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Appendix 3.1 Training and Public engagement

Courses and Training

- Quantitative analysis module
- Specialised Stata training ranging from data management and manipulation, combining data sets, do-files, descriptive statistics, tables, cross-tabulations, combining cross-tabulations and descriptive, to survey data visualisation techniques, logistic regression models, and meta-analysis)
- Systematic Reviews: Diversity, Design and Debate course,
- Systematic Reviews: meta-analysis, qualitative synthesis & mixed-method synthesis course
- Introduction to Qualitative Analysis
- Narrative Research by distance learning,
- Introduction to Interviewing in Qualitative Research,
- Qualitative analysis workshop: Advanced course
- Introduction to Mixed Methods Research module

Dissemination and public engagement

- *Using dialogic/performance analysis to assess the suitability and acceptability of social isolation and loneliness interventions for older minoritised people living in the UK: A reflection on the benefits and drawbacks.* Presentation at the virtual postgraduate conference "To think is to experiment" organised by the University of East London, Centre for Narrative Research, London, 29th April, 2020

- *Using dialogic/performance narrative analysis to assess the suitability and acceptability of social isolation and loneliness interventions for older minoritised*

people living in the UK. Presentations at Thomas Coram Research Unit Centre for Narrative Research Graduate seminars, London, 4th February, 2020.

- Older ethnic minority adults have fewer close friends. UCL News release based on publication. Available from https://www.ucl.ac.uk/news/2020/jan/older-ethnic-minority-adults-have-fewer-close-friends 17th January 2020

- *The four planes of social being.* Presentations at UCL, Institute of Education, London, 21st November and 5th December, 2019

- *Community based group interventions for social isolation and loneliness: A mixed methods systematic review.* Poster presented at the Gerontological Society of America annual scientific Meeting, Austin Convention Centre, Austin, Texas, 13th November, 2019

- *Understanding diversity in ageing populations through examining social processes.* Guest Lecture, UCL, Institute of Education, London, 22nd October, 2019

- Understanding the friendship networks of older minoritised people living in the United Kingdom Paper presented at the Health Studies User Conference 2019 organised by the UK Data Service in collaboration with UCL and NatCen Social Research. London, 10th July 2019.

- *Illuminating social isolation and loneliness in older minoritised people living in the United Kingdom through an intersectional analysis* Paper presented at the 2019 IMISCOE Annual Conference: Understanding International Migration in the 21st Century: Conceptual and Methodological Approaches in Malmö, Sweden, 28th June 2019.

- Understanding the friendship networks of older minoritised people living in the United Kingdom. Oral and Poster presentation at the London-based ESRC Doctoral Training Partnerships Research Day, London, 6th June 2019.

- *Understanding diversity in patterns of ageing.* Guest Lecture, UCL, Institute of Education, London, 30th November, 2018.

- *Analysing the social networks of older Black and Minority ethnic people using the four planes of social being.* Presentation at the Critical Realism Reading Group at UCL, Institute of Education, London, 29th November 2018

- The effectiveness and appropriateness of social isolation and loneliness interventions for older Black and minority ethnic people living in the UK. Departmental seminar. Thomas Coram Research Unit, UCL, Institute of Education, London, 20th November 2018.

- *Analysing the social networks of older Black and Minority ethnic people using the four planes of social being.* Presentation at the Health Care and Critical Realism: Introductory and Basic refresher day course, at UCL, Institute of Education, London, 17th November 2018.

- *Critical realism for beginners: Four planes of social being.* Presentation at UCL, Institute of Education, London, 15th November 2018.

- *Social exclusion, social isolation and loneliness among older people.* Guest Lecture, UCL, Institute of Education, London, 30th October, 2018

- *The effectiveness and appropriateness of social isolation and loneliness interventions for older Black and minority ethnic people living in the UK.* External seminar. Open University, Centre for Ageing and Biographical Studies, Milton Keynes, 16th October 2018

- *The effectiveness and suitability of interventions for reducing social isolation & loneliness in older Black and Minority Ethnic (BME) people.* Infographic presented at the British Society of Gerontology-Emerging Researchers in Ageing pre-conference event, Manchester, 3rd July 2018.

- *The effectiveness and suitability of interventions for reducing social isolation & loneliness in older Black and Minority Ethnic (BME) people* Poster entered at UCL Doctoral Poster Competition, London, 5th June 2018.

- *The efficacy of social isolation and loneliness interventions for older Black and Minority Ethnic individuals living in the UK,* Presentations at *COST Action IS1409 Training School*, Mendel University, Brno, 18-21 March 2018.

- *The efficacy of social isolation and loneliness interventions for older Black and Minority Ethnic individuals living in the UK,* Presentation at Thomas Coram Research Unit*,* UCL Institute of Education, 16th March 2018.

- *The efficacy of social isolation and loneliness interventions for older Black and Minority Ethnic individuals living in the UK.* Presentation at UBEL–DTP Winter conference, Birkbeck, 7th December 2017.

- *Are mainstream interventions targeting social isolation and loneliness effective for older individuals from Black and Minority Ethnic categories living in the UK?*

Presentation at Centre for Doctoral Education Summer Conference, UCL Institute of Education, 13th June 2017

- *Preventing social isolation and loneliness in older individuals from Black and Minority Ethnic categories: Making a case for pre-retirement interventions.* Presentation at PhD students' workshop "Life-course influences on retirement: Perspectives from research and stakeholders, University of Helsinki, 17th May 2017.

- *Social Isolation and Loneliness in Black and Minority Ethnic Elders Living in the UK.* Poster entered at UCL Doctoral Poster Competition, London, 7-8 March 2017

Appendix 3.2 Information Sheet

Institute of Education

UCL

Exploring the Social Networks and Social Ties of Black and Minority Ethnic Individuals Aged 65 and Over Living in the Community

March 2017 to September 2020

Information sheet for [name of adult participant group]

Who is conducting the research?

My name is Brenda Hayanga and I am inviting you to take in part in my research project, Exploring the Social Networks and Social Ties of Black and Minority Ethnic Individuals Aged 65 and Over Living in the Community.

I am a post graduate research student at the Institute of Education, University College London, which is the world's leading centre for education and related social science.

I am hoping to learn more about the relationships, social contacts and social networks of individuals aged 65+ from Black and Minority Ethnic (BME) groups living in the UK.

I very much hope that you would like to take part. This information sheet will try and answer any questions you might have about the project, but please don't hesitate to contact me if there is anything else you would like to know.

Why are we doing this research?

Social participation, relationships and contact with family and friends are important to many people as they grow older. There is a paucity of literature in this on this topic within Black and Minority Ethnic groups aged 65 and over from living in the UK. The research is being conducted to explore this area further within this particular population. I would mainly like to find out from participants about their friendships, networks, social relationships, social support and their satisfaction with these.

Why am I being invited to take part?

You are being invited to take part so that you can help me understand more about this subject and from our earlier contact,

you fit the criteria of the participants therefore I would like to include in the study.

What will happen if I choose to take part?

If you choose to take part, you will be invited to participate in an interview that will be recorded and transcribed for analysis. The interviews will take an hour or so and will be conducted in person at a suitable time and location of your choice. During the interviews, you will be asked questions about your friendships, social networks, forms of social support and your satisfaction with the relationships. Examples of such questions are “can you contact people whenever you need them?” or “are there people whom you can talk to about your day to day issues?”

Will anyone know I have been involved?

No one apart from myself and my two supervisors will know of your involvement in this research. Your information will remain confidential. There will not be any identifying of names in the interview transcripts. Your names and any other identifying details will never be revealed in any publication of the results of this study. The transcripts will be encrypted and stored on a password protected computers and drives. However, if you provide any information that is deemed to affect your welfare, I am obligated to disclose this to the relevant parties.

Could there be problems for me if I take part?

I do not anticipate any problems but in the event that you experience any discomfort, anxiety or embarrassment during the interview, you are entitled to stop the interview at any point.

What will happen to the results of the research?

The results of the research will help contribute to the sparse literature in this population. In addition, the findings will be used to help formulate the review questions for a systematic review. Please be assured that your contributions will remain anonymous in any reports that are produced. The data collected in this research will be stored securely for up to two years after the completion of the study in 2020 on the institute's drives which are encrypted and password protected. Only my two supervisors and I will have access to the data.

Do I have to take part?

Participation in this study is voluntary and refusal to participate will involve no penalty. You are free to withdraw consent and discontinue participation in this project at any time without prejudice. You are also free to refuse to answer any question I might ask you. I hope that if you do choose to be involved then you will find it a valuable experience.

Thank you very much for taking the time to read this information sheet.

If you would like to be involved, please complete the following consent form and return to brenda.hayanga.14@ucl.ac.uk by [insert date].

If you have any further questions before you decide whether to take part, you can contact me or my supervisor

Brenda Hayanga,

Department of Social Sciences,

UCL Institute of Education,

20 Bedford Way, London, WC1H 0AL

Dr Dylan Kneale,

Evidence for Policy and Practice Information and Coordinating Centre,

Department of Social science,

UCL Institute of Education,

using the details below

UCL Institute of Education, 20 Bedford Way, London WC1H 0AL

+44 (0)20 7612 6000 | enquiries@ioe.ac.

This project has been reviewed and approved by the UCL IOE Research Ethics Committee

Appendix 3.3 Consent form

Institute of Education

Exploring the Social Networks and Social Ties of Black and Minority Ethnic Individuals Aged 65 and Over Living in the Community
March 2017 to September 2020

If you are happy to participate, please complete this consent form and return to brenda.hayanga.14@ucl.uk by [insert date].

	Yes	No
I have read and understood the information leaflet about the research	☐	☐
I agree to be interviewed as outlined on the information sheet	☐	☐
I am happy for my interview to be audio recorded	☐	☐
I understand that if any of my words are used in reports or presentations they will not be attributed to me	☐	☐
I understand that I can withdraw from the project at any time, and that if I choose to do this, any data I have contributed will not be used	☐	☐
I understand that I can contact Brenda Hayanga at any time	☐	☐
I understand that the results will be shared with the researcher's supervisors	☐	☐

Name _____
Signed _____ Date_____

Researcher's name _____
Signed _____ Date_____

UCL Institute of Education
20 Bedford Way, London WC1H 0AL
+44 (0)20 7612 6000 | enquiries@ioe.ac.uk | www.ucl.ac.uk/ioe

Appendix 3.4 Interview Schedule

Exploring the social networks and social ties of individuals Aged 65 and over from minoritised ethnic groups living in the community

Name of interviewee:
Male or Female:
Date and time of the interview:
Location of the interview:

Introduction

Hello, my name is Brenda. I am a student at UCL – Institute of Education. I am exploring the social networks and social ties of people from Black and Minority Ethnic categories aged 65 and over who are living in the community. Thank you for taking the time to participate in my study.

The interview should last around an hour or so. Would you mind if I recorded this interview? All the data collected will be kept confidential and your details will remain anonymous. All data will be kept in the secure drives at the university and only my supervisors and I will have access to the data.

Before we begin, I would like to remind you that you do not have to answer any questions that you do not want to answer. You are also are free to stop the interview at any point if you feel uncomfortable.

I have brought along the information sheet with details of the study as well as consent form for you to sign that confirms that you are happy to participate in this interview. Would you mind signing it and then we shall begin?

Section One:

I will start by asking you about yourself. Please tell me your life history, the events and experiences that have been important to you up till now

Questions to ask if they don't bring them up in their interview.

Section Two: Living arrangements

1. Do you live alone or do you live with someone?
    - If you live with someone, who is it that you resides with? (ask about children or spouse or siblings)
2. How long have you lived here?
3. Do you like the area that you live in?
    - Please tell me why you like/don't living here?

Section Three: Family members

1. Who are your closest family members? (children, siblings, parents, other relations) (obtain number)

    1.1 If they do live with them…

    - What activities do you do together?
    - How often do you eat a meal together?
    - How do you feel about the things you do together?
    - What makes it easy or difficult to do these things?

    1.2 If they do not live with them….

    - Where do your closest family members live?
    - How do you get in touch with them? By phone, email, visits
    - How often do you see or hear from the family members with whom you have the most contact? (weekly/monthly/yearly)
    - Where do you meet?
    - What do you do together?
    - How do you feel about this level of contact?
    - What makes it easy/difficult for you to see or hear from these family members?

Section Four: Social Support and satisfaction with social support

I will now ask you questions about the support you get from your friends and family

1. Who do you turn to when…
    a. You need help with things like cooking, cleaning, shopping?
    b. If you need to speak to someone about financial advice or health issues?
    c. If you are unhappy?

2. Do you have someone you can confide in?
    - How are they related to you? (Friend, family* member, neighbor, colleague?)
    - If not family – how long have you known them?
    - How far away do they live from you?
    - How do you get in touch?
    - Are there any difficulties in reaching this person?

**If they only rely on a family member for help, you can ask the following:*

3. Other than members of your family, are there people in your local area that you feel you can depend on or you feel very close to?

    3.1 If there are…
    - How far away from you do they live?
    - How do you get in touch with them?

4. How do you feel about the level of assistance they provide?
    - Please give reasons…
    - Do you feel that they listen to you?
    - Do you feel that they understand you?

Overall, how would you describe your friends and family?

Section Five: Timeframe questions

1. Can you tell me how you spent your day yesterday?
    a. Is this a typical day for you?
2. What sorts of things did you get up to last week?
    a. Who did you do it with?
    b. Is this a typical week for you?
3. What sorts of activities do you have lined up this week?

Section Six: Social Interactions

1. What sorts of activities/clubs/communities do you like to take part in when you are free?
    - Why do you do _____?
    - How often do you do _____?
    - Where do you do _____?

- Do you do _____alone or with someone else? (Friends, neighbors, family?)
- How long do spend doing_____?
- How do you feel about the time spent doing _____?
- How does doing _____make you feel?
- What makes it easy/ difficult to do _____?

If they don't do anything

- Is there any activity that you would like to do?
- What activity is it?
- What stops you from doing _____?
- What would make it easier for you to do _____?

Section Seven: Questions on Social Isolation and Loneliness

Research show that the number of people experiencing social isolation and loneliness is growing.

1. What sort of things do you think can make someone feel lonely or isolated?
2. What sort of things do you think someone can do to avoid being lonely or isolated?
3. What sorts of things can government do for people who are feeling lonely or isolated?
4. Is this something that that you have experienced at any point in your life or do you know someone who has experienced this?
5. Please can you tell me the reasons that brought about this feeling/situation?
6. Did you/they do anything to make you/them feel less lonely or less isolated?
    a. If yes, what did you/they do make you feel less lonely or less isolated?
    b. If not, what prevented you/them from doing anything to make you/them feel less lonely or less isolated
7. Are you aware of any services offered in your area to help people who feel lonely or isolated?
    a. If yes, what are they?
    b. Where did you hear about it?
    c. Have you used any of these services?

   d. How did you feel about using the services? (satisfied, dissatisfied)
8. If no, what type of services would you be interested in accessing if you had the chance?
   a. Please give me the reasons…

Section Eight: Wrap up

(Ask the following questions if they have not come up during the interview)

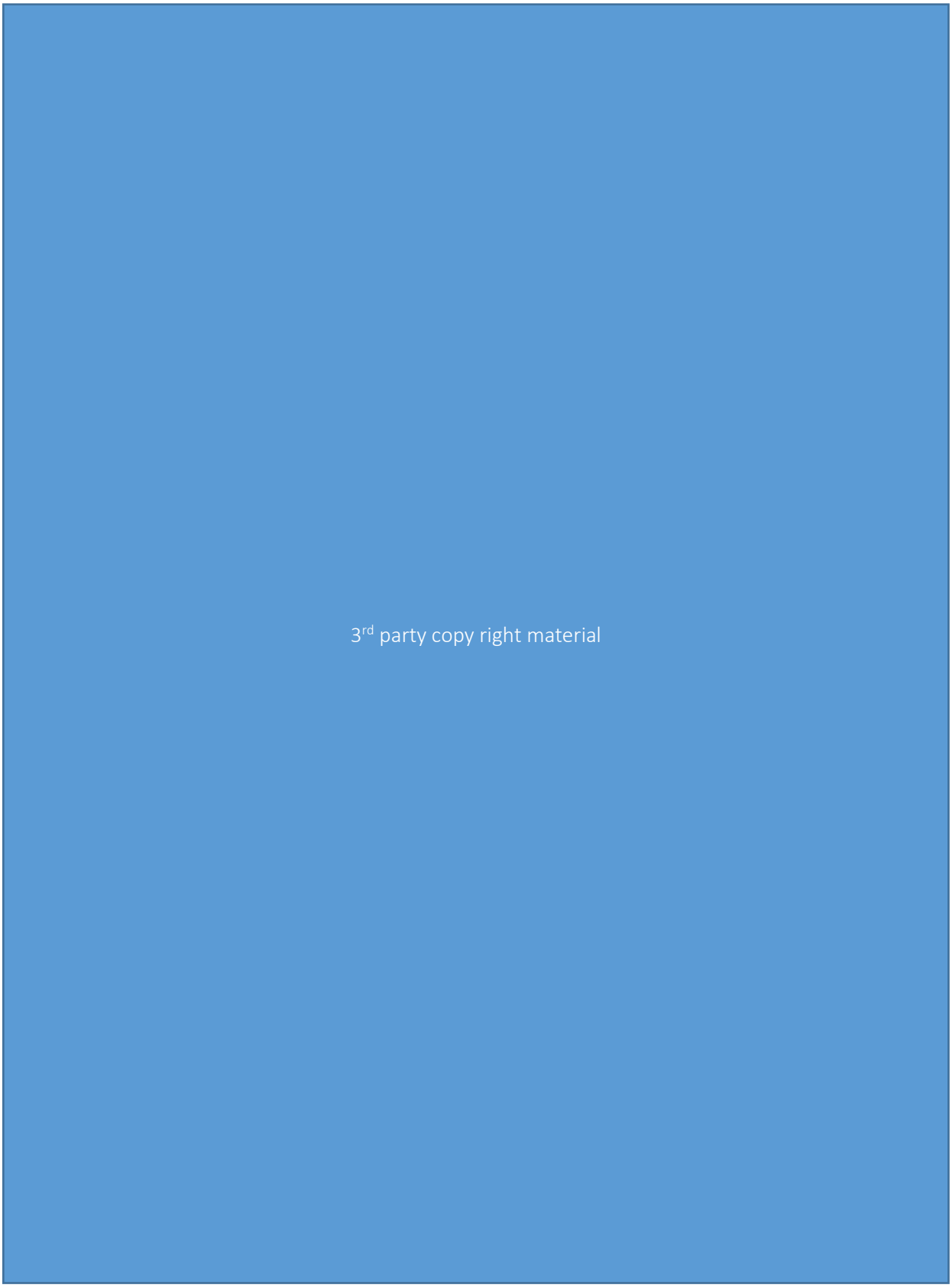
Thank you taking the time to speak to me today about your social networks and ties. There are a few quick details I'd like to find out if you don't mind.

1. In which year were you born?
2. What is your country of birth?
3. If born outside the UK, please tell me how long you have lived in the UK.
4. Are you married?
5. Do you have any children?
6. How would you rate your health?
7. Are you employed/self-employed/retired?
8. What is/was your occupation?

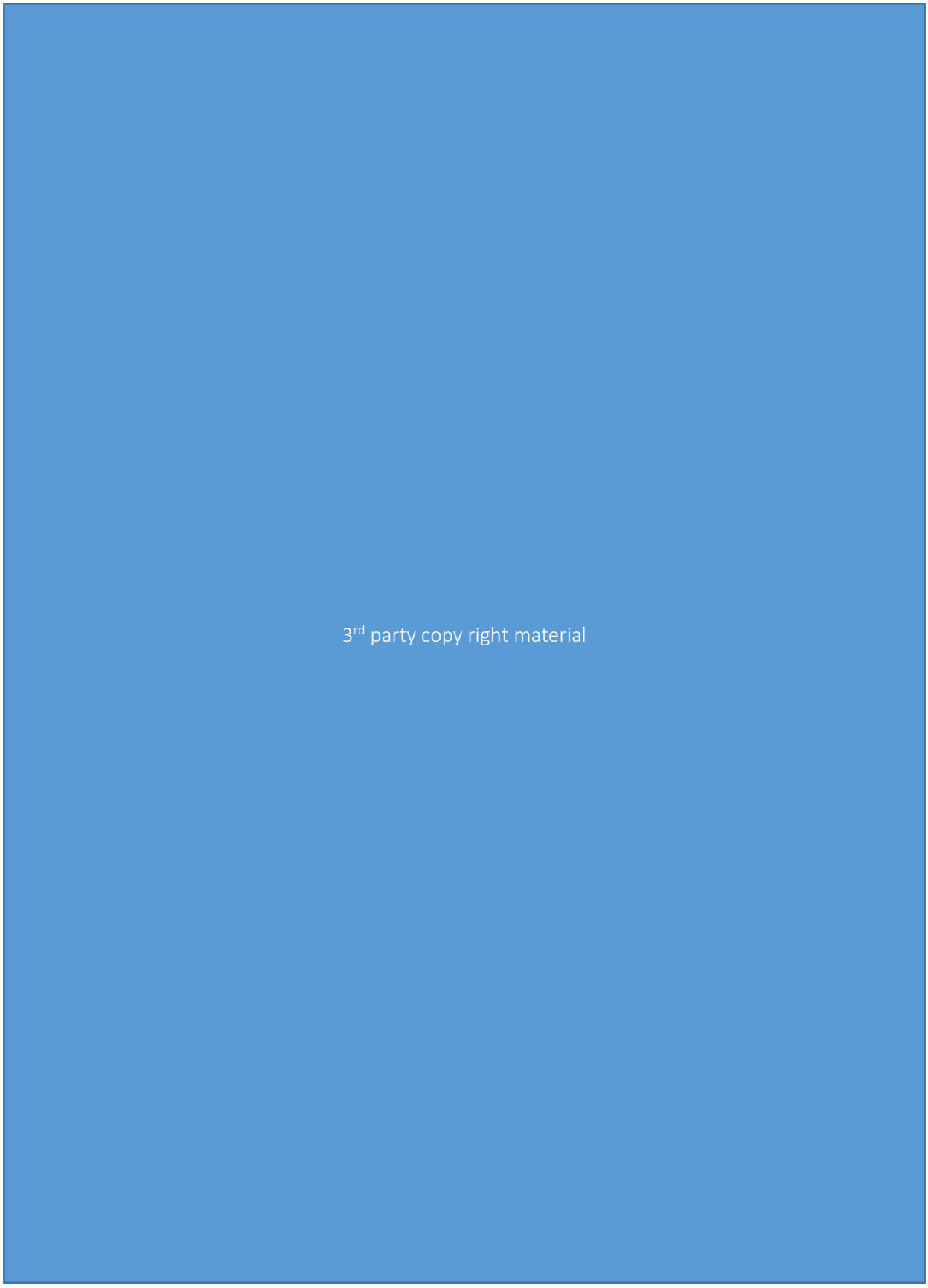
Is there anything that you would like to add or ask me?

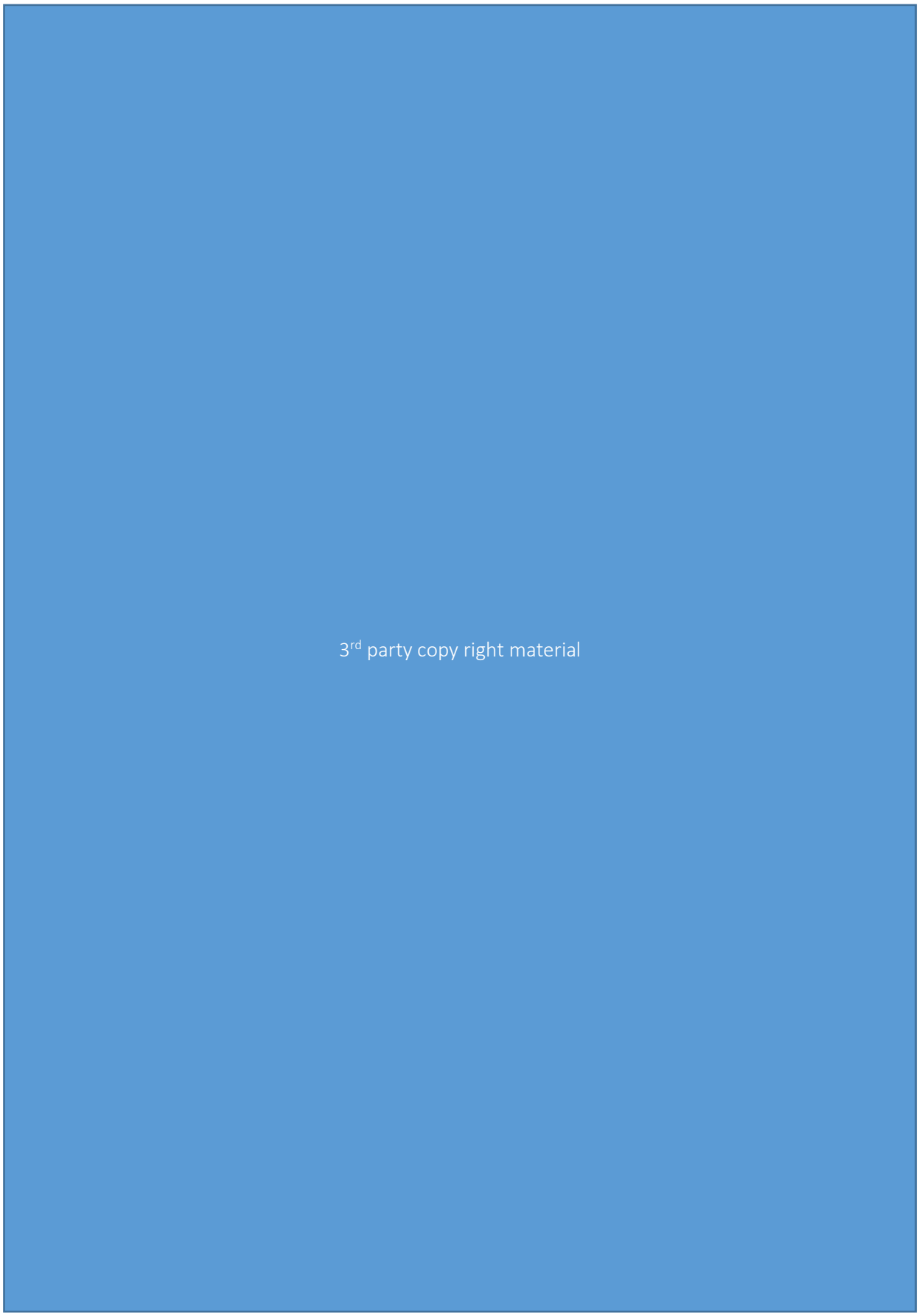
If you have any further questions, please feel free to contact me. My details are on the information sheet that I have provided you with. Thank you for taking part.

