SYMPOSIUM: Connections & Relationships in Northern Ireland, Wales & Scotland

Early findings from Healthy Ageing in Scotland (HAGIS):

Engagement with health behaviours in an ageing Scottish population

Dr Elaine Douglas & Professor David Bell

UNIVERSITY of STIRLING

1. Engagement with health behaviours in an ageing Scottish population
2. A Latent Class Approach
3. Results
4. Discussion

BE THE DIFFERENCE

Ageing Research In Scotland

- Scotland's population is ageing at a faster rate than other UK nations
- Highest mortality rates and lowest life expectancy in Western Europe
- Glasgow Effect
  - Even when compared with Liverpool and Manchester (UK cities with shared history of de-industrialisation) Glasgow's health is poorer
- Considered to be predominantly due to high levels of socioeconomic deprivation or health behaviours

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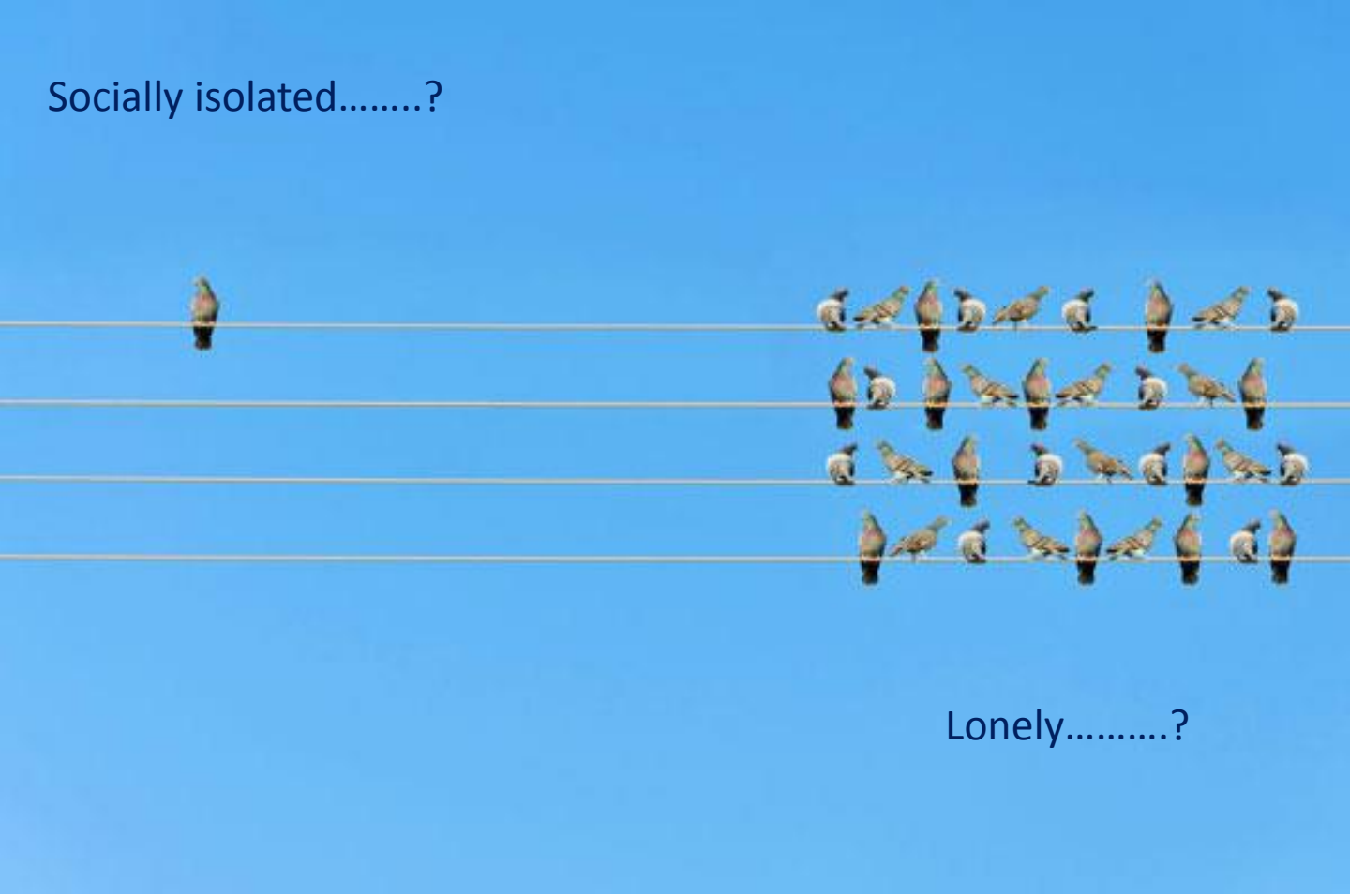
Loneliness - What characteristics and circumstances are associated with feeling lonely?

