

EU Loneliness (ESS):

https://ec.europa.eu/jrc/sites/jrcsh/files/fairness_pb2018_loneliness_jrc_i1.pdf

Interactive js: Which european country is the loneliest? (Eurostat)

<https://www.euronews.com/2017/06/29/what-is-europes-loneliest-country>

Age and Loneliness in 25 Europe countries

https://hollis.harvard.edu/primo-explore/fulldisplay?docid=TN_cambridgeS0144686X1000139X&context=PC&vid=HVD2&search_scope=everything&tab=everything&lang=en_US

UK Loneliness - What characteristics and circumstances are associated with feeling lonely?

https://www.ons.gov.uk/peoplepopulationandcommunity/wellbeing/articles/lonelinesswhatcharacteristicsandcircumstancesareassociatedwithfeelinglonely/2018-04-10?WT.mc_id=31467e922c749a1befdd5b48d84d20f5&WT.sn_type=TWITTER&hoot.message=Read%20our%20latest%20article%3A%20Loneliness%20-%20what%20characteristics%20and%20circumstances%20are%20associated%20with%20feeling%20lonely%3F%20%5BLINK%5D&hoot.send_date=2018-04-10%2008%3A30%3A32&hoot.username=ONS&hoot.send_dayofweek=Tuesday&hoot.send_hour=08#which-factors-independently-affect-loneliness

[How much money do governments spend on loneliness?]

- Let's talk loneliness: <http://letstalkloneliness.co.uk/>
- Loneliness Funding News:
 - <https://www.civilsociety.co.uk/news/government-unveils-20m-fund-to-tackle-loneliness.html>
 - <https://www.gov.uk/government/news/20-million-investment-to-help-tackle-loneliness>

[Reasons]

Quality rather than quantity of relationships.

[CONFIDANT]

[1] 1984 - 2004 , 3 confidants in 1984 to 0 confidants in 2004

Europe's loneliest country

- <https://www.euronews.com/2017/06/29/what-is-europes-loneliest-country>

[LIVING ARRANGEMENTS]

[MARRIAGE]

[OPEN RELATIONSHIP]
[ECONOMICAL STATUS]
[CONTAGIOUS]

- [3] In a ten-year study, researchers examined how loneliness spreads in social networks. The results indicated that people close to someone experiencing loneliness were 52 percent more likely to become lonely as well.

[How Do We Deal / Actions]

Cigna US Loneliness Survey

https://www.multivu.com/players/English/8294451-cigna-us-loneliness-survey/docs/IndexGraphics_1525138674329-1850684297.pdf

Additional References:

[1] Mcpherson, M., Smith-Lovin, L., & Brashears, M. (2006). **Social Isolation in America: Changes in Core Discussion Networks over Two Decades.** *American Sociological Review*, 71(3), 353-375.
https://hollis.harvard.edu/primo-explore/fulldisplay?docid=TN_sage_s10_1177_000312240607100301&context=PC&vid=HVD2&search_scope=everything&tab=everything&lang=en_US

Table 1. Size of Discussion Networks, 1985 and 2004^b

Network Size	Total Discussion Network		Kin Network ^a		Non-Kin Network ^a	
	1985	2004	1985	2004	1985	2004
0	10.0%	24.6%	29.5%	39.6%	36.1%	53.4%
1	15.0%	19.0%	29.1%	29.7%	22.4%	21.6%
2	16.2%	19.2%	21.0%	16.0%	18.1%	14.4%
3	20.3%	16.9%	11.7%	9.4%	13.2%	6.0%
4	14.8%	8.8%	5.8%	4.0%	6.8%	3.1%
5	18.2%	6.5%	2.8%	1.3%	3.4%	1.4%
6+	5.4%	4.9%	—	—	—	—
Mean	2.94	2.08	1.44	1.12	1.42	.88
Mode	3.00	.00	.00	.00	.00	.00
SD	1.95	2.05	1.41	1.38	1.57	1.40

[2] Cacioppo, J., Fowler, J., & Christakis, N. (2009). **Alone in the Crowd: The Structure and Spread of Loneliness in a Large Social Network.** *Journal Of Personality And Social Psychology*, 97(6), 977-991.
https://hollis.harvard.edu/primo-explore/fulldisplay?docid=TN_wos000272496400004&context=PC&vid=HVD2&search_scope=everything&tab=everything&lang=en_US

Table 3. Multiple Regression Model of Lonelinessa: Loneliness Model in Total Sample ($N = 340$)

VARIABLE	B	SE	FDR- Adjusted p	COHEN'S d
Age	-0.001	0.0007	0.04	0.11
Sex	0.05	0.02	0.03	0.12
Living alone	0.13	0.03	0.0001	0.24
Perceived stress	0.008	0.003	0.02	0.14
Optimism	-0.01	0.004	0.004	0.17
Mental well-being	-0.007	0.002	0.0004	0.21
Wisdom	-0.17	0.03	< 0.0001	0.29
Cognitive complaints	0.002	0.0009	0.03	0.12

b: Loneliness Model in Each Sex

Women ($N = 170$)				
Age	-0.02	0.03	0.57	0.05
Living alone	0.13	0.04	0.003	0.26
Perceived stress	0.008	0.004	0.11	0.16
Optimism	-0.009	0.004	0.12	0.15
Mental well-being	-0.009	0.003	0.002	0.28
Wisdom	-0.19	0.04	0.0004	0.32
Cognitive complaints	0.002	0.001	0.24	0.11
Men ($N = 170$)				
Age	-0.06	0.03	0.15	0.14
Living alone	0.15	0.05	0.01	0.24
Perceived stress	0.007	0.005	0.18	0.11
Optimism	-0.02	0.006	0.04	0.20
Mental well-being	-0.004	0.003	0.15	0.12
Wisdom	-0.15	0.05	0.01	0.24
Cognitive complaints	0.002	0.001	0.15	0.12

[3] Lee, E., Depp, C., Palmer, B., Glorioso, D., Daly, R., Liu, J., . . . Jeste, D. (2019). **High prevalence and adverse health effects of loneliness in community-dwelling adults across the lifespan: Role of wisdom as a protective factor.** 31(10), 1447-1462.

https://hollis.harvard.edu/primo-explore/fulldisplay?docid=TN_cambridgeS1041610218002120&context=PC&vid=HVD2&search_scope=everything&tab=everything&lang=en_US