Appendix 4.1 Breakdown of ethnic categories of the analytical sample



Appendix 4.2 Recoding selected variables from Wave 6 of Understanding Society

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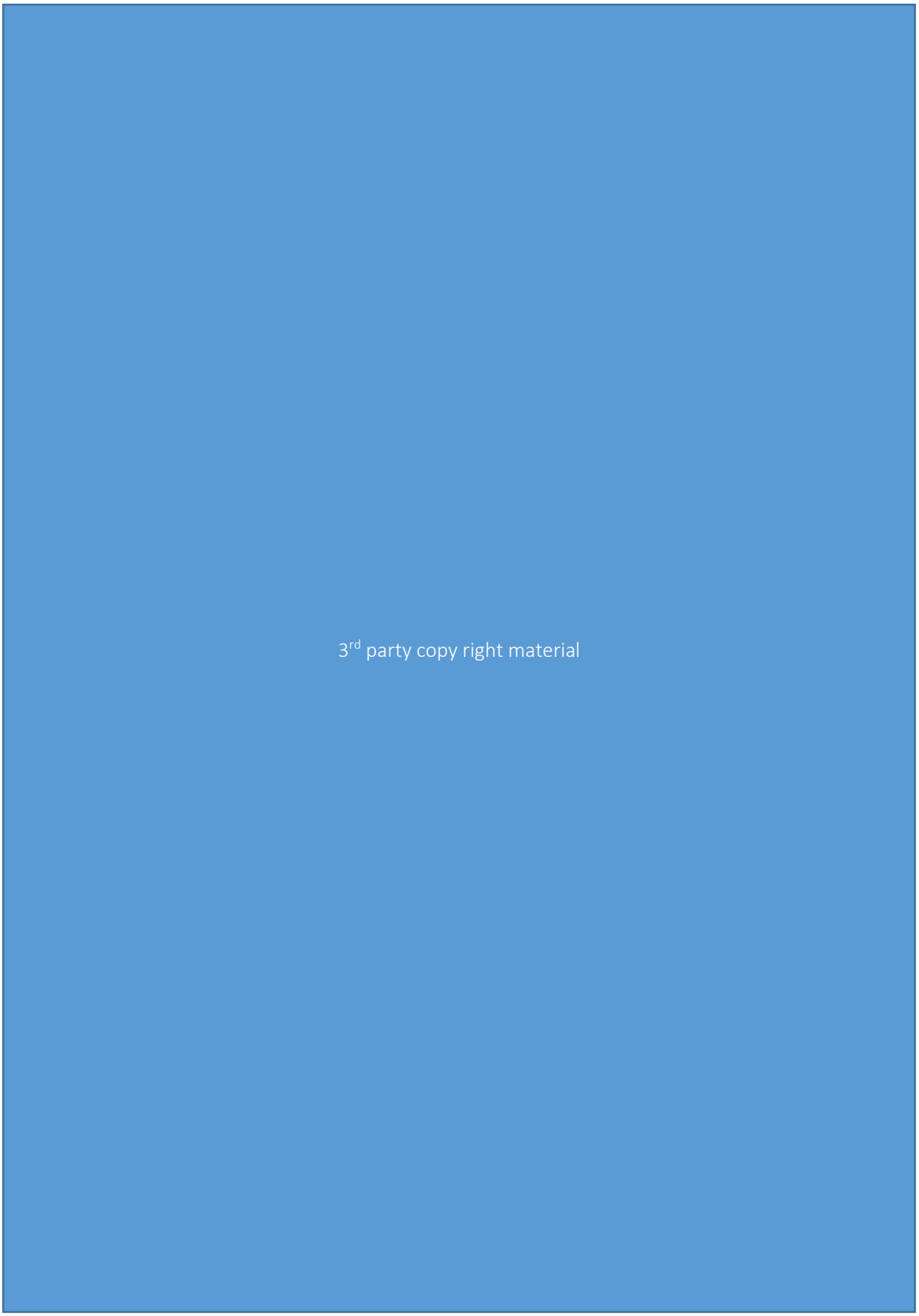
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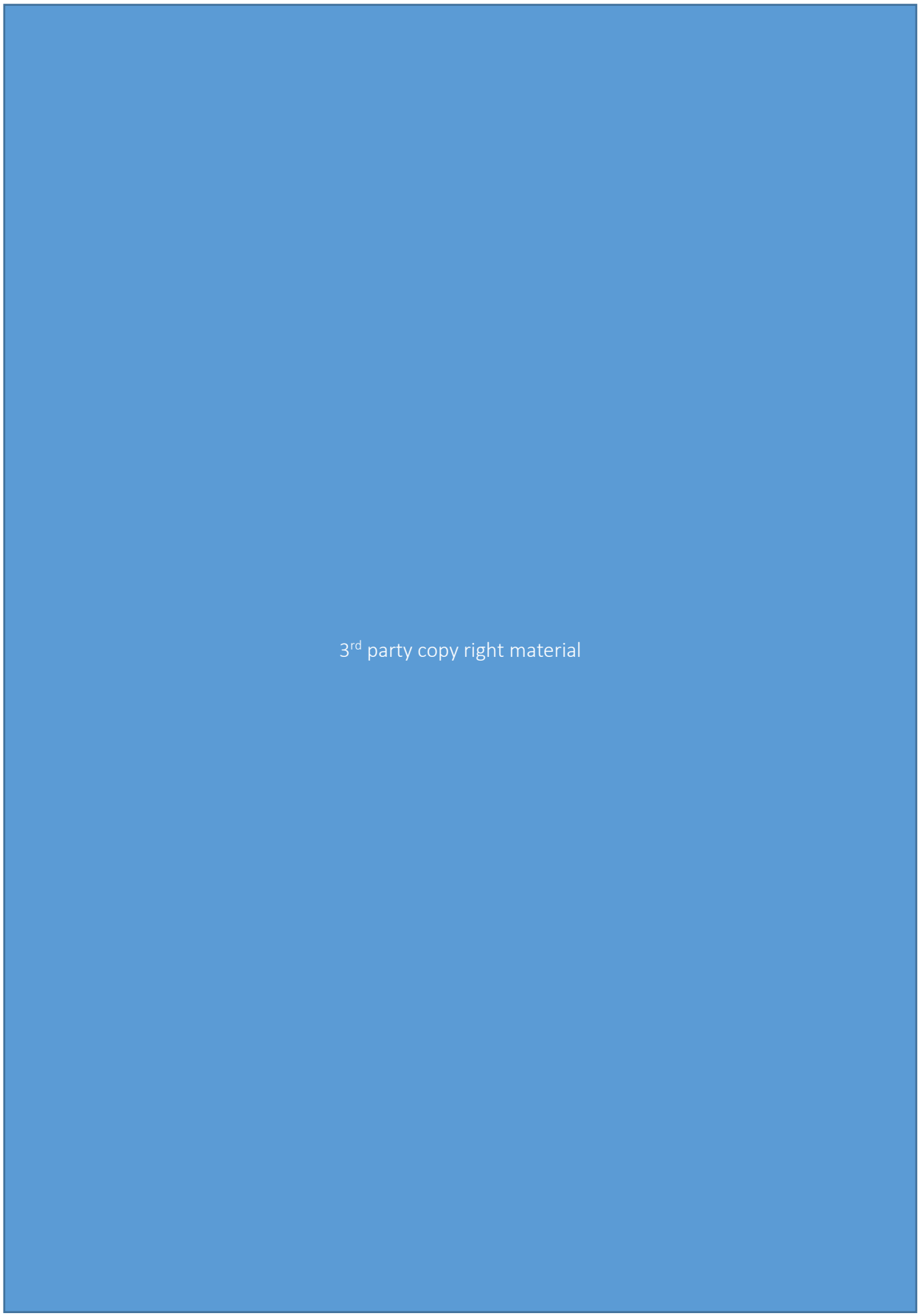
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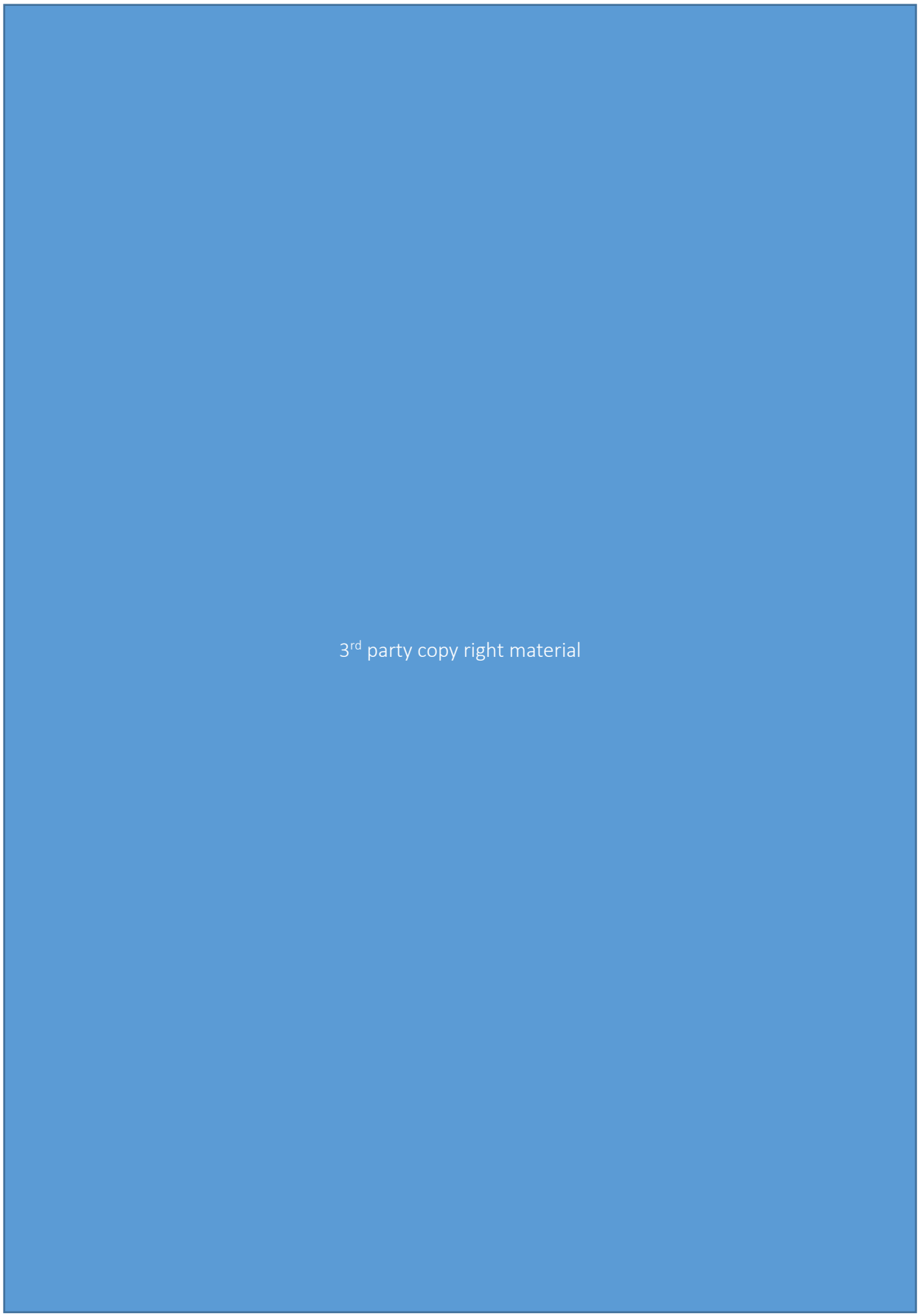
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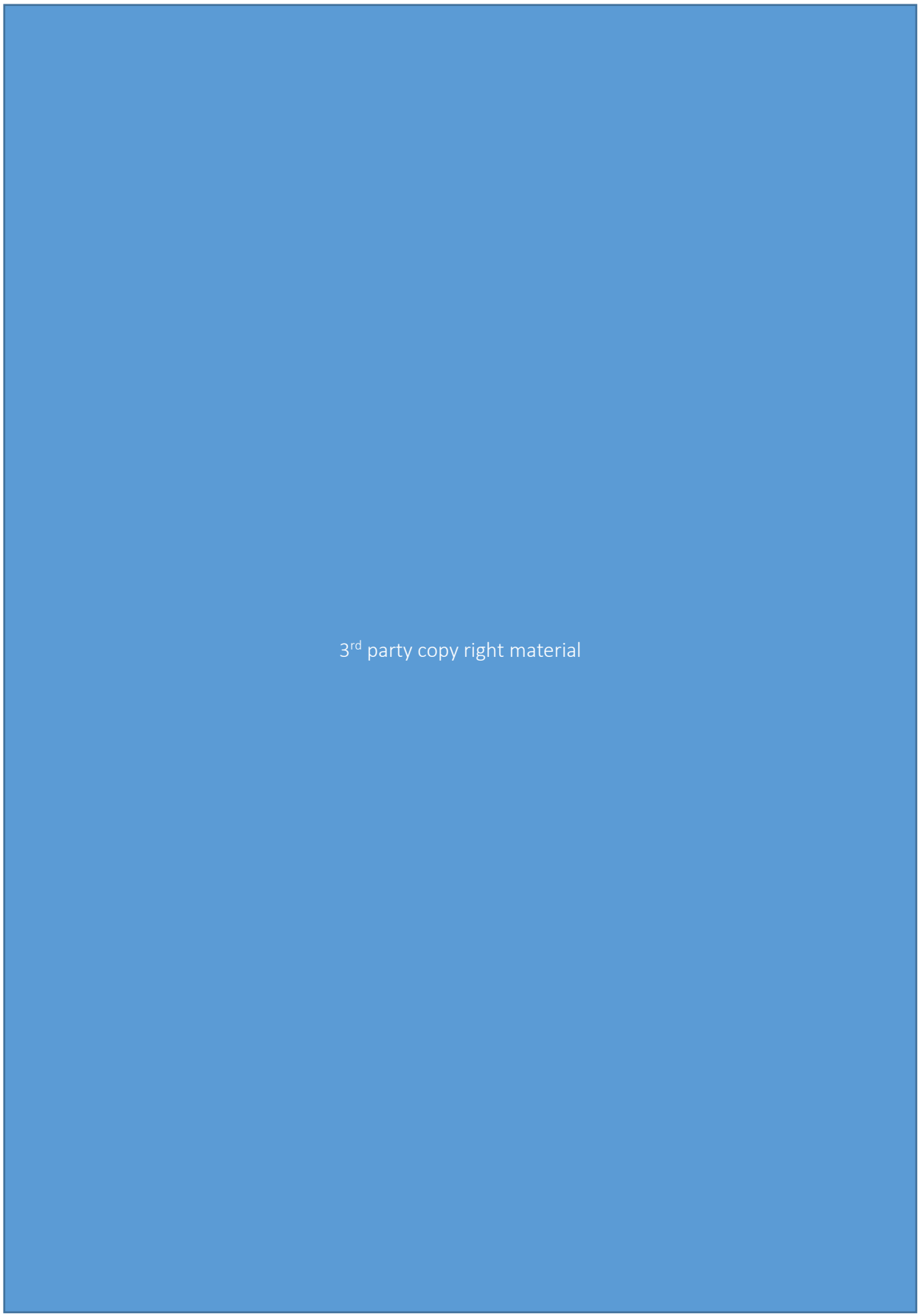
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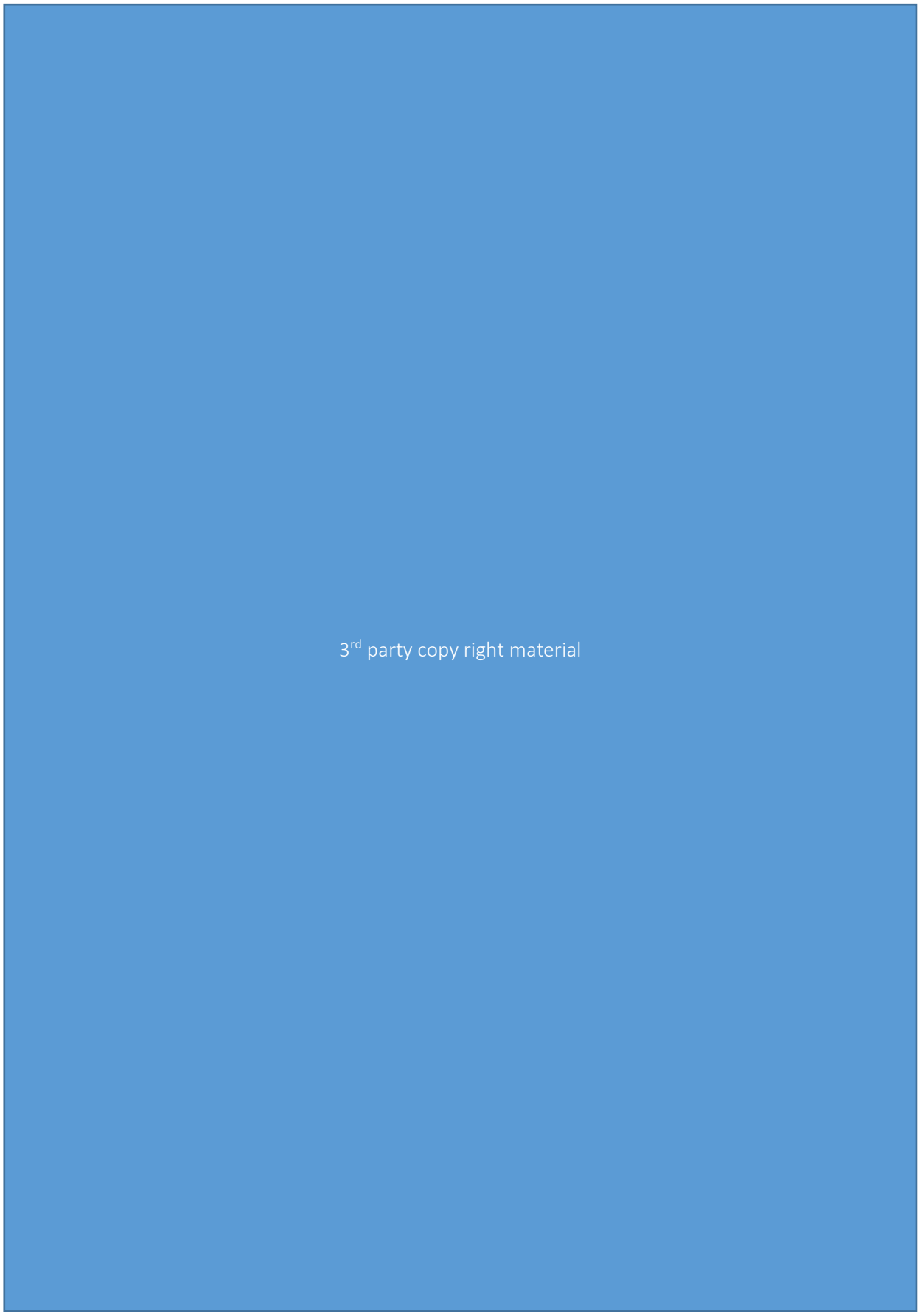
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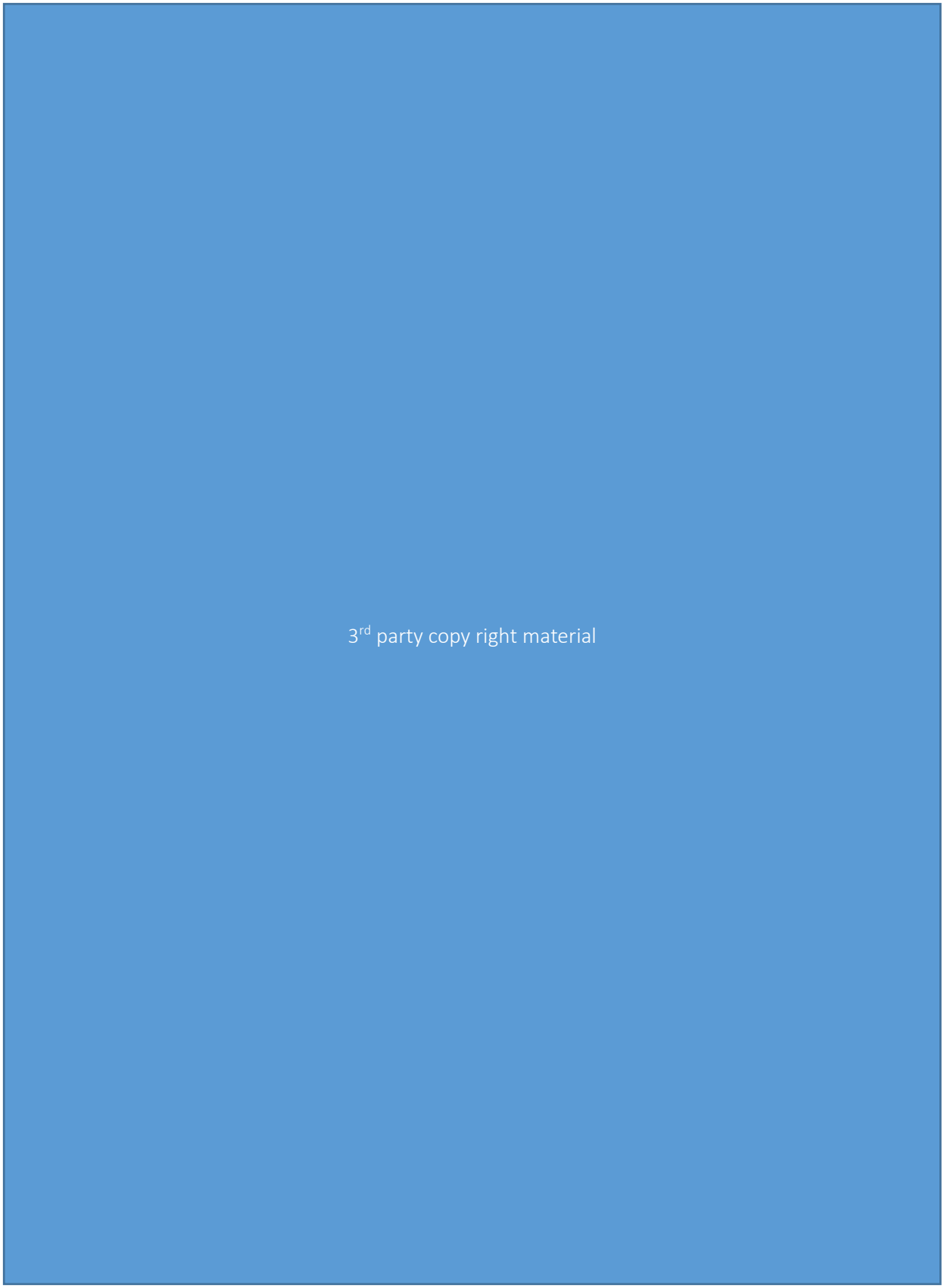
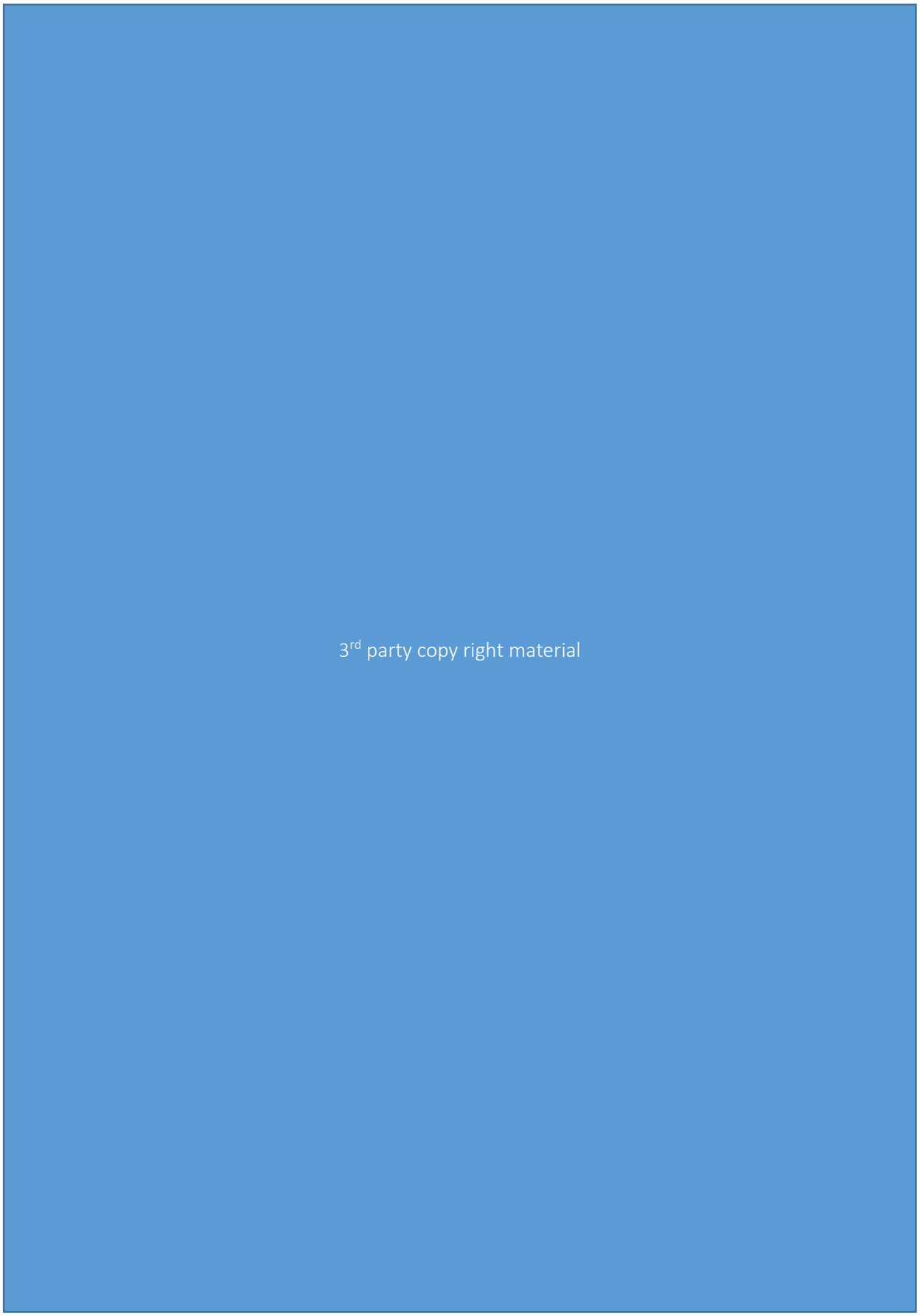
Appendix 4.3 Logistic regression models showing the association between friendship network indicators and selected sociodemographic factors Age 65 and over



Appendix 4.4 Logistic regression models showing the association between friendship network indicators and selected sociodemographic factors age 50 and over



Appendix 5.1 Pro forma for capturing information for pen-portraits

	Mr Bilal	Mrs Chakrapani	Mr Edosa	Mr Fiaz	Mr Gill	Mr Hall	Miss Isaacs	Mrs Jide	Mrs Khuboni	Mrs Lambert
Gender										
Age										
Year of Birth										
Country of Birth										
Years in UK at time of interview										
Former occupation										
Year of retirement										
Current occupational status										
Marital Status										
Living arrangements										
Past hobbies										
Current hobbies										
Talks about relationship with family										
Talked about own history										
Talks about Family Life										
Talks about Children										
Talks about Spouse										
Talks about Other family										
Talks about Friends										
Neighbourhood										
Social Economic class										
What is their health like?										
General philosophy in life										
How is it growing old in UK										

Appendix 5.2 Pen Portrait: Mrs Lambert and Mr Fiaz

Mrs Lambert

"I just take care of myself and my husband and my home"

Interviewed on the 7th of October 2017

Mrs. Lambert is a woman who was in her late eighties at the time of the interviews. She lives with and cares for her husband who suffers from dementia and Alzheimer's disease. She has two children who often come to visit and a sister in [the Caribbean]. She also has a brother who lives in [North America] but travels frequently to [the Caribbean]. She keeps in touch with them by telephone. Her parents and two of her siblings are deceased.

She has lived in the same neighbourhood for about 30 years and tells me that she knows her neighbours well. She has never had any problems with her neighbours and she likes where she lives. She tells me that wherever she has lived, she has gotten along with everybody.

She left [the Caribbean] for England in the mid-1950s to join her two brothers who were already in England. On the day of the interview, she had been in the UK for over 60 years. She describes her first impressions of the England as dreary, cold, dark and miserable and tells me that she cried for three months after she arrived. One of her early memories of England that she recounts is seeing the smoke from the chimneys and thinking that it was from factory chimneys only to realize that the smoke was actually from people's houses.

She remembers that in the fifties in England, visibility was poor because of the thick smog that hung in the air. The severity is illustrated when she describes how on some days one would hear someone walking behind them but was only able to see them when they were very close. In addition to the poor visibility, she had to deal with the cold weather. She tells me that she arrived in the UK with her

summer clothes so she found it difficult but they had to cope. In addition, she tells me that during those days, they experienced very heavy snowfall. She pauses and then dismissingly says,

> "*urgh…forget about it…anyway, we survived*"

Despite this the cold weather and the smog, she tells me that the snow was the nicest thing about winter as illustrated below. However, when it melted, it was unpleasant.

> *"To me it was magical, it was beautiful. You hear of snow but you never experience it before. Really, one great moment then..."*

Mrs Lambert tells me that at the time, they had to adapt to very many things. One thing that she noticed when she arrived in the UK was that people did not speak to one another in the streets. If they did, they only commented on the weather. She contrasts this with [the Caribbean] where people would chat to strangers on the streets. In consequence, she learnt how to keep her mouth shut. However, she acknowledges that things have changed for the better since then.

Soon after arrival, she was taken to the Exchange to look for work. She told her brother that she had been a teacher in [the Caribbean] but she was told that she could not teach in England and was sent to a factory. The following statement illustrates how she felt about the factory.

> *"…So they sent me to the factory…which I hated. I thought the people were really...*[inaudible] *daft, they asked stupid questions…uh, I don't know…I just…thought, what have I done?..."*

Her parents had paid a lot of money to send her to school and educate her back in [the Caribbean] and she was unhappy about being forced to work in a factory. At the time, there were a lot of people from [the Caribbean] who were working in the factories but were planning on going back to their countries once they had

accumulated enough money. She, however, didn't have the same plan and was determined to stay and fight. She put up with the way life was at the time and decided to go to night school to do shorthand and typing. She tells me that life was hard at the time because when she left work it was dark, she had to go home and then leave again to go to evening classes. She exclaims,

"*Oh God! What days they were…*"

By the time she had finished the course, she had met her husband and after a year, they were married. Her husband was a post office engineer who went into to various offices to fix faulty equipment. He helped her secure a job when he went into a job agency to fix a device. He told one of the women who worked there that his wife was looking for a job and asked whether there were any roles that she could be given. The agency found her a job as an assistant to an accountant. Despite having done the typing and shorthand course, she took the role. She worked there for a while and after leaving, she got other jobs in the accountancy field and remained there until she retired in the early nineties. As such, she moved from Social Class II - Technical Occupation (Teaching) to Social Class V- Unskilled Occupation (Factory worker) back up to Social Class III- Skilled Non-manual (Accountancy related roles).

When she was younger, she thought that her husband wanted to retire in [the Caribbean]. Therefore, when she was about to retire, she took a course in floristry so that if they went back to [the Caribbean] and she got bored, she could open up a flower shop and do floral arrangements and bouquets at a British standard. She completed the course and passed her exams after two or three years. She laughs as she tells me that after passing her exams her husband told her that he would not be going back to [the Caribbean].

At that time, she felt really disappointed that they did not move back to [the Caribbean] but she tells me that now she isn't disappointed because when she

goes back to visit, it isn't a place that she would want to return to. She tells me that the people she knows are dead or have moved away. Moreover, there was a new generation that is different from the one that she grew up with. Her reasons for not going back to [the Caribbean] are captured below

> *"…they don't know me, I am a stranger in my own hometown…and uh, [the Caribbean] is not [the Caribbean] I left. People cared about people…now they just kill you. Oh God! No, I'm not going back to [the Caribbean]…"*

She loves travelling and tells me that when her children were still in school, they would often travel as illustrated below

> *"….I like travelling…so we, I would take them on holiday…we were always on holiday, if it's not on coach, you know, we go to places"*

One of her children worked for an airline and this made it easier and cheaper for her to travel frequently. They have been to many places together. Since retiring, she has travelled to Australia, North America, and various countries in Asia and Africa. She used to travel to [the Caribbean] very often but since her parents passed away, visiting has not been the same. She now only goes if there are special occasions like weddings or funerals. The last time she travelled to [the Caribbean] was two years ago to attend her older sister's funeral.

Mrs Lambert tells me that her youngest brother moved from London to Bristol after arriving in England in the 50s. He then became a preacher and moved to [North America] where he started his family. He is now retired and travels between [North America] and [the Caribbean]. She tells me that when he first settled in [North America], he invited both her and her older brother to join him. Her older brother took up the offer and moved. He passed away a few years later. She, on the other hand, declined his offer because of the weather conditions in [North America] as illustrated below

"I said, 'Thanks but I'm not going to another cold country…when I leave here, I am going back to where it's warm!'"

She tells me that she is unable to visit her brother in [North America] because of the caring responsibilities she has as captured in the following statement.

"At the moment, I cannot see me travelling going anywhere because I've got [Julius] to look upon…erm we speak on the phone. I can't see me going to [the Caribbean] now…or [North America]..."

With reference to how often she sees her children she tells me that one of her children has taken early retirement and comes to help her every now and then. She tells me that her children do what they can for her but she also points out that they have a life of their own. Her husband's condition negatively impacts on her life as illustrated below.

"My husband has dementia…and uh…it takes a lot out of me and I'm not very well myself so, they help me the best they can"

She tells me that although there are carers who come in twice a day, she still has to do a lot because they are only there for half an hour. For instance, they only help with bathing her husband whereas she has to feed him and also cook, clean and iron. She tells me that she tries to do as much as she can and summarizes her role as follows.

"I've got to run my house, I've got to do everything else that everybody else does. I just take care of myself and my husband and my home"

She has been offered respite services but she has not taken this up yet because she doesn't know if her husband will be ok.

When it comes to her health, Mrs. Lambert suffers from a back problem which makes caring for her husband more difficult. She tells me that she is in so much

pain and attributes the back ache to growing older. She tells me that she wears a patch that has been prescribed by the doctor. She also takes tablets for pain relief but she doesn't think that these measures make any difference.

With reference to loneliness, she tells me that she wouldn't describe herself as lonely as illustrated when she says

> *"Erm...I wouldn't say I am lonely. Erm Erm…I was never one to have lots of people running in and out. I like my, my privacy in life"*

When I asked her what could be done for people who were lonely, she tells me that she doesn't really know. She suggests that people should be taken to respite homes. Because she didn't have much to say on loneliness, I asked her about her situation and what would make it easier for her. To this she responds by telling me that the question I have posed is a difficult one to answer because of her husband's condition as illustrated when she says

> *"My husband has got dementia and, uh, Alzheimer's mixed. If you could take that away, he would be back to the good, nice, understanding husband. He used to be loving…erm…. not wanting to give anybody any problems just like myself…"*

She wishes that we go back to the time when things were ok with her husband, but she acknowledges that life doesn't work like that so she accepts whatever she has been offered and tries to cope as best as she can. She adds that if people come around to visit her then she would find it acceptable and she would be very pleased to have them as illustrated below

> *"…people turning up and saying hello, you know it makes a difference"*

In fact, on the morning of the interview, she had hosted two visitors who had just left before I called. Her former minister and his wife were in her area and decided

to visit her. She tells me that she doesn't normally get many visitors so she was happy to receive them as illustrated in the statement below.

> *"…it make me so peace this morning…so you got me in a good mood* [Laughs]…*they just left and gave me a good prayer, oh God…"*

Apart from the minister and his wife, she doesn't talk about having friends throughout the interview but she tells me that they usually go to a day centre where other older people from [the Caribbean] as well as a few White people meet up. She enjoys going to the day centre because she gets the opportunity to meet people from the same back ground as her. She sits and chats to people that she doesn't get to see every day as captured below.

> *"..erm it's very.. it's very ha- It's very good. It's that time where you meet people of your... of your own... background and so on which is just good and we play games like Dominos or scrabble or...you know whatever [interviewer: yeah] or just sit down and have a chat with somebody that you don't see every day and erm it's very good"*

They also play games such as dominos and scrabble. In addition, there are various trips that are organised by the day centre. In fact, she tells me that on the previous day, they went to the [Theatre] to listen to the orchestra playing. This trip was organised by the day centre and she really enjoyed herself. She was only able to go for this trip because one of her children watched her husband whilst she was out.

Pen portrait: Mr. Fiaz

"I won't know much about loneliness because I've always lived with the family"

Interviewed 25th September 2017

Mr. Fiaz is a man in his mid-sixties who was born in East Africa. He arrived in the UK in the early 1970s as a refugee with his with his brother. On the day of the interview, he had been living in the UK for just over 40 years. He lives with his wife of 40 years and has two children who are in their 30s. His parents and one of his brothers are deceased. He has four siblings who live in the UK and another two who live in North America.

Back in his country of birth, Mr. Faiz left senior secondary school after the first year to look for work because he felt that he was never good at school. In addition, he was in a very expensive private school and he didn't want to waste his mother's money as illustrated below.

> *"This was [1960s]…and my mother had to pay 500 shillings a term…it was three terms. It was a lot of money at that time…so I said, 'Why am I wasting mother's money?' you know, cause I was not going to pass anyway…"*

He decided to get into the jewelry trade because both his father and grandfather used to be jewelers. He trained for a year without pay and then got a low paying job. As he was just getting into the trade and starting to earn more money, they were forced out of [East Africa].

Mr Fiaz and his family members came to the UK with very little as each person was allowed 50 pounds. Anything more was confiscated at the airport before they left. When they arrived in the UK, they stayed in a camp for the first month. At the camp, they were given food and clothes and they received help from the British government. The experience of moving with nothing is summarized as follows.

"They used to give us secondhand clothes…charity clothes because we were penniless. We couldn't …we weren't allowed to take anything. Just clothes and that's it"

They arrived in autumn and were unprepared for the cold weather owing to the fact that they were coming from a hot country with only light clothes. At the airport they were offered warm clothes, but they didn't take them because they had clothes of their own. They didn't realize how cold it was going to get.

His mother and brother arrived in the UK before them and had already moved into a rented house, so he moved in with them. He soon found work at a factory. He tells me that he had applied to be a labourer but because of his small stature, he was offered assembly work instead. He held this role for four years and later found work in the jewelry trade through his cousin. He worked with the same company for 9 years and thereafter, the company was sold and it relocated to a different town. He continued with the company but had to commute to work. He did this for three years and then resigned because he found the commute difficult as illustrated when he says

"I worked there and then I got tired er…running up and down."

In the late 80s, he found work as a machine operator and worked there until he retired. From 2005, he also worked as a cleaner for 2.5 hours in the evenings. He retired in March 2017 but maintains his role as a cleaner to keep himself busy. The various roles he has held throughout his life illustrate a downward social mobility as he moved Social Class III – Skilled Non manual occupation (Jeweler) to Social Class IV - Partly Skilled (Assembly worker) Occupation back to Social Class III (Jeweler), then To Social Class IV (Machine Operator) and finally Social Class V – Unskilled Occupation (Cleaner).

Mr. Faiz bought his first house in the late 70s through the help of his sibling who assisted him with the deposit. He lived in that house for 6 years and then sold it and bought a detached house in the late 80s. The house is close to the motorway. The train station is two miles away and there are regular bus services in the area. Although he is 9 miles away from the main city center, there are other smaller retail centers nearby. In addition, a large retail center was built five years ago and is 3 and a half away from where he lives.

When he first moved to the neighborhood, it was a predominantly White neighborhood. It has become more diverse over the years as captured below.

> *"…Where I live it's all English people area mainly. There are now few Afric…you know…the Black Minorities like I don't know Ghanaians or Nigerians. I don't know but they are all mixed*... [clears throat] ...*There are some Somalians...but they are all nice. You know, we get on with each other, I say hello to everybody uh…"*

He mentions that in the past, they had ups and downs with neighbours in the area where kids threw stones and broke windows. However, he tells me that it is no longer like that as some people have moved out and the children have also grown up and left.

He abhors violence and says that he gets along with everyone. He mentions that living in England has been nice. He is grateful to the British people and the British government for the assistance he received as illustrated in the following statements

> *"It's been uh…it's been nice to be here in England you know. Because you get a lot of help from the government to start with…and uh…whenever… you lose a job, they help you to find a job…"*

"Overall it's been alright…Getting help from other people, government, neighbours, there is a lady called [Sally]… She really helped us and she even signed the forms for us to get the British Citizen…"

In relation to his children, he tells me that they both suffer from a genetic disease which characterized by short sightedness, abnormal clotting of blood, brittle bones. In some cases, it leads to developmental delays and learning difficulties. His sons live with him and he still accompanies them to medical appointments. In fact, on the day of the interview he mentioned that they had a medical appointment in a week's time. This disease has had an impact on their lives and is illustrated when he says

"That's why they are not working because...uh...like maybe it is something to do with their brains because of the disease. What they learn they cannot keep it. It wipes out…and er...you know…we tried a lot of things you know... Send them to private tuition and this and that but what they learn today, the next day they forget. It's not that they want to but…."

The condition doesn't prevent his children from engaging in social activities. For instance, he tells me that his eldest son met a girl from [East Africa]and they have become good friends. In 2016, they went to [East Africa] to meet her. They all then toured different countries in East Africa. On the way back to the UK, he collapsed at the airport before boarding the plane. He was examined at the airport medical room where it was discovered that he was dehydrated. He was sent to hospital where he fell in to a coma that lasted two days. When he came to, his wife and sister were by his side. His son had taken over and contacted them about the situation. They had flown to [East Africa] upon hearing the news of his collapse at the airport. He stayed in the hospital for two weeks and underwent dialysis to clear an infection in his stomach.

With reference to his health, he tells me that he has diabetes which he manages by exercising, monitoring his blood sugar levels and administering insulin shots

four times a day. His schedule revolves around his health. He tells me that most morning, he gets up, has a shower and prays. As he is diabetic and needs to burn sugar, he goes out walking for 1.5-2 hours. He then goes back home to check his sugar levels. If it is low, he eats something and administers insulin.

Mr. Fiaz had a stroke in 2016 which damaged his left his hip and his left eye. He also suffers from a frozen shoulder which he developed in later that year 2016. This makes it difficult for him to lift things and was one of the reasons that he retired from his role as a machine operator in 2017. He tells me that his health doesn't affect his day-to-day activities as he is still able to visit his friends and family. He is able to manage his diabetes and can tell when his blood sugar is high, and action is needed.