Socially isolated……..?



Lonely…….?

Engagement with health behaviours in an ageing Scottish population

- Social isolation & loneliness are associated with poorer health status, physical & mental health conditions (Steptoe et al, 2013)

- Population characteristics, health and health behaviours vary in populations identified as socially isolated or lonely (Ong et al, 2016, Smith & Victor, 2018)

- Pathways to social isolation and loneliness and how these are associated with health outcomes and health behaviour remain unclear (Courtin & Knapp, 2017)

Engagement with health behaviours in an ageing Scottish population

Aim:

1. to identify patterns of social isolation and loneliness
2. Test for associations with perceived health and health behaviour

Healthy Ageing In Scotland (HAGIS) Pilot (n = 1,057)

- Data collection in over 50s across Scotland in 2017
- Part of Gateway to Global Ageing studies, including NICOLA & ELSA
- Face-to-face computer assisted programme interview (CAPI)
- Self-completion questionnaire

www.hagis.scot

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Descriptive Statistics	100% (685)
Sex	
Female (vs male)	**55.3 (379)**
Age	
50-59 years	21.2 (145)
60-69 years	**35.0 (240)**
70-79 years	**29.6 (203)**
80+	14.2 (97)
Marital Status	
Married/living with partner	**66.1 (453)**
Single (never married)	8.0 (55)
Divorced/Separated/Widowed	25.8 (177)
Education (highest level)	
None/primary	17.8 (121)
High School	**39.1 (266)**
Further Education	**20.0 (136)**
Higher Education (degree +)	**23.1 (157)**
Current Status	
Retired	**67.4 (457)**
Working	26.0 (176)
Other (Unemployed/ Sick/ Looking after family)	6.6 (45)

HAGIS SAMPLE

Socio-demographics

Overall n = 1,057

Missing Values – self-completion

Measuring Social Connectedness (Isolation)

1. How often do you meet your…
2. How often do you communicate (phone/text/email) your…
   - Children
   - Friends
   - Other Family

   Responses coded as:
   - At least once per month
   - Less than once per month
   - No children/ No friends / No other family

3. Do you participate in clubs / organised activities
   - Local and national level
   - Yes/No

Measuring Loneliness

UCLA Loneliness Scale (short 3 scale version)

- Do you ever feel that you…
  - Lack companionship
  - Feel left out?
  - Feel isolated?
- Responses:
  - Hardly ever/Never
  - Sometimes
  - Often

Asked as part of the self-completion questionnaire

Measuring Perceived Health and Health Behaviours

Health Behaviours

- Current **smoker**
- Exceed recommended weekly **alcohol** units
- Eat <5 portions of **fruit/veg** per day
- Ever returned **bowel screening** test
- Any moderate/vigorous **exercise** in last week?
- **Coded in line with current public health recommendations – Yes/No**

Perceived Health

- How would you say your health is?
- How would you say your emotional or mental health is?