Table 1. Comparison of Study Participants by Severity of Loneliness*

	NO/LOW LONELINESS (A)			MODERATE LONELINESS (B)			HIGH LONELINESS (C)			F or χ^2	p	POST-HOC SIGNIFICANT COMPARISONS
	N	MEAN	SD	N	MEAN	SD	N	MEAN	SD			
Number (%)		82 (24%)			184 (54%)			74 (22%)				
Sociodemographic												
Age (years)	82	60.0	17.8	184	63.0	18.0	74	59.8	19.0	1.26	0.28	
Sex (% Female)	82	56.1%		184	47.3%	74	50.0%			1.76	0.41	
Race (% Caucasian)	82	76.8%		184	80.4%		74	77.0%		0.63	0.73	
Education attainment	79			176			71			2.99	0.56	
High school and below		8.9%			9.7%			7.0%				
Some college		59.5%			52.3%			63.4%				
Graduate school/higher		31.6%			38.1%			29.6%				
Marital status (% single)	79	29.1%		176	36.9%		71	53.5% ^a		9.87	0.007	
Living alone (%)	82	9.8% ^a		177	20.3%		73	34.2% ^a		14.1	0.001	
Personal income	79			170			70			25.9	< 0.001	
Less than \$35,000		31.6%			24.7% ^a			55.7% ^a				
\$35,000 to \$49,999		12.7%			14.1%			15.7%				
\$50,000 to \$74,999		16.5%			21.2%			12.9%				
\$75,000 or more		39.2%			40.0%			15.7% ^a				
Negative psychological traits/states												
Depression (PHQ-9)	79	1.1	1.8	181	2.2	2.8	72	4.6	4.4	26.6	< 0.001	A < B < C
Anxiety (BSI)	81	0.67	1.8	183	1.3	1.8	74	2.3	2.8	12.1	< 0.001	A < B < C
Perceived stress (PSS)	80	7.9	4.8	181	10.9	4.4	72	15.3	5.7	45.6	< 0.001	A < B < C
Positive psychological traits/states												
Resilience (CD-RISC)	82	26.3	3.2	180	24.1	3.6	74	21.4	4.4	34.1	< 0.001	A < B < C
Optimism (LOT-R)	80	34.9	4.8	180	31.3	5.4	74	27.4	6.5	35.7	< 0.001	A < B < C
Mental well-being (SF-36)	82	57.8	4.5	183	55.0	7.0	71	47.7	9.5	41.5	< 0.001	A < B < C
Wisdom (SD-WISE)	48	4.26	0.42	122	3.93	0.35	47	3.62	0.39	34.6	< 0.001	A < B < C
Subjective Cognition												
Cognitive complaints (CFQ)	81	18.3	10.5	176	27.4	12.8	72	31.1	13.1	22.9	< 0.001	A < B < C
Physical health												
Physical functioning (SF-36)	82	50.6	9.5	183	47.6	10.3	71	48.6	9.2	2.5	0.083	

Table 1. Continued

	NO/LOW LONELINESS (A)			MODERATE LONELINESS (B)			HIGH LONELINESS (C)			F or χ^2	p	POST-HOC SIGNIFICANT COMPARISONS
	N	MEAN	SD	N	MEAN	SD	N	MEAN	SD			
Loneliness measures												
UCLA-3	82	23.9	2.2	184	34.7	4.6	74	51.9	6.8	675.0	< 0.001	A < B < C
PROMIS social isolation	53	39.3	4.6	136	45.9	5.5	54	56.8	7.1	131.0	< 0.001	A < B < C
CESD item #14	81	0.09	0.28	181	0.26	0.54	74	1.01	0.99	50.3	< 0.001	A < B < C

For all measures (except the Cognitive complaints score, loneliness scales, depression, anxiety, and perceived stress), lower scores suggest worse functioning.

BSI = Brief Symptom Inventory – Anxiety subscale; measure of anxiety (Derogatis and Melisaratos, 1983).

CD-RISC = Connor Davidson Resilience Scale; measure of resilience (Connor and Davidson, 2003).

CESD = Center for Epidemiologic Studies Depression Scale; measure of loneliness (Radloff, 1977).

CFQ = Cognitive Failures Questionnaire; measure of forgetfulness, distractibility and false triggering (Broadbent, 1982; Rast, 2008).

LOT-R = Life Orientation Test – Revised; measure of optimism (Scheier et al., 1994).

PHQ-9 = Patient Health Questionnaire-9; measure of depression (Kroenke et al., 2001).

PROMIS = Patient-Reported Outcomes Measurement Information System.

PSS = Perceived Stress Scale; measure of perceived stress (Cohen et al., 1983).

SD-WISE = San Diego Wisdom Scale; measure of wisdom (Thomas et al., 2017).

SF-36 = Medical Outcomes Survey - Short Form 36; measure of mental and physical functioning (Ware and Sherbourne, 1992).

UCLA-3 = UCLA Loneliness Scale (Version 3); measure of loneliness (Russell, 1996).

* Cutoff for loneliness.

UCLA-3 Total score < 28 = No /Low Loneliness.

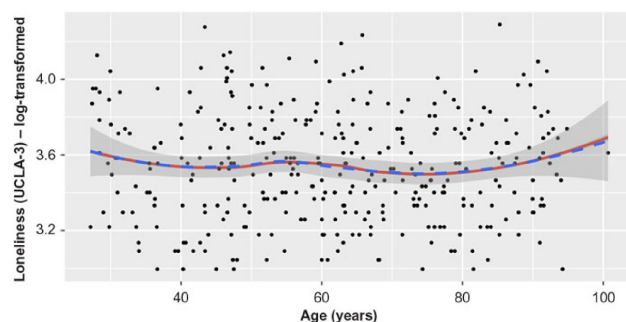
UCLA-3 Total score 28 - 43 = Moderate Loneliness.

UCLA-3 Total score > 43 = High Loneliness.

^aPost-hoc Chi-square tests were significantly different at the Bonferroni-corrected p-value level.