He tells me that that friends-wise, he is ok. He has a friend whom he visits every other day and over the weekends when he takes his morning walk. They used to work together in the jewelry trade and have kept in touch. His wife also has a friend who is from his country of birth that she has known for nearly 30 years who visits every Sunday.

He is also very close to his family and they often meet. When his mother was moved to a nursing home, he visited her weekly or in some cases fortnightly until she passed away. He also tells me that he used to take his wife to visit her mum on mother's day. The one year that he was unable to take her, his in-laws drove down to see them instead.

He is also in touch with his siblings. He often calls the ones who live in North America. Moreover, his brother who lives in North America usually travels to the UK to attend weddings, funerals and big family ceremonies. He regularly meets with the siblings that live in the UK as captured below

> *"…Tomorrow I'm going to see my eldest brother, he's 81 he lives in Birmingham. We came together from Uganda…"*

In fact, he has even travelled with his brothers to [East Africa]. They also went to their country of birth to see the house that they grew up in and the shop that they owned before they left for the UK in the 1970s. He tells me that the place has changed dramatically. There used to be a lot of open space but now the place is congested. The recreation grounds and cricket have all disappeared and have been replaced with buildings. The streets are no longer clean and people sit by the side of the road selling things because they cannot afford shops. He sympathizes with them and tells me that he understands that they have to earn a living. When asked whether he would ever move back, he tells me that he cannot move back there as there is nothing there for him anymore.

> *"…The way I see it, I don't mind going back but …I've got a house here, a good family, everything here, I'm well settled here…and if I go back there, I've got nothing there…"*

Moreover, managing his health is expensive and he would never be able to afford to pay for it privately. In addition, he tells me that he cannot rely on his children because of the condition that they suffer from. He tells me that he cannot expect them to take care of him.

Mr. Faiz tells me that he doesn't have any hobbies nowadays. However, in the past, he played darts and pool but had to stop when he got a second job as illustrated below.

> *"Sunday nights I used to play pool. I was in a…in the league …every Sunday we used to play, and uh Mondays I used to play darts. But uh then I stopped, uh, 'cos, uh, in 2005 when I got the second job in the evening I used to get tired and I couldn't throw so I stopped playing. So apart from that you know I haven't got any other hobbies"*

When asked about loneliness, he tells me that he hasn't experienced loneliness. However, he believes that it depends on an individual. He also acknowledges that people are different and some may be unable to get along with other people. He

says that those who don't socialise and mix with others create their own loneliness. This is illustrated when he says

> *"…It depends on the individual, the individuals, you know like. I have seen some guys, they used to work with me. They lived in a council flat. They wouldn't go out, nothing you know. They go to work, from work home, sit at home to watch TV and…It's so isolation you know. They don't mix with other people. It's creating…they create their own loneliness you know…"*

He believes that such people could mix with others but acknowledges that going out and participating in social activities costs money and there are those who cannot afford it. He tells me that this was the case during the 90s when times were hard. He and his wife were lucky enough to have been working and if they struggled, his mother and sister who lived with him at the time would help financially. He has never known loneliness because he has always been with his family.

Appendix 6.1 Search strategy

Search strategy [Search date in parenthesis]

Ovid MEDLINE (22.08.2018), Ovid PsychInfo (22.08.2018) and Ovid Embase (17.10.2018)

1. Exp loneliness
2. Lonel*
3. (Emotion* adj3 lonel*)
4. (Social* adj3 lonel*)
5. Exp (Social isolation)
6. (Social* isolat*)
7. (social*adj3 isolat*)
8. (Emotion* adj3 isolat*)
9. (Social* adj2 exclu*)
10. Isolat* adj2 (elder* OR old*)
11. (Social* adj2 alienat*)
12. 1 OR 2 OR 3 OR 4 OR 5 OR 6 OR 7 OR 8 OR 9 OR 10 OR 11 OR 12
13. Exp Aged
14. Ag?ng
15. Elder*
16. Geriatric
17. Senior*
18. Older*
19. (Old* age*)
20. Retire*
21. 13 OR 14 OR 15 OR 16 OR 17 OR 18 OR 19 OR 20
22. (Randomi?ed controlled trial*)
23. (RCT*)
24. (Controlled clinical trial*)
25. (Clinical trial*)
26. Random*
27. Placebo*
28. Group*
29. Trial*
30. match*
31. assign*
32. 22 OR 23 or 24 or 25 or 26 or 27 or 28 or 29 or 30 or 31
33. Animals
34. humans
35. 33 NOT (33 AND 34)
36. 32 NOT 35
37. 36 AND 21 AND 12

Medline (ti.ab.if) ti: title, ab: abstract if: keywords/identifiers
Psych Info (Ti.ab.id): id: key concept
Embase (kw.ti.ab): kw: keyword, ti: title, ab: abstract

Scopus (12.10.2018)

(((TITLE-ABS-KEY (lonel*)) OR (TITLE-ABS-KEY ((emotion* PRE/3 lonel*))) OR (TITLE-ABS-KEY ((social* PRE/3 lonel*))) OR (TITLE-ABS-KEY ((social* AND isolat*))) OR (TITLE-ABS-KEY ((social* PRE/3 isolat*))) OR (TITLE-ABS-KEY ((emotion* PRE/3 isolat*))) OR (TITLE-ABS-KEY ((social* PRE/2 exclu*))) OR (TITLE-ABS-KEY (isolat* PRE/2 (elder* OR old*)))) OR (TITLE-ABS-KEY ((social* PRE/2 alienat*)))) AND ((TITLE-ABS-KEY (ag?ng)) OR (TITLE-ABS-KEY (elder*)) OR (TITLE-ABS-KEY (geriatric)) OR (TITLE-ABS-KEY (senior*)) OR (TITLE-ABS-KEY (older*)) OR (TITLE-ABS-KEY ((old* AND age*))) OR (TITLE-ABS-KEY (retire*))) AND (((TITLE-ABS-KEY (trial*)) OR (TITLE-ABS-KEY (match*)) OR (TITLE-ABS-KEY (assign*)) OR ((TITLE-ABS-KEY ((randomi?ed AND controlled AND trial*))) OR (TITLE-ABS-KEY ((rct*))) OR (TITLE-ABS-KEY ((controlled AND clinical AND trial*))) OR (TITLE-ABS-KEY ((clinical AND trial*))) OR (TITLE-ABS-KEY (random*)) OR (TITLE-ABS-KEY (placebo*)) OR (TITLE-ABS-KEY (group*))))) AND NOT ((TITLE-ABS-KEY (animals)) AND NOT ((TITLE-ABS-KEY (animals)) AND (TITLE-ABS-KEY (humans)))))

Title, ABS: abstract, KEY: Keyword

PubMed (15.10.2018)

((((((((((("loneliness"[MeSH Terms]) OR lonel*[Title/Abstract]) OR Emotion* AND lonel*[Title/Abstract]) OR Social* AND lonel*[Title/Abstract]) OR "social isolation"[MeSH Terms]) OR social* AND isolat*[Title/Abstract]) OR Emotion* AND isolat*[Title/Abstract]) OR Social* AND exclu*[Title/Abstract]) OR (Isolat*[Title/Abstract] AND (elder*[Title/Abstract] OR old*) AND Title/Abstract)) OR Social* AND alienat*[Title/Abstract])) AND (((((((("aged"[MeSH Terms]) OR ((AGEING[Title/Abstract] OR AGING[Title/Abstract]))) OR Elder*[Title/Abstract]) OR Geriatric[Title/Abstract]) OR Senior*[Title/Abstract]) OR Older*[Title/Abstract]) OR Old* AND age*[Title/Abstract]) OR RETIRE*[Title/Abstract])) AND ((((((((((((Randomised controlled trial*[Title/Abstract]) OR Randomized controlled trial*[Title/Abstract]) OR RCT*[Title/Abstract]) OR Controlled clinical trial*[Title/Abstract]) OR Clinical trial*[Title/Abstract]) OR Random*[Title/Abstract]) OR Placebo*[Title/Abstract]) OR Group*[Title/Abstract]) OR Trial*[Title/Abstract]) OR match*[Title/Abstract]) OR assign*[Title/Abstract])) NOT ((Animals[Title/Abstract]) NOT (Animals[Title/Abstract] AND humans[Title/Abstract])))

ASSIA (15.10.2018), Social Services Abstracts (17.10.2018) and Sociological abstracts (18.10.2018)
(MAINSUBJECT.EXACT("Loneliness") OR ab,ti,if(Lonel*) OR ab,ti,if(Emotion* NEAR/3 lonel*) OR ab,ti,if(Social* NEAR/3 lone*) OR MAINSUBJECT.EXACT("Isolation") OR ti,ab,if(Social* isolat*) OR ti,ab,if(social* NEAR/3 isolat*) OR ti,ab,if(Social* NEAR/2 exclu*) OR ((ti,ab,if (Isolat* NEAR/2 elder*)) OR (ti,ab,if (Isolat* NEAR/2 old*))) OR ti,ab,if(Social* NEAR/2 alienat*) OR ti,ab,if(Emotion* NEAR/3 isolat*)) AND (MAINSUBJECT.EXACT("Elderly people") OR ab,ti,if(Ag?ng) OR ab,ti,if(Elder*) OR ab,ti,if(Geriatric) OR ab,ti,if(Senior*) OR ab,ti,if(Older*) OR ab,ti,if("Old* age*") OR ab,ti,if(Retire*)) AND ((ab,ti,if(Randomi?ed controlled trial*) OR ab,ti,if(RCT*) OR ab,ti,if(Controlled clinical trial*) OR ab,ti,if(Clinical trial*) OR ab,ti,if(Random*) OR ab,ti,if(Placebo*) OR ab,ti,if(Group*) OR ab,ti,if(Trial*) OR ab,ti,if(match*) OR ab,ti,if(assign*)) NOT (ab,ti,if(Animals) NOT (ab,ti,if(Animals) AND ab,ti,if(humans))))

TI: Title; AB: Abstract, IF: Identifier

Cinahl (12.10.2018)

#	Query
S37	S12 AND S21 AND S36
S36	(S22 OR S23 OR S24 OR S25 OR S26 OR S27 OR S28 OR S29 OR S30 OR S31) NOT S35
S35	((TI animals OR AB animals)) NOT ((TI animals OR AB animals) AND (TI humans OR AB humans))
S34	TI humans OR AB humans
S33	TI animals OR AB animals
S32	S22 OR S23 OR S24 OR S25 OR S26 OR S27 OR S28 OR S29 OR S30 OR S31
S31	AB assign* OR TI assign*
S30	TI match* OR AB match*
S29	TI Trial* OR AB Trial*
S28	TI Group* OR AB Group*
S27	AB Placebo* OR TI Placebo*
S26	AB Random* OR TI Random*
S25	TI (Clinical trial*) OR AB (Clinical trial*)
S24	TI (Controlled clinical trial*) OR AB (Controlled clinical trial*)
S23	TI (RCT*) OR AB (RCT*)
S22	TI (Randomi?ed controlled trial*) OR AB (Randomi?ed controlled trial*)
S21	S13 OR S14 OR S15 OR S16 OR S17 OR S18 OR S19 OR S20
S20	AB Retire* OR TI Retire*
S19	AB (Old* age*) OR TI (Old* age*)
S18	TI Older* OR AB Older*
S17	TI Senior* OR AB Senior*
S16	AB Geriatric OR TI Geriatric
S15	TI Elder* OR AB Elder*
S14	TI Ag?ng OR AB Ag?ng
S13	(MH "Aged+")

S12	S1 OR S2 OR S3 OR S4 OR S5 OR S6 OR S7 OR S8 OR S9 OR S10 OR S11
S11	(MH "Social Isolation+")
S10	TI (Social* adj2 alienat*) OR AB (Social* adj2 alienat*)
S9	TI (Isolat* adj2 (elder* OR old*)) OR AB (Isolat* adj2 (elder* OR old*))
S8	TI (Social* adj2 exclu*) OR (Social* adj2 exclu*)
S7	TI (Emotion* adj3 isolat*) OR AB (Emotion* adj3 isolat*)
S6	TI (social*adj3 isolat*) OR AB (social*adj3 isolat*)
S5	TI (Social* isolat*) OR AB (Social* isolat*)
S4	TI (Social* adj3 lonel*) OR AB (Social* adj3 lonel*)
S3	TI (Emotion* adj3 lonel*) OR AB (Emotion* adj3 lonel*)
S2	TI lonel* OR AB lonel*
S1	(MH "Loneliness")

TI: Title; AB: Abstract

Cochrane library – trials only (15.10.2018)

ID	Searchterms
#1	MeSH descriptor: [Loneliness] explode all trees
#2	Lonel*
#3	Emotion* near/3 lonel*
#4	Social* near/3 lonel*
#5	MeSH descriptor: [Social Isolation] explode all trees
#6	Social* isolat*
#7	social*near/3 isolat*
#8	Emotion* near/3 isolat*
#9	Social* near/2 exclu*
#10	Isolat* near/2 (elder* OR old*)
#11	(Social* near/2 alienat*)
#12	#1 OR #2 OR #3 OR #4 OR #5 OR #6 OR #7 OR #8 OR #9 OR #10 OR #11
#13	MeSH descriptor: [Aged] explode all trees
#14	Ag?ng
#15	Elder*
#16	Geriatric
#17	Senior*
#18	Older*
#19	(Old* age*)
#20	Retire*
#21	#13 OR #14 OR #15 OR #16 OR #17 OR #18 OR #19 OR #20
#22	(Randomi?ed controlled trial*)
#23	(RCT*)
#24	(Controlled clinical trial*)
#25	(Clinical trial*)
#26	Random*
#27	Placebo*
#28	Group*
#29	Trial*
#30	match*
#31	assign*
#32	#22 OR #23 OR #24 OR #25 OR #26 OR #27 OR #28 OR #29 OR #30 OR #31
#33	Animals
#34	humans
#35	#33 NOT (#33 AND #34)
#36	#32 NOT #35
#37	#12 AND #21 AND #36

Science Direct (12.10.2018)
"loneliness" OR “social isolation” AND AGEING OR elder OR older AND “Randomised controlled trial” OR RCT

OpenGrey (10/10/2018)
("loneliness" OR lonel* OR Emotion* lonel* OR Social* lonel* OR "social isolation" OR social* isolat* OR Emotion* isolat* OR Social* exclu* OR Social* alienat*) AND ("aged" OR AGEING OR AGING OR Elder* OR Geriatric OR Senior* OR Older* OR Old* age* OR RETIRE*) AND (Randomised controlled trial* OR Randomized controlled trial* OR RCT* OR Controlled clinical trial* OR Clinical trial*OR Random* OR Placebo* OR Group* OR Trial*OR match* OR assign*)

Google Scholar (10/10/2018)
("loneliness" OR lonel* OR Emotion* lonel* OR Social* lonel* OR "social isolation" OR social* isolat* OR Emotion* isolat* OR Social* exclu* OR Social* alienat*) AND ("aged" OR AGEING OR AGING OR Elder* OR Geriatric OR Senior* OR Older* OR Old* age* OR RETIRE*) AND (Randomised controlled trial* OR Randomized controlled trial* OR RCT* OR Controlled clinical trial* OR Clinical trial*OR Random* OR Placebo* OR Group* OR Trial*OR match* OR assign*)

Web of Science Core Collections (18.10.2018)

37 #36 AND #21 AND #12
36 TOPIC: ((Randomi?ed controlled trial* OR RCT OR Controlled clinical trial* OR Clinical trial* OR Random* OR Placebo* OR Group* OR Trial* OR match* OR assign*) NOT (animals NOT (animals AND humans)))
35 TOPIC: (animals NOT (animals AND humans))
34 TOPIC: (humans)
33 TOPIC: (Animals)
32 #31 OR #30 OR #29 OR #28 OR #27 OR #26 OR #25 OR #24 OR #23 OR #22
31 TOPIC: (assign*)
30 TOPIC: (match*
29 TOPIC: (Trial*)
28 TOPIC: (Group*)
27 TOPIC: (Placebo*)
26 TOPIC: (Random*)
25 TOPIC: ("Clinical trial*")
24 TOPIC: ("Controlled clinical trial*")
23 TOPIC: ("RCT")
22 TOPIC: ("Randomi?ed controlled trial*")
21 #20 OR #19 OR #18 OR #17 OR #16 OR #15 OR #14 OR #13
20 TOPIC: (Retire*)
19 TOPIC: ("Old* age*")
18 TOPIC: (Older*)
17 TOPIC: (Senior*)
16 TOPIC: (Geriatric)
15 TOPIC: (Elder*)
14 TOPIC: (Ag?ng)
13 TOPIC: (Aged)
12 #11 OR #10 OR #9 OR #8 OR #7 OR #6 OR #5 OR #4 OR #3 OR #2 OR #1
11 TOPIC: ((Social* near/2 alienat*))
10 TOPIC: (Isolat* near/2 (elder* OR old*))
9 TOPIC: (Social* near/2 exclu*)
8 TOPIC: (Emotion* near/3 isolat*)
7 TOPIC: (social*near/3 isolat*)
6 TOPIC: (Social* isolat*)
5 TOPIC: ("Social Isolation")
4 TOPIC: (Social* near/3 lonel*)
3 TOPIC: (Emotion* near/3 lonel*)

2 **TOPIC:** (Lonel*)

1 **TOPIC:** (loneliness)

Topic: Title, Abstract, Keywords

Appendix 6.2 Data extraction tool process evaluations

INTERVENTION CHARACTERISTICS

Theoretical Basis

Is the intervention underpinned by theory? (Content)

- Social Isolation theories
- Loneliness Theories
- Community based group participation theories/models
- Life course theory (around life transitions)
- Other (Please Specify)
- Not Stated

Participant recruitment

How were the participants recruited? (Other)

- Self-referral
- Referral by family members (Please specify)
- Referral by health professionals (Please specify)
- Referral by/Recruited from local organisations (Please specify)
- Referral by/Recruited from religious organisations (Please specify)
- Other (Please Specify)
- Not Stated

Geographical region of intervention

In which geographical region did the intervention take place? (Accessibility)

- Urban
- Rural
- Not Stated

Intervention Type (Tick all that apply)

Please select the type of intervention offered to the participants. (Implementation)

- Art-Based (Please specify)

- Religious (Please specify)
- Educational (Please specify)
- Physical activity (Please specify)
- Technology based (Please specify)
- Psychological therapies (e.g. CBT, counselling)
- Other (Please Specify)
- Not Stated

Mode of delivery (Tick all that apply)

How was the intervention delivered?(Implementation)

- Online
- In-person
- Via telephone
- Other (Please specify)
- Not Stated

Size of Intervention

How many participants took part in the intervention? (Implementation)

- Large groups 100+ (Please specify)
- Medium groups 30-99 (Please specify)
- Small groups 1-29 (Please specify)

Which stakeholders were involved in the interventions(Consultation)

- Agencies associated with ageing (please specify)
- Businesses (please specify)
- Charities & Voluntary bodies (please specify)
- Educational establishments (please specify)
- Individuals with cultural expertise (Please specify)
- Local agencies (please specify)
- Local Government (please specify)

- Religious organisations (please specify)
- Self-funded Community groups (please specify)
- Health professionals
- Other (please specify)
- Not stated

PARTICIPANT CHARACTERISTICS

Age Group

Which age group does the paper focus on?

- <55 years
- Young-old (55-74 years)
- Old-old (>75 years)
- Other (Please specify)

Gender

Which gender does the paper focus on?

- Only Female
- Only Male
- Mixed
- Not stated

Ethnicity

What is the ethnic background of the participants?

- Stated (Please specify)
- Not Stated

Socioeconomic Status

Is the socio-economic status of the participants reported?

- Stated (Please specify)

Not Stated

Health Status

What is the health status of the participants?

Stated (Please specify)

Not Stated

INDICATORS OF EFFECTIVENESS

Which measures of social isolation and/or loneliness were used?

Measures of loneliness

Stated (Please specify)

Not Stated

Not Applicable

Measures of social isolation

Stated (Please specify)

Not Stated

Not Applicable

INDICATORS OF SUCCESSFUL IMPLEMENTATION

Dosage

How many hours per session were the participants exposed to the intervention?

1 hour

2 hours

3 hours

Other (Please specify)

Not Stated

Adherence

Did the participants fully engage/participate with the intervention?

Stated (Please Specify)

Not Stated

Participant satisfaction with intervention

Were the participants (dis)satisfied with the intervention?

Stated (Please Specify)

Not Stated

Attrition

Were there any participants who did not complete the intervention?

Stated (Please specify)

Not Stated

Any other process that might be of importance

Yes (Please specify)

No

Appendix 6.3 Data Extraction Outcome Evaluations

Study Characteristics

Aims

- Stated
- Not stated

Design

- Parallel Design
- Crossover Design
- Not Stated

Unit of allocation

- By individual
- By group
- By cluster
- Not stated

Location

- Urban
- Rural
- Not Stated

Ethical approval needed/obtained

- Stated
- Not Stated

Start Date

- Stated
- Not stated

End Date

- Stated
- Not stated

Participant characteristics

- Inclusion Criteria
  - Stated
  - Not stated
- Exclusion Criteria
  - Stated
  - Not stated
- Participant Recruitment

How were the participants recruited? (Other)

  - Self-referral
  - Referral by family members (Please specify)
  - Referral by health professionals (Please specify)
  - Referral by/Recruited from local organisations (Please specify)
  - Referral by/Recruited from religious organisations (Please specify)
  - Other (Please Specify)
  - Not Stated
- Informed consent obtained?
  - Stated
  - Not stated
- Total number randomised
  - Stated
  - Not stated
- Number of clusters
  - Stated
  - Not stated
  - Not applicable
- Types of clusters
  - Stated
  - Not stated
  - Not applicable

Number of people per cluster

Stated

Not stated

Not applicable

Baseline imbalances

Stated

Not stated

Withdrawals and exclusions

(if not provided below by outcome)

Stated

Not stated

Age Group

Which age group does the paper focus on?

<55 years

Young-old (55-74 years)

Old-old (>75 years)

Other (Please specify)

Gender

Which gender does the paper focus on?

Only Female

Only Male

Mixed

Not stated

Ethnicity

What is the ethnic background of the participants?

Stated (Please specify)

Not Stated

Health Status

What is the health status of the participants?

Stated (Please specify)

Not Stated

Socioeconomic Status

Is the socio-economic status of the participants reported?

Stated (Please specify)

Not Stated

Intervention Characteristics

Group name

Stated

Not stated

No. randomised to group

(specify whether number of people or cluster)

Stated

Not stated

Theoretical Basis

Is the intervention underpinned by theory? (Content)

Social Isolation theories

Loneliness Theories

Community based group participation theories/models

Life course theory (around life transitions)

Other (Please Specify)

Not Stated

Geographical region of intervention

In which geographical region did the intervention take place?

Urban

Rural

Not Stated

Intervention Type (Tick all that apply)

Please select the type of intervention offered to the participants.

- Art-Based (Please specify)
- Religious (Please specify)
- Educational (Please specify)
- Physical activity (Please specify)
- Technology based (Please specify)
- Psychological therapies (e.g. CBT, counselling)
- Other (Please Specify)
- Not Stated

Mode of delivery (Tick all that apply)

How was the intervention delivered?

(Implementation)

- Online
- In-person
- Via telephone
- Other (Please specify)
- Not Stated

Size of Intervention

How many participants took part in the intervention? (Implementation)

- Large groups 100+ (Please specify)
- Medium groups 30-99 (Please specify)
- Small groups 1-29 (Please specify)

Intervention setting (Tick all that apply)

Please select where the intervention was delivered to the participants

- Community centre
- Religious centre (Please specify)
- Clinic (Please specify)
- Hospital or Primary Care unit (Please specify)
- Educational setting (please specify)
- Other (Please Specify)

- Not Stated

Stakeholders (Tick all that apply)

Which stakeholders were involved in the intervention?

- Agencies associated with ageing (please specify)
- Businesses (please specify)
- Charities & Voluntary bodies (please specify)
- Educational establishments (please specify)
- Individuals with cultural expertise (Please specify)
- Local agencies (please specify)
- Local Government (please specify)
- Religious organisations (please specify)
- Self-funded Community groups (please specify)
- Health professionals
- Other (please specify)
- Not stated

Dosage: implementation

How many hours per session were the participants supposed to be exposed to the intervention?

- 1 hour
- 2 hours
- 3 hours
- Other (Please specify)
- Not Stated

Duration

How long did the intervention last?

- One day or less
- 1 day to 1 week (please specify)
- 1 week (and 1 day) to 1 month (please specify)
- 1 month (and 1 day) to 3 months (please specify)

- 3 months (and 1 day) to 6 months (Please specify)
- 6 months (and 1 day) to 1 year (please specify)
- 1 year (and 1 day) to 2 years (please specify)
- 3 years (and 1 day) to 5 years (please specify)
- more than 5 years (please specify)
- Other (Please specify)
- Not stated

Frequency

How often did the intervention take place?

- Weekly
- Fortnightly
- Monthly
- Other (Please specify)
- Not Stated

Co-intervention

(Co-interventions may be separate to the intervention of interest, or they may be other similar elements in a suite of interventions which have a common purpose).

- Stated
- Not stated
- Not applicable

Resource requirements

e.g. staff numbers, equipment

- Stated
- Not stated

Integrity of Delivery

- Stated
- Not Stated

Economic information

- Stated

- Not Stated

- Compliance
  - Stated
  - Not Stated

- **Outcomes**

- Outcome name
  - Social Isolation
  - Loneliness
  - Social Isolation and Loneliness

- Outcome definition
  - Stated
  - Not stated

- Measurement tool
  - Stated
  - Not Stated

- Outcome tool validated
  - Yes
  - No
  - Not stated

- Time points measured

(specify whether from start or end of intervention)
  - Stated
  - Not stated

- Person measuring/reporting
  - Stated
  - Not stated

- Unit of measurement (if relevant)
  - Stated

- Not stated
- Not applicable

- Scales: Upper and lower limit

(indicate whether high or low score is good)

- Stated
- Not stated

- Imputation of missing data

(e.g. assumptions made for ITT analysis)

- Stated
- Not stated

- Assumed risk estimate

(e.g. baseline or population risk noted in background)

- Stated
- Not stated

- Power

- Stated (Please specify)
- Not Stated

- Results: Loneliness (if applicable)

- Comparison

- Stated (please specify)

  provide description as stated in report/paper

- Not Stated

- Subgroup

- Stated (please specify)
- Not stated

- Time points measured

(specify whether from start or end of intervention)

- Stated (Please specify)

- Not stated

- Intervention group results
  - Mean (Please specify)
  - SD (or other variance)
  - No. of participants
- Comparison group results
  - Mean (Please specify)
  - SD (or other variance)
  - No. of participants
- Effect Size
  - Stated (Please specify)
  - Not stated
- Standard Error
  - Stated (Please specify)
  - Not stated
  - I-squared statistic
  - Stated (Please specify)
  - Not stated
- 95% Confidence interval
  - Stated (Please specify)
  - Not stated

Results: Social Isolation (if applicable)

- Comparison
  - Stated (please specify)

    provide description as stated in report/paper
  - Not Stated
- Subgroup
  - Stated (please specify)

- Not stated

- Time points measured

(specify whether from start or end of intervention)

  - Stated (Please specify)
  - Not stated

- Intervention group results

  - Mean (Please specify)
  - SD (or other variance)
  - No. of participants

- Comparison group results

  - Mean (Please specify)
  - SD (or other variance)
  - No. of participants

- Effect Size

  - Stated (Please specify)
  - Not stated

- Standard Error

  - Stated (Please specify)
  - Not stated

- I-squared statistic

  - Stated (Please specify)
  - Not stated

- 95% Confidence interval

  - Stated (Please specify)
  - Not stated

- Statistical method used

  - Stated (please specify)
  - Not specified

Appendix 6.4 Intervention Component Analysis data extraction tool

Study name	Intervention type	Approach to reducing loneliness	Use of theory to inform intervention	Screening for loneliness after	Monitoring facilitators	Training facilitators	Following protocol	Thorough pre-planning to avoid	Targeting cognitive processes	Activating Group Experiences	Giving participants an active role	Learning new skills	Additional intervention components	Evidence	comments	Studies with additional intervention components
1																
2																
3																
4																
5																
6																
7																
8																
9																
10																
11																

Appendix 6.5 Evidence table with details of the data extracted from Mountain (2017)

Table has been transferred from Microsoft Excel and split so as to fit into Microsoft Word.

Study name	Intervention type	Approach to reducing loneliness
Mountain, 2017	Based on an occupational approach to healthy ageing"	cognitive, social, educational

Use of theory to inform intervention	Screening for loneliness after recruitment	Monitoring facilitators	Training facilitators	Following protocol
"Based on an occupational approach to healthy ageing"	x	"The facilitators were paid National Health Service (NHS) or social care staff who were provided with training and supervised by qualified occupational therapists throughout"	"The facilitators were paid National Health Service (NHS) or social care staff who were provided with training and supervised by qualified occupational therapists throughout"	"Adherence to the manualised intervention was assessed"

		"Facilitator fidelity to the group intervention was determined by two independent researchers evaluating video recordings of four groups (two at each site) during weeks 4 and 10 of delivery using a checklist which rated six domains: goals and needs, resources, personal qualities, enabling, group work skills and content"		

Thorough pre-planning to avoid disruption	Targeting cognitive processes	Activating Group Experiences (emotional support, social interaction, social comparison)	Giving participants an active role	Learning new skills
x	"The emphasis throughout was upon the identification of participants' goals, empowerment through sharing strengths and skills"	"The emphasis throughout was upon the identification of participants' goals, empowerment through sharing strengths and skills"	X	"The emphasis throughout was upon the identification of participants' goals empowerment through sharing strengths and skills and providing support to enable them to practice new or neglected activities independently, particularly in the community"
		Social comparison "This suggests that the groups could have influenced a		

		reappraisal of relationships and social networks, a potential area for further study"		

Additional intervention components	Evidence	comments	Studies with this additional intervention components
1.Mismatch between what the intervention offers and what participants need	"A small proportion of individuals (4.1%) took up all four offers of a one to one session with a facilitator. Fostering increased uptake of these sessions, which focussed on goal setting, may aid individuals gain quality of life in future evaluations"	Key points. Mismatch between what participants deem acceptable and what the interventionists deem effective. Some components are not acceptable. They may have reached a population that was not ready for the trial. There is a question of which aspect of loneliness the intervention targets. Is it social loneliness or emotional loneliness?	Theeke, 2016 found that opportunities for social interaction noted as key for participants as they could share their feelings and be open to others the intervention was a good fit for participants. Cohen-Mansfield 2018 noted that senior centres offered services that do not meet the needs of the participants. Kremers 2016 point out that future studies should attend to the fit between target group and tine intervention type. Mountain 2017 were surprised at the low uptake of personal counselling in the intervention and still advocated for it. Hartke 2003 participants rated the social interaction and did not talk

			much of the content. They also did not rate the phone aspect highly
2. Acceptability of the intervention	"A small proportion of individuals (4.1%) took up all four offers of a one to one session with a facilitator"		Kremers 2006 had high dropout rates in the educational intervention. Mountain 2017 many participants did not choose the one to one sessions. Pynnonen 2018 participants opted for the exercise and personal counselling more than the social activity. Hartke 2003 participants did not rate the phone aspect of the intervention highly
3. Participants not ready for intervention	"In our trial, older adults were also independently living but were recruited from the community and did not necessarily have any involvement in community centres" and "were not at a stage of their life when then would benefit most from such an intervention, nor were they activity seeking support when recruited."		Cohen-Mansfield 2018 noted that some participants were not ready to participate in the group sessions and may have needed one to one sessions to prepare them for group sessions, Mountain 2017 indicated that some participants were in a stage of their lives that they might not have needed the intervention. Kremers 2016 had high dropout rates which indicates that some may not have been ready for the group intervention. Hartke 2003 note that participants may not be ready for aspects of the intervention
4. The impact of intervention on	"At 24 months there were significant decreases in aspects of		Mountain 2017, Theeke, 2016, Creswell 2012, Kremers 2016 all had one intervention that

different dimensions of social isolation and loneliness (social/emotional) - changes in emotional loneliness after 24 months.	emotional loneliness (e.g. 'I often feel rejected'; 'I miss having people around me') for those who had participated in the Lifestyle Matters intervention"		targeted different dimensions of loneliness or dimensions of social isolation with varying results. Larsson 2012, found that loneliness was reduced but social integration decreases in one group. Also there were differences with satisfaction with offline contacts. Pynnonen 2018 found that loneliness decreased in both groups but there was an increase in social integration perhaps due to the social aspect of the intervention? Thus in some cases, the intervention targeted at loneliness can reduce social isolation.
5. Additional one to one component	"Participants were also asked to engage in monthly individual sessions with a facilitator."		Mountain 2017, Larsson 2016 and Cohen-Mansfield 2018 have an additional 1to1 component that participants can choose. Pynnonen also gave the participants choice of personal counselling although if they opted for personal counselling, they could not pick something else. Mountain 2014 had a one to one component to prepare participants for the group interventions
6. Participants in need not reached	"limitations were that targeted recruitment through service providers and the community		Theeke, 2016 ensured that they had the target population. Pynnonen 2018 did screening before randomisation. Mountain 2017,

	(recommended from the feasibility study) was unsuccessful" and "Identifying older people when they are beginning to decline and taking action at that point is crucial to the success of preventive interventions." and "were not at a stage of their life when then would benefit most from such an intervention, nor were they activity seeking support when recruited." and "the randomised controlled trial methodology did not provide the time required to seek those in most need."		Creswell 2012 and Larsson 2016 did not stipulate that high levels of loneliness as an inclusion criteria and did not screen for loneliness. Kremers 2006 did not screen but reached a population with high rates of loneliness, Hartke 2003 indicate that they might not have reached vulnerable participants
7. Monitoring participants performance in the group	"Group member performance' was also assessed using a checklist to determine a participant's uptake of the intervention and their understanding of it."		