Asked as part of the self-completion questionnaire (n=696)

Methodology

- Indices are commonly used in this area of research BUT
- Indices impose structure on the data, rather than letting it speak for itself
- Researchers make subjective decisions on the weights to attach to individual responses

Why not let the data speak for itself?

Latent Class Analyses

- Assume that there are a number of (latent) classes of people that experience loneliness/social isolation in broadly similar ways

- Use an algorithm to determine:
  - how many classes there are
  - to which of these groups individuals (respondents) are most likely to belong

- Similar to the approach used by Smith & Victor (2018) to assess associations between loneliness, social isolation and physical/mental health in ELSA

Methodology – Latent Class Analyses

1. Identify the number of groups (classes) for both social isolation and loneliness using goodness of fit statistics: BIC, LLR, p-value and parameters

2. Assign participants to group according to maximum probability of membership

3. Examine (previously unobserved) characteristics of loneliness & social isolation

4. Test association between group membership and perceived health and health behaviour

Social Isolation

Step 1.

Identify Number of Groups within data

Goodness of Fit:

Optimum combination of lower

* **Log Likelihood**
* **Parameters**
* **BIC**

No of Groups	Obs	ll(model)	df	AIC	BIC
2	616	-2803.238	27	5660.476	5779.904
3	616	-2650.563	38	5377.125	5545.208
4	616	-2581.231	53	5268.461	5502.894
5	616	-2519.618	63	5165.236	5443.9
6	**616**	**-2446.781**	**68**	**5029.563**	**5330.344**
7	616	-2423.455	86	5018.91	5399.309
8	616	-2463.535	99	5125.07	5562.972
9	616	-2395.733	108	5007.465	5485.176
10	616	-2411.563	115	5053.126	5561.799

Step 2.

Observe probabilities of membership of groups

Social Isolation - probabilities

	Group 1	Group 2	Group 3	Group 4	Group 5	Group 6
% sample in group	**24.8%**	**19.5%**	**5.4%**	**28.4%**	**15.0%**	**6.9%**
Meets children						
More than once a month	93.7	53.8	63.9	94.0	0.0	67.4
Less than once a month	6.3	46.2	3.6	6.1	0.0	30.9
No children	0.0	0.0	32.4	0.0	100.0	1.6
Communicates with children						
More than once a month	99.9	86.8	67.6	100.0	0.0	91.1
Less than once a month	0.1	13.2	0.0	0.0	0.0	7.3
No children	0.0	0.0	32.4	0.0	100.0	1.6
Meets friends						
More than once a month	70.2	75.5	4.2	98.4	78.5	68.1
Less than once a month	29.8	24.5	0.6	1.6	21.5	9.5
No friends	0.0	0.0	95.1	0.0	0.0	22.4
Communicates with friends						
More than once a month	82.4	78.1	4.7	99.5	91.4	70.5
Less than once a month	17.6	21.9	0.1	0.5	8.6	7.1
No friends	0.1	0.0	95.1	0.0	0.0	22.4
Meets family						
More than once a month	64.1	13.9	57.4	81.2	52.7	1.0
Less than once a month	35.9	85.7	30.7	18.8	39.9	10.2
No other family	0.0	0.4	11.8	0.0	7.3	88.8
Communicates with family						
More than once a month	92.7	52.2	79.5	97.9	76.4	3.1
Less than once a month	7.3	47.4	8.6	2.1	16.1	8.1
No other family	0.0	0.4	11.8	0.0	7.4	88.8
Clubs/Social Activities						
In clubs (vs not in clubs)	46.3	55.5	22.4	72.2	58.1	44.2

Social Isolation – observed membership

Step 3.