[4] <https://www.multivu.com/players/English/8294451-cigna-us-loneliness-survey/>

[5] Yan, Z., Yang, X., Wang, L., Zhao, Y., & Yu, L. (2014). **Social change and birth cohort increase in loneliness among Chinese older adults: A cross-temporal meta-analysis, 1995–2011.** 26(11), 1773-1781. https://hollis.harvard.edu/primo-explore/fulldisplay?docid=TN_cambridgeS1041610214000921&context=P_C&vid=HVD2&search_scope=everything&tab=everything&lang=en_US



Loneliness and social anxiety across childhood and adolescence: Multilevel meta-analyses of cross-sectional and longitudinal associations.

<https://www.ncbi.nlm.nih.gov/pubmed/30896228>

Trajectories of loneliness during childhood and adolescence: Predictors and health outcomes

<https://www.sciencedirect.com/science/article/pii/S0140197113000122>

Table 1

Adjusted loneliness scores over time by peer loneliness class.

Participant's age in years	Loneliness class				Whole sample
	Relatively high	Moderate increasing	Moderate decreasing	Low/stable	
7	32.87 (4.82)	26.72 (5.67)	28.55 (5.29)	22.13 (4.05)	27.00 (6.34)
9	33.68 (5.23)	27.46 (4.66)	25.45 (3.07)	24.83 (3.39)	27.55 (5.36)
11	32.84 (7.98)	30.34 (8.66)	24.57 (7.23)	18.86 (5.75)	26.05 (9.44)
13	37.87 (4.82)	31.72 (5.67)	23.08 (5.30)	21.19 (5.23)	31.20 (5.83)
15	36.03 (6.96)	32.80 (6.81)	21.31 (7.26)	18.36 (5.46)	26.18 (9.93)
17	30.41 (6.63)	32.41 (5.72)	22.49 (4.24)	21.81 (3.85)	24.46 (6.11)

Note. Scores are adjusted for missing data using full information maximum likelihood estimation (FIML) within Mplus version 5.1. Scores for trajectories are also adjusted for the following covariates shown to distinguish class membership: social preference, negative reactivity, self-worth, playing alone, externalization of positive events, and trust beliefs. Scores on peer loneliness range from 12 to 48.

Table 2

Conditional growth mixture modeling for peer loneliness: global fit statistics.

Class	AIC	BIC	Adjusted BIC	Entropy	LRT <i>p</i> value
1	22,526.93	22,575.04	22,540.12	–	–
2	22,449.43	22,510.66	22,466.22	.85	.0807
3	22,371.37	22,445.72	22,391.75	.87	.0001
4	22,347.53	22,434.99	22,371.51	.95	.0001
5	22,353.53	22,464.12	22,391.10	.91	.50

Notes: AIC = Akaike Information Criteria, BIC = Bayesian information criteria, LRT = Lo–Mendell–Rubin test. AIC, BIC, Adjusted BIC = lower values indicate a more parsimonious model; Entropy = values closer to 1 index greater precision (range: 0–1). The LRT = a low *p* value indicates a better fit to the data. The final model selection of a four-class solution was based on the model fit information detailed above, in combination with the predictor and outcome effects noted in the remainder of this paper.

Values in bold are those with the best fit to the data.

Table 1. We found that most of the children (37%) followed a low stable trajectory of loneliness, whilst another 23% followed a moderate declining trajectory of loneliness. Furthermore, 22% followed a high stable trajectory, whilst another 18% followed an increasing loneliness trajectory that started at a moderate start point on the loneliness scale.

OTHERS:

<https://www.verywellmind.com/loneliness-can-be-contagious-2795748>

<https://www.crisistextline.org/get-help/loneliness>

TIMELINE

[Nov. 10th]	[Nov.17th]	[Nov.24th]	[Dec.1st]	[Dec.6th]
Decide on datasets Early data exploration Sketch interactive storyboards Sketch major visualizations	Build Sections and Transitions	Finish Visualization Prototypes v1: Individual visualization	Finish Visualization prototypes v2: Web Page Structure Integration	Improve design details. Merge code. Finalize visualization

FEATURE LIST

[MUST-HAVE] **A Geographical Mapping** for global / EU loneliness
A Timeline, that visualize how loneliness degree evolved through past decade
A Stacked-Area Chart/Stacked Bar Chart that visualize the reasons for loneliness
A Dot Matrix that visualize the percentage of people suffering from loneliness across different social groups
A Line Chart or Scatter-Plot Chart that visualize how the degree of loneliness varies across different age groups
Small multiples of numbers visualization + illustrations depicting the characteristics and habits that differentiates lonely people

[GOOD-TO-HAVE]

Sections and transitions between different views, focusing on **a coherent thread/narrator** that binds the various views together, e.g. a protagonist that tells the story

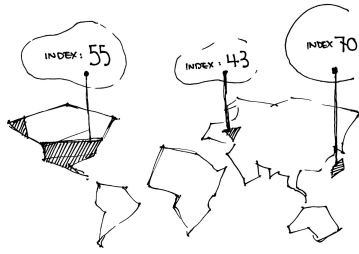
[OPTIONAL ITEMS]

Animate the visualization that shows how the degree of loneliness changes as age changes

INITIAL SKETCHES / STORYBOARD / NARRATIVES

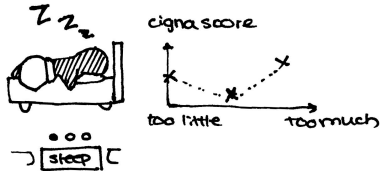
[VISUAL SKETCHES]

These are some of our initial visual explorations regarding what kinds of visualization can we include in the project.



GeoMap Visual: International Data

Representing KFF data (US, UK, Japan) as call-out / tool-tip / infographic for international data.