8. Control/Participants offered choice of intervention	""Participants were also asked to engage in monthly individual sessions with a facilitator.""		Mountain 2017 gave participants the option of the individual session but few took it up. Mountain 2017, Larsson 2016 and Cohen-Mansfield 2018 have an additional 1to1 component that participants can choose. Pynnonen also gave the participants the choice of personal counselling although if the opted for personal counselling, they could not pick something else.
9. Intervention design informed by effective intervention reported in past systematic reviews	"As described previously, intervention design was located in existing evidence (Cattan et al. 2011)"		Systematic review findings key to informing new trials. Creswell 2012 influenced by Masi's review. Theeke 2016 influenced by Masi but they also add the narrative theory as well and make use of group processes. Shvedko 2018,2020 influenced by results of past systematic reviews. Cohen-Mansfiled, 2018 also based their intervention on findings of past reviews and limitations of the studies. Hartke 2003 based the intervention on other studies using telephone for carers. Mountain 2014, Mountain 2017 intervention informed by past reviews and studies. Saito 2012 also base their intervention on past reviews. Kremers also take an RCT based on the conclusions from

			past systematic reviews. Larsson 2016 and Pynnonen 2018 based the intervention on previous studies with (positive results for Pynnonen)

Appendix 6.6 Process evaluation studies quality assessment tool

PROCESS EVALUATION QUALITY ASSESSMENT

REPORTING QUALITY

Transparent and Clearly Stated Aims

Aims and objectives clearly stated. (High bias if not stated; Medium bias if inferred by reader; Low bias if stated)

☐High bias ☐Medium Bias

☐Low bias ☐Unclear

Explicit theories underpinning and/or literature review

Whether the study adopted a stated theoretical framework and/or introduced a literature to support themes of process evaluation (High bias if not stated; Medium bias if inferred by reader; Low bias if stated)

☐High bias ☐Medium Bias

☐Low bias ☐Unclear

Transparent and clearly stated methods and tools

Methods (i.e. overall approach to data collection) and tools (including origin) clearly stated. (High bias if not stated; Medium bias if inferred by reader; Low bias if stated)

☐High bias ☐Medium Bias

☐Low bias ☐Unclear

Selective reporting

State how the possibility of selective outcome reporting was examined by the review authors, and what was found. Reporting bias due to selective outcome reporting.

(High bias if measures of interest not reported as stated in aims and objectives; Medium bias if aims and objective not clearly stated but clear that all expected indicators included; Low bias if stated indicators of interest reported on)

□High bias □Medium Bias

□Low bias □Unclear

Harmful effects

State whether possibility of negative outcomes or unexpected outcomes/implementation factors occurring were addressed by the study authors in the process evaluation, and record what was found. (High bias if authors did not address in the study; Medium bias if inferred by reader; Low bias if stated and addressed)

□High bias □Medium Bias

□Low bias □Unclear

POPULATION AND SELECTION FACTORS

Population and sample described well

State whether information about the intervention participants and any sampling and recruitment that occurred presented. [High bias if not stated; Medium bias if inferred by reader; Low bias if stated]

□High bias □Medium Bias

□Low bias □Unclear

Continuous evaluation

State whether evaluation study design captures all participants including attritors [High bias if post-intervention design only or not clear, Low bias if concurrent process evaluation

Medium bias for other designs (pre- and post-)]

□High bias □Medium Bias

□Low bias □Unclear

EVALUATION PARTICIPATION EQUITY AND SAMPLING

Steps to increase rigour in evaluation:

Were all relevant stakeholders active participants in the process evaluation?

Was the sampling strategy adequate and were attempts made to weight the data to account for any imbalances? Overall, did the evaluation strategy ensure equity in terms of participation and sampling? [High bias if no steps taken, Medium bias if some steps taken, Low bias if all steps taken, Unclear/not reported also an option]

□High bias □Medium Bias

□Low bias □Unclear

DESIGN AND METHODS (INTERNAL VALIDITY)

Overall approach

Did the evaluation take into account multiple sources of evidence/employ multiple methods at multiple time-points. [High bias if reliance on one source of evidence, Medium bias if multiple sources of evidence supporting limited number conclusions, Low bias if multiple sources of evidence supporting most conclusions]

□High bias □Medium Bias

□Low bias □Unclear

Tools and methods of data collection reliable/credible

Were data collection methods piloted? Was the data collection method documented and audited? Were data collection instruments validated in the case of quantitative measures? Was the data collection comprehensive enough/flexible

enough or sensitive enough to provide a complete and rich description and evaluation of the processes undertaken in the intervention? [High bias if no steps taken to address points, Medium bias if some steps taken, Low bias if all relevant steps taken]

☐High bias ☐Medium Bias

☐Low bias ☐Unclear

Tools and methods of data analysis reliable/credible

Were the data analysis methods appropriate to the data collected? Were the data analysis measures systematic? Were normal measures around assessing credibility of findings employed (e.g. exploring negative cases in qualitative data) or significance testing in quantitative data). [High bias if no steps taken to address points, Medium bias if some steps taken but not fully addressed (e.g. univariate/bivariate but not multivariate analysis), Low bias if all relevant steps taken]

☐High bias ☐Medium Bias

☐Low bias ☐Unclear

Performance bias/neutrality/ credibility/conformability

Was attention given to negative cases and outcomes? Was the data collection/analysis carried out by different researchers to those delivering the intervention? Was reassurance given to participants with regards to confidentiality? In the case of qualitative methods was the impact of the researcher assessed? [High bias if no steps taken to address, Medium bias if some steps taken, Low bias if all relevant steps taken]

☐High bias ☐Medium Bias

☐Low bias ☐Unclear

RELIABILITY AND TRANSFERABILITY

Reliability of findings and recommendations

Were the findings of the process evaluation supported by the data: e.g. were enough data presented to show how the author arrived at their findings; e.g. for quantitative were descriptive and multivariate weighted and unweighted estimated provided and for qualitative were quotes included to support judgements made. [High bias if no steps taken to address, Medium bias if some steps taken, Low bias if all relevant steps taken]

□High bias □Medium Bias

□Low bias □Unclear

Transferability of findings

Did authors assess the transferability of their findings to future studies/trials? Overall, was the information provided rich enough to identify the facilitators and barriers to running similar interventions in future? [High bias if no steps taken to address, Medium bias if some steps taken

Low bias if all relevant steps taken and rich information provided]

□High bias □Medium Bias

□Low bias □Unclear

OVERALL

Process evaluation category

□Standalone □Named section □Integrated

Breadth and depth

Complexity (depth) of a range of intervention and contextual factors (breadth) explored

□neither broad or deep □depth not breadth

□breadth not depth □breadth and depth

Voice of participants given prominence

Voice of participants and/or other significant stakeholders given sufficient prominence

☐Not featured ☐Featured but not sufficiently

☐Sufficient coverage

Overall risk of bias of PE

Note it's PE not study

☐High risk ☐Medium risk

☐Low risk ☐Unclear

Appendix 6.7 Cochrane Collaboration's tool for assessing risk of bias

- Selection bias

  Flaws in the design, conduct, analysis, and reporting of randomised trials can cause the effect of

  an intervention to be underestimated or overestimated. The Cochrane Collaboration's tool for

  assessing risk of bias aims to make the process clearer and more accurate

  - Random sequence generation

    Describe the method used to generate the allocation sequence

    in sufficient detail to allow an assessment of whether it should produce comparable groups

    - Low risk
    - High risk
    - Unclear
  - Allocation concealment

    Describe the method used to conceal the allocation sequence in sufficient detail to determine whether intervention allocations could have been foreseen before or during enrolment

    - Low risk
    - High risk
    - Unclear
- Performance bias
  - Blinding of participants and personnel*

    Describe all measures used, if any, to blind trial participants and researchers from knowledge of which intervention a participant received. Provide any information relating to whether the intended blinding was effective

**Assessments should be made for each main outcome or class of outcomes.*

- Low risk
- High risk
- Unclear

- Detection bias
  - Blinding of outcome assessment*

    Describe all measures used, if any, to blind outcome assessment from knowledge of which intervention a participant received. Provide any information relating to whether the intended blinding was effective

    **Assessments should be made for each main outcome or class of outcomes.*

    - Low risk
    - High risk
    - Unclear
- Attrition bias
  - Incomplete outcome data*

    Describe the completeness of outcome data for each main outcome, including attrition and exclusions from the analysis. State whether attrition and exclusions were reported, the numbers in each intervention group (compared with total randomised participants), reasons for attrition or exclusions where reported, and any re-inclusions in analyses for the review

    **Assessments should be made for each main outcome or class of outcomes.*

NOTE - THERE IS A SEPARATE CODING SET FOR MISSINGNESS

- Low risk
- High risk
- Unclear

- Reporting bias
  - Selective reporting

    State how selective outcome reporting was examined and what was found

    - Low risk
    - High risk
    - Unclear
- Other bias
  - Missingness

    Where participants haven't dropped out of the study but have declined to share their information

    - Low risk
    - High risk
    - Unclear
  - Baseline imbalance

    Where participants differed significantly at baseline and this is not accounted for in the subsequent analysis

    - Low risk
    - High risk
    - Unclear
  - Risk of contamination

    Where there is a risk of spill over of the intervention effects from the intervention to the control group - i.e. where control group received the intervention and vice-versa

        - Low risk
        - High risk
        - Unclear
- Final judgement
    - Overall

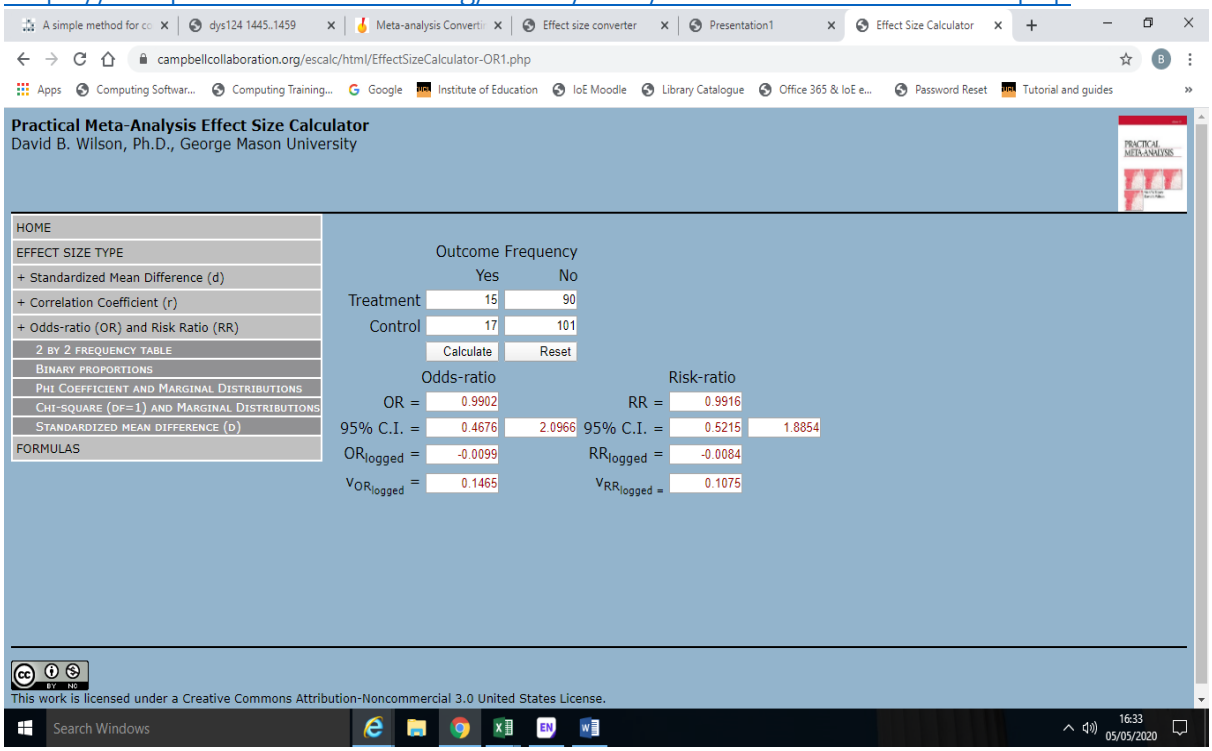
      Criteria given for overall Risk of Bias (useful for later sensitivity analysis)

        - Low risk
        - High risk
        - Unclear

Appendix 6.8 Converting Odds Ratios and Confidence Intervals to Effect Size and Standard Errors

1. Pynnonen (2018) provided measures for people who were often or continuously lonely at follow up (6 months after the intervention)

This data was then entered data into Campbell effect size calculator to work out the Odds Rations and Confidence Intervals.
https://campbellcollaboration.org/escalc/html/EffectSizeCalculator-OR1.php



To work out the effect size from the odds ratio I used the formula below proposed by Borenstein et al. (2009)

$$d = LogOddsRatio \times \frac{\sqrt{3}}{\pi},$$

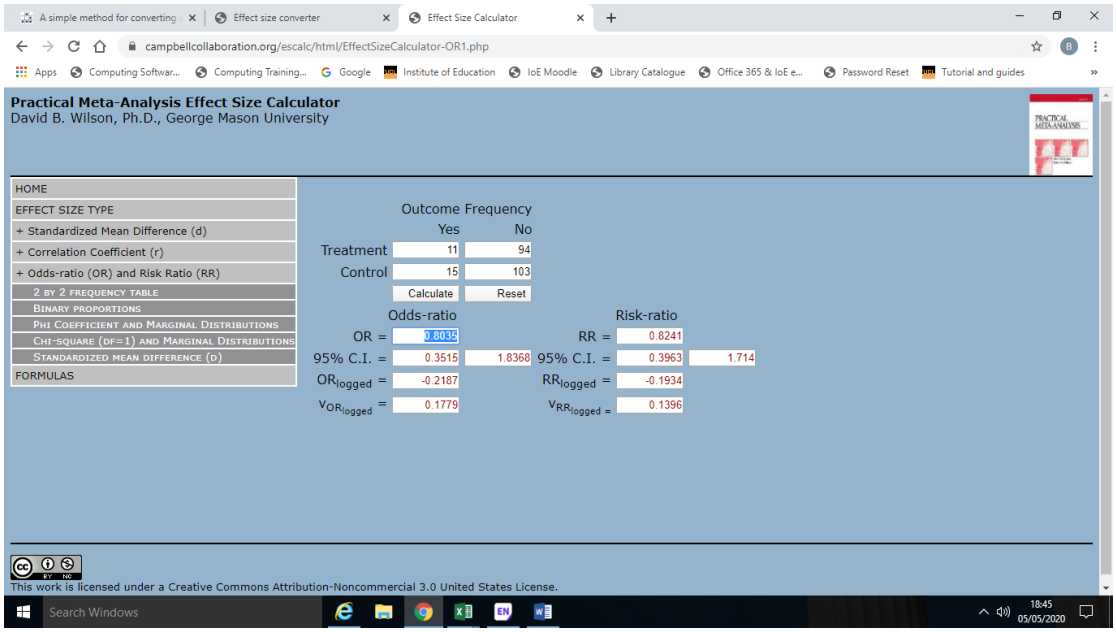
d = logOR x (square root of 3/π)
d= -0.0099x0.5513
d=-0.0054

To work out the SE, I used the formula put forth by Chinn (2000)

1) Ln transform the Confidence Intervals.
2) Then (CIu – CIl / 3.92).
3) Divided the answer by 1.81

(Ln2.0966 – ln0.4676)/3.92
0.740316985—(-0.76014204938) / 3.92
1.501731/3.92
0.383094642/1.81
SE=0.211654

2. Pynnonen (2018) provided measures for people who were often or continuously lonely at post 6 month intervention.



To work out the effect size from the odds ratio I used the formula below proposed by Borenstein et al. (2009)

$$d = LogOddsRatio \times \frac{\sqrt{3}}{\pi},$$

d = logOR x (square root of 3/π) =0.5513
d= -0.2187x0.5513
d=-0.12056931

To work out the SE, I used the formula put forth by Chinn (2000)

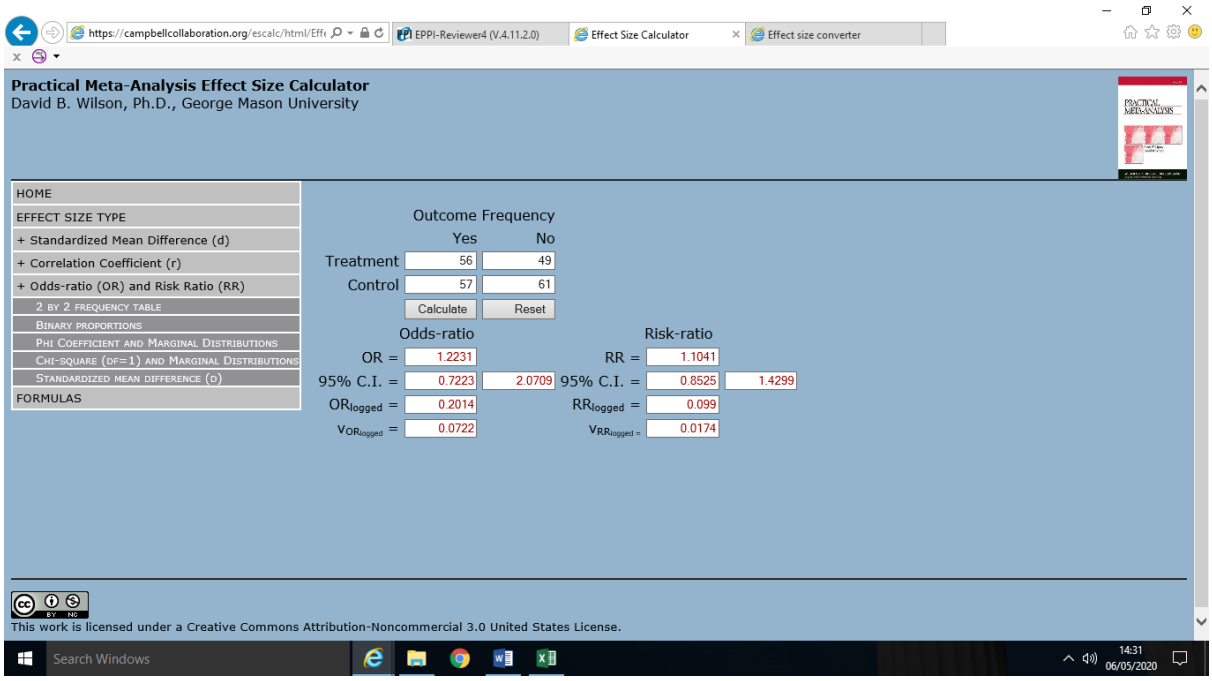
1) Ln transform the Confidence Intervals.

2)Then (CIu – CIl / 3.92).

3) Divided the answer by 1.81

(Ln1.8368– ln0.3515)/3.92
0.608024927143—(-1.04554556773) / 3.92
1.653570494873/3.92
0.421829207875/1.81
SE=0.23305481

3. Pynnonen (2018): No/Very rarely lonely post 6 month intervention (PI)



To work out the effect size from the odds ratio I used the formula below proposed by Borenstein et al. (2009)

$$d = LogOddsRatio \times \frac{\sqrt{3}}{\pi},$$

d = logOR x (square root of 3/π) =0.5513
d= 0.2014x0.5513
d= 0.111

To work out the SE, I used the formula put forth by Chinn (2000)

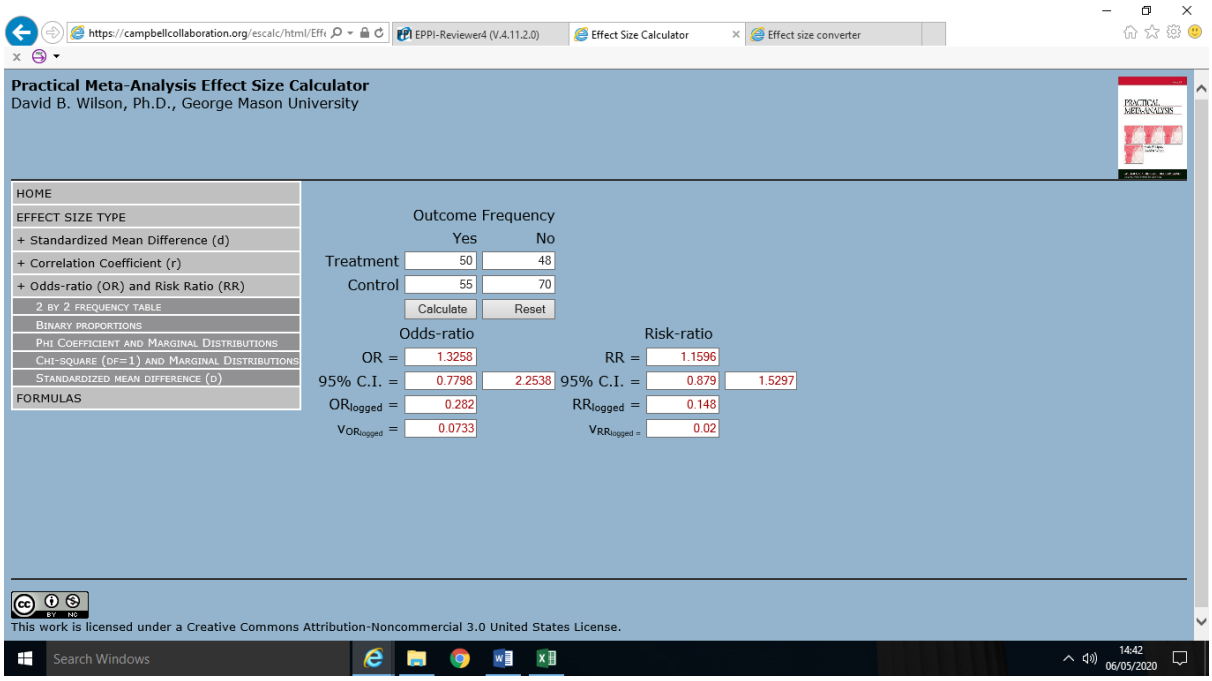
1) Ln transform the Confidence Intervals.

2)Then (CIu – CIl / 3.92).

3) Divided the answer by 1.81

(Ln2.0709– ln0.7223)/3.92
0.7279983295395—(-0.32531471392) / 3.92
1.053313/3.92
0.268702307004/1.81
SE=0.148454313262

4. Pynnonen (2018): No/Very rarely lonely at 18 months



To work out the effect size from the odds ratio I used the formula below proposed by Borenstein et al. (2009)

$$d = LogOddsRatio \times \frac{\sqrt{3}}{\pi},$$

d = logOR x (square root of 3/π) =0.5513
d= 0.282x0.5513
d= 0.1554666

To work out the SE, I used the formula put forth by Chinn (2000)

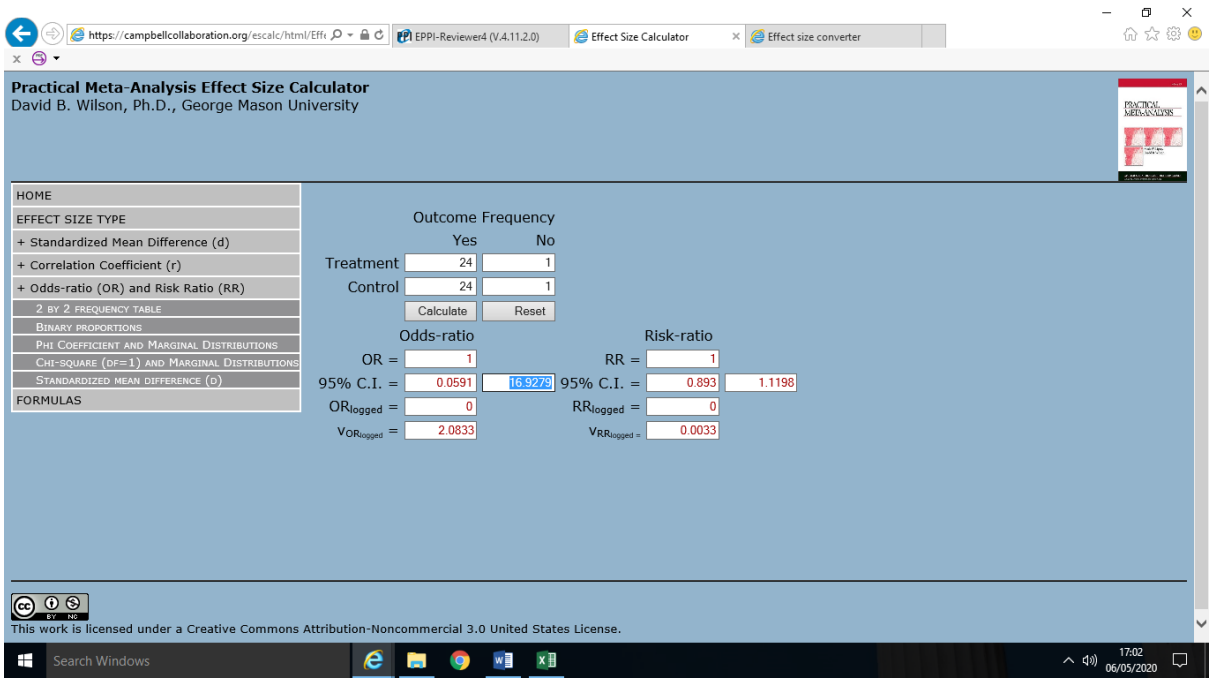
1) Ln transform the Confidence Intervals.

2)Then (CIu – CIl / 3.92).

3) Divided the answer by 1.81

(Ln2.2538– ln0.7798)/3.92
0.812617680536—(-0.24871780243) / 3.92
1.061335482969/3.92
0.270748847696/1.81
SE=0.149584998727

5.Fukui (2003) Social Isolation Indicator 4: social support post intervention (6 week intervention) (PI)



To work out the effect size from the odds ratio I used the formula below proposed by Borenstein et al. (2009) below

$$d = LogOddsRatio \times \frac{\sqrt{3}}{\pi},$$

d = logOR x (square root of 3/π) =0.5513
d= 0x0.5513
d= 0

To work out the SE, I used the formula put forth by Chinn (2000)

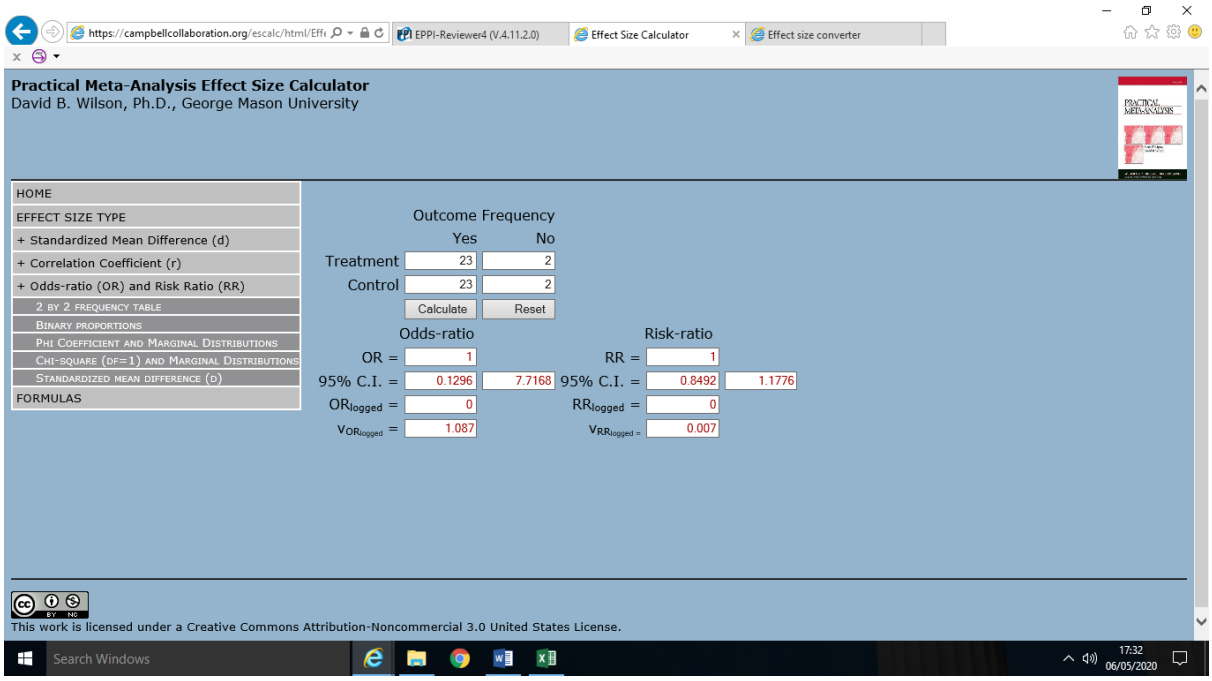
1) Ln transform the Confidence Intervals.

2)Then (CIu – CIl / 3.92).

3) Divided the answer by 1.81

(Ln16.9279– ln0.0591)/3.92
2.828963148286—(-2.82852435457) / 3.92
5.657487502856/3.92
1.443236607871/1.81
SE=0.797368291641

6. Fukui (2003): Social Isolation Indicator 4: social support at 6 months



To work out the effect size from the odds ratio I used the formula below proposed by Borenstein et al. (2009)

$$d = LogOddsRatio \times \frac{\sqrt{3}}{\pi},$$

d = logOR x (square root of 3/π) =0.5513
d= 0x0.5513
d= 0

To work out the SE, I used the formula put forth by Chinn (2000)

1) Ln transform the Confidence Intervals.

2)Then (CIu – CIl / 3.92).

3) Divided the answer by 1.81

(Ln 7.7168– ln 0.1296)/3.92
2.043399770332—(-2.04330249506) / 3.92
4.086702265396/3.92
1.042526088111/1.81
SE=0.57591264149

Appendix 6.9 Description of included outcome evaluation studies

1. Andersson, 1985		
Methods	Study design: Geographic region: Period:	RCT Urban: Stockholm Spring to Autumn 1981
Participants	Inclusion criteria: Exclusion criteria: No. Randomised: Completed (Intervention): Age group: Gender: Ethnicity: Health status: Socioeconomic status: Screened for Loneliness at baseline:	Women, living alone aged between 60-80, with fewer than five hours of home help per week who stated that they were lonely when asked using a single item question They deliberately those who were ranked as low priority on a-grade scale. This was to avoid those with physical disabilities that necessitated a referral to an institution 68 participants randomised: 40 in the intervention group & 28 in the control group 35 participants Old-old (Mean age: 77) 100% female Not stated Subjective health measures at T1 and t2 2.97(high) Participants had a higher SES compared to non-participants Yes, women who stated that they were lonely when asked using a single item question were included in the study
Interventions	Intervention type: Mode of delivery: Theoretical underpinning: Intervention description:	Psychological therapies In person CCC model- Social comparison, personal control, availability of a confidant Participants met in groups of 3-5 people. The home help assistants were present during the first and the last meeting. Participants discussed the residential area in the first meeting, the role of the retiree in the second meeting and social and medical services in the third meeting. A summary of the first three meetings was

		provided, and possibilities for leisure activities discussed. The meetings were to form grounds for social comparison. For a sense of personal control, participants wrote down their views on the topics discussed, which were to be fed back to the leaders and administrators. The meetings provided an opportunity for finding a confidant.
Outcomes	Dosage: Duration: Extractable outcomes:	Not stated 4 weeks Loneliness change score and Social Isolation Indicator 5: Social contacts change score
Notes		Includes a separate process evaluation

Risk of bias	Authors' judgement	Support for judgement
Random sequence generation (Selection bias):	Unclear	Authors state that participants were randomly allocated to intervention and control groups but there is no mention of which rules they used to allocate.
Allocation concealment (Selection bias):	Unclear	They randomly assigned participants to interventions but did not state the rules they used to do so Anderson 1985.pdf: Page 3: "mentioned, the subjects were randomly assigned to the intervention and one control group, and therefore the groups should differ initially only by chance"
Blinding of participants and personnel (Performance bias):	High risk	No information provided about blinding of participants
Blinding of outcome assessment (Detection bias):	High risk	No information on blinding of outcome assessment provided
Incomplete outcome data (Attrition bias):	Low risk	They excluded participants who did not want to participate. They excluded those that dropped out due to natural causes. They provided details of the differences between those who wanted to participate and those who did not want to participate

Selective reporting (Reporting bias):	Low risk	They reported on loneliness at T1 and T2 Anderson 1985.pdf: Page 4: "in Table 1, in the intervention group there has been a significant change in nine outcome variables out of 14"
Missingness (Other bias):	Unclear	There were participants who had dropped out. However, there was no information on whether there were participants who had refused to share their information. only that they had dropped out due to natural causes
Baseline imbalance (Other bias):	Low risk	They excluded non participants and noted that the differences between participants and non-participants Anderson 1985.pdf: Page 3: " with the exception of a lower self-esteem and a somewhat higher SES among the participants"
Risk of contamination (Other bias):	Low risk	The intervention was only offered to the intervention group
Overall risk of bias:	Unclear	This is marked as unclear risk because they ensured some types of bias, e.g. they did random allocation. However, they didn't report which rules they used. They didn't mention blinding therefore, performance bias was high. They indicate that all the participants received the same amount of attention. There was no reporting bias and they addressed baseline imbalances, and attrition bias. There was no risk of contamination either. In summary, they address some biases but not all.