Examine characteristics of social isolation

Groups	1	2	3	4	5	6
% (n) sample	16.2% (100) (<)	17.2% (106) (=)	5.4% (33) (=)	39.8% (245) (>)	15.1% (93) (=)	6.3% (39) (=)
Meets children ***						
More than once a month	**98.0 (98)**	**41.5 (44)**	**60.6 (20)**	**95.1 (233)**	0 (0)	**69.2 (27)**
Less than once a month	2.0 (2)	**58.5 (62)**	6.1 (2)	4.9 (12)	0 (0)	30.8 (12)
No children	0% (0)	0 (0)	**33.3 (11)**	0 (0)	**100.0 (93)**	0 (0)
Communicates w/ children ***						
More than once a month	**100.0 (100)**	**84.9 (90)**	**66.7 (22)**	**100.0 (245)**	0 (0)	**92.3 (36)**
Less than once a month	0 (0)	15.1 (16)	0 (0)	0 (0)	0 (0)	7.7 (3)
No children	0 (0)	0 (0)	33.3 (11)	0 (0)	**100.0 (93)**	0 (0)
Meets friends ***						
More than once a month	43.0 (43)	**80.2 (85)**	0 (0)	**100.0 (245)**	**78.5 (73)**	**69.2 (27)**
Less than once a month	57.0 (57)	19.8 (21)	0 (0)	0 (0)	21.5 (20)	10.3 (4)
No friends	0 (0)	0 (0)	**100.0 (33)**	0 (0)	0 (0)	20.5 (8)
Communicates with friends ***						
More than once a month	**65.0 (65)**	**82.1 (87)**	0 (0)	**100.0 (245)**	**91.4 (85)**	**71.8 (28)**
Less than once a month	35.0 (35)	17.9 (19)	0 (0)	0 (0)	8.6 (8)	7.7 (8)
No friends	0 (0)	0 (0)	**100.0 (33)**	0 (0)	0 (0)	20.5 (8)
Meets family ***						
More than once a month	43.0 (43)	5.7 (6)	**54.6 (18)**	**85.3 (209)**	**52.7 (49)**	0 (0)
Less than once a month	57.0 (57)	**94.3 (100)**	33.3 (11)	14.7 (36)	39.8 (37)	2.6 (1)
No other family	0 (0)	0 (0)	12.1 (4)	0 (0)	7.5 (7)	**97.4 (38)**
Communicates family ***						
More than once a month	**95.0 (95)**	**39.6 (42)**	**75.8 (25)**	**98.4 (241)**	**76.3 (71)**	0 (0)
Less than once a month	5.0 (5)	**60.4 (64)**	12.1 (4)	1.6 (4)	16.1 (15)	2.6 (1)
No other family	0 (0)	0 (0)	12.1 (4)	0 (0)	7.5 (7)	**97.4 (38)**
Clubs/Social Activities ***						
In clubs (vs not in clubs)	28.0 (28)	**58.5 (62)**	**24.2 (8)**	**71.4 (175)**	**58.1 (54)**	**43.6 (17)**

Social Isolation

6 Groups

Group 1 – Moderate-highly connected with **ALL**

Group 2 – Highly connected with **FRIENDS**

Group 3 - **Least** connected - **No Friends & 1/3 no children**

Group 4 – **Highly** connected with **ALL**

Group 5 – Socially connected with **Friends / No Children**

Group 6 – Mod-high connection with **children & friends**

Social Isolation

Step 4.