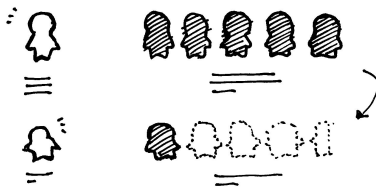


Little people - FlowData / Migration / Animation

Visual language of alone / loneliness

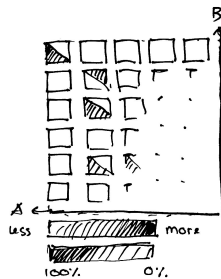
Cigna Data - Scatter plot / Line graph alongside illustration

Since they're small bits of information without the whole context, it is better to show it as tips or "facts" that are small. We could potentially use small multiples



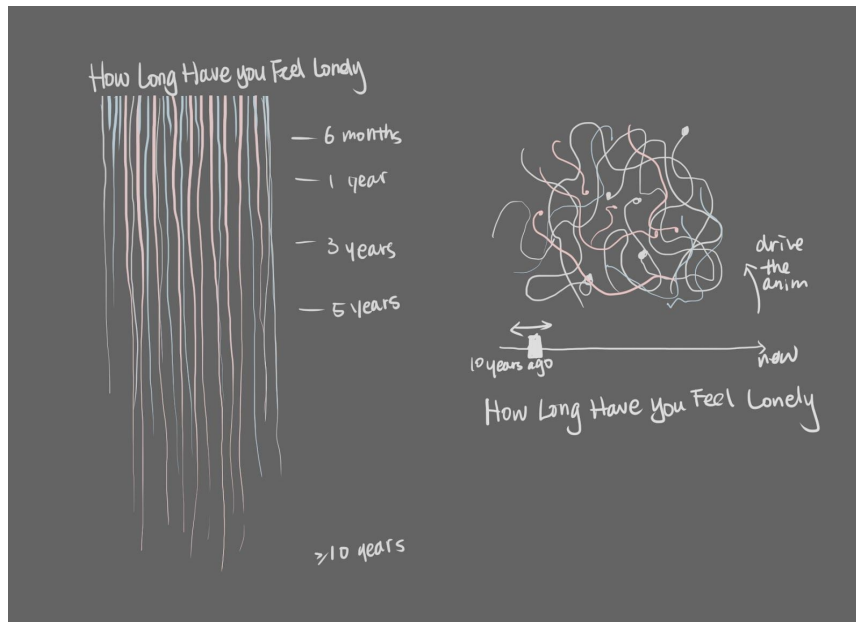
Migration / Transparency Demographics

Like FlowingData but moving people with transparency changes to represent development and trend of loneliness across time or age.



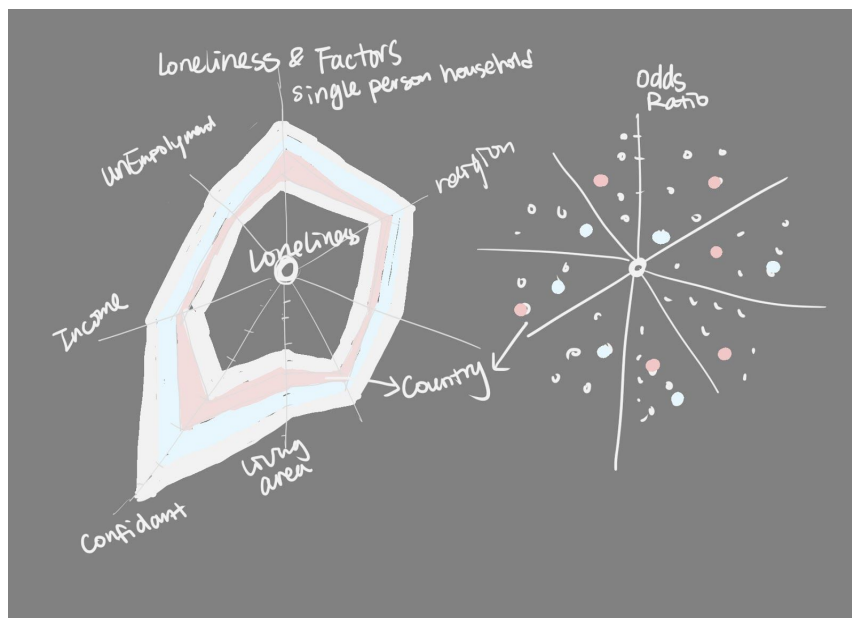
Matrix for Correlations

Matrix map for displaying potential correlation between the different causation / demographics division of percentage lonely population.



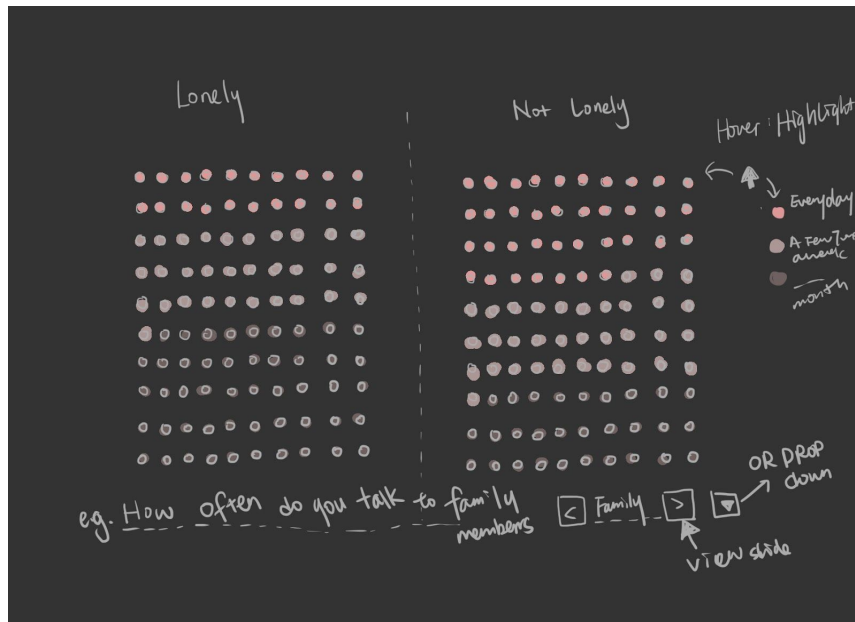
KFF Data - Loneliness Facts - Line Width Change/Transparency /Animation

Representing KFF data (US, UK, Japan) Q40. Country encoded in color. Particles (animated, moving) representing lonely individuals, the length of (waved) lines (as the trajectories of particles) representing how long they feel they have been lonely.



ESS Data - Loneliness Factors - Line Width / Color/ Hover/Click

Representing ESS data (Europe Social Survey 2014) Loneliness's correlations with different factors. Country encoded in color, represented as stacked area (left) or dots (right) The odds ratio of each factor and loneliness is encoded in the position of radial axes. Highlight & tooltip when hovering, show data for individual country when click.