2. Cohen-Mansfield, 2018		
Methods	Study design:	RCT

	Geographic region:	not stated (Israel)
	Period:	not stated
Participants	Inclusion criteria:	(1) age 65 and above; (2) feeling lonely based on the questions of degree (moderate level and above) and frequency (several times a week and above) of loneliness on the screening questionnaire, as well as not participating in social activities and expressing at least moderate desire to have additional company; (3) being able to participate based on cognitive function (MMSE > 22); (4) no significant depression as screened by the Geriatric Depression Scale (GDS).
	Exclusion criteria:	people scoring above moderate depression were excluded
	No. Randomised:	89 (44 = control, 45 = intervention)
	Completed (Intervention):	39
	Age group:	Old-old (Mean age of control group 76.6 years (6.8)
	Gender:	Mixed (79% women)
	Ethnicity:	Mixed 'Based on country of birth. Out of 39 participants, 15 were born in Israel and 12 in Europe'
	Health status:	Subjective health measured with intervention group mean being 2.36 and control group mean is 2.24
	Socioeconomic status:	not stated
	Screened for Loneliness at baseline:	Yes. One of the inclusion criterion was feeling lonely based on the questions of degree (moderate level and above)
Interventions	Intervention type:	Psychological therapies
	Mode of delivery:	In-person
	Theoretical underpinning:	Based on the Cognitive-Behavioural theoretical model
	Intervention description:	The intervention focused on addressing psychosocial barriers, such as low social self-efficacy, and environmental barriers, such as lack of social opportunities in the vicinity of

		the older person. It was tailored and participants can choose individual sessions or group sessions or both.
	Dosage:	Not stated
	Duration:	6 months
Outcomes	Extractable outcomes:	loneliness (change, post intervention, and follow up scores)
Notes		n/a

Risk of bias	Authors' judgement	Support for judgement
Random sequence generation (Selection bias):	High risk	The participants were randomised but the method of randomisation was not provided
Allocation concealment (Selection bias):	High risk	The allocation concealment not reported
Blinding of participants and personnel (Performance bias):	Unclear	The blinding of participants and personnel not reported but perhaps not applicable in this intervention
Blinding of outcome assessment (Detection bias):	Low risk	They used a research assistant not associated with the intervention to administer the post intervention questionnaire to reduce desirability bias
Incomplete outcome data (Attrition bias):	Low risk	Drop outs were reported. They were excluded from analysis. The reasons for dropping out were also reported. Page 2: " flow diagram presenting recruitment and exclusions of potential participants is presented in Fig. 1"
Selective reporting (Reporting bias):	Low risk	Authors provided the results on the impact of the intervention on loneliness
Missingness (Other bias):	Low risk	The drop outs provided reasons for non-participation. The information was available for the rest of the participants

Baseline imbalance (Other bias):	Low risk	Page 4: "Participants were randomized into two groups (intervention and control). Statistically significant differences were not found between the groups with regard to demographics, health, and cognitive function (Table 1)."
Risk of contamination (Other bias):	Low risk	there was no crossovers as this was an RCT with a parallel design
Overall risk of bias:	Low	Apart from allocation concealment, the interventionists took steps to address the risk of bias in this trial

3. Creswell, 2012		
Methods	Study design:	RCT
	Geographic region:	Urban (USA)
	Period:	October 2007 to January 2008
Participants	Inclusion criteria:	"English-speaking, not currently practicing any mind-body therapies more than once per week (e.g., meditation, yoga), non-smokers, mentally and physically healthy for the last three months, and not currently taking medications that affect immune, cardiovascular, endocrine, or psychiatric functioning"
	Exclusion criteria:	cognitive impairments, left handed, non-removable metal or non MRI safety approved implants weighed more than 300lbs
	No. Randomised:	40
	Completed (Intervention):	35
	Age group:	Old-Old Mean age 65 (SD=7)
	Gender:	Mixed (33 women)
	Ethnicity:	Mixed ethnicity (64% Caucasian)
	Health status:	Healthy older adults included in study
	Socioeconomic status:	Not stated

	Screened for Loneliness at baseline:	no
Interventions	Intervention type:	Mindfulness meditation training "Mindfulness-Based Stress Reduction (MBSR) program"
	Mode of delivery:	In person
	Theoretical underpinning:	Meditation practice
	Intervention description:	MBSR was administered by one of three trained clinicians over three cohorts, and consisted of eight weekly 120-minute group sessions, a day-long retreat in the sixth or seventh week, and 30-minutes of daily home mindfulness practice. During each group session, an instructor lead participants in guided mindfulness meditation exercises, mindful yoga and stretching, and group discussions with the intent to foster mindful awareness of one's moment-to-moment experience. The daylong seven-hour retreat during week six or seven of the MBSR intervention focused on integrating and elaborating on the exercises learned during the course. Finally, MBSR participants were asked to participate in 30 minutes of daily home mindfulness practice six days a week during the program.
	Dosage:	120 minutes
	Duration:	8 weeks
Outcomes	Extractable outcomes:	Loneliness
Notes		n/a

Risk of bias	Authors' judgement	Support for judgement
Random sequence generation (Selection bias):	Low	"Participants were then randomized to either the 8-week Mindfulness-Based Stress Reduction (MBSR) program or a Wait-List (WL) control condition using a computerized number generator." Page 3
	High	Not stated

Allocation concealment (Selection bias):		
Blinding of participants and personnel (Performance bias):	Low	"MBSR class attendance was recorded by a hypothesis-blind staff member," page 3
Blinding of outcome assessment (Detection bias):	low	“After the 8-week period, all participants returned to complete the same measures as those administered at baseline, including the loneliness questionnaire and another blood sample by blinded study staff." Page 3
Incomplete outcome data (Attrition bias):	Unclear	They excluded participants who dropped out from the final analysis. but they conducted comparison between drop outs and participants and found there were no significant differences
Selective reporting (Reporting bias):	Low	They reported on all the outcome measures that they indicated
Missingness (Other bias):	Low	They provided information for all participants who took part in the study
Baseline imbalance (Other bias):	Low	“The MBSR and WL groups did not significantly differ on 131any measured demographic characteristics at baseline (see Table 1), indicating success of randomization." Page 5
Risk of contamination (Other bias):	Low	“Participants in the WL condition were asked not to participate in any new behavioural health programs during the waiting-period and received the MBSR program after completing the primary dependent measures in the study." Page 3
Overall risk of bias:	Low	They addresses the selection, performance, detection, attrition, and reporting bias in this study

4. Ehlers 2017		
Methods	Study design:	RCT

	Geographic region:	USA
	Period:	October 2011 to November 2014
Participants	Inclusion criteria:	“a) 60–79 years-old; (b) able to read and speak English; (c) right-handed; (d) low-active or inactive (i.e., participated in 30 or minutes of moderate physical activity fewer than 2 days per week over the past 6 months); (e) local to the study location for the duration of the program; (f) willing to be randomized to one of four interventions; (g) not involved in another physical activity program; and (h) scored >21 on the Telephone Interview of Cognitive Status questionnaire (de Jager et al., 2003) and >23 on the Mini Mental State Exam (Folstein et al., 1975)" page 3
	Exclusion criteria:	"(a) free from neurological disorders; (b) no history of stroke, transient ischemic attach, or surgeries including the removal of brain tissue; (c) no implanted devices or metallic bodies above the waste; (d) normal or corrected-to-normal vision of at least 20/40 in both eyes; and (e) no color blindness." Page 3
	No. Randomised:	247
	Completed (Intervention):	168
	Age group:	Young-old : Mean age 65.4 yrs(+/-4.56)
	Gender:	Mixed (68.4% female)
	Ethnicity:	Primarily white sample 83% white, 13% African American, 3.2% Asian
	Health status:	Not stated
	Socioeconomic status:	Not stated
	Screened for Loneliness at baseline:	None
Interventions	Intervention type:	Physical activity
	Mode of delivery:	In person
	Theoretical underpinning:	Not stated

	Intervention description:	Participants in all conditions attended three 1-h exercise sessions per week for 24 weeks (∼6 months). Each group session was supervised by trained exercise leaders, began with a brief warmup consisting of walking and full-body stretching, and concluded with an abbreviated set of stretches. Individuals assigned to the Dance condition participated in social dancing comprised of American and English folk dancing. Individuals assigned to the SSS condition participated in exercise sessions designed to improve flexibility, strength, and balance with the aid of yoga mats and blocks, chairs, and resistance bands. Individuals assigned to the Walk and Walk Plus conditions participated in walking sessions led by trained exercise leaders. Individuals assigned to Walk Plus also received a nutritional supplement containing antioxidants, anti-inflammatories, vitamins, minerals, and beta alanine (Abbott Nutrition, Abbott Park, Illinois)
	Dosage:	60 minutes
	Duration:	24 weeks
Outcomes	Extractable outcomes:	none
Notes	All participants were grouped together and there was no control group. Authors were emailed nut no response received	

Risk of bias	Authors' judgement	Support for judgement
Random sequence generation (Selection bias):	Low	Page 3: "Participants were randomized using a computer data management system and baseline-adaptive randomization scheme (Begg and Iglewicz, 1980)."
Allocation concealment (Selection bias):	High	Not reported
Blinding of participants and personnel (Performance bias):	High	Not reported

Blinding of outcome assessment (Detection bias):	High	Not reported
Incomplete outcome data (Attrition bias):	Unclear	“Additionally, while we accounted for participant attrition via FIML estimation, some bias may still be present, as over 30 percent of our sample had missing MRI data at baseline and/or post-intervention”
Selective reporting (Reporting bias):	Unclear	Individual data for the groups not reported but otherwise total mean change reported
Missingness (Other bias):	Low	Page 3: "Due to missing MRI data, 78 participants had incomplete data at baseline and post-intervention."
Baseline imbalance (Other bias):	Low	One-way analysis of variance comparing participants in each exercise condition indicated that participants across the four conditions did not differ in demographics, psychosocial variables, or regional brain volumes at baseline (all $p > 0.05$).
Risk of contamination (Other bias):	Low	The groups were assigned different exercise condition and so there was no risk of contamination. Also, after all baseline data were collected, eligible participants were randomly assigned to one of four interventions implemented over four waves from October 2011 to November 2014
Overall risk of bias:	Unclear	The risk of bias for random sequence generation was low however, the allocation, performance, detection bias were judged as having a high risk of bias. Attrition bias and Reporting bias were deemed unclear as steps were taken to address some of the bias but not satisfactorily. The study was rated unclear as some aspects of bias have been addresses but others haven’t

5. Fukui 2003		
Methods	Study design:	RCT
	Geographic region:	Urban, Japan
	Period:	Not stated
Participants	Inclusion criteria:	Less than 65 years of age, diagnosed and informed of having primary breast cancer, had surgery within previous 4-18 months, had no chemotherapy or had completed chemotherapy
	Exclusion criteria:	Page 2: " Patients were excluded from participation if they had severe mental disorders, recurrence, or been diagnosed with cancer at another sit"
	No. Randomised:	50
	Completed (Intervention):	All 50 patients completed the baseline and six-week assessment, but four (8%) patients dropped out during the follow- up period."
	Age group:	Young-old: Mean age53.5 ± 7.1 years
	Gender:	All female
	Ethnicity:	Japanese women
	Health status:	all diagnosed with breast cancer
	Socioeconomic status:	Not stated
	Screened for Loneliness at baseline:	No
Interventions	Intervention type:	psychosocial group intervention
	Mode of delivery:	In-person
	Theoretical underpinning:	social comparison, reciprocal exchange of support and social learning
	Intervention description:	“The goals of the intervention were to provide within-group support by professionals and peers, lessen the psychological distress associated with having cancer, and assist patients in learning effective coping methods for the concerns related to

		having cancer (Fawzy, 1995). The intervention consisted of health education, coping skills, and stress management”
	Dosage:	1.5 hours
	Duration:	6 weeks
Outcomes	Extractable outcomes:	Number of social contacts, satisfaction of contacts, Loneliness
Notes		
Risk of bias	Authors’ judgement	Support for judgement
Random sequence generation (Selection bias):	High	Page 3: "Patients who met the eligibility criteria and wished to participate in the intervention were assigned randomly to an experimental group or a wait-list control group"
Allocation concealment (Selection bias):	High	Not reported
Blinding of participants and personnel (Performance bias):	High	Not reported
Blinding of outcome assessment (Detection bias):	High	Not reported
Incomplete outcome data (Attrition bias):	Low	Page 5: "Of the 53 patients who wished to participate, three were excluded, two because they had scores higher than 20 on HADS and were assessed as having major depression at the time of recruitment. One person was excluded because her disease recurred before she could be randomized. Accordingly, 50 (33%) patients satisfied all eligibility criteria and were assigned randomly to study groups. All 50 patients

		completed the baseline and six-week assessment, but four (8%) patients dropped out during the follow- up period. Two of the four dropouts were in the experimental group. One could not complete the six-month follow-up assessment because of the death of her husband; the other re-fused further assessment. One of the patients in the wait-list control group could not attend the assessment because she had been admitted for treatment of a newly diagnosed cancer at another site during the waiting period, and the other declined to attend because of recurrence during the waiting period"
Selective reporting (Reporting bias):	Low	They reported on all the measures they included whether they were significant or not
Missingness (Other bias):	Low	They collected data from all participants apart from the drop outs
Baseline imbalance (Other bias):	low	"The dropouts were not significantly different in terms of demo- graphic or clinical variables or dependent measures at the baseline from those who completed all assessment"
Risk of contamination (Other bias):	Low	The experimental group received the treatment first. control group were given the treatment after all measures were recorded at follow up
Overall risk of bias:	Unclear	The paper rates high risk on performance, detection, selection but low risk on attrition, reporting and other bias. thus overall risk is unclear

6. Harris 1978		
Methods	Study design:	RCT
	Geographic region:	USA
	Period:	Not stated

Participants	Inclusion criteria:	Implicit as they were looking for disengaged participants and the MWP participants fit this criteria
	Exclusion criteria:	Implicit as they say that MWP participants were not enrolled onto any activities
	No. Randomised:	52
	Completed (Intervention):	52
	Age group:	Young-old (Mean age: 68.9 years
	Gender:	Mixed
	Ethnicity:	the MWP (disengaged) participants were typically white FGP (active, engaged) were white
	Health status:	Not stated
	Socioeconomic status:	Not stated
	Screened for Loneliness at baseline:	Not reported
Interventions	Intervention type:	Activity Group Experience
	Mode of delivery:	In person
	Theoretical underpinning:	activity theory and disengagement theory
	Intervention description:	A group of community-living, disengaged elderly were identified. Disengaged subjects in the experimental group were exposed to an activity group experience. Activity Group Experience which involves, entertainment by children, group discussions, sharing poems and bible verses
	Dosage:	120 minutes
	Duration:	6 weeks
Outcomes	Extractable outcomes:	None
Notes	This intervention was not included in any of the meta-analysis models	

Risk of bias	Authors' judgement	Support for judgement
Random sequence generation (Selection bias):	High	not stated on that they were randomised
Allocation concealment (Selection bias):	High	Not reported
Blinding of participants and personnel (Performance bias):	High	Not reported
Blinding of outcome assessment (Detection bias):	High	Not reported
Incomplete outcome data (Attrition bias):	High	Not reported
Selective reporting (Reporting bias):	Low	They reported all measures of interest
Missingness (Other bias):	High	Not reported
Baseline imbalance (Other bias):	Low	The baseline characteristics reported. No significant differences between the groups
Risk of contamination (Other bias):	Low	Only the experiments group received the AGE program
Overall risk of bias:	high	This study has been classed as having a high risk of bias. They don't attend to the main Risk of biases through Selection, Performance, Detection, and

		Attrition. They do have low risk on other risk of biases such as reporting bias, baseline imbalance and risk of contamination but overall this study had a high risk of balance.
7. Hartke 2003		
Methods	Study design:	RCT
	Geographic region:	Urban, USA
	Period:	Not stated
Participants	Inclusion criteria:	"a) 60 years of age or older, (b) married or spousal equivalent and living with the stroke sur- vivor, (c) primary caregiver for a minimum of 1 month, (d) not currently in a caregiver support group, and (e) a telephone in the home and sufficient hearing to participate in telephone conference calls and individual assessment interviews."
	Exclusion criteria:	Not stated
	No. Randomised:	124 (68 in experimental group)
	Completed: (intervention)	43
	Age group:	Young-old Mean age 69.72 years
	Gender:	Mixed
	Ethnicity:	81% white, 15% African American, 4% other
	Health status:	Not stated
	Socioeconomic status:	Not stated
	Screened for Loneliness at baseline:	No
Interventions	Intervention type:	Educational, psychosocial support group
	Mode of delivery:	telephone
	Theoretical underpinning:	stress and coping model
	Intervention description:	Treatment participants engaged in an eight-session psychoeducational telephone group
	Dosage:	60 minutes
	Duration:	8 weeks
Outcomes	Extractable outcomes:	loneliness

Notes	n/a	
Risk of bias	Authors' judgement	Support for judgement
Random sequence generation (Selection bias):	High	Not reported
Allocation concealment (Selection bias):	High	Not reported
Blinding of participants and personnel (Performance bias):	High	Not reported
Blinding of outcome assessment (Detection bias):	High	Not reported
Incomplete outcome data (Attrition bias):	Low	The authors report only on the data from participants who completed the study and measured at three time points
Selective reporting (Reporting bias):	Unclear	They report on the statistical and non-statistical results of all outcome measures but they did not report on the measures for the control group at T2
Missingness (Other bias):	Low	The participants who completed the intervention provided information
Baseline imbalance (Other bias):	Low	They report on the difference between the two groups at baseline with the intervention group experiencing more distress and needing more help with caring for their spouse
Risk of contamination (Other bias):	Low	Low risk of contamination as the control group did not take part in the telephone intervention

Overall risk of bias:	Unclear	Although they take steps to minimise attrition bias, missingness, contamination but they don't report on how they addressed performance, selection and detection bias. Also, they don't report on measures of control group at T2
8. Kremers 2006		
Methods	Study design:	RCT
	Geographic region:	The Netherlands
	Period:	Started in 2004. No end date reported
Participants	Inclusion criteria:	Single community dwelling women, 55 years of age and older, were asked to respond by phone if they missed having people around them, wished to have more friends, participated in very few leisure activities, or had trouble in initiating activities.
	Exclusion criteria:	Not stated
	No. Randomised:	149 intervention(63) or control (79)
	Completed (Intervention):	13 women dropped out before the end of the intervention.
	Age group:	Young-old (Mean age 62.8 (SD=6.4))
	Gender:	Only female
	Ethnicity:	Not stated
	Health status:	"Physical functioning 58.5 (SD 25.0) 53.2 (SD 29.2)"
	Socioeconomic status:	Not stated
	Screened for Loneliness at baseline:	No
Interventions	Intervention type:	Educational and cognitive
	Mode of delivery:	In person
	Theoretical underpinning:	Self-management of well-being theory
	Intervention description:	Guided by the SMW theory, each meeting focused on one or more of the six self-management abilities. The women were

		taught to apply these abilities to the five basic needs (dimensions) of well-being.
	Dosage:	2.5 hours
	Duration:	6 weeks
Outcomes	Extractable outcomes:	loneliness
Notes	n/a	

Risk of bias	Authors' judgement	Support for judgement
Random sequence generation (Selection bias):	High	The participants randomised but no report on the randomisation sequence
Allocation concealment (Selection bias):	High	No report of allocation concealment.
Blinding of participants and personnel (Performance bias):	High	Not reported
Blinding of outcome assessment (Detection bias):	High	Not reported
Incomplete outcome data (Attrition bias):	Low	They report on all participants apart from those who dropped out
Selective reporting (Reporting bias):	Low	They report on the results of loneliness including social and emotional loneliness
Missingness (Other bias):	Low	Drop outs were not included and they reported on the results of the remaining participants

Baseline imbalance (Other bias):	Low	Page 5: "Table I shows that there was no significant difference between the baseline characteristics of the 46 women who completed the intervention, and also completed the T 1 questionnaire, and the base- line characteristics of the 73 women in the control group who were still participating at T 1 . Although the controls tended to be somewhat older than the women in the intervention group, this difference was not significant, t(1, 117) ¼ 1.75, p ¼ 0.06. In addition, no significant differences were found with regard to marital status, 2 ¼ 5.08, p ¼ 0.17, children (children or no children), 2 ¼ 2.92, p ¼ 0.09, or level of physical functioning, t(1,116) ¼ 1.00, p ¼ 0.32"
Risk of contamination (Other bias):	unclear	The authors suggest that the control group might have behaved differently knowing that they didn't receive the intervention
Overall risk of bias:	Unclear	The risk of bias in terms of selection, performance, detection was rated high but low on attrition, reporting and other bias.

9. Larsson 2016		
Methods	Study design:	RCT
	Geographic region:	Urban,Sweden
	Period:	Not stated
Participants	Inclusion criteria:	"The inclusion criteria were: (a) living in ordinary housing with no home care services, (b) aged 60 years old or older, (c) retired, (d) reporting experiences of loneliness, (e) reporting decreased social contacts and/or decreased participation in social activities, (f) internet users (including email) and (h) having a computer with Internet access at home."

	Exclusion criteria:	Regular FB or skype user. issues with communication, inability to receive support coz of geographical location
	No. Randomised:	30 participants
	Completed (Intervention):	Two dropouts one from control and one from intervention group
	Age group:	Young-old (Age range 61—80 years old)
	Gender:	Mixed (24 women and 6 men)
	Ethnicity:	Not stated
	Health status:	Not stated
	Socioeconomic status:	Not stated
	Screened for Loneliness at baseline:	Yes
Interventions	Intervention type:	Educational and Technological
	Mode of delivery:	Online and in-person
	Theoretical underpinning:	Based on client centred approach
	Intervention description:	The focus of the intervention programme was to support individually adapted and goal-directed participation in Social Internet Based Activities. The intervention programme combines individual and group meetings, including in-home support and remote support via the internet or telephone.
	Dosage:	1.5 hours
	Duration:	12 weeks
Outcomes	Extractable outcomes:	Loneliness, Satisfaction with social contacts online, Satisfaction with social contacts offline
Notes	n/a	
Risk of bias	Authors' judgement	Support for judgement
Random sequence generation (Selection bias):	Low	"The 30 participants were randomised using a computerised programme. The first author wrote

		in the sequence boundaries (1–24, 25–30) for randomisation, and the participants were stratified according to sex. The numbers were then randomly assigned into two groups by one employee who was working at the same department as the research group (not otherwise included in the study)."
Allocation concealment (Selection bias):	Low	Page 2."The first author then received a preset list from a second employee (within the research group)"
Blinding of participants and personnel (Performance bias):	Unclear	They all received the intervention
Blinding of outcome assessment (Detection bias):	Low	Page 4: "An external rater who was blinded to group allocation and was trained to administer all of the measurements per- formed all data collection during the three measurement points (T1, T2 and T3). At T1, baseline characteristics were collected, and initial evaluations of the primary and secondary outcomes were conducted. At T2 and T3, the primary and secondary outcomes were re-evaluated."
Incomplete outcome data (Attrition bias):	Low	Page 3: "During the study, two participants dropped out: woman from group 1 (I/C) and one man from group 2 (C/I). The reasons given for withdrawal were a lack of time and no need for the intervention. One male partici- pated only in the measurement periods but not in the intervention, and one female did not participate in the last month of her intervention period. These two participants were not considered as dropouts, thereby supporting future comparisons to studies in which not all participants comply with the intervention plans."

Selective reporting (Reporting bias):	Low	They reported on all measures whether significant or not
Missingness (Other bias):	Unclear	There was missing data from two participants but they were still included in the analysis. They were not considered drop outs. Page 3: "One male participated only in the measurement periods but not in the intervention, and one female did not participate in the last month of her intervention period. These two participants were not considered as dropouts, thereby supporting future comparisons to studies in which not all participants comply with the intervention plans."
Baseline imbalance (Other bias):	unclear	Other than the age differences between the two groups, there were no significant differences between the two groups
Risk of contamination (Other bias):	High	Page 2: " A washout period was not applicable in this study because of the educational feature of the intervention in which the knowledge was expected to be sustained, as well as because of a lack of research regarding estimation of the correct washout period length (previously applied by Prosperini et al., 2013). Despite the omission of a washout period, the crossover design was chosen based on the ethical benefits, as all participants were offered the intervention."
Overall risk of bias:	Unclear	Although they attend to factors such selection bias, performance bias, detection bias, the lack of a wash out period makes this a high risk of bias

		study. thus it will be classed as an unclear risk of bias

10. Mountain 2014		
Methods	Study design:	RCT
	Geographic region:	Urban, UK
	Period:	June 2011 to December 2013
Participants	Inclusion criteria:	Page 2: "Those eligible for the study: (a) were aged 75 or over; (b) had good cognitive function, defined as Six Cognitive Impairment Test (6CIT [26]) score of 7 or under; (c) lived independently (alone or with others) or in sheltered housing; and (d) could converse in English."
	Exclusion criteria:	Page 2: "(a) could not use a telephone even if provided with appropriate assistive technology; (b) lived in residential/nursing care homes; and (c) were already receiving telephone interventions."
	No. Randomised:	157 (78 in the intervention and 79 in the control group)
	Completed (Intervention):	43 in the intervention group completed (44 in control group)
	Age group:	Old-old (mean for control was 80.1 years and mean for intervention group was 81.8 years)
	Gender:	Mixed
	Ethnicity:	White European
	Health status:	Only participant with good cognitive function were included. General health at baseline reported with intervention group scoring a mean of 69.2 on the SF-36 general health scale and the control group scoring 60.
	Socioeconomic status:	In intervention group, 38% had professional occupations and 29% had managerial/technical occupations. in the control group it was 23% and 29% respectively

	Screened for Loneliness at baseline:	No
Interventions	Intervention type:	Telephone be-friending group
	Mode of delivery:	Telephone
	Theoretical underpinning:	Not stated
	Intervention description:	Participants aged >74 years, with good cognitive function, living independently in one UK city were recruited through general practices and other sources, then randomised to: (1) 6 weeks of short one-to-one telephone calls, followed by 12 weeks of group telephone calls with up to six participants, led by a trained volunteer facilitator;
	Dosage:	One to one intervention: 20-30 minutes long one per week for six weeks -Group intervention: 1 hour long once a week for 12 weeks
	Duration:	One to one intervention: 20-30 minutes long one per week for six weeks -Group intervention: 1 hour long once a week for 12 weeks
Outcomes	Extractable outcomes:	Loneliness, social loneliness, emotional loneliness
Notes		

Risk of bias	Authors' judgement	Support for judgement
Random sequence generation (Selection bias):	Low	Mountain 2014.pdf: Page 4: "The randomisation sequence was generated in advance by a CTRU statistician who was not a member of the trial team, without tratification but using blocked randomization with randomly-selected block sizes."
Allocation concealment (Selection bias):	Low	Page 3: "The principal investigator and study statisti- cians were blinded to treatment allocation

		codes until the final analysis was complete."
Blinding of participants and personnel (Performance bias):	Unclear	Participants and volunteers were not blinded. However, it was not possible to do so.
Blinding of outcome assessment (Detection bias):	Low	Page 3: "The principal investigator and study statisticians were blinded to treatment allocation codes until the final analysis was complete."
Incomplete outcome data (Attrition bias):	Low	Page 9 “Only 35% (9/26) of intervention group participants who had valid 6-month outcome data completed 75% or more of the group intervention telephone calls and were entered in the per-protocol analysis"
Selective reporting (Reporting bias):	Low	They reported on all measures they set out to report whether they were significant or not
Missingness (Other bias):	low	Page 9: "The results for the primary outcome were robust to missing data in sensitivity analyses, with all imputation methods producing similar results (Table 4 and Figure 3)."
Baseline imbalance (Other bias):	low	Page 4: "Baseline and socio-demographic characteristics were summarised and assessed for comparability between trial arms without formal testing of statistical significance [38,39]."
Risk of contamination (Other bias):	Low	This intervention was a telephone befriending service and groups were allocated in advance
	Low	

Overall risk of bias:		Overall this was a low risk of bias study. they attempted to reduce different types of bias where possible

11. Mountain, 2017		
Methods	Study design:	RCT
	Geographic region:	Multisite (Rural & urban), UK
	Period:	December 2011 to November 2015
Participants	Inclusion criteria:	Community living people aged 65 years and over with reason- able cognitive ability to participate
	Exclusion criteria:	Not stated
	No. Randomised:	288(145 in interventions group)
	Completed (Intervention):	134
	Age group:	Young-old Mean age for the whole sample was 72.1 years
	Gender:	Mixed 68.1% were women
	Ethnicity:	98.3% of the sample was English, Welsh, Scottish, northern Irish/British
	Health status:	Participants were mentally well with mean baseline SF-36 MCS score of 52
	Socioeconomic status:	Implicit in the reporting of occupation type where of the total sample, 16.3% had professional occupations, 23.3% held managerial/technical posts. 26% were skilled non manual posts, 12.5% were manually skilled. 7.3% were partly skilled and 11.1% were unskilled
	Screened for Loneliness at baseline:	No
Interventions	Intervention type:	Occupational based lifestyle intervention
	Mode of delivery:	In-person

	Theoretical underpinning:	Occupational approach to healthy ageing
	Intervention description:	Lifestyle Matters is a National Institute for Health and Care Excellence recommended multi-component preventive intervention designed to improve the mental well-being of community living older people at risk of decline. Participants were also asked to engage in monthly individual sessions with a facilitator. The facilitators worked with the participants to explore the selected topic through discussion, activities and community enactment. The emphasis throughout was upon the identification of participants' goals, empowerment through sharing strengths and skills and providing support to enable them to practice new or neglected activities independently, particularly in the community
	Dosage:	Not stated
	Duration:	16 weeks
Outcomes	Extractable outcomes:	Loneliness, social loneliness, emotional loneliness
Notes		

Risk of bias	Authors' judgement	Support for judgement
Random sequence generation (Selection bias):	Low	Page 2: "The randomisation sequence was computer generated in advance by the trial statistician and stratified by site. Random permuted blocks of variable size were used to ensure that sufficient participants were allocated in a 50:50 ratio to each arm of the trial at each study site. When a couple in the same household both consented to take part, the pair was randomised as a couple."
Allocation concealment (Selection bias):	low	Page 2: "The principal investigator (PI), TSC, study statisticians, health economists and RAs collecting outcome data at 6 and 24 months were blinded to treatment allocation but the Trial Manager, clerical team and participants were not blinded."

Blinding of participants and personnel (Performance bias):	Unclear	Page 2: "The principal investigator (PI), TSC, study statisticians, health economists and RAs collecting outcome data at 6 and 24 months were blinded to treatment allocation but the Trial Manager, clerical team and participants were not blinded. RAs who undertook follow-up appointments asked partici- pants to avoid revealing which arm they were allocated to."
Blinding of outcome assessment (Detection bias):	Unclear	Page 3: "RAs were unblinded to group allocation in 13.7% (n = 109) of follow- up appointments."
Incomplete outcome data (Attrition bias):	Low	Authors reported on the exclusions as well as on information on why participants did not complete the data. They excluded them from the analysis.
Selective reporting (Reporting bias):	Low	All measures reported regardless of whether there were changes or not
Missingness (Other bias):	Low	Page 3: "There was less than 5% missing data for costs and as a result no imputation was necessary."
Baseline imbalance (Other bias):	High	Authors do not state whether there were differences between the groups at baseline.
Risk of contamination (Other bias):	Low	The participants who took part in group intervention had their attendance monitored so no one from a different group would have received the group intervention
Overall risk of bias:	Low	This study was judged as having a low risk of bias because they attended to selection, performance and detection bias as well as attrition, reporting and other biases. There were some area where it

		was rated as unclear risk but overall, the study was rated as having a low risk of bias

12. Shvedko, 2020		
Methods	Study design:	RCT
	Geographic region:	Urban (Birmingham)
	Period:	February 2018 to August 2018
Participants	Inclusion criteria:	Community-dwelling older adults aged 60 years and older; previously sedentary, at risk of loneliness and having ≥ 6 out of 9 points on the three-item loneliness scale during the phone screening, physically mobile as measured using the Short Physical Performance Battery with a score ≥ 9 out of 12, healthy or having one or more common chronic diseases but ambulatory, without a cognitive disability as assessed by the Montreal Cognitive Assessment with a score ≥ 22 out of 30, able to give written informed consent, English speaking and able to complete paper and pencil questionnaires
	Exclusion criteria:	Younger than 60 years old, currently taking part in another physical activity intervention, socially active or not lonely based on the phone screening tool, regularly physically active, moderate to severe cognitive disability with cut-off below 22 for MOCA or clinical diagnosis of dementia or Alzheimer's disease, not ambulatory, not literate in English
	No. Randomised:	25 (12 in intervention)
	Completed (Intervention):	12
	Age group:	Young-old : Mean age *68.4(5.9)*
	Gender:	Mixed (5/12 male)
	Ethnicity:	Mixed (7 white, 2 black, 1 Asian)
	Health status:	*9/12 had at least one comorbidity*
	Socioeconomic status:	Not stated

	Screened for Loneliness at baseline:	Yes
Interventions	Intervention type:	Physical activity, health education and social interaction
	Mode of delivery:	In-person
	Theoretical underpinning:	Theory of active engagement
	Intervention description:	Group walking sessions were run once weekly for up to 45 minutes each in small groups (up to eight to nine people per group) and delivered by a trained walk leader. The sessions were followed by the health education/social interactions workshops delivered in the form of a group presentation weekly for up to 45 minutes by the researcher (PhD student)
	Dosage:	90 minutes in total for both sessions
	Duration:	12 weeks
Outcomes	Extractable outcomes:	Social support, loneliness, social support
Notes	N/A	

Risk of bias	Authors' judgement	Support for judgement
Random sequence generation (Selection bias):	Low risk	"Potentially eligible participants identified after baseline screening were randomised into the intervention or a WL control group using a computer generated random sequence performed by an external researcher not involved in the delivery of the intervention or outcome assessment"
Allocation concealment (Selection bias):	Low risk	"Participants were informed about the group allocation by e-mail or a phone call by a person not involved in assessments or delivery of the intervention"
Blinding of participants and personnel (Performance bias):	High risk	"Intervention providers who were responsible for outcome assessments were not blinded to the intervention delivery as this would not be possible,

		given that the PhD student researcher (AS) conducted the study and walks"
Blinding of outcome assessment (Detection bias):	High risk	"Intervention providers who were responsible for outcome assessments were not blinded to the intervention delivery as this would not be possible, given that the PhD student researcher (AS) conducted the study and walks"
Incomplete outcome data (Attrition bias):	Low risk	The study provides a flow chart reporting the number of participants at each stage of the trial and the numbers who dropped out with reasons provided such as losing interest, personal reasons, health reasons
Selective reporting (Reporting bias):	Unclear	The authors did not mention any information about exclusions from analysis. There were participants who did not complete the intervention but it appears they were included in the final analysis as the number of people randomised where the same number of people who had data provided at the start of the intervention.
Missingness (Other bias):	Unclear	Not reported
Baseline imbalance (Other bias):	Low	"Exercise questionnaire showed high internal consistency reliability at baseline, with Cronbach's alpha equalling 0.926 (a week before) and 0.938 (a week after); at post-intervention the value was 0.97" Page 8:
Risk of contamination (Other bias):	Low	The risk of contamination was low as this was an exercise interventions with a workshop. There was a waitlist control group who received the intervention after the trial completed
Overall risk of bias:	Unclear	*Although there was a random allocation and efforts to conceal assignment , this trial was rated as having an unclear risk of bias because the person delivering the intervention was also the person who was responsible for outcome*

		assessments. They attended to other risks of bias to some extent but the small sample size and the inclusion of one assessor to implement and take outcomes increases the risk of bias

13. Pynnonen (2018)		
Methods	Study design:	RCT
	Geographic region:	Urban (Finland)
	Period:	August 2008
Participants	Inclusion criteria:	Page 3 "1) feeling loneliness, melancholy, or depressive mood at least sometimes, (2) a Mini-Mental State Examination (MMSE) score greater than 21 in order to be able to participate in discussions, (3) willing to participate in the study, were met by 296 persons, of whom 39 withdrew from the study before randomization."
	Exclusion criteria:	Not stated
	No. Randomised:	257 (129 in intervention group)
	Completed (Intervention):	223 (105 intervention group)
	Age group:	Old-old (Mean age: 77 years)
	Gender:	Mixed: 75% women
	Ethnicity:	Not stated
	Health status:	Page 5: "Mean MMSE score was 27.2 and mean number of chronic diseases was 2.9. Participants typically had only early signs of mobility decline as 35% reported difficulties only in walking longer distances (2 km) and 60% reported no difficulties in any mobility tasks."
	Socioeconomic status:	Not stated

	Screened for Loneliness at baseline:	Yes
Interventions	Intervention type:	Mixed: Physical activity, counselling, social activity
	Mode of delivery:	In person
	Theoretical underpinning:	Not stated
	Intervention description:	Participants were asked to choose between three interventions. An exercise program which involved varying types of exercise and was conducted by qualified instructors in municipal gyms., a social activity program which was delivered by health care students from JAMK University of Applied Sciences and participants met in the city library. And a Per-social counselling program which was conducted by a rehabilitation counsellor
	Dosage:	Weekly
	Duration:	Page 5: "Depressive symptoms and perceived togetherness were assessed at baseline and at the end of the six-month intervention"
Outcomes	Extractable outcomes:	Loneliness and Social Isolation Indicator 2: social integration
Notes	n/a	
Risk of bias	Authors' judgement	Support for judgement
Random sequence generation (Selection bias):	Low risk	Page 4: "57 persons were allocated to the intervention or control groups, using a randomized ratio 1:1, by drawing lots"
Allocation concealment (Selection bias):	High	Not reported

Blinding of participants and personnel (Performance bias):	Unclear	*It would have been difficult to blind participants as they were receiving the intervention and had to choose the intervention they wanted to be in.*
Blinding of outcome assessment (Detection bias):	Low	Page 4: "Interviewers and data collecting assistants were blinded to the group assignment of the participants throughout the study."
Incomplete outcome data (Attrition bias):	Low	Page 4: "Only the data on the persons who participated in both home interviews (intervention group n = 105, control group n =118) were analyzed in this study."
Selective reporting (Reporting bias):	unclear	Although they report the findings of the intervention group as a whole, it would have been ideal to separate the analysis to see the effects of each subgroup. Page 5: "We report the type III effect p-values that are invariant to the choice of reference category. In the analyses, to optimize statistical power relative to the control group, we did not separate the three intervention subgroups but treated them as a single group."
Missingness (Other bias):	low	Page 4: "Only the data on the persons who participated in both home interviews (intervention group n D 105, control group n D 118) were analysed in this study."
Baseline imbalance (Other bias):	low	There were no differences in the measures between the control group and the intervention group Pynnonen 2018.pdf: Page 5: "In depressive symptoms, melancholy, loneliness, and dimensions of perceived togetherness, the intervention and the control groups were comparable."
Risk of contamination (Other bias):	low	Participants were assigned different groups and there were activities involved that the control group would not have been able to access.