Test associations

*** socio-demographics**

Groups	1	2	3	4	5	6
Group % (n)	16.2%	17.2%	5.4%	39.8%	15.1%	6.3%
Sex *						
Female (vs male)	**64.0 (64)**	44.2 (46)	54.6 (18)	**61.5 (150)**	53.3 (49)	43.6 (17)
Age **						
50-59 years	**22.0 (22)**	20.2 (21)	**24.2 (8)**	16.4 (40)	**34.8 (32)**	5.1 (2)
60-69 years	**38.0 (38)**	**35.6 (37)**	**30.3 (10)**	**34.8 (85)**	**42.4 (39)**	**35.9 (14)**
70-79 years	**27.0 (27)**	**32.7 (34)**	**21.2 (7)**	**35.3 (86)**	13.0 (12)	**43.6 (17)**
80+	13.0 (13)	11.5 (12)	**24.2 (8)**	13.5 (33)	9.8 (9)	15.4 (6)
Marital Status ***						
Married/living with partner	**74.0 (74)**	**72.1 (75)**	**60.6 (20)**	**69.7 (170)**	**40.2 (37)**	64.1 (25)
Single (never married)	2.0 (2)	1.9 (2)	**15.2 (5)**	1.2 (3)	**38.0 (35)**	**0 (0)**
Divorced/Separated/ Widowed	24.0 (24)	26.0 (27)	24.2 (8)	**29.1 (71)**	21.7 (20)	**35.9 (14)**
Education (highest level) **						
None/primary	**18.0 (18)**	7.7 (8)	**24.2 (8)**	18.6 (45)	15.7 (14)	10.3 (4)
High School	**54.0 (54)**	30.8 (32)	**42.4 (14)**	38.8 (94)	**36.0 (32)**	**35.9 (14)**
Further Education	13.0 (13)	**27.9 (29)**	18.2 (6)	18.6 (45)	**23.6 (21)**	**23.1 (9)**
Higher Education (degree +)	15.0 (15)	**33.7 (35)**	15.2 (5)	24.0 (58)	**24.7 (22)**	**30.8 (12)**
Current Status **						
Retired	**66.7 (66)**	**68.0 (70)**	**63.6 (21)**	**71.2 (173)**	57.3 (51)	**71.8 (28)**
Working	26.3 (26)	**30.1 (31)**	24.2 (8)	24.7 (60)	25.8 (23)	18.0 (7)
Other (Unemployed/ Sick/ Looking after family)	7.1 (7)	1.9 (2)	12.1 (4)	4.1 (10)	**16.9 (15)**	10.3 (4)

**** p<0.05***
***** p<0.01***
****** p<0.001***

n.s. not significant

Social Isolation

Step 4.

Test associations:

Health Behaviour

Perceived Health

Groups	**1**	**2**	**3**	**4**	**5**	**6**
Group % (n)	16.2%	17.2%	5.4%	39.8%	15.1%	6.3%
Health Behaviour	**% (n)**	**% (n)**	**% (n)**	**% (n)**	**% (n)**	**% (n)**
Smoker (vs non smoker) *n.s*	15.0 (15)	9.4 (10)	15.2 (5)	13.9 (34)	**23.7 (22)**	10.3 (4)
Alcohol (>14 units) *n.s*	11.8 (6)	32.2 (19)	**45.5 (5)**	27.7 (41)	28.0 (14)	**42.1 (8)**
Fruit/Veg (<5 p/day) *n.s*	42.4 (42)	45.7 (48)	50.0 (16)	42.6 (103)	48.4 (44)	**61.5 (24)**
Bowel Screening (never) *n.s*	23.0 (23)	29.4 (30)	21.2 (7)	21.4 (52)	**34.8 (32)**	20.5 (8)
Exercise (No vigorous/mod) *n.s*	54.0 (54)	62.1 (64)	48.5 (160	60.3 (147)	60.9 (56)	56.4 (22)
Subjective Health *						
Excellent-Very Good	36.0 (36)	**43.1 (44)**	18.2 (6)	**40.3 (98)**	35.9 (33)	25.6 (10)
Good	28.0 (28)	37.3 (38)	36.4 (12)	29.6 (72)	35.9 (33)	**46.2 (18)**
Fair-Poor	36.0 (36)	19.6 (20)	**45.5 (15)**	30.0 (73)	28.3 (26)	28.2 (11)
Subjective Mental Health *						
Excellent-Very Good	**46.9 (46)**	**47.1 (48)**	21.9 (7)	**50.2 (122)**	**50.6 (46)**	34.2 (12)
Good	**28.6 (28)**	**35.3 (36)**	**43.8 (14)**	35.4 (86)	25.3 (23)	**42.1 (16)**
Fair-Poor	24.5 (24)	17.7 (18)	**34.4 (11)**	14.4 (35)	24.2 (22)	23.7 (9)