KFF Data - Loneliness Recommendations - Amount of dots in each color /Matix /Click or Dropdown

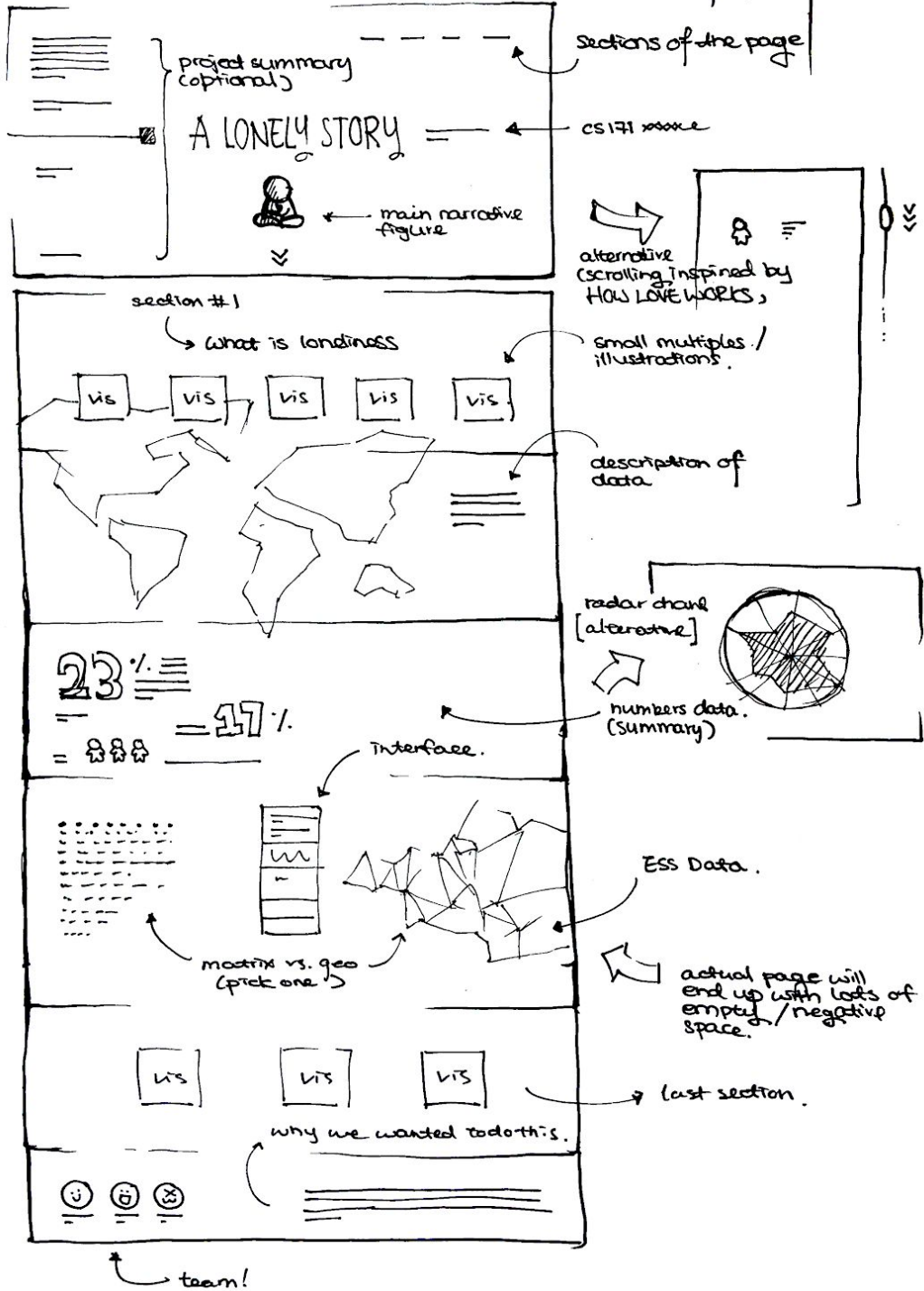
Representing KFF data, Compare people's lifestyle between those who feel lonely and those who do not. A 10 * 10 matrix of dots, with colors encoding different lifestyles, represents the percentage of people in that part. Click to view the visuals of different aspects, or use drop down menu to go to that aspect directly.

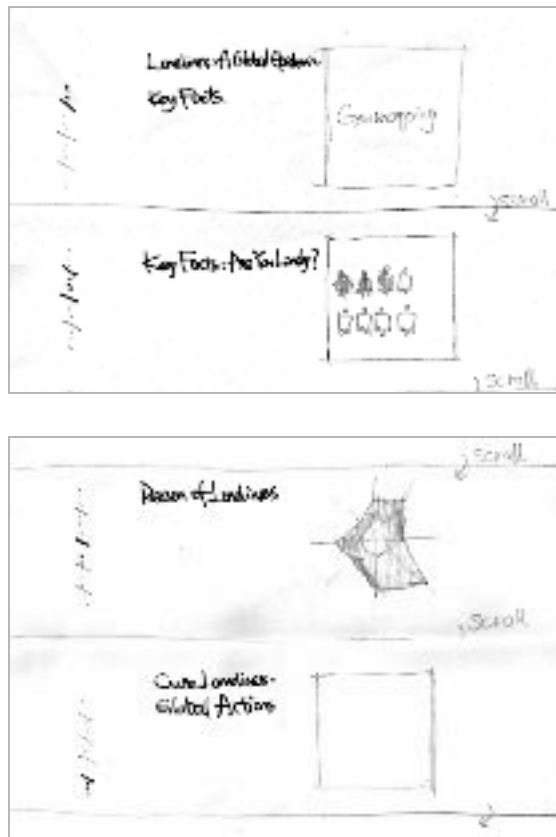
[NARRATIVE AND STORYBOARDS]

The narrative should be focusing on creating empathy with the viewer, as well as translating abstract information into concrete visualization via data. There may be many transitional sections, animations (potentially interactable) and figures throughout the website to help build the atmosphere.