Overall risk of bias:	unclear	This study has an unclear risk of bias. They account for many of the biases although they do not report the details of the individual groups. Also, the measures used are not validated. But they do attend to selection bias, attrition bias, and other biases.
14. Routasalo (2009)		
Methods	Study design:	RCT
	Geographic region:	Not stated
	Period:	2003 to 2006
Participants	Inclusion criteria:	Page 1: "The inclusion criteria for the group intervention were age ‡75 years, subjective feeling of loneliness and willingness to participate in the intervention."
	Exclusion criteria:	Page 2: "The exclusion criteria were moderate or severe dementia [Mini Mental State Examination score <19 points or Clinical Dementia Rating Scale score >1], living permanently in institutional care, blindness, deafness or inability to walk independently." "or exercise and discussion groups (see below), New York Heart Association Classification classes three and four constituted additional exclusion criteria."
	No. Randomised:	235
	Completed (Intervention):	97.5% completed Page 6: "Only 2.5% of intervention participants did not complete the intervention."
	Age group:	Old-old (Mean age 80years)
	Gender:	Mixed: *in the intervention 74% were female and in the control group, 72%were female*
	Ethnicity:	Not stated
	Health status:	Page 4: " The participants were old (mean age 80 years), female, widowed, and lived alone, and their physical functioning was fairly good."
	Socioeconomic status:	Not stated
	Screened for Loneliness at baseline:	Yes
Interventions	Intervention type:	*Pyschosocial group intervention involving an art based group , writing group and exercise*

		and group discussion group
	Mode of delivery:	In person
	Theoretical underpinning:	*Geriatric Rehab Nursing Model*
	Intervention description:	Page 299 “The intervention was carried out in seven centres and six communities. Each group consisted of 7–8 participants. The groups met once a week for 3 months (12 times). The group meetings were goal-oriented and closed, so that once the group was formed no new member could join even if someone dropped out. The psychosocial groups consisted of three types of activities, depending on the interests of the participants: art and inspiring activities (AIA), group exercise and discussions (GED), and therapeutic writing and group therapy (TWGT) (Savikko 2008). In the AIA groups, various artists visited the meetings, the participants visited cultural events and also actively produced their own art. In the GED groups, participants performed various exercises (senior dancing, swimming and walking in the countryside), and discussed the health themes that interested them. In the TWGT groups, participants wrote about their own past lives, experiences and loneliness at home and then discussed their writing in the groups.”
	Dosage:	Not stated
	Duration:	12 weeks
Outcomes	Extractable outcomes:	No
Notes		

Risk of bias	Authors’ judgement	Support for judgement
Random sequence generation (Selection bias):	Low	Page 3: "The randomization was performed in blocks of 16 people using a computer-generated random numbers centre."

Allocation concealment (Selection bias):	Low	Page 3: "After interviewing and assessing the participants for one week, the study nurse ended up with a list of 16 eligible participants in the order they had been assessed. She telephoned to the randomization centre and read the names from a paper list in the order which they appeared in her list. The person at a randomization centre did not know the identities of potential participants."
Blinding of participants and personnel (Performance bias):	High	Not stated
Blinding of outcome assessment (Detection bias):	High	They mention that a study nurse took the measurements at baseline, 3 months and 6 months and a postal questionnaire after 12 months was sent but no mention of blinding
Incomplete outcome data (Attrition bias):	High	Not stated
Selective reporting (Reporting bias):	Unclear	They report the medians but not the mean scores. Also, they don't report on the scores for the individual subgroups
Missingness (Other bias):	High	They report that there are 2.5% of people that did not complete the intervention but they don’t say if participants who completed the trial refused to submit their final results
Baseline imbalance (Other bias):	Low	Page 4: "The intervention and control groups were comparable at baseline.”
Risk of contamination (Other bias):	Low	The participants meet in groups and the groups randomised at the start
	Unclear	

Overall risk of bias:		This study has an unclear risk of bias. They do attend to selection and performance bias but then score poorly on the other risk of bias. Some sections were rated as having a high risk of bias as information that one would expect from an RCT was not reported. e.g. the flow of participants to show attrition rates and the reasons for dropping out

15. Saito, 2012		
Methods	Study design:	RCT
	Geographic region:	Suburban Tokyo, Japan
	Period:	September and October 2006
Participants	Inclusion criteria:	aged 65 years or over who had moved into City A within the last 2 years
	Exclusion criteria:	older persons who had moved to residential facilities (i.e., a special care or home-care facility for the frail elderly) in City A were excluded
	No. Randomised:	63 (21 in intervention group)
	Completed (Intervention):	20
	Age group:	Young-old Mean age 72.2
	Gender:	Mixed (8 participants were male)
	Ethnicity:	Japanese
	Health status:	All participants in the intervention group were assessed, and 18 of them were found to be independent with instrumental activities of daily living
	Socioeconomic status:	Not stated
	Screened for Loneliness at baseline:	No
Interventions	Intervention type:	Educational and Social access
	Mode of delivery:	In person
	Theoretical underpinning:	Not stated

	Intervention description:	Page 541 “The purpose of the intervention was to improve the health and well-being of the elderly participants by preventing social isolation. Based on previous studies (Cattan et al., 2005; Findlay,2003), we developed a group-based educational, cognitive, and social support program designed to prevent social isolation by improving community knowledge and networking with other participants and various community ‘‘gatekeepers,’’ who could make connections between the study participants and community services”
	Dosage:	120 minutes
	Duration:	Once every four weeks
Outcomes	Extractable outcomes:	Loneliness and social support
Notes		

Risk of bias	Authors’ judgement	Support for judgement
Random sequence generation (Selection bias):	Unclear	Page 2: "Among the 76 respondents, 63 completed a self- administered mail questionnaire pre-test (T1) survey and were assigned sequential numbers in the order of their response. In the group allocation, the sequential numbers were randomly assigned to two groups with an allocation ratio of 1:2 for the intervention and control groups, respectively, according to simple randomization"
Allocation concealment (Selection bias):	High	Page 2: "Thus, this trial was randomized but was not blinded."
Blinding of participants and personnel (Performance bias):	High	Page 2: " this allocation was carried out by the authors, who developed and implemented the program and analyzed the data. Thus, this trial was randomized but was not blinded."
Blinding of outcome	High	Page 2: "This allocation was carried out by the authors, who developed and implemented the

assessment (Detection bias):		program and analyzed the data. Thus, this trial was randomized but was not blinded."
Incomplete outcome data (Attrition bias):	Unclear	They provide data on all the outcomes they set out to assess. The report on the numbers of people who were excluded and who withdrew but they don't provide reasons why they did so.
Selective reporting (Reporting bias):	Low	They report on all the measures whether significant or not and they do so for both groups
Missingness (Other bias):	Low	The authors report that three participants dropped out and they were excluded from the analysis.
Baseline imbalance (Other bias):	Low	Page 5: "There were no statistical differences between the intervention and control groups in terms of participant characteristics at pre-test other than familiarity with services, which was significantly higher in the control group (p = 0.041)."
Risk of contamination (Other bias):	Low	There was no risk of contamination. In any case, the control group were to get the intervention after 7 months
Overall risk of bias:	Unclear	In terms of risk of bias, the study was judged to have an unclear risk of bias because although the study was deemed to have a high risk of bias in relation to selection, performance and detection bias, they score low on other bias and reporting bias therefore, the study has an overall unclear risk of bias

16. Theeke (2016)		
Methods	Study design:	RCT
	Geographic region:	Rural (Appalachia)
	Period:	Not stated

Participants	Inclusion criteria:	Page 4: " 1) All patients should be 65 years of age or older. 2) They must have a minimum loneliness score of 40 on the revised 20-item UCLA Loneliness scale [40]. 3) Participants should be living in the community. 4) They have been diagnosed with at least one chronic illness. 5) Each participant must have voluntarily signed an informed consent form prior to enrolment."
	Exclusion criteria:	Page 4: " 1) Potential participants who had lost their spouse within the last 2 years were excluded to control for grief reaction. 2) Those who had cognitive impairment with scores less than 23 on the Folstein mini-mental status exam did not participate. 3) Those with institutional living were excluded. 4) Those with significant psychiatric or developmental problems that prevented their ability to independently answer survey questions were also excluded."
	No. Randomised:	27
	Completed (Intervention):	27
	Age group:	Old-old (Mean age 75)
	Gender:	Mixed
	Ethnicity:	Not stated
	Health status:	Total chronic illness was 2.9 for the intervention group and 2.6 for the control group
	Socioeconomic status:	In the intervention group, 4 participants earned less than $20K per year, and 3 earned $40K and over. The rest earned between $20k and $40k in the control group 6 participants earned less than $20K per year, and 3 earned $40K and over. The rest earned between $20k and $40k
	Screened for Loneliness at baseline:	Yes
Interventions	Intervention type:	Psychological therapies
	Mode of delivery:	In person

	Theoretical underpinning:	CBT theory, story theory and a psychoneuroimmunology paradigm
	Intervention description:	LISTEN is a cognitive behavioural intervention for loneliness, on loneliness. Three to five participants at a time met weekly for a total of five times (2 h each time) Participants begin each session with writing; during weeks 1–4, the participants complete unique homework assignments relevant to the content for the upcoming week. The content of the sessions was derived from the health and social science literature on loneliness, and the sessions are designed to be sequential, focusing first on belonging, then relationships, role in community, loneliness as a health challenge, and meaning of loneliness.
	Dosage:	2 hours
	Duration:	5 weeks
Outcomes	Extractable outcomes:	Loneliness, social support, emotional support, positive social interaction,
Notes		

Risk of bias	Authors' judgement	Support for judgement
Random sequence generation (Selection bias):	High	Not reported
Allocation concealment (Selection bias):	High	Not reported
Blinding of participants and personnel (Performance bias):	High	Not reported
Blinding of outcome assessment (Detection bias):	High	Not reported

Incomplete outcome data (Attrition bias):	Low	The authors reported no dropouts although the final 12 week analysis includes all participants. it's unclear whether there were any dropouts
Selective reporting (Reporting bias):	Low	The authors reported on all the measures of interest
Missingness (Other bias):	Unclear	It Is unclear as to whether the participants who took part refused to allow their data to be used in the final analysis.
Baseline imbalance (Other bias):	Low	Page 6: "The LISTEN and attention control groups did not differ significantly on any of the baseline demographic characteristics (Table 1)."
Risk of contamination (Other bias):	Low	The two groups were help concurrently with different activities in both groups.
Overall risk of bias:	High	This study was rated as having a high risk of bias. The sample size was small and there was no evidence that the authors attended to selection, performance, or detection bias. It was unclear as to how they dealt with missingness. They did however address attrition, reporting and baseline imbalance.

17. Woodward (2011)		
Methods	Study design:	RCT
	Geographic region:	Rural (USA)
	Period:	Not stated
Participants	Inclusion criteria:	Not stated
	Exclusion criteria:	Not stated
	No. Randomised:	83
	Completed (Intervention):	Not reported
	Age group:	Young-old (Mean age 72 years)
	Gender:	Mixed (72% female)
	Ethnicity:	Not stated
	Health status:	Not stated

	Socioeconomic status:	Page 8: "Roughly a third (34%) of participants had incomes less than $25,000, 38% had incomes between $25,000 and $49,999, and 28% had incomes of $50,000 or greater."
	Screened for high levels of loneliness at baseline:	No
Interventions	Intervention type:	Technology based. ICT training for older people
	Mode of delivery:	In-person.
	Theoretical underpinning:	Not stated
	Intervention description:	Page 5: The main goals of the training were to increase participants' comfort with technology, increase awareness of and knowledge about safety and security issues related to the Internet, and introduce new tools for connecting with geographically Dispersed family and friends."
	Dosage:	Not stated
	Duration:	6 month program
Outcomes	Extractable outcomes:	None
Notes		

Risk of bias	Authors' judgement	Support for judgement
Random sequence generation (Selection bias):	High	Not reported
Allocation concealment (Selection bias):	High	Not reported
Blinding of participants and personnel (Performance bias):	High	Not reported

Blinding of outcome assessment (Detection bias):	High	Not reported
Incomplete outcome data (Attrition bias):	Low	Drop-out rates provided as were the reasons for dropping out. Page 7: " In particular, 76% of respondents completed all four data points. Of those who did not complete all interviews, 10% missed only one data collection point and 5% missed two. Several of these were participants who went to warmer climates for the winter months. An additional 10% dropped out after the baseline data collection period. Most of these were in the experimental group and most of them left for health or other personal reasons."
Selective reporting (Reporting bias):	Low	All measures of interest were reported on regardless of significance.
Missingness (Other bias):	Low	In this study, they used mixed regression model because they did not require that subjects be measured on the same number of time points. This is important because, as is to be expected with any longitudinal study, there was some attrition in our sample. This approach meant that the likelihood of missing data was reduced.
Baseline imbalance (Other bias):	Low	Comparison of the experimental and control group participants show that there were no significant differences between the two groups at baseline
Risk of contamination (Other bias):	Low	There was a low risk of contamination as the control group did not take part in any training during the trial period
Overall risk of bias:	Unclear	This study is rated as having an unclear risk of bias because although they did not address selection, performance, and detection bias, they addressed attrition, reporting and other risk of bias.

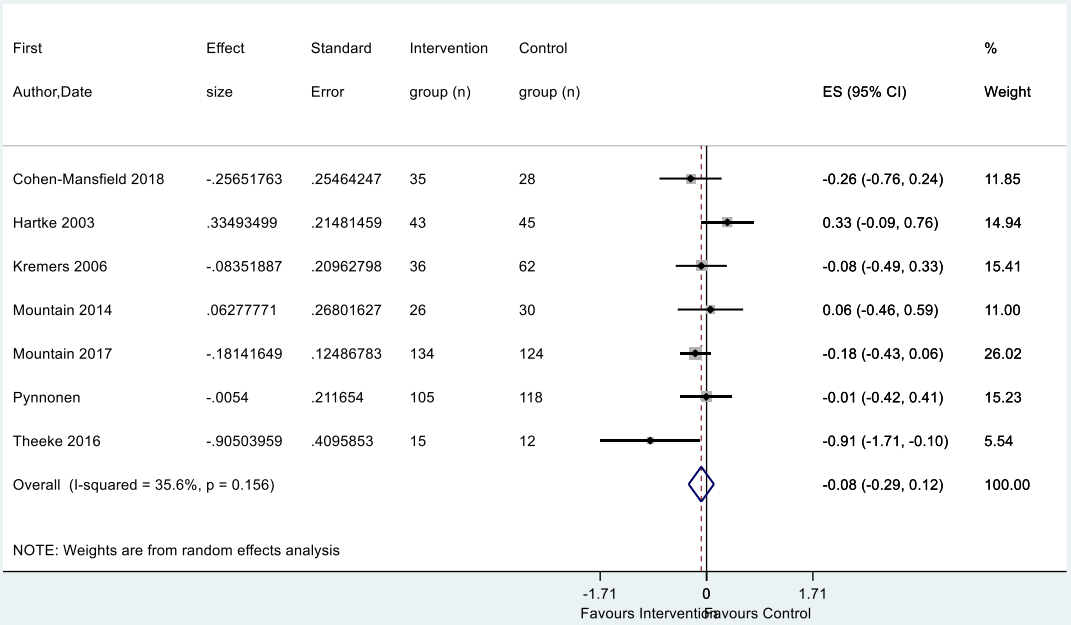
Appendix 6.10 Summary of outcome measures

Study ID	Outcomes extracted	Intervention (n)	Control (n)	Effect size	Standard Error
Andersson, 1985	Loneliness (Change Score) (FU)	35	22	0.134	0.272
Andersson, 1985	SII 5: Social contacts (Change Score (FU)	35	22	0.547	0.277
Cohen-Mansfield, 2018	Loneliness (PI)	39	35	-0.304	0.234
Cohen-Mansfield, 2018	Loneliness at (FU)	35	28	-0.257	0.255
Cohen-Mansfield, 2018	Loneliness (Change Score) (FU)	39	35	-0.531	0.258
Cohen-Mansfield, 2018	Loneliness (change score) (PI)	35	28	-0.518	0.237
Creswell, 2012	Loneliness (Change Score)(PI)	20	20	-0.887	0.331
Creswell, 2012	Loneliness (PI)	20	20	-0.305	0.318
Fukui, 2003	SII 4: Social support PI (PI)	25	25	0.000	0.797
Fukui, 2003	SII 3: Satisfaction with confidants (FU)	23	23	0.625	0.302
Fukui, 2003	Loneliness (Change Score) (FU)	23	23	-0.679	0.303
Fukui, 2003	SII 6: No. of confidants (Change Score) (FU)	23	23	0.648	0.303
Fukui, 2003	SII 4: social support at FU (FU)	25	25	0.000	0.576
Hartke, 2003	Loneliness (FU)	43	45	0.335	0.215
Kremers, 2006	Loneliness (PI)	46	73	0.116	0.188
Kremers, 2006	Loneliness (FU)	36	62	-0.084	0.210
Kremers, 2006	emotional Loneliness (PI)	46	73	0.152	0.189
Kremers, 2006	emotional Loneliness (FU)	36	62	0.000	0.210
Kremers, 2006	social Loneliness PI (PI)	46	73	-0.105	0.188
Kremers, 2006	social Loneliness (FU)	36	62	-0.108	0.210
Larsson, 2016	Loneliness (Change Score) (FU)	14	14	-1.371	0.420
Larsson, 2016	Loneliness (PI)	14	14	0.059	0.378
Larsson, 2016	SII 3: Satisfaction with social contacts online (PI)	14	14	0.614	0.388
Larsson, 2016	SII 3: Satisfaction with social contacts online (Change Score) (FU)	14	14	1.371	0.420
Larsson, 2016	SII 3: Satisfaction with social contacts offline (PI)	14	14	0.307	0.381
Larsson, 2016	SII 3: Satisfaction with social contacts offline (Change Score) (FU)	14	14	1.294	0.416
Mountain, 2014	DJG emotional Loneliness(FU)	26	30	0.000	0.268
Mountain, 2014	DJG social Loneliness (FU)	25	30	0.058	0.271
Mountain, 2014	DJG overall Loneliness (FU)	26	30	0.063	0.268
Mountain, 2017	Emotional Loneliness 6 months (FU)	130	122	-0.049	0.126
Mountain, 2017	Emotional Loneliness 24 months (FU)	117	116	-0.185	0.131
Mountain, 2017	Loneliness 6 months (FU)	134	124	-0.181	0.125
Mountain, 2017	Loneliness 24 months (FU)	121	117	-0.313	0.130
Mountain, 2017	Social Loneliness 6 months (FU)	133	123	-0.216	0.125
Mountain, 2017	Social Loneliness 24 months (FU)	122	117	-0.323	0.130
Pynnonen, 2018	SII 2: social integration (PI)	105	118	0.071	0.134
Pynnonen, 2018	Loneliness (Change Score) (PI)	105	118	0.074	0.134
Pynnonen, 2018	Often or continuously lonely 6 months(PI)	105	118	-0.121	0.233
Pynnonen, 2018	Often or continuously lonely 6 months (FU)	105	118	-0.005	0.212
Pynnonen, 2018	No/Very rarely lonely FU 6 months (FU)	105	118	0.155	0.150

Pynnonen, 2018	No/Very rarely lonely post 6 month intervention (PI)	105	118	0.111	0.148
Pynnonen, 2018	Loneliness (Change Score) (FU)	105	118	-0.017	0.134
Saito, 2012	Loneliness (1 month FU)	20	40	-1.877	0.326
Saito, 2012	Loneliness (6 months FU)	20	40	-1.846	0.325
Saito, 2012	SII 4: Social support PI (1month FU)	20	40	0.692	0.282
Saito, 2012	SII 4: Social support PI (6 month FU)	20	40	1.738	0.319
Saito, 2012	Loneliness (Change Score) (6 months FU)	20	40	-0.710	0.282
Saito, 2012	SII 4: Social support (Change Score) (6 months FU)	20	40	0.693	0.282
Shvedko, 2020	Loneliness PI (PI)	12	13	-0.093	0.401
Shvedko, 2020	Social Isolation LSN Total (PI)	12	13	0.575	0.410
Shvedko, 2020	Social Isolation LSN Family (PI)	12	13	0.236	0.402
Shvedko, 2020	Social Isolation LSN Friends (PI)	12	13	0.589	0.410
Shvedko, 2020	SII 4:Social Support -indicator of social isolation (PI)	12	13	0.196	0.401
Theeke, 2016	Loneliness (Change Score) (12 weeks FU)	15	12	-0.788	0.402
Theeke, 2016	SII 4: MOS total social support (Change Score)	15	12	0.774	0.401
Theeke, 2016	SII 4: Emotional support subscale 12 weeks FU	15	12	0.315	0.390
Theeke, 2016	SII 4: Tangible support (Change Score) (FU)	15	12	1.025	0.412
Theeke, 2016	SII 4: Affectionate support subscale 12 weeks PI	15	12	0.605	0.397
Theeke, 2016	Loneliness (1 week FU)	15	12	-0.532	0.395
Theeke, 2016	Loneliness (6 weeks FU)	15	12	-0.170	0.388
Theeke, 2016	Loneliness (12 weeks FU)	15	12	-0.905	0.410
Theeke, 2016	SII 4: MOS total Social Support at (12 weeks FU)	15	12	0.853	0.407
Theeke, 2016	SII 4: Emotional support (Change Score) (FU)	15	12	0.589	0.395
Theeke, 2016	SII 4: Tangible support subscale (12 weeks FU)	15	12	0.847	0.407
Theeke, 2016	SII 4: Affectionate support (Change Score) (12 weeks FU)	15	12	0.426	0.392
Theeke, 2016	SII 3: Positive Social interaction (12 weeks FU)	15	12	0.690	0.400
Theeke, 2016	SII 3: Positive Social interaction (Change Score) (FU)	15	12	0.216	0.388

Appendix 6.11 Sensitivity analysis of effect of community-based group interventions versus usual care on loneliness at follow-up

Effect of community-based group interventions versus usual care on loneliness at follow-up (Without Saito, 2012)



Heterogeneity chi-squared = 9.32 (d.f. = 6) p = 0.156

I-squared (variation in ES attributable to heterogeneity) = 35.6%

Estimate of between-study variance Tau-squared = 0.0256

Test of ES=0 : z= 0.82 p = 0.414

Appendix 6.12 Subgroup analyses loneliness at follow up

Figure 1. Forest plot of comparison: Effect of community based group interventions versus usual care on loneliness at follow up sub-grouped by whether screening for loneliness was done prior to intervention

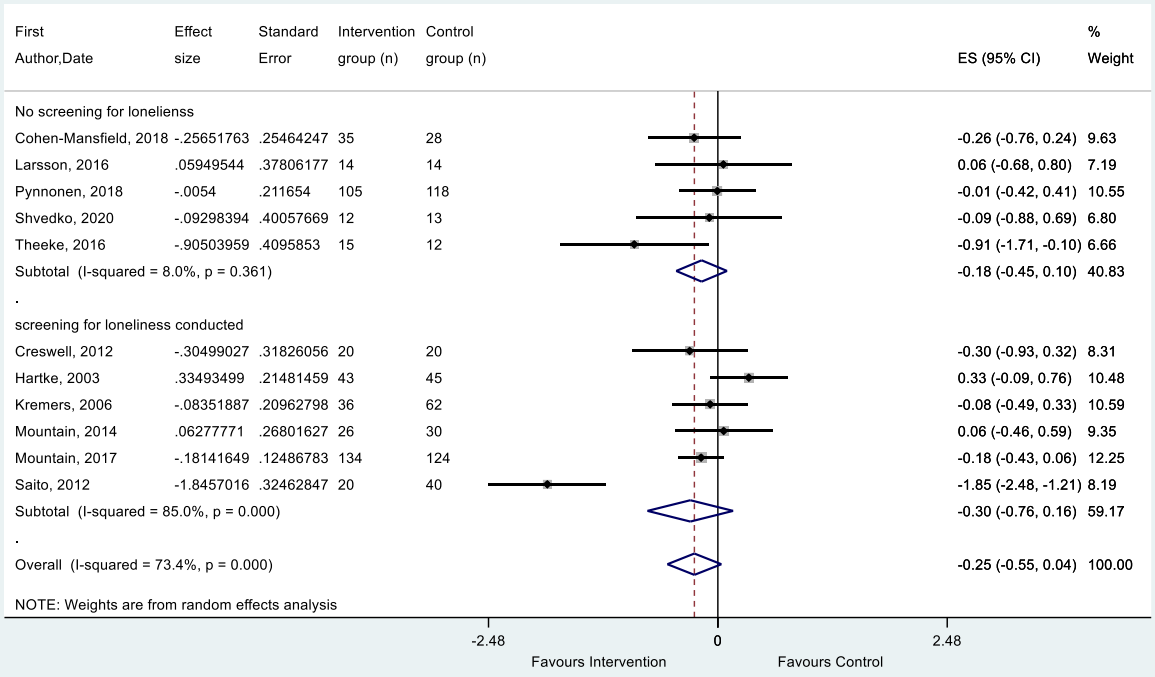


Figure 2. Forest plot of comparison: Effect of community based group interventions versus usual care on loneliness at follow up sub-grouped by Duration

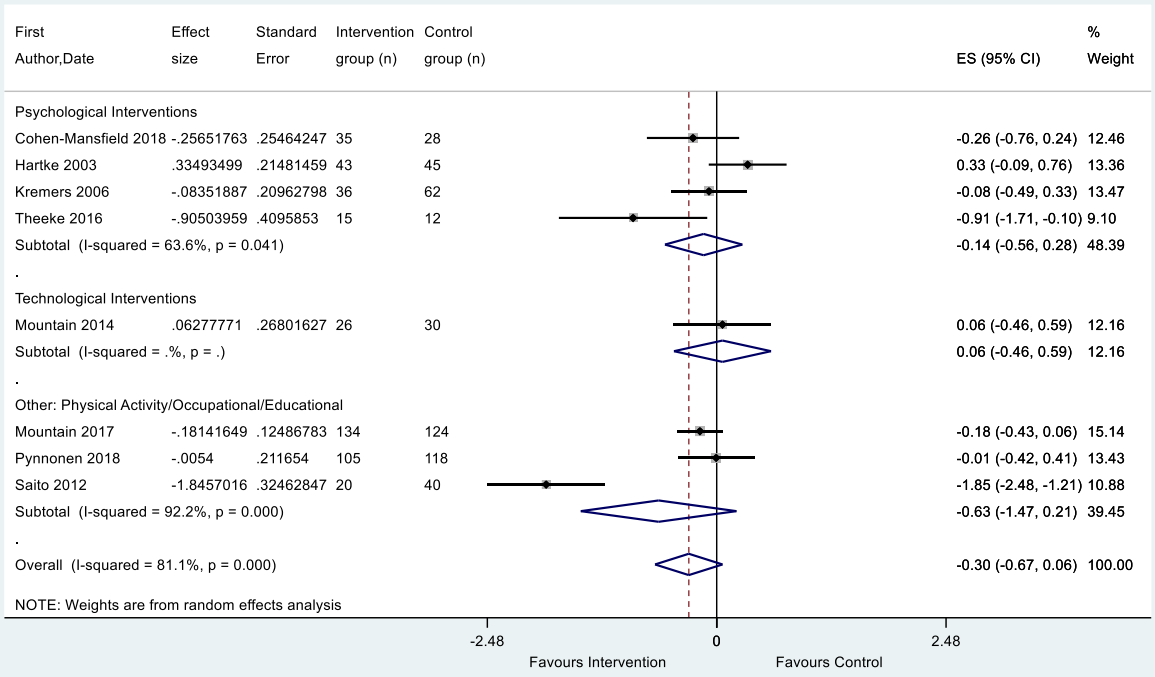


Figure 3. Forest plot of comparison: Effect of community based group interventions versus usual care on loneliness at follow up sub-grouped by Age group

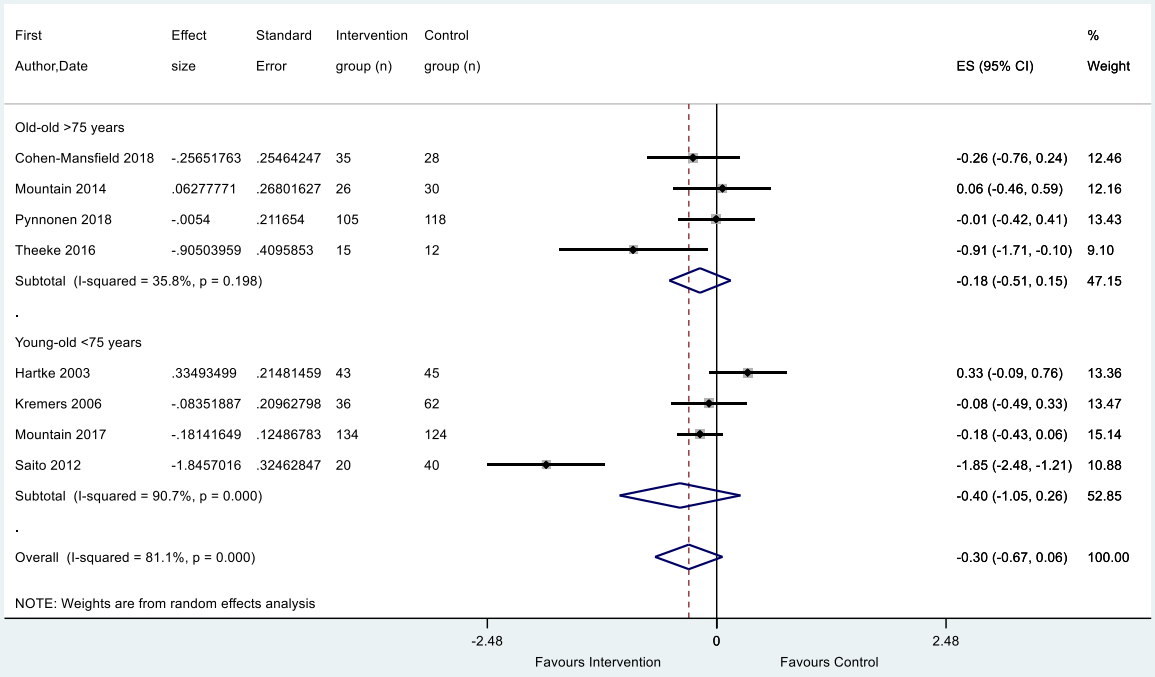


Figure 4. Forest plot of comparison: Effect of community based group interventions versus usual care on loneliness at follow up sub-grouped by Gender

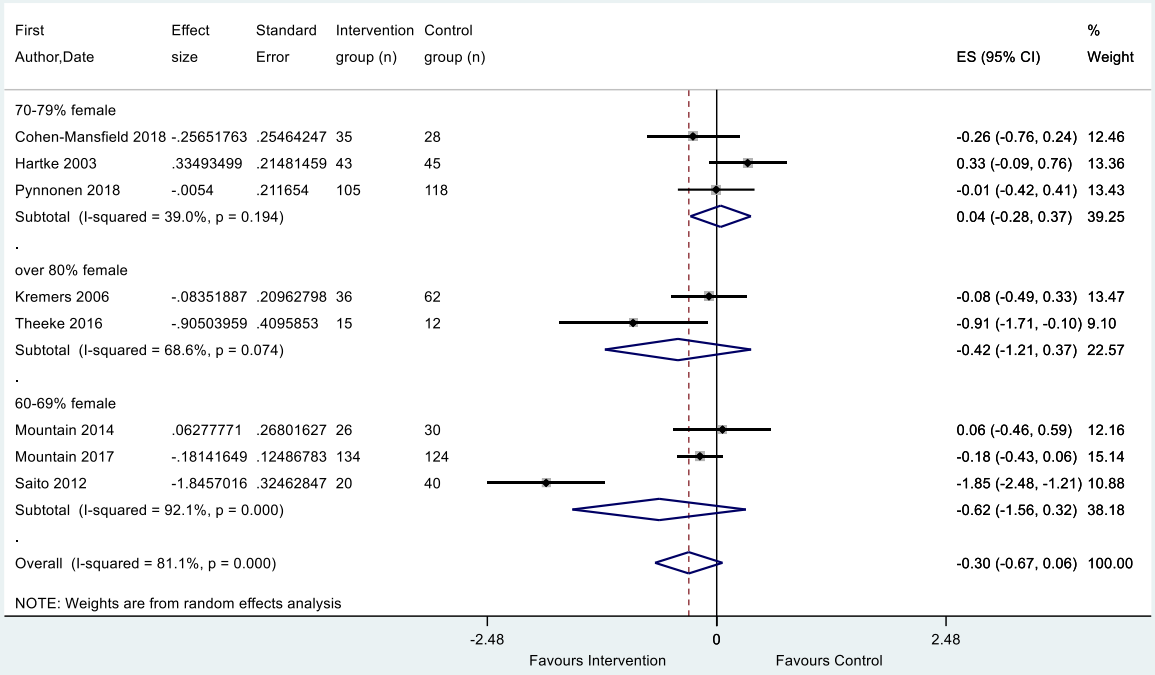
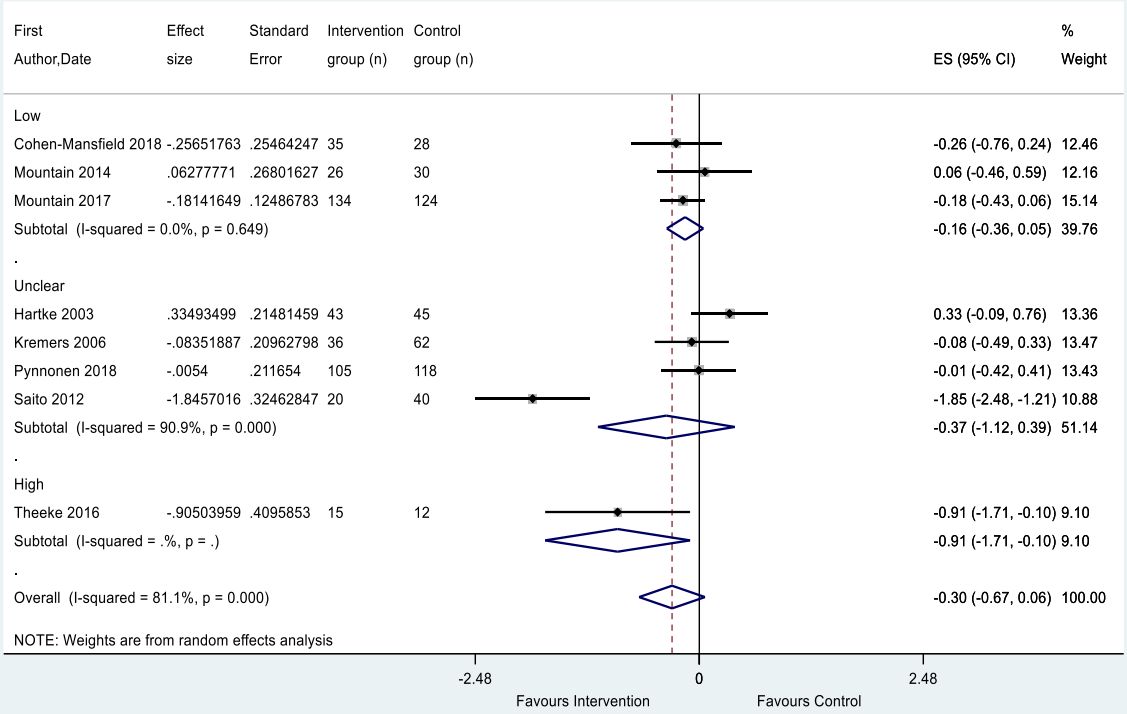
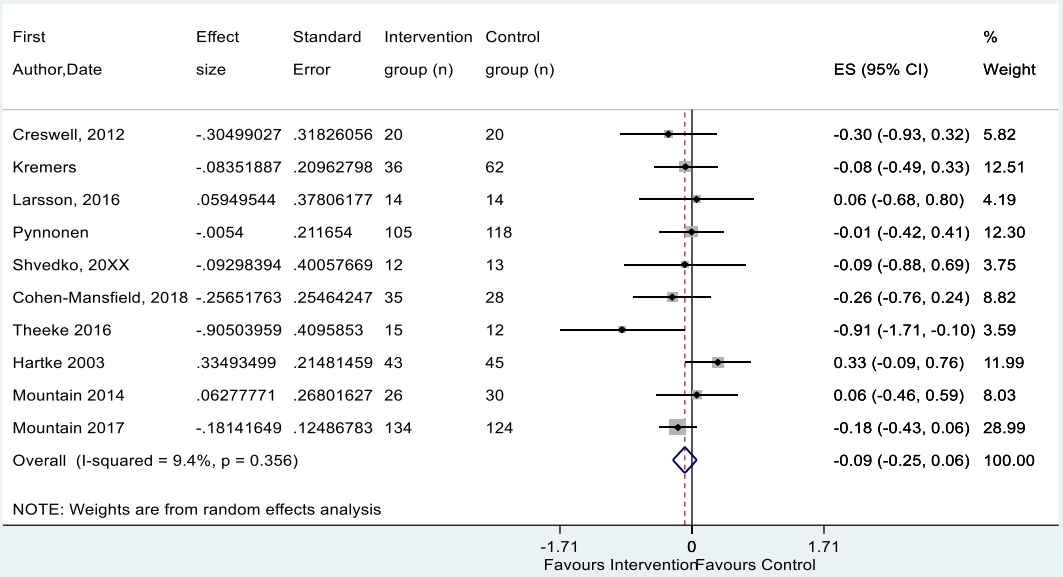


Figure 5. Forest plot of comparison: Effect of community based group interventions versus usual care on loneliness at follow up sub-grouped by risk of bias



Appendix 6.13 Sensitivity analysis of effect of community-based group interventions versus usual care on final loneliness scores (up to 6 months).