**** p<0.05***
***** p<0.01***
****** p<0.001***

n.s. not significant

Loneliness

No of Groups	n	Log likelihood	df	AIC	BIC
2	692	-1544.645	13	3115.289	3174.304
3	**692**	**-1453.028**	**20**	**2946.056**	**3036.847**
4	692	-1453.028	25	2954.553	3068.043
5	692	-1452.039	28	2960.077	3087.185
6	692	-1450.33	32	2964.66	3109.927
7	692	-1448.427	36	2968.854	3132.279
8	692	-1456.317	40	2992.633	3174.217
9	692	-1448.158	42	2980.316	3170.978
10	692	-1452.773	48	3001.546	3219.446

Step 1.

Identify Number of Groups within data

Goodness of Fit:

Optimum combination of lower

* Log Likelihood
* Parameters
* BIC

Loneliness

UCLA Loneliness Scale	Group 1	Group 2	Group 3
Sample Groups 100% (692)	61.9% (429)	28.8% (199)	9.3% (64)
Lacks companionship			
Hardly Ever or Never	**85.1 (365)**	14.1 (28)	1.6 (1)
Sometimes	13.5 (58)	**74.4 (148)**	10.9 (7)
Often	1.4 (6)	11.6 (23)	**87.5 (56)**
Feels left out			
Hardly Ever or Never	**90.2 (387)**	14.1 (28)	3.1 (2)
Sometimes	9.8 (42)	**82.4 (164)**	12.5 (8)
Often	0.0 (0)	3.5 (7)	**84.4 (54)**
Feels isolated			
Hardly Ever or Never	**96.0 (412)**	19.1 (38)	0.0 (0)
Sometimes	3.7 (16)	**76.4 (152)**	10.9 (7)
Often	0.2 (1)	4.5 (9)	**89.1 (57)**

Step 2.

Observe probabilities of membership of groups

Step 3.

Examine characteristics of social isolation

Loneliness

Groups	1 Hardly Ever	2 Sometimes	3 Often
% sample in group	100% (429)	100% (199)	100% (64)
Sex *n.s*			
Female (vs male)	54.9 (234)	56.6 (112)	54.1 (33)
Age *n.s*			
50-59 years	21.1 (90)	18.7 (37)	29.5 (18)
60-69 years	34.0 (145)	36.9 (73)	36.1 (22)
70-79 years	31.2 (133)	28.3 (56)	23.0 (14)
80+	13.6 (58)	16.2 (32)	11.5 (7)
Marital Status ***			
Married/living with partner	**74.7 (318)**	**52.5 (104)**	**50.8 (31)**
Single (never married)	5.6 (24)	11.6 (23)	13.1 (8)
Divorced/Separated/Widowed	19.7 (84)	**35.9 (71)**	**36.1 (22)**
Education (highest level) *n.s*			
None/primary	14.4 (61)	24.0 (47)	21.3 (13)
High School	40.2 (170)	38.3 (75)	34.4 (21)
Further Education	19.9 (84)	18.9 (37)	24.6 (15)
Higher Education (degree +)	25.5 (108)	18.9 (37)	19.7 (12)
Current Status **			
Retired	**68.6 (293)**	**66.3 (130)**	**55.7 (34)**
Working	26.1 (110)	25.5 (50)	26.2 (16)
Other (Unemployed/ Sick/ Looking after family)	4.3 (18)	8.2 (16)	**18.0 (11)**

Step 4.