Header: A lonely Story (subject to change)

Landing page





Part I:

Define the Global Situation of Loneliness
Compare Situations among various countries

Part II:

Depicts key facts about the global loneliness crisis

Part III:

Visualize the reasons of loneliness
Compare different factors that contributed

Part IV:

Depicts global effort to cure and ease loneliness

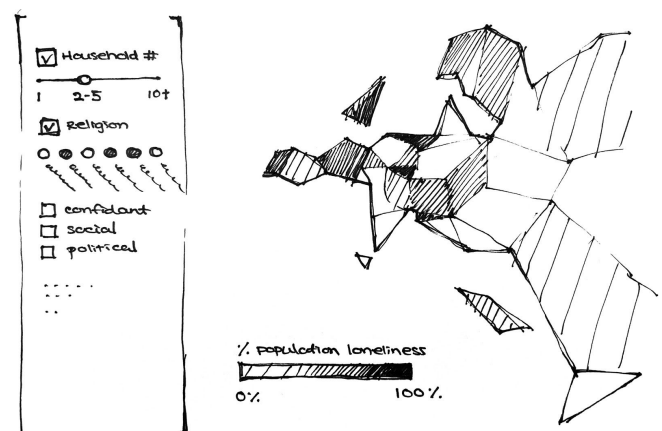
[INTERACTIONS]

These are some possible interactions for our project (both for visualization and for animations)

GeoMap Interaction: Demographics

Combining the multiple degree of data from ESS (Household #, Religion, Ethnicity, etc.) and create an interactive interface that displays the percentage of lonely population after multiple-filtering.

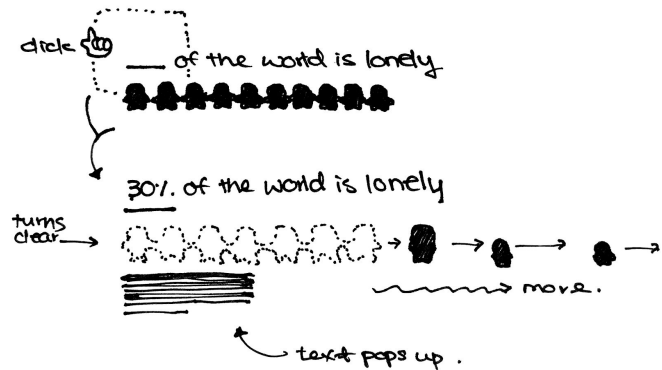
You can toggle on / off each selection on the panel on the left, and hover above each EU country to display tooltips showing the filtered information.



FlowData: Migration & Movement

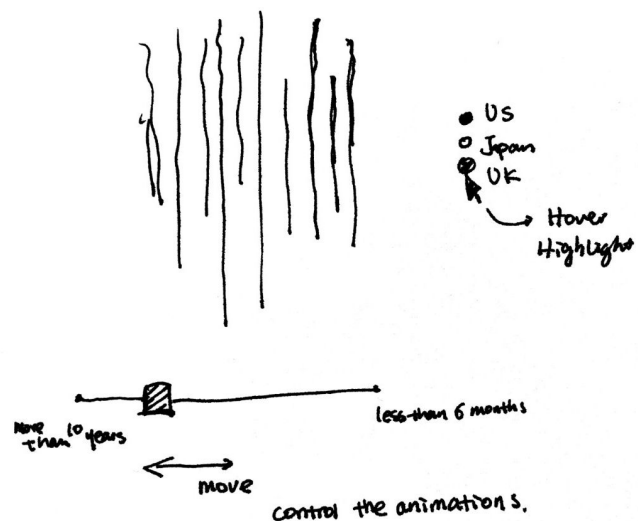
There will be a lot of minimal visualization for single-number data. The original data will be hidden, and once it has been clicked on / scrolled past, it will display the actual number data, and the visual at the bottom will also move (via transition or other method).

Paragraph / text that explains the data will also pop up as the animation happens.



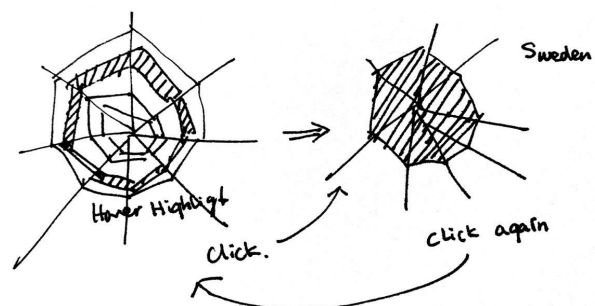
Loneliness for how long: Particle Animation

Particles are animated to move on canvas, representing individuals who are experiencing loneliness. User can view this animation or drag the button below to control the animation (going forward/backward). When hovering on the country legend, the corresponding group will be highlighted (with others dimmed to dark gray).



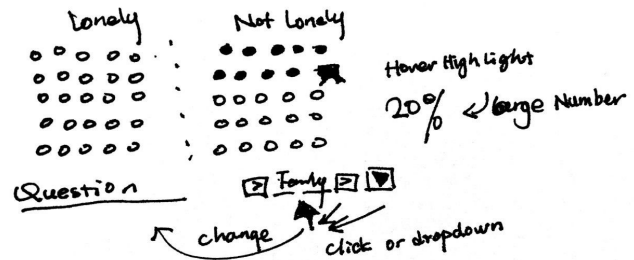
Loneliness and factors: Hover /Click / Filter

The radial stacked area chart shows the correlations between different factors and loneliness. By hovering and click, user can view the details of specific country.



Loneliness Recommendations: Click/Hover

The dot matrix compares the lifestyles of lonely people with ordinary people, so as to give recommendations for alleviating loneliness. When hovering the dots of different colors(life categories), the corresponding percentage will be shown on the sides. User can also click/dropdown to view different aspects.



TEAM ROLES

The three team members will be working collaboratively for the project. The goal for this week will be idea brainstorming, each team member will come up with a set of visualizations as listed above.

Guangyu Du: Sketch, Visualization

Lucy Yip: Sketch, Visualization, Decider

Runjia Tian: Data Exploration, Cleaning and Parsing

WEEK 1 PRESENTATION

Prepare slides for a **3 minute presentation of goals/tasks/sketches/data for peer feedback and include the presentation slides** in your submission.

[LINK TO PROPOSAL FEEDBACK PRESENTATION] [11/10 Due Presentation](#)

VISUALIZATION NARRATION FLOW

Introduction

Intro diagnose questions -
What is loneliness (vis or diagram or illustration)
Loneliness has become a global issue. Why?

Particle visualization - Guangyu

Point of argument: there are so many people who have been lonely for such a long time

Loneliness correlation with Age (Maybe)

Long time loneliness => chronic loneliness

// transition: Loneliness is a common feeling now, it can arrive for many reasons.