Figure 1. Forest plot of comparison: Effect of community-based group interventions versus usual care on final loneliness scores (up to 6 months) excluding Saito (2012)



Heterogeneity chi-squared = 9.93 (d.f. = 9) p = 0.356

I-squared (variation in ES attributable to heterogeneity) = 9.4%

Estimate of between-study variance Tau-squared = 0.0059

Test of ES=0 : z= 1.17 p = 0.242

Appendix 6.14 Subgroup analyses loneliness at consolidated model

Figure 1. Forest plot of comparison: Effect of community based group interventions versus usual care on loneliness at follow up sub-grouped by whether screening was done

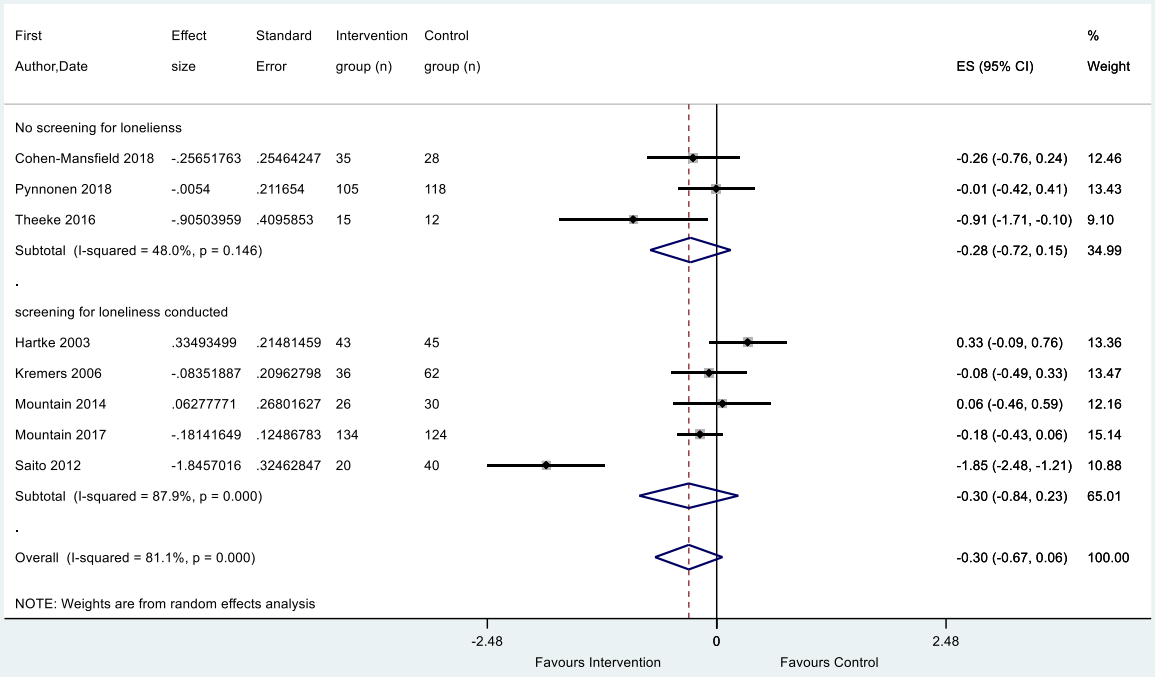


Figure 2. Forest plot of comparison: Effect of community based group interventions versus usual care on loneliness at follow up sub-grouped by risk of bias

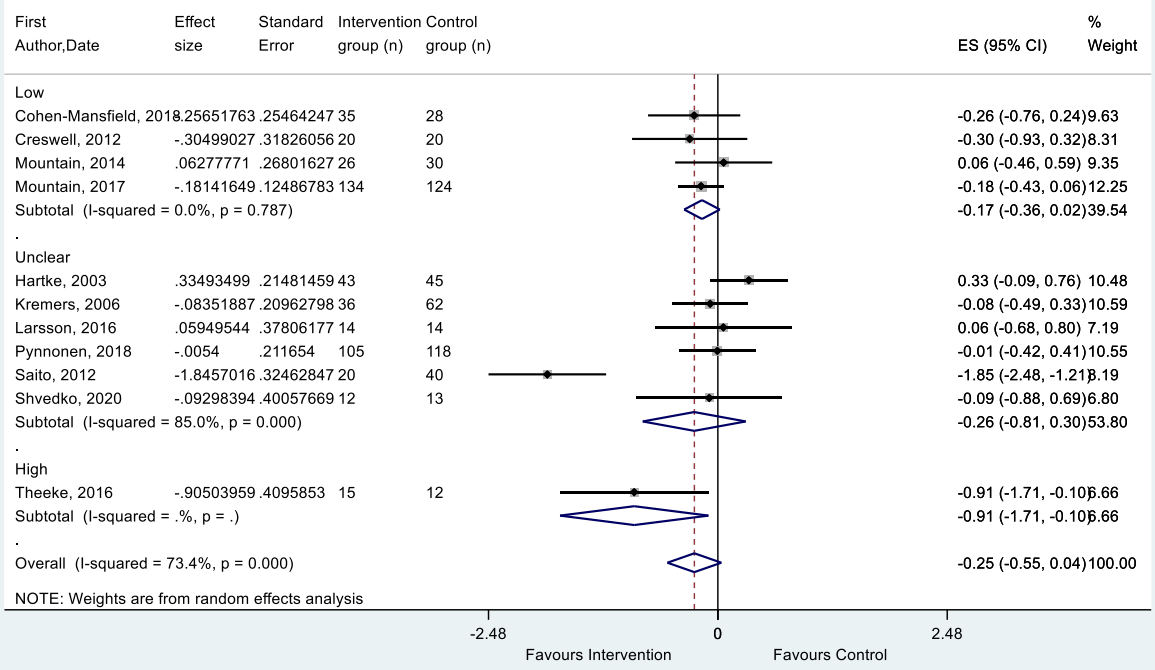


Figure 3. Forest plot of comparison: Effect of community based group interventions versus usual care on loneliness at follow up sub-grouped by intervention duration

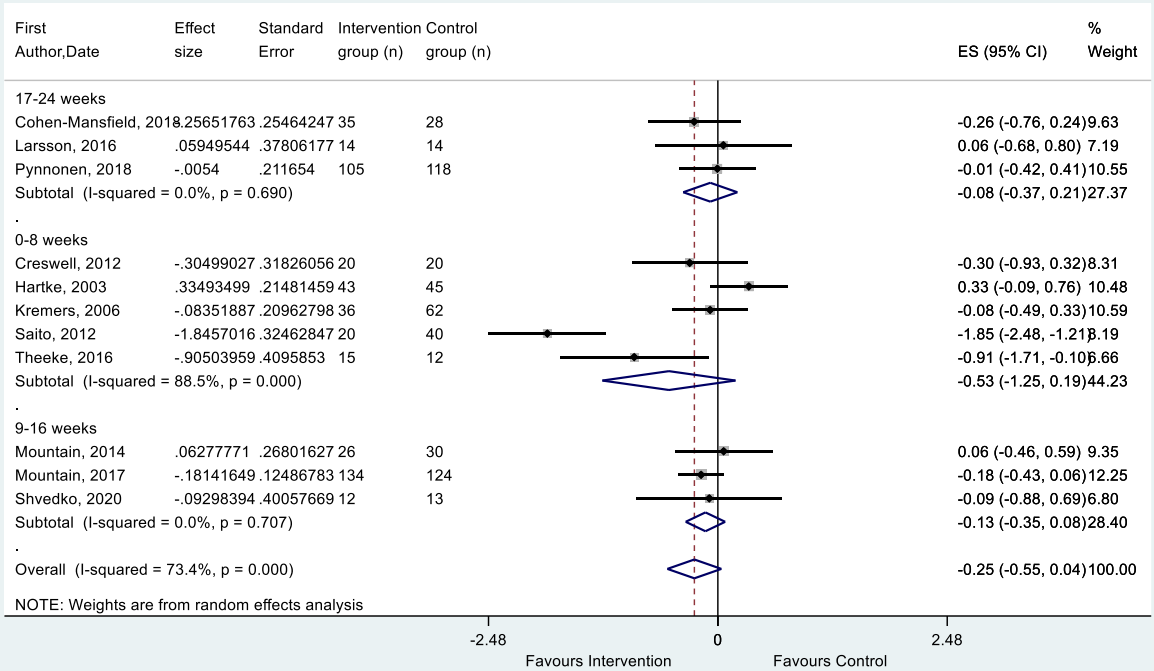


Figure 4. Forest plot of comparison: Effect of community based group interventions versus usual care on loneliness at follow up sub-grouped by gender

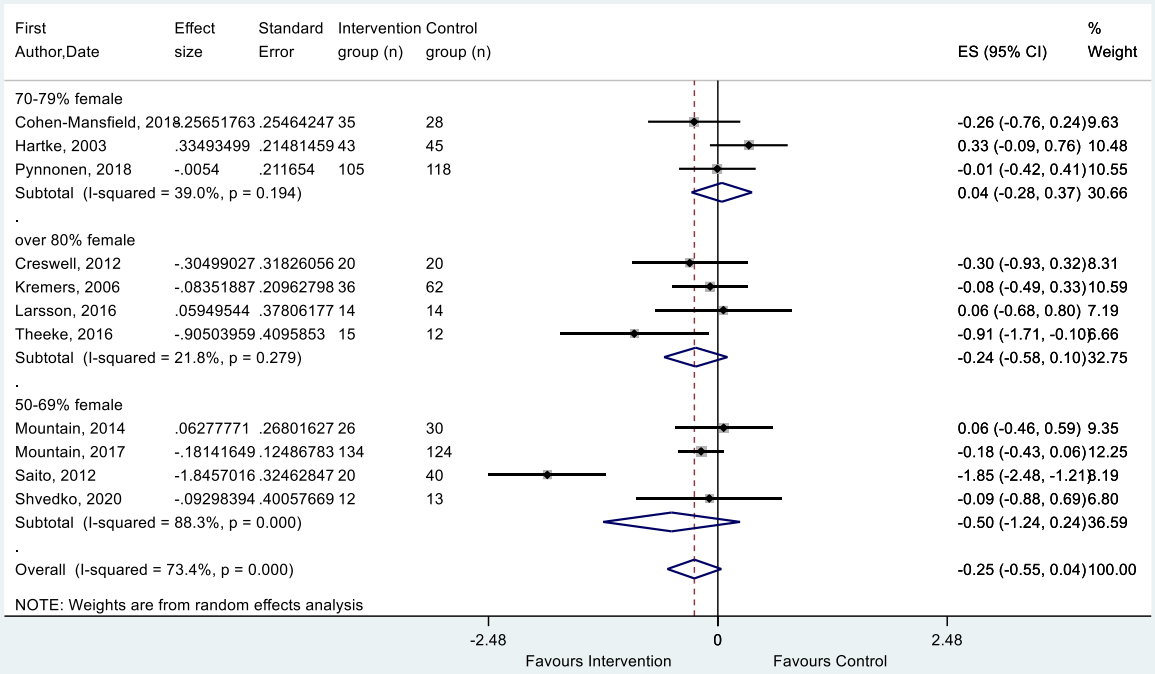
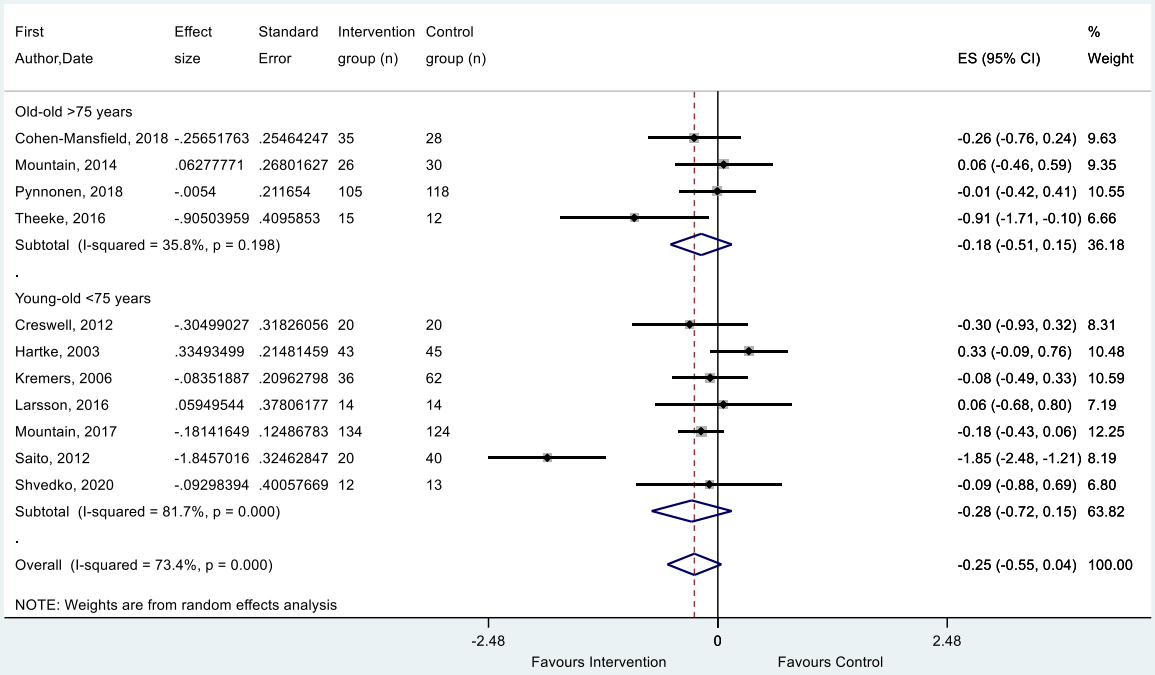


Figure 5. Forest plot of comparison: Effect of community based group interventions versus usual care on loneliness at follow up sub-grouped by Age group



Appendix 7.1 Description of included process evaluation studies

Andersson 1984 Included as process evaluation		
Methods	**Intervention study design:** Randomised control trial **Process evaluation methods:** statistical comparisons, interviews, diaries, written contributions, follow-up questions	
Participants	**Age Group**: Old-old : mean age 77 years **Gender**: Female only **Ethnicity**: not stated **Health status**: Subjects chosen from the lowest category of a 4-grade scale only to avoid those whose physical disabilities necessitate referral to an institution **Socioeconomic Status**: compared to control group, participants had high SES	
Interventions	**Intervention type**: Psychological therapies **Mode of delivery:** In person **Theoretical underpinning:** CCC design- Social comparison, personal control, availability of a confidant **Intervention description:** Participants met in groups of 3-5 people. The home help assistants were present during the first and the last meeting. Participants discussed the residential area in the first meeting, the role of the retiree in the second meeting and social and medical services in the third meeting. A summary of the first three meetings was provided, and possibilities for leisure activities discussed. The meetings were to form grounds for social comparison. For a sense of personal control, participants wrote down their views on the topics discussed, which were to be fed back to the leaders and administrators. The meetings provided an opportunity for finding a confidant.	
Outcomes	**Core processes evaluated**: Mechanisms, Context, Implementation The paper set out to explore reach and program fidelity and provided information on Attrition, Adherence, and Participant satisfaction.	
Notes	**Process evaluation category:** stand alone **Breadth and depth**: breadth and depth **Voice of participants given prominence:** featured but not sufficiently	
Quality Assessment	**Authors' judgement**	**Support for Judgement**
Transparent and Clearly Stated Aims	Low bias	Aim as stated was to describe a method for undertaking social work with the elderly and to examine how far the sample was representative

Explicit theories underpinning and/or literature review	Low bias	The rationale of the intervention based on the CCC model and concepts of loneliness.
Transparent and clearly stated methods and tools	Low bias	Two central questions for the process evaluation identified and the methods and tools used to address these questions described
Selective reporting	Low bias	The measures of interest stated in the introduction and aims section reported in results section
Harmful effects	Unclear bias	Some participants did not return after the first meeting but reasons behind this not reported..
Population and sample described well	Low bias	Recruitment of participants and how their chosen method of recruitment affected sample size discussed. Selected of intervention and control group explained
Continuous evaluation	Low bias	Participants interviewed before and, after allocation, after the intervention. And at follow up. The home help assistants kept diaries
Evaluation participation equity and sampling	Unclear bias	Participants and home help assistants involved in the evaluation. Data not weighted to account for imbalances
Reliability of findings and recommendations	Unclear bias	Enough data presented to show the authors arrived at their findings. They did not include quotes not included, only descriptive. Weighted estimates not provided
Transferability of findings	Low bias	Representativeness in their large sample discussed and characteristics of the sample provided. Enough information provided to identify barriers and facilitators.
Overall risk of bias of PE	Low bias	The study had a large sample size and multiple instruments used to collect data. Enough detail provided enough to be able to replicate the study. The views of most stakeholders included and factors that impacted on implementation considered.

Goedendorp 2017	
Methods	**Intervention study design:** Implementation study pre-test post-test

	Process evaluation methods: Questionnaire and descriptive statistics
Participants	**Age Group:** Young-old (mean age 66+/- 9.1) **Gender:** Female only **Ethnicity:** Not stated **Health status:** Participants scored 3.36 +/- 0.78 on the SF-36 general health **Socioeconomic Status:** Not stated
Interventions	**Intervention type**: Psychological therapies **Mode of delivery:** In person **Theoretical underpinning:** The Self-Management of Wellbeing theory **Intervention description:** The intervention is based on SMW theory which specifies six core self-management abilities assumed to be important for managing one's physical and social resources in such a way that physical and social well-being are achieved and maintained, and that losses in physical and social resources are managed optimally. All participants received a workbook with summaries of the sessions and homework exercises. The intervention consisted of six one-week interval group sessions of 21/2 hours with about ten participants
Outcomes	**Core processes evaluated**: Mechanisms, Context, Implementation The authors set out to explore barriers to adherence, reach and fidelity and they provided information on Dosage and Attrition)
Notes	**Process evaluation category:** Integrated **Breadth and depth**: breadth not depth **Voice of participants given prominence:** Featured but not sufficiently

Quality Assessment	Authors' judgement	Support for Judgement
Transparent and Clearly Stated Aims	Low bias	*The aim was to assess whether effects of the SMW intervention were comparable with the original randomized controlled trial (RCT) Furthermore, they investigated threats to effectiveness, such as participant adherence, group reached, and program fidelity*
Explicit theories underpinning and/or literature review	Low bias	*The intervention is based on SMW theory.*
Transparent and clearly stated methods and tools	Low bias	The methods and tools clearly described
Selective reporting	Low bias	*Self-management ability, Well-being, Loneliness, General health and a change in general health, Program fidelity, drop-out rates and attendance were measures of*

		interest and all were reported on. Table 2&4
Harmful effects	High bias	Not reported
Population and sample described well	Low bias	The participants characteristics were well described and compared to the RCT participants
Continuous evaluation	Unclear bias	Measures taken at pre- and post-intervention. There was no continuous evaluation
Evaluation participation equity and sampling	Unclear bias	Although the participants and the professionals who delivered the intervention were assessed, no steps taken to weight data
Reliability of findings and recommendations	Unclear bias	The findings were supported by the data which was tabulated and a summary of the problems as described by participants provided.
Transferability of findings	Low bias	Authors indicate that findings show that valid transfer of the SMW group intervention to practice settings is possible without loss of effectiveness
Overall risk of bias of PE	High bias	They describe things well but could have used multiple sources to collect data. Their use of self-report measures to report on fidelity, they didn't use independent assessor and not all teachers returned the attendance sheets plus the fact that there was missing post intervention data renders this as having a high risk of bias

Jansson 2018	
Methods	**Intervention study design:** Implementation study with post-test design **Process evaluation methods:** postal and electronic questionnaire
Participants	**Age Group:** Old-old **Gender:** Mixed (85% were women) **Ethnicity:** Not stated **Health status:** 72.6% of older people from taking part between 2014 and 2016 rated themselves as having good self- rated health. **Socioeconomic Status:** Not stated
Interventions	**Intervention type**: Psychosocial group intervention **Mode of delivery:** In person **Theoretical underpinning:** Circle of Friends (CoF) group model

	Intervention description: The main idea of the CoF group model is to enhance interaction among its group members, i.e. lonely older people. It encourages them to share their feelings, alleviates loneliness, and supports them in continuing their group meetings and interaction within the group without group facilitators. Since 2006, the CoF has been actively disseminated in Finnish municipalities by an organized CoF training program. Altogether 752 group facilitators have been trained so far, and over 8000 older people have participated in CoF groups in 80 municipalities around Finland
Outcomes	**Core processes evaluated**: Mechanisms, Context, Implementation The authors set out to explore how training influenced the success of the intervention. They provided information on adherence, Participant satisfaction)
Notes	**Process evaluation category:** Stand alone **Breadth and depth**: Breadth not depth **Voice of participants given prominence:** Featured but not sufficiently

Quality Assessment	Authors' judgement	Support for Judgement
Transparent and Clearly Stated Aims	Low bias	The study aims to explain how training succeeded in practice and to describe the outcomes of CoF implementation
Explicit theories underpinning and/or literature review	Low bias	The CoF is based on rigorous training of professionals and activating learning methods
Transparent and clearly stated methods and tools	Low bias	Methods and tools clearly described
Selective reporting	Low bias	Measures of interest reported on regardless of whether they were significant or not
Harmful effects	High bias	The don't report on harmful effects
Population and sample described well	Unclear bias	The sample described well and compared to the original RCT but they don't indicate how they were recruited for the interventions
Continuous evaluation	High bias	Questionnaires sent out to those who had participated in the CoF groups and sent to facilitators after they facilitated the group process
Evaluation participation equity and sampling	Unclear bias	No details included on how participants were recruited however, they sent questionnaires to both participants and facilitators

Reliability of findings and recommendations	Unclear bias	Enough information provided to show how they arrived at their conclusions. However, weighting not discussed
Transferability of findings	Low bias	Transferability discussed as a limitation
Overall risk of bias of PE	High bias	The study design didn't allow for pre intervention measures. Although the sample size was large, not everyone responded to the questionnaires. The questionnaire has pre-set questions and no qualitative element. They used a single measure question for loneliness

Theeke 2015	
Methods	Intervention study design: Randomised controlled trial Process evaluation methods: Written feedback from study personnel and quantitative and qualitative evaluation from participants.
Participants	Age Group : Young-old and old-old Mean age 75 (SD of 7.5) Gender: Mixed (24women and 3 men) Ethnicity: Not Stated Health status: participants had a UCLA Loneliness score of > 40, and were experiencing chronic illness Socioeconomic Status: Household income per year: 37% earned $0 - $20,000, 22% earned $20,001 - $30,000, 30% earned $30,001 - $50,000 and 11% earned $50,001+
Interventions	Intervention type: Psychological therapies Mode of delivery: In-person Theoretical underpinning: story theory and principles of cognitive restructuring which are foundational to cognitive behavioural therapy. Intervention description: 'LISTEN is a 5-session intervention that is delivered in 2-hour sessions over a sequential 5-week period with 1 session each week. The content for each session is guided by talking points that were determined from the literature on loneliness. The first session focuses on perceived belonging as the construct that matters most about loneliness to self. The second session focuses on relationships. The third session focuses on role of one-self in the community by encouraging participants to discuss ways that they "get out" or "stay in". Session 4 focuses on loneliness as a health challenge. Participants share ways that they meet the challenge of living with loneliness. During weeks 1 through 4, participants complete homework in preparation for the upcoming session. The fifth session is about establishing meaning in loneliness and identifying potential new solutions to loneliness as an individual health problem. During week 5, participants review progress made during weeks one through

	four and write messages for other people who might be experiencing loneliness' (Theeke et el 2015:3).
Outcomes	Core processes evaluated: Mechanisms, Context, Implementation. The authors sought to explore the feasibility and acceptability of the intervention. They provided information on Dosage, Attrition, Adherence, and Participant satisfaction.
Notes	Process evaluation category: Standalone Breadth and depth: breadth and depth Voice of participants given prominence: Sufficient coverage

Quality Assessment	Authors' judgement	Support for Judgement
Transparent and Clearly Stated Aims	Low bias	The purpose of this paper is to present the feasibility and acceptability of LISTEN intervention
Explicit theories underpinning and/or literature review	Low bias	Story theory and principles of cognitive restructuring which are foundational to cognitive behavioural therapy. The Medical Research Council (MRC) framework for developing complex interventions was used to guide the development of LISTEN
Transparent and clearly stated methods and tools	Unclear bias	Methods and tools were reported clearly. Although the modes of analysis could have been reported in more detail
Selective reporting	Low bias	They set out to report on the feasibility and acceptability of the intervention to reduce loneliness and did just that giving us the results of their qualitative and quantitative evaluation from the participants and from facilitators
Harmful effects	Low bias	One participant in the control group reported that the first session was boring to them.
Population and sample described well	Low bias	The sample was described well as was the recruitment process
Continuous evaluation	Low bias	Field notes were kept by the study team for each intervention session and were used by the study team to further consider participant response to the intervention.

Evaluation participation equity and sampling	Low bias	All participants provided feedback of the intervention. The views of the facilitators were also included through field notes
Reliability of findings and recommendations	Low bias	Enough data provided to show how authors arrived at their findings
Transferability of findings	Low bias	Authors acknowledge that sample was made up primarily of women. Most participants were from rural counties. Details on the barriers and facilitators of the intervention provided
Overall risk of bias of PE	Low bias	Although the mode of analysis was not explicitly mentioned, the study was well conducted and details were adequately reported.