Test associations

*** socio-demographics**

Marital status
Current status

**** p<0.05***
***** p<0.01***
****** p<0.001***

n.s. not significant

Loneliness

Groups	1 Hardly Ever	2 Sometimes	3 Often
Sample % (n)	100% (429)	100% (199)	100% (64)
Health Behaviour			
Smoker (vs non smoker) **	12.1 (52)	**20.6 (41)**	7.8 (5)
Alcohol (>14 units) *n.s*	25.9 (62)	24.2 (25)	38.9 (14)
Fruit/Veg (<5 p/day) *	42.3 (180)	**53.6 (104)**	43.8 (28)
Bowel Screening (never) *n.s*	25.5 (108)	26.8 (53)	30.0 (18)
Exercise (No vigorous/moderate) *n.s*	38.8 (165)	48.5 (96)	45.9 (28)
Self-reported Health			
Subjective Health ***			
Excellent-Very Good	**41.7 (176)**	29.3 (58)	21.3 (13)
Good	**34.6 (146)**	**33.3 (66)**	29.5 (18)
Fair-Poor	23.7 (100)	**37.4 (74)**	**49.2 (30)**
Subjective Mental Health ***			
Excellent-Very Good	**53.1 (223)**	**37.2 (73)**	21.7 (13)
Good	32.9 (138)	**38.8 (76)**	30.0 (18)
Fair-Poor	14.1 (59)	24.0 (47)	**48.3 (29)**

Step 4.