Cause (in 100) of loneliness - Runjia

"among 100 lonely people, 1 is lonely because his marriage didn't work out, 5 are lonely because..."
Point of argument: loneliness exists on multiple different premises

// transition: Lonely people occupies a great percentage of the world's population (EU as example).
Let's have a look of who they are.

Demographics of loneliness - Lucy

Geographical topo map of categorical + % data, with additional small multiples
Point of argument: Loneliness is more prevalent in certain groups of people

// transition: Then we can summarize from these data what factors contribute more to loneliness

Radar graph of odds ratio - Guangyu

Point of argument: Loneliness is most related with having no confidant

// transition: This result is not surprising. Research shows, among three levels of social ties, confidant relationship is most salient to emotional-well being. But maintaining other levels of social connections can also alleviate loneliness:

Dot Matrix - Recommendations for combat loneliness based on three levels of social connections



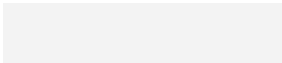

// transition: Beyond things that individuals can do, our society should also make more efforts to tackle the global epidemic of loneliness..

Society awareness of loneliness - Lucy
Use either government funding data (from text-mining / news articles), or Cigna.

Conclusion
We live in a lonely world, but you are not alone.
Seek help (?)

VISUAL LANGUAGE

COLORS

Background	Primary	Bold / Emphasis	Accent(s)
#161c26 	#ff6666 	"white" 	#8293b6 

Gradient: for charts, etc. #596271, #7A809A, #8293B6, #A0ADDA, #CCCFE3, #e6e7ed



STORYBOARD

A LONELY STORY

CS 171: Visualization Final Project

Group Member: Guangyu Du, Lucy Yip, Runjia Tian

Introductory Questions

Firstly, pop-up questions

1. How often do you feel that you have a lot in common with the people around you?
2. How often do you feel that no one really knows you well?
3. How often do you feel that people are *around* you but not *with* you?
4. How often do you feel that there are people you can talk to or turn to?

(Choose from Never | Rare | Sometimes | Always)

Then, based on user's choices, show one of the two sentences:

You are likely to be lonely, and everyone feels lonely sometimes.
Everyone feels lonely sometimes, and you are among the lucky few.

What is Loneliness

We are living through an epidemic of loneliness.

Loneliness is a subjective feeling of perceived discrepancy between desired and actual social relationships (Weiss, 1973).

It is a complex and usually unpleasant emotional response to isolation, typically includes anxious feelings about a lack of connection or communication with other beings, both in the present and extending into the future.

Is loneliness a life sentence, or is it possible for some to break through it and come out the other side?

Weiss, R. S., 1973. *Loneliness: The Experience of Emotional and Social Isolation*. Cambridge, MA: MIT Press.

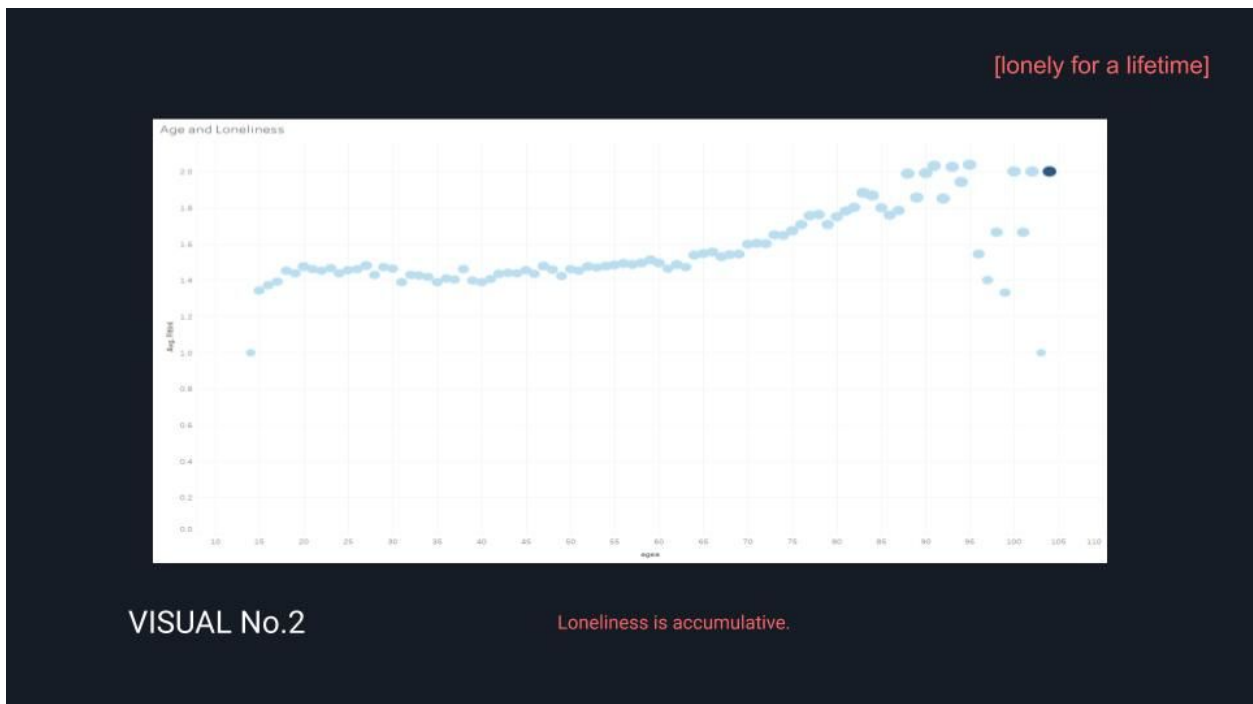
Loneliness Matters

Loneliness has been considered the latest global health epidemic, with serious health implications.

A growing body of longitudinal research indicates that loneliness predicts increased morbidity and mortality (Hawkey and Cacioppo, 2010).

According to a study from the British Red Cross, over nine million adults in the U.K. feel the same way—that's about 1/5 of the country's population! Now even governments are getting involved—in 2018, the U.K. appointed a Loneliness Minister, Tracey Crouch, to help combat the country's chronic loneliness problem.

Hawkey, L.C. and Cacioppo, J.T., 2010. Loneliness matters: a theoretical and empirical review of consequences and mechanisms. *Annals of Behavioral Medicine*, 40(2), pp.218-227.
<https://www.redcross.org.uk/about-us/what-we-do/action-on-loneliness>



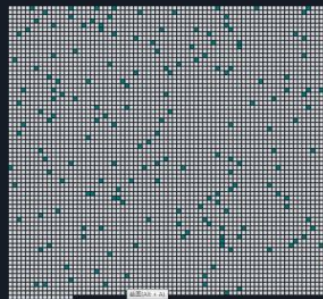
Loneliness is a common feeling now.
It can arrive for many reasons.

[lonely for different premises]

Causes (in 100) of Loneliness

Specific Details about Causes of Loneliness

Unemployment is the second most cause
Loneliness can also be caused due to
unemployment



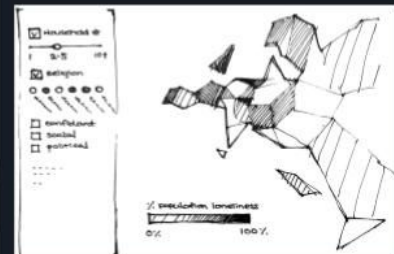
"among 100
lonely people, 1
is lonely
because his
marriage didn't
work out, 5 are
lonely
because..."

VISUAL No.3

loneliness exists on multiple different premises

Lonely people occupies a great percentage of
the world's population (EU as example).
Let's have a look of who they are.

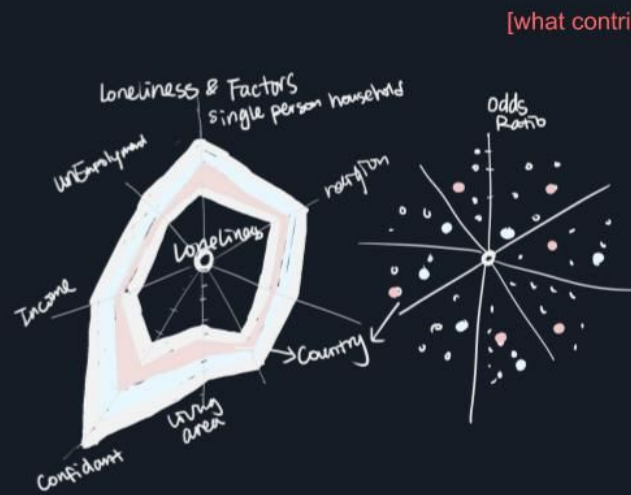
[who are lonely]



VISUAL No.4

Loneliness is more prevalent in certain groups of people

Then we can summarize from these data
what factors contribute more to loneliness



VISUAL No.6

Loneliness is most related with having no confidant

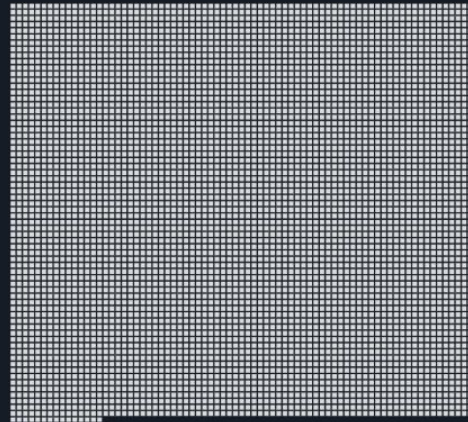
Three Levels of Loneliness

intimate - confidant
relational - family/friends
collective - community/organization

Three correlated but separable dimensions of loneliness are intimate isolation/connection, relational isolation/connection, and collective isolation/connection (Weiss, 1973; Hawkey et al., 2005; Cacioppo and Patrick, 2008; Cacioppo, Cacioppo, and Boomsma, 2014). They respectively refer to the perceived absence/presence of emotional confidant, quality friendships or family connections, and identity with groups or social entity (Cacioppo et al., 2014). It is noteworthy that it is the quality more than the quantities of social connections that strongly influences the level of loneliness (Putman, 2000; Cacioppo and Patrick, 2008).

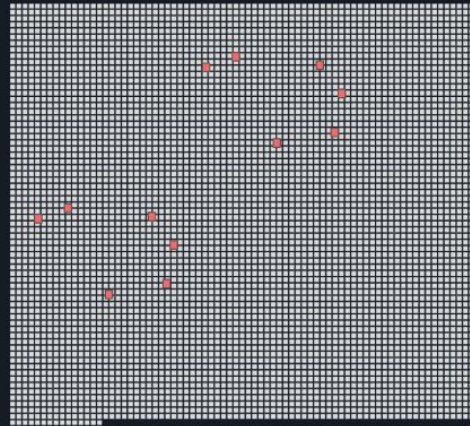
Sometimes loneliness are caused by
specific events, such as loss of family.
Specific Events that Causes Loneliness

Unemployment is the second most cause.
Loneliness can also be caused due to
unemployment



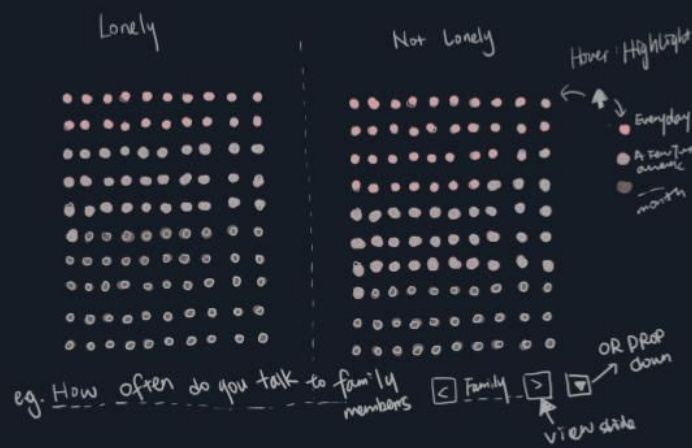
Research on loneliness has focused on
social ties, but not on the
Specific Events that Cause Loneliness

collective - community/organization



This result is not surprising. Research shows, among three levels of social ties, confidant relationship is most salient to emotional-well being. But maintaining other levels of social connections can also alleviate loneliness:

[How to alleviate loneliness]



VISUAL No.7

Loneliness is can be alleviated through building quality social connections

Beyond things that individuals can do, our society should also make more efforts to tackle the global epidemic of loneliness.

[global efforts]

Loneliness support centers

OR

Loneliness global fundings

VISUAL No.8

We need more global efforts for tackling loneliness.