Smoking
Fruit/veg

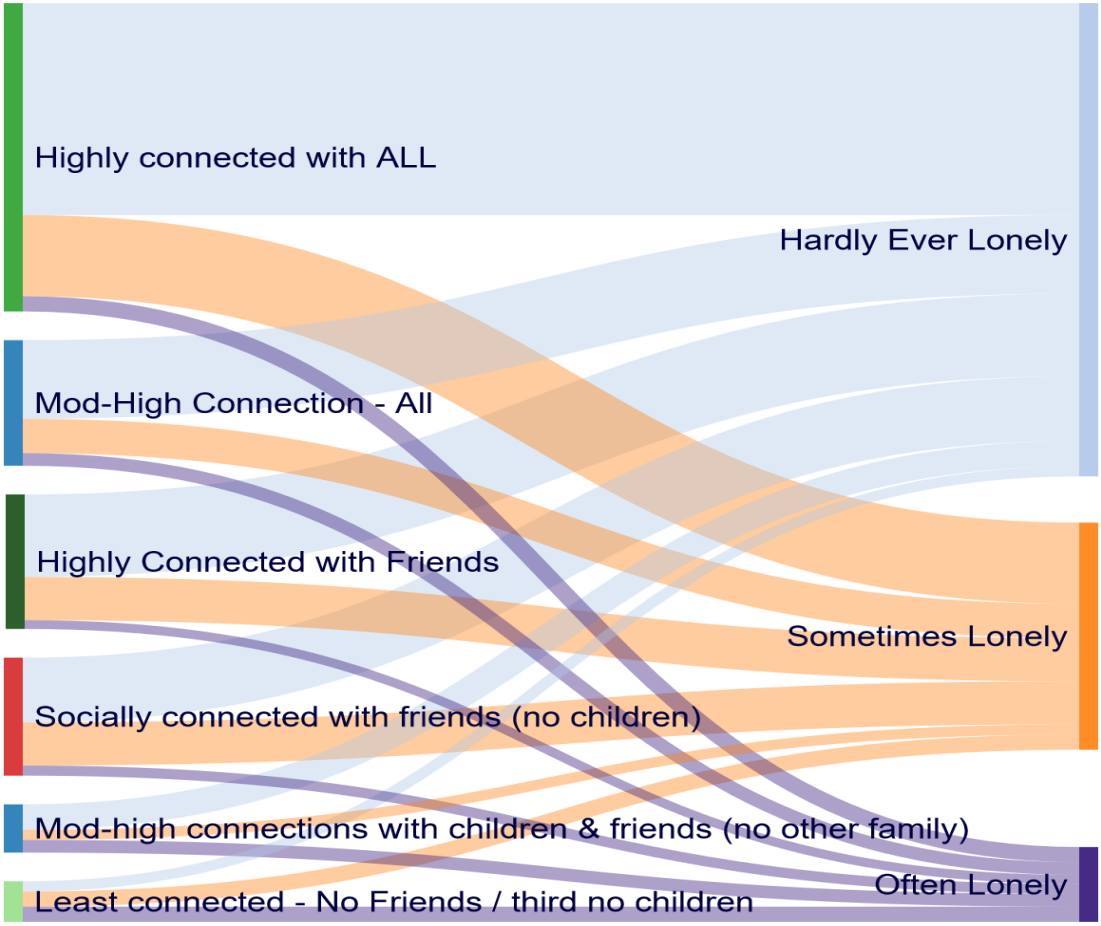
Subjective health

**** p<0.05***
***** p<0.01***
****** p<0.001***

n.s. not significant

Socially Isolated..

…. Or lonely?



Discussion

- Latent class analyses offers a means to 'discover' populations groups in relation to social phenomena

- Social connected Groups
  - No significant variation in health behaviours
  - Poorest self-reported physical and mental health in least connected group

- Loneliness Groups
- Hardly Ever: highest proportion to report Excellent/Very Good physical & mental health
- Sometimes Lonely: highest proportion of smokers and eat <5 fruit/veg a day
- Often Lonely: Poorest self-reported physical and mental health

Strengths & Limitations

Strengths:

- Latent classes offer a data-driven approach to understand survey responses
- Opportunity to characterise social isolation and loneliness in an ageing population

Limitations:

- Cross-sectional study (presently)
- Include other loneliness variables
- Include wider responses to health behaviour

Future Developments

1. Compare with other Scottish data

- Run the same analyses in data collected by Scottish Health Survey or Understanding Society
- Extend to include NHS Scotland administrative health data
  - Diagnosis
  - Health service usage (hospital episodes and length of stay)

2. Compare and contrast with other ageing studies

- English Longitudinal Study of Ageing (ELSA)
- NICOLA
- TILDA

Thank You for Listening

Elaine.Douglas@stir.ac.uk
@ED_ETD

@HAGIS_SCOT

Thank You

Questions?

Social Isolation

Probabilities

Social Isolation	Group 1	Group 2	Group 3	Group 4	Group 5	Group 6
% sample in group	24.8%	19.5%	5.4%	28.4%	15.0%	6.9%
Meets children						
More than once a month	**93.7**	**53.8**	**63.9**	**94.0**	0.0	**67.4**
Less than once a month	6.3	**46.2**	3.6	6.1	0.0	30.9
No children	0.0	0.0	**32.4**	0.0	**100.0**	1.6
Communicates with children						
More than once a month	**99.9**	**86.8**	**67.6**	**100.0**	0.0	**91.1**
Less than once a month	0.1	13.2	0.0	0.0	0.0	7.3
No children	0.0	0.0	32.4	0.0	**100.0**	1.6
Meets friends						
More than once a month	70.2	**75.5**	4.2	**98.4**	**78.5**	**68.1**
Less than once a month	29.8	24.5	0.6	1.6	21.5	9.5
No friends	0.0	0.0	**95.1**	0.0	0.0	22.4
Communicates with friends						
More than once a month	**82.4**	**78.1**	4.7	**99.5**	**91.4**	**70.5**
Less than once a month	17.6	21.9	0.1	0.5	8.6	7.1
No friends	0.1	0.0	**95.1**	0.0	0.0	22.4
Meets family						
More than once a month	**64.1**	13.9	**57.4**	**81.2**	**52.7**	1.0
Less than once a month	35.9	**85.7**	30.7	18.8	39.9	10.2
No other family	0.0	0.4	11.8	0.0	7.3	**88.8**
Communicates family						
More than once a month	**92.7**	**52.2**	**79.5**	**97.9**	**76.4**	3.1
Less than once a month	7.3	**47.4**	8.6	2.1	16.1	8.1
No other family	0.0	0.4	11.8	0.0	7.4	**88.8**
Clubs/Social Activities						
In clubs (vs not in clubs)	46.3	**55.5**	**22.4**	**72.2**	**58.1**	**44.2**