Stewart 2001	
Methods	Included as process evaluation **Intervention study design:** pre-test, post-test, and delayed post-test within subjects design **Process evaluation methods:** participant diaries, leader field notes, and post intervention interviews
Participants	**Age Group :** Young-old **Gender :** Only Female (28 widowed **Ethnicity:** Not Stated **Health status:** Not stated **Socioeconomic Status:** Not Stated
Interventions	**Intervention type**: psychological therapies: support/self-help groups **Mode of delivery: in person** **Theoretical underpinning:** social learning theory **Intervention description:** Four face-to-face support groups for widowed seniors were conducted weekly for a maximum of 20 weeks. During the first meeting of the four support groups, widows were invited to discuss their priority needs and relevant issues. As group decision making was emphasized, widows selected discussion topics. If group members chose, discussion was augmented by guest lecturers, case studies, audio- visual aids, and role-playing exercises. Peer and professional leaders provided information resources requested by group members'

Outcomes	**Core processes evaluated**: Mechanisms, Context, Implementation. The authors provided information on Dosage, Attrition, Adherence. Participant satisfaction was garnered though semi-structured interviews
Notes	**Process evaluation category:** Integrated **Breadth and depth**: breadth not depth **Voice of participants given prominence:** Featured but not sufficiently. Participants kept diaries and were interviewed yet only one quote reported

Quality Assessment	Authors' judgement	Support for Judgement
Transparent and Clearly Stated Aims	Low bias	Aims were to rest impact of support group intervention on isolation, loneliness, positive and negative affect
Explicit theories underpinning and/or literature review	Low bias	In this study, a network of peers in support groups was created to enhance and supplement the depleted natural network of widowed seniors. The effects of stressors (for example, bereavement) on health outcomes can moderated by social support
Transparent and clearly stated methods and tools	Low bias	*They described the focus groups; post-test survey and the validated instruments used*
Selective reporting	High bias	The description of the focus group guide is not provided so we know little about what was asked and can't map this onto what was reported. Reasons why the group disbanded early not provided.
Harmful effects	Unclear	A group disbanded and reasons for this not reported
Population and sample described well	Low bias	The small sample was described well enough
Continuous evaluation	Low bias	Diaries used to capture the views of participants after each session.
Evaluation participation equity and sampling	Unclear	Participants and the facilitator's feedback taken into account. However, attempts to weight the data dot discussed
Reliability of findings and recommendations	Unclear	Some parts are clearly reported and reliable
Transferability of findings	Unclear	No information provided on the disbanded group but consideration given to other design aspects
Overall risk of bias of PE	Unclear	Sufficient description of processes but insufficient evaluation of processes

Appendix 7.2 Conceptual map with the full codes and categories that constitute narrative synthesis themes

Figure 1. Conceptual map with coding for barriers to implementation

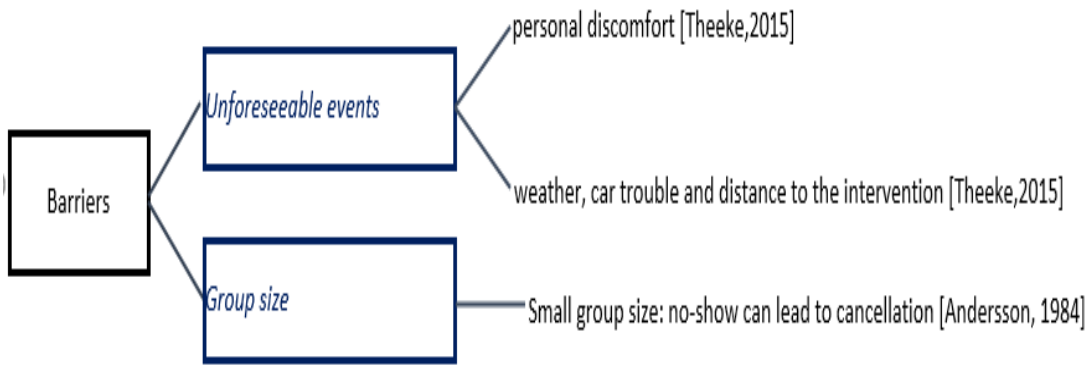

Barriers
Unforeseeable events
personal discomfort [Theeke,2015]
weather, car trouble and distance to the intervention [Theeke,2015]
Group size
Small group size: no-show can lead to cancellation [Andersson, 1984]

Figure 2. Conceptual map showing coding and categorisation for facilitators of intervention success

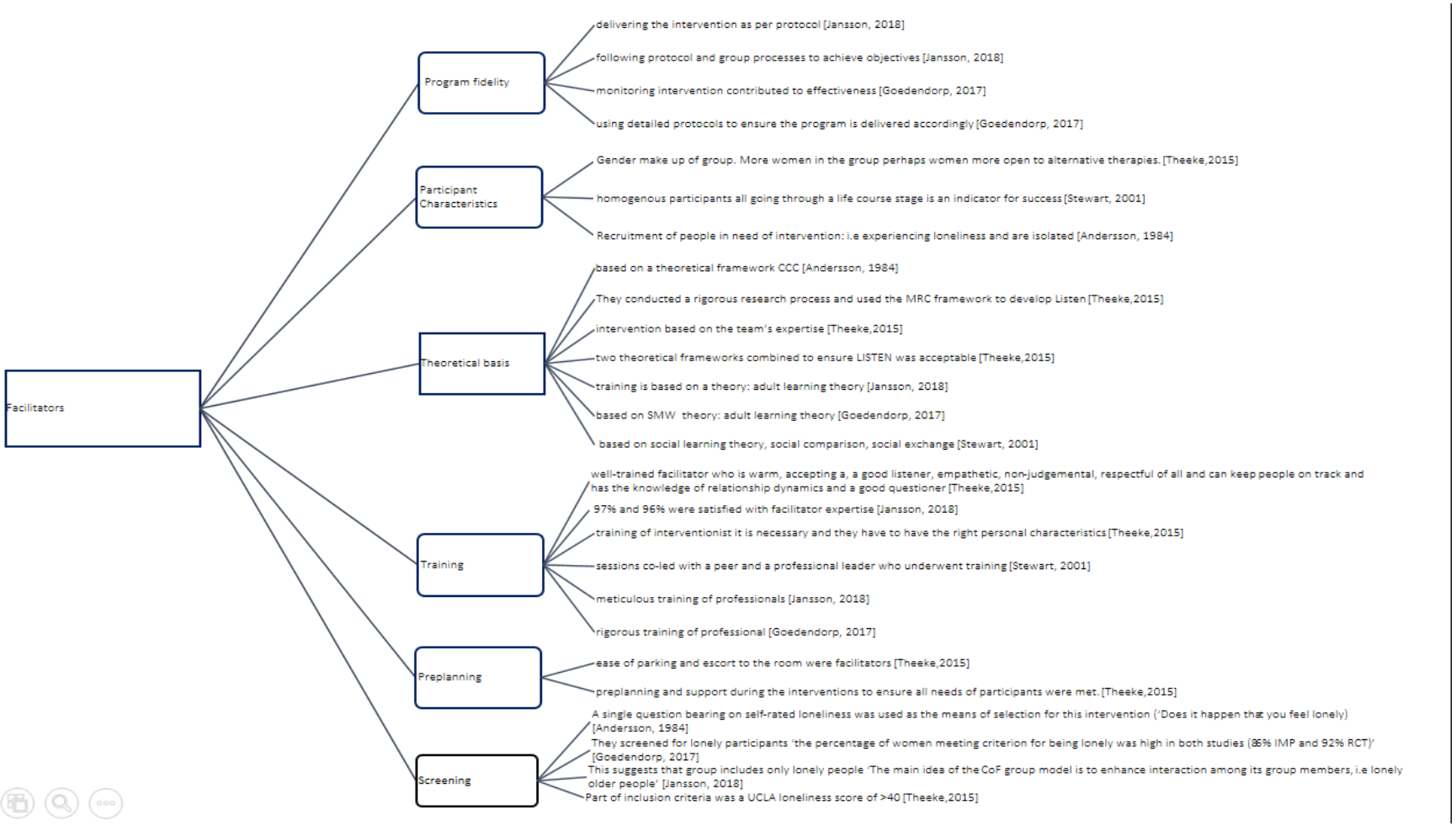
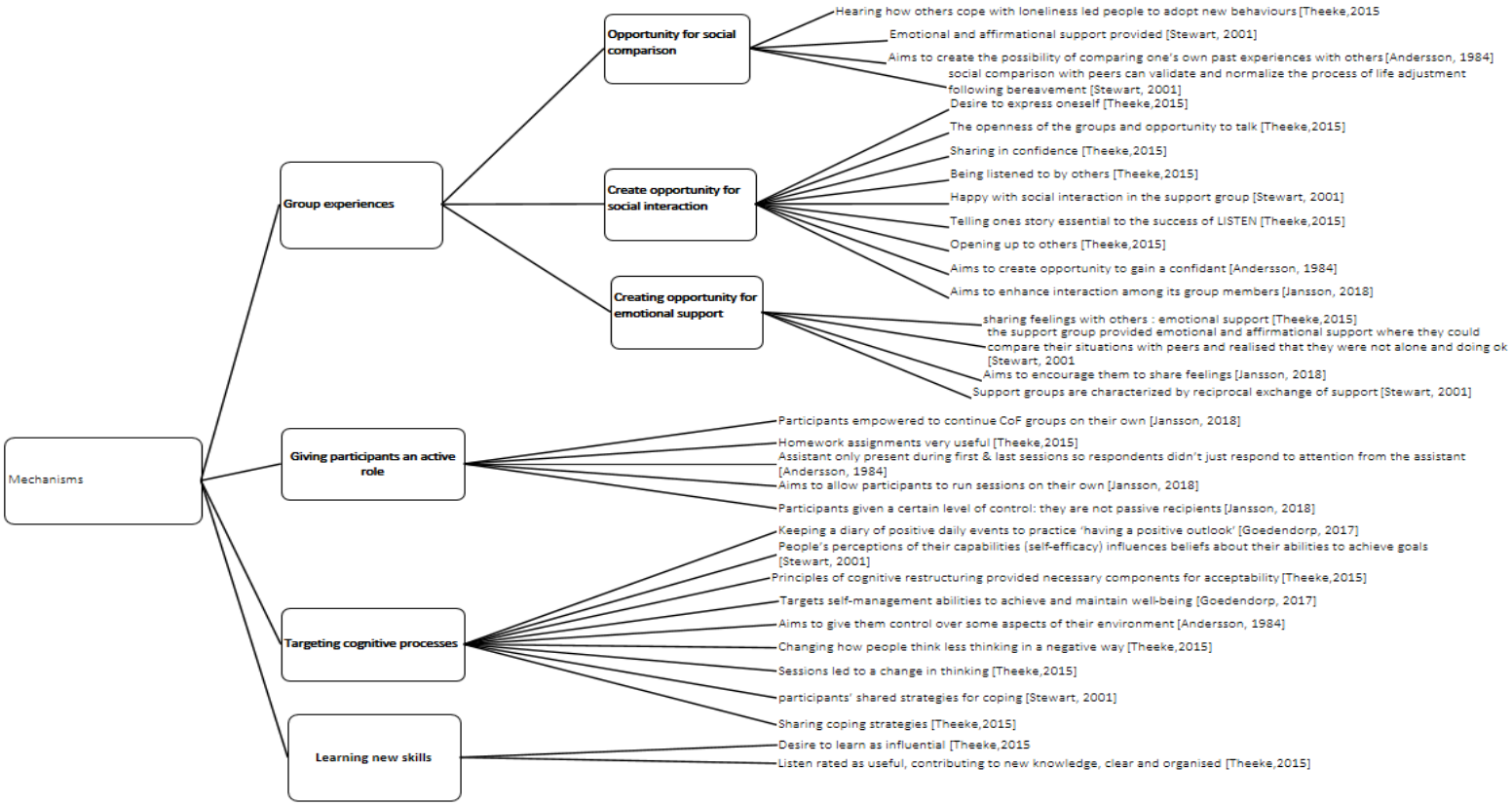


Figure 3. Conceptual map showing coding and categorisation for mechanisms leading to reductions in social isolation and loneliness



Appendix 7.3 Coding Scheme

1. Coding scheme for 'approaches to reducing loneliness'

Study	Effect Size	**Social skills training (improves participants' interpersonal communication skills)**	**enhancing social support (offers regular contacts, care, or companionship)**	**social access (increases opportunities for participants to engage in social interaction (e.g., online chat room or social activities)**	**social cognitive training (changing participants' social cognition)**
Saito 2012	-1.845701584	0	This was a group-based educational, cognitive, and social support program designed to prevent social isolation by improving community knowledge and networking with other participants and various community ''gatekeepers,'' who could make connections between the study participants and community services."	This was a group-based educational, cognitive, and social support program designed to prevent social isolation by improving community knowledge and networking with other participants and various community ''gatekeepers,'' who could make connections between the study participants and community services."	They say it is a cognitive approach but they don't really set out to address this, however, they recognise that change in social cognition happened through group interaction e.g. "The participants had plenty of opportunities to evaluate their relocation experiences by communicating with other participants during the program in a supportive atmosphere. It is possible that some participants began to accept their experience as a preferable

					one and evaluated the cognitive aspects of subjective well-being more positively" p.545
Theeke, 2016	-0.905039592	0	Based on the process evaluation, participants gave and received emotional support. This happened as a result of the change to share their experiences.	Some evidence that this happened when they were given chance to share their narratives of loneliness	Strong evidence of the intervention taking this approach
Creswell, 2012	-0.304990269	0	Some evidence? As it was not their intention but the group based format may have led to social support and social access "It is possible that observed changes in loneliness in MBSR vs. WL control could be explained by non-specific factors (e.g., social support, participant contact with an instructor). For example, it may be	Some evidence? As it was not their intention but the group based format may have led to social support and social access "It is possible that observed changes in loneliness in MBSR vs. WL control could be explained by non-specific factors (e.g., social support, participant contact with an instructor). For example, it may be	"One potential psychological pathway then, is that MBSR reduces psychological perceptions of social threat or distress, and reduced distress may decrease perceptions of loneliness. As the Buddhist Nun Pema Chodron suggests (opening quote), mindfulness meditation training can “turn our fearful patterns upside down”, reducing the distress that can accompany loneliness (Chodron, 2000)" or "This study provides a promising

			that the group-based format of MBSR classes is providing social support (and networking), and these social factors are reducing loneliness. However, it is unlikely that non-specific group support accounts for the observed decreases in loneliness in the MBSR condition, as prior randomized controlled trials have found that loneliness is not altered following administration of social support and social skills training (Masi et al., 2011). Moreover, when mindfulness	that the group-based format of MBSR classes is providing social support (and networking), and these social factors are reducing loneliness. However, it is unlikely that non-specific group support accounts for the observed decreases in loneliness in the MBSR condition, as prior randomized controlled trials have found that loneliness is not altered following administration of social support and social skills training (Masi et al., 2011). Moreover, when mindfulness meditation training is taught individually (i.e., not in a group-based	initial indication that the 8-week MBSR program may reduce perceptions of loneliness in older adults, which is a well-known risk factor for morbidity and mortality in aging populations (Hawkley and Cacioppo, 2010)."

			meditation training is taught individually (i.e., not in a group-based format) stress symptoms are reduced along with improvements in markers of physical health (Kabat-Zinn et al., 1998)."	format) stress symptoms are reduced along with improvements in markers of physical health (Kabat-Zinn et al., 1998)."	
Cohen-Mansfield 2018	-0.256517632	"up to seven group sessions of participants and the activities counselors were held in order to provide opportunities to increase social competence by practicing social skills within a protected setting" p70	up to ten individual meetings with an activities counselor, which focused on helping the person address personal barriers to social integration and included discussions concerning options for social contacts as well as using techniques and local resources to tackle the barriers (e.g., undertaking a mapping of social opportunities in the neighborhood using	"up to ten individual meetings with an activities counselor, which focused on helping the person address personal barriers to social integration and included discussions concerning options for social contacts as well as using techniques and local resources to tackle the barriers (e.g., undertaking a mapping of social opportunities in the neighborhood using resources from local	First, the intervention developed for this study, the Increasing Social Competence and social Integration of older Adults experiencing Loneliness (I-SOCIAL) intervention, is theory-based. It is grounded in the general framework of a Cognitive-Behavioral theoretical model, conceptualizing behaviors as resulting from the interaction between personal and environmental factors, as well as being

			resources from local governments and senior centers); p.70	governments and senior centers);" p.70 and "up to seven group sessions of participants and the activities counsellors were held in order to provide opportunities to increase social competence by practicing social skills within a protected setting" p70	based on the Model of Depression and Loneliness (MODEL), which identified specific barriers to social integration among lonely older individuals. p.70 (Cohen-Mansfield and Parpura-Gill, 2007)
Mountain, 2017	-0.181416488	0	The facilitators worked with the participants to explore the selected topic through discussion, activities and community enactment. The emphasis throughout was upon the identification of participants' goals, empowerment through sharing strengths and skills and providing support to enable them to practice new or neglected activities independently,	Social participation and involvement in meaningful activities can prevent mental ill-health in older adults.	0

			particularly in the community		
Shvedko, 2018,2020	-0.092983939	0	0	"The PAIL feasibility study is a 12-week intervention consisting of group walking and health educational/social interaction workshops performed once weekly for a duration of up to 90min per session" p.4	0
Kremers, 2006	-0.083518873	implied in their advert but not delivered Single communitydwelling women, 55 years of age and older, were asked to respond by phone if they missed having people around them, wished to have more friends, participated in very few	implied in the advert but not delivered "Single communitydwelling women, 55 years of age and older, were asked to respond by phone if they missed having people around them, wished to have more friends, participated in very few leisure activities, or had trouble in initiating activities. Eligible women received a	implied in their advert but not delivered	According to the SMW theory, the following six self-management abilities are important. Prerequisites in achieving and maintaining friends are the ability to take initiatives in making friends, and the ability to be self-efficacious with regard to one's own behaviour in making friends and being a friend. The maintenance of a friendship furthermore requires the ability to invest in the friendship, which again

		leisure activities, or had trouble in initiating activities	booklet containing information"		requires the ability to have a positive frame of mind with regard to this friendship in the future (necessary for investment behaviour).
Pynnonen 2018	-0.0054	0	Personal counselling meetings were held approximately every third week and each participant attended 4–5 meetings. The issues discussed in the meetings varied depending on what topics the participant considered important. Counselling was given when needed. ALSO Discussion on topics important to a participant, and counselling using a solution-focused method. Focus on listening, appreciation of the person's experiences	The basic idea behind the intervention was that by giving the participants a possibility to interact and by promoting social integration their loneliness would decrease.	Personal counselling meetings were held approximately every third week and each participant attended 4–5 meetings. The issues discussed in the meetings varied depending on what topics the participant considered important. Counselling was given when needed. ALSO Discussion on topics important to a participant, and counselling using a solution-focused method. Focus on listening, appreciation of the person's experiences and goals, person's responsibility for his or her own well being, and positive attitude and

			and goals, person's responsibility for his or her own well being, and positive attitude and coping skills of the participant.		coping skills of the participant.
Larsson, 2016	0.059495445	0	The focus of the intervention programme was to support individually adapted and goal-directed participation in SIBAs. The	The focus of the intervention programme was to support individually adapted and goal-directed participation in SIBAs	0
Mountain 2014	0.062777713	0	One-to-one calls aimed to familiarise the participant with the volunteer, conduct everyday conversation and prepare participants for the telephone friendship groups.	The aim of the group intervention was to help older people maintain good mental health by increasing the extent of their social networks	0
Hartke 2003	0.334934995	0	Finally, to augment the supportive nature of the intervention, participants were encouraged to have contacts with one another outside of the group meetings; Also In	Finally, to augment the supportive nature of the intervention, participants were encouraged to have contacts with one another outside of the group meetings; AND it happened naturally based	The intervention was tailored to the stress of providing care to a stroke survivor and concentrated on caregiver appraisals and mediating factors of skills and resources according to a stress and coping model

			their open-ended comments, participants noted that they felt free to express them selves and spoke “from the heart”....	on the group format "In their open-ended comments, participants noted that they felt free to express them selves and spoke “from the heart”...	

2. Coding scheme for 'program fidelity'

Study	Effect Size	**Monitoring facilitators**	**Training facilitators**	**Adherence to protocol**
Saito 2012	-1.845701584	0	0	0
Theeke, 2016	-0.905039592	"Recordings were reviewed by the study team after each session to monitor the fidelity to LISTEN."	Prior to the intervention study, all team members were trained to understand the study protocol, which was reviewed prior to enrolment of each cohort of patients	Prior to the intervention study, all team members were trained to understand the study protocol, which was reviewed prior to enrolment of each cohort of patients LISTEN integrates the key concepts from narrative therapy and cognitive behavioral therapy to offer the participants the opportunity to share a narrative of their personal experience of loneliness."
Creswell, 2012	-0.304990269	0	MBSR was administered by one of three trained clinicians over three cohorts	0
Cohen-Mansfield 2018	-0.256517632	During the intervention, they summarized the activities after each individual and group session and received at least one hour of supervision a week	the activities counsellors received training in motivational interviewing and in the principles of cognitive behavior therapy	0
Mountain, 2017	-0.181416488	A Trial Steering Group (TSC) and	"The facilitators were paid National Health Service (NHS)	"Adherence to the manualised intervention was assessed"

		independent Data Monitoring Committee (DMC) were appointed to monitor the quality and conduct of the study	or social care staff who were provided with training and supervised by qualified occupational therapists throughout"	
Shvedko, 2018,2020	-0.092983939	0	Group walking sessions will be run once weekly for up to 45 min each in small groups (up to eight to nine people per group) and delivered by a trained walk leader (i.e. level 3 certified personal trainer and a group exercise instructor).	0
Kremers, 2006	-0.083518873	0	0	0
Pynnonen 2018	-0.0054	0	0	0
Larsson, 2016	0.059495445	0	The occupational therapists had previous experience of working with older adults, and prior to the intervention, they attended a two-day course on how to apply the intervention programme.	0
Mountain 2014	0.062777713	0	6 weeks of short one-to-one telephone calls, followed by 12 weeks of group telephone calls	"A strength of our study is that volunteers received standardised training and delivered an intervention that is manualised and therefore more reproducible than

			with up to six participants, led by a trained volunteer facilitator;	most interventions intended to ameliorate social isolation or loneliness"
Hartke 2003	0.334934995	0	0	0

3. Coding scheme for 'intervention underpinning'

Study	Effect Size	Theoretical	Evidence from systematic review findings	Stand-alone interventions
Saito 2012	-1.845701584	0	Based on previous studies (Cattan et al., 2005; Findlay, 2003), we developed a group-based educational, cognitive, and social support program designed to prevent social isolation by improving community knowledge and networking with other participants and various community ''gatekeepers,'' who could make connections between the study participants and community services.	0
Theeke, 2016	-0.905039592	One recent meta-analysis of interventions suggested that effectiveness may be enhanced if interventions targeted common thought process errors that occur with loneliness [26], such as automatic thinking [27] or fears and phobias [28]. In response to this body of knowledge, we developed LISTEN, a novel intervention for loneliness	0	0

Creswell, 2012	-0.304990269	0	0	0
Cohen-Mansfield 2018	-0.256517632	First, the intervention developed for this study, the Increasing SOcial Competence and social Integration of older Adults experiencing Loneliness (I-SOCIAL) intervention, is theory-based	The current study addresses limitations of past studies in several ways"	The I-SOCIAL intervention is based on findings from Cohen-Mansfield and Parpura-Gill (2007), which highlighted the role of barriers in producing and maintaining loneliness in older persons
Mountain, 2017	-0.181416488	0	0	The aim of the study reported in this paper was to test whether an intervention modelled on Lifestyle Redesign and adapted for a UK population (Lifestyle Matters) could also demonstrate clinical and cost-effectiveness
Shvedko, 2018,2020	-0.092983939	0	The design and features of the PAIL intervention are based on the features of effective interventions that were obtained from a systematic review and meta-analysis of the "existing evidence conducted by Shvedko et al. [23]."	0
Kremers, 2006	-0.083518873	How does the proposed intervention differ from others? First of all, it is based on a theoretical framework, whereas most interventions lack such a basis.	"As Cattan and "White (cited in Findlay, 2003) argued, one of the criteria for effective interventions is that the evaluation fits the intervention and includes a process evaluation. Based on these	0

			considerations, a short theory-based group intervention was designed and evaluated in an RCT."	
Pynnonen 2018	-0.0054	0	Previous systematic reviews concluded that interventions that were effective in decreasing loneliness were typically conducted in a group setting, involved some form of educational or training input and social activity, and in which older people were active participants (Cattan, White, Bond, & Learmouth,2005; Dickens et al., 2011).	We designed our intervention based on studies that had obtained positive results, but we were not able to detect additional benefits with respect to loneliness, melancholy, and depressive symptoms beyond those achieved naturally over time.
Larsson, 2016	0.059495445	"The intervention programme (Larsson et al., 2013) was based on the client-centred approach described in the Occupational Therapy Intervention Process Model (OTIPM; Fisher, 2009)."	0	0
Mountain 2014	0.062777713	0	In particular, one review suggested that the most effective interventions were those conducted in a group with educational and/or supportive input [13]. As a result, the PLINY study was commissioned to establish whether a home-based intervention could improve or successfully maintain the mental wellbeing of older people living in the community with a focus upon	0

			those who are vulnerable and hard to reach.	
Hartke 2003	0.334934995	"The intervention was tailored to the stress of providing care to a stroke survivor and concentrated on caregiver appraisals and mediating factors of skills and resources according to a stress and coping model"	0	0

4. Coding scheme for 'participants in need'

Study	Effect Size	Target vulnerable populations(e.g. carers, bereaved, migrants)	Inclusion of those with health/cognitive impairments/mobility issues	Screen for high/moderate levels of loneliness
Saito 2012	-1.845701584	migrants "we assumed that the elderly people who experienced relocation within 2 years tended to be socially isolated"	0	0
Theeke, 2016	-0.905039592	"Chronically ill "4) They have been diagnosed with at least one chronic illness"	0	"They must have a minimum loneliness score of 40 on the revised 20-item UCLA Loneliness scale [40]."
Creswell, 2012	-0.304990269	0	0	0
Cohen-Mansfield 2018	-0.256517632	0	Our sample included persons with multiple physical, medical, financial, and personality limitations who were not provided with the needed support.	Inclusion criteria were (1) age 65 and above; (2) feeling lonely based on the questions of degree (moderate level and above) and frequency (several times a week and above) of loneliness on the screening questionnaire
Mountain, 2017	-0.181416488	0	0	0
Shvedko, 2018,2020	-0.092983939	0	0	"Inclusion criteria were (1) age 65 and above; (2) feeling lonely based on the questions of degree (moderate level and above)"

Kremers, 2006	-0.083518873	Single older women "Single communitydwelling women, 55 years of age and older, were asked to respond by phone if they missed having people around them, wished to have more friends, participated in very few leisure activities, or had trouble in initiating activities"	0	0
Pynnonen 2018	-0.0054	The Old-old .They targeted 75-79 year olds "The target population comprised of all the 75- to 79-year-old residents of Jyv€askyl€a, Central Finland, who were living in the city center area in August 2008 (N D 1167)."	0	Of the original target population of 1167 people, information on perceived loneliness and melancholy was obtained for 985 persons via phone screening. and loneliness was included in the inclusion criteria
Larsson, 2016	0.059495445	0	0	"The inclusion criteria were: (a) living in ordinary housing with no home care services, (b) aged 60 years old or older,(c) retired, (d) reporting experiences of loneliness, (e) reporting decreased social contacts and/or decreased participation in social activities,"
Mountain 2014	0.062777713	0	0	0
Hartke 2003	0.334934995	Caregivers "The stress of caregiving over time can result in emotional, physical, and social morbidities.1,2 Increased mortality, 3 social isolation,4 as well as a range of	0	0

		disruptive emotional states5,6 have all been reported."		

5. Coding scheme for use of one-to one sessions

Study	Effect Size	1-to-1 sessions prior to group intervention	1-to-1 sessions alongside group intervention	1-to-1 sessions instead of group intervention
Saito 2012	-1.845701584	0	"The third session was conducted to find out what information each participant was interested in and for meetings with gatekeepers who could support each participant based on their interests. We prepared seven small booths where participants could make face-to-face contact with each gatekeeper specializing in specific themes such as health and welfare issues, volunteering, and leisure activities for seniors in City A; history or historical places in City A; transportation and commercial facilities in City A; or the department in City A that provides information on activities" and support for the frail elderly.	0
Theeke, 2016	-0.905039592	0	0	0
Creswell, 2012	-0.304990269	0	0	0
Cohen-Mansfield 2018	-0.256517632	0	The participants chose whether to partake in the individual meetings, the group sessions, or both	The participants chose whether to partake in the individual meetings, the group sessions, or both

Mountain, 2017	-0.181416488	0	Participants met in a weekly group of up to 12 people over 4 months at a local venue. Participants were also asked to engage in monthly individual sessions with a facilitator	0
Shvedko, 2018,2020	-0.092983939	0	0	0
Kremers, 2006	-0.083518873	0	0	0
Pynnonen 2018	-0.0054	0	0	The participants randomized to the intervention group were allowed to select from three alternatives the intervention regime they thought would benefit them the most (Table 1). The exercise program was the most favored (n D 45) followed by personal counseling (n D 33) and the social activity program (n D 27).
Larsson, 2016	0.059495445	0	"The intervention programme combines individual and group meetings, including in-home support and remote support via the internet or telephone." and "The individual meetings are offered weekly, and the frequency and type of support (in home or remotely) are adapted to the participants' needs for support, and can therefore take place more frequently for some participants"	0
Mountain 2014	0.062777713	6 weeks of short one-to-one	0	0

		telephone calls, followed by 12 weeks of group telephone calls with up to six participants, led by a trained volunteer facilitator;		
Hartke 2003	0.334934995	0	0	0

6. Coding scheme for 'group cohesion'

Study	Effect Size	**Recruiting people with shared interest/background/identity**	**Creating opportunities for participants to bond and connect**
Saito 2012	-1.845701584	They targeted migrants who shared the experience of moving from one are to another.	There were group discussions and the way they structured their sessions allowed for group cohesion
Theeke, 2016	-0.905039592	Participants shared an Appalachian identity, experiences of loneliness and chronic illness	The format sequence and activities in the group helped to foster strong connections
Creswell, 2012	-0.304990269	Interest in MBSR - "Randomized participants (N=40) were healthy older adults (age 55-85 years; M= 65 SD= 7) recruited via newspaper advertisements from the Los Angeles area, who indicated an interest in learning mindfulness meditation techniques (a self-selected group)"	They went on a 7hour retreat so this may have been an opportunity to integrate what they had learned. This is evidence of giving them an opportunity to connect during the seven hour retreat
Cohen-Mansfield 2018	-0.256517632	interest in having additional company "(2) feeling lonely based on the questions of degree (moderate level and above) and frequency (several times a week and above) of loneliness on the screening questionnaire, as well as not participating in social activities and expressing at least moderate desire to have additional company"	in the group sessions, they were given the chance to practice and share solutions with each other which is strong evidence of trying to get them to connect . also there is some evidence of this in that they used the one to one sessions to address barriers to social integration so this may have helped them bond in the group sessions.
Mountain, 2017	-0.181416488	0	0
Shvedko, 2018,2020	-0.092983939	Shared experience of loneliness? They stipulate in the inclusion criteria that participants must be lonely "At risk of	During guided walking, the instructor will be acting as a facilitator of social contact by using in-session talks and friendly discussion between participants

		loneliness and having ≥ 6 out of 9 points on the three-item loneliness scale during the phone screening [39] (Additional file 3);"	to reduce psychosocial tension
Kremers, 2006	-0.083518873	some evidence as this group was not targeted enough "Single communitydwelling women, 55 years of age and older, were asked to respond by phone if they missed having people around them, wished to have more friends, participated in very few leisure activities, or had trouble in initiating activities. Eligible women received a booklet containing information"	0
Pynnonen 2018	-0.0054	weak evidence of shared national history owing to them all being 75-79 year old Fins? But perhaps not targeted enough as the demographic characteristics show a very diverse group	They report that all three interventions included social interaction which could have resulted in increased emotional support which in turn can enhance the experience of acceptance and belonging.
Larsson, 2016	0.059495445	0	0
Mountain 2014	0.062777713	0	0
Hartke 2003	0.334934995	The study addressed past criticism of poor specificity in caregiving research by targeting	The telephone hampered their efforts to promote group cohesion and intimacy

		older, spousal, stroke carers with a focused intervention and outcome measurements	

7. Coding scheme for 'adaptability'

Study	Effect Size	**different modes of interaction/adaptability**
Saito 2012	-1.845701584	Room to address personal circumstances "The third session was conducted to find out what information each participant was interested in and for meetings with gatekeepers who could support each participant based on their interests. We prepared seven small booths where participants could make face-to-face contact with each gatekeeper specializing in specific themes such as health and welfare issues, volunteering, and leisure activities for seniors in City A; history or historical places in City A; transportation and commercial facilities in City A; or the department in City A that provides information on activities and support for the frail elderly."
Theeke, 2016	-0.905039592	The fact that in the process evaluation notes that the intervention was designed to offer both self-help and mutual group help may be some evidence that the intervention was adaptable.
Creswell, 2012	-0.304990269	0

Cohen-Mansfield 2018	-0.256517632	The study is pioneering in its individualization of treatment options to the needs of the participants, as it is the first study that combines individual and group intervention options, and it allows the participants to choose based on what is acceptable to them p.73
Mountain, 2017	-0.181416488	participants were also asked to engage in monthly individual sessions with a facilitator. Session topics were either chosen from the manualised programme or new topics identified
Shvedko, 2018,2020	-0.092983939	0
Kremers, 2006	-0.083518873	The women were then asked to consider their own GLANS-plate and to 'self diagnose' their own situation: which aspects of the plate they missed, or would like to change or to work on.
Pynnonen 2018	-0.0054	The participants randomized to the intervention group were allowed to select from three alternatives the intervention regime they thought would benefit them the most
Larsson, 2016	0.059495445	The intervention programme combines individual and group meetings, including in-home support and remote support via the internet or telephone. Adapted to the needs of the participants and "The occupational therapists' ability to work in a client centred way, to tailor the intervention to the individual (that is, level of independence and time needed to learn)"
Mountain 2014	0.062777713	0
Hartke 2003	0.334934995	The original protocol called for in-person luncheons for the first and last meetings of each group. However, these in-person meetings became too difficult to schedule. consequently, almost all groups were conducted exclusively by telephone conference call initiated by the group facilitators over a period of approximately 8 weeks

Appendix 7.4 Additional Truth Tables

Model 2. Approach to loneliness

Table B below is a truth table based on the approach to loneliness theme with four conditions; Social skills training, Social support, Social access and Cognitive training each represented in a column of its own. These conditions were selected as they reflect the approaches used by other systematic reviewers to categorise loneliness interventions (Masi et al., 2011). With four identified conditions for this domain, the truth table below could potentially feature up to 16 possible different configurations (i.e. 2^4).

Table B. Approaches to loneliness truth table

Configuration (1= Present; 2=Absent)	Social skills training	Social support	Social access	Cognitive training	Outcome	No of cases in configuration	Consistency score	proportional reduction in inconsistency
A	1	1	1	1	1	1	1.000	1.000
B	0	1	1	1	0	3	0.778	0.714
C	0	0	0	1	0	2	0.663	0.598
D	0	0	1	0	0	3	0.564	0.239
E	0	1	1	0	0	2	0.333	0.145

A:Cohen-Mansfield 2018; **B:**Saito 2012,Theeke, 2016,Hartke 2003; **C:**Creswell, 2012,Kremers, 2006; **D:**Mountain, 2017,Shvedko, 2018,2020,Pynnonen 2018; **E:**Larsson, 2016,Mountain 2014

As can be seen in table B above, out of a possible 16 combinations, only five were presented. Given that there was only one successful configuration supported by only one case where all four conditions were present (Cohen-Mansfield et al., 2018), this model was deemed unhelpful in distinguishing between the effective, modestly effective or ineffective cases.

Model 3. Participants in need

This truth table examined whether conditions such as screening for levels of loneliness, inclusion of those with impairments (e.g. chronic illnesses, mobility issues) or those considered vulnerable (e.g. carers, migrants, single women living alone) resulted in a successful outcome (Table C). When discussing the limitations of their interventions, some interventionists noted that their samples included participants who may not have been in need of the intervention (Mountain et al., 2017; Stewart et al., 2001). As such the three conditions in this model were based on the strategies taken by some interventionists to interventionists to ensure that they were reaching participants who would benefit most from the intervention.

Table C. Participants in need truth table

Configuration (1=Present; 2=Absent)	Vulnerable populations	Inclusive of those with impairments	Screening	Outcome	No of cases in configuration	Consistency score	Proportional Reduction in inconsistency score
A	0	1	1	1	1	1.000	1.000
B	1	0	1	0	2	0.665	0.599
C	0	0	0	0	3	0.553	0.496
D	1	0	0	0	3	0.443	0.375
E	0	0	1	0	2	0.165	0.000

A:Cohen-Mansfield 2018**; B:**Theeke, 2016,Pynnonen 2018; **C:**Creswell, 2012,Mountain, 2017,Mountain 2014**; D:**Saito 2012,Kremers, 2006 ,Hartke 2003**; E:**Shvedko, 2018,2020,Larsson, 2016

As can be seen in Table C above, five out of the eight possible different configurations (i.e. 2^3), are reported. There is one successful configuration supported by one study (Cohen-Mansfield et al., 2018) in which two out of three

conditions were present. However, with such low coverage of the outcomes, further analysis was not considered.

Model 4. Program fidelity

The intervention component analysis revealed that for some interventionists, ensuring the intervention was delivered as designed was key to ensuring the effectiveness of the intervention (Mountain et al., 2014; Mountain et al., 2017). The truth table for the 'program fidelity' domain examined whether conditions such as training, monitoring and adherence to protocol triggered a successful outcome (Table D). The conditions were based on the different strategies used in the intervention to ensure that the interventions were delivered as intended. With three conditions, there are eight possible configurations (i.e. 2^3). Table D below displays the five configurations supported by cases. There is one successful outcome supported by one case (Cohen-Mansfield et al., 2018) with two out of three conditions present. This models also does not warrant further analysis given the low coverage of the outcomes.

Table D Program fidelity truth table

Configuration (1=Present; 2=Absent)	Monitoring facilitators	Training facilitators	Adherence to protocol	Outcome	No of cases in configuration	Consistency score	Proportional Reduction in inconsistency score
A	1	1	0	1	1	1.000	1.000
B	1	1	1	0	2	0.830	0.795
C	0	1	0	0	3	0.443	0.375
D	0	0	0	0	4	0.415	0.299
E	0	1	1	0	1	0.000	0.000

A:Cohen-Mansfield 2018; **B:** Theeke, 2016,Mountain, 2017; **C:**Creswell, 2012,Shvedko, 2018,2020,Larsson, 2016; **D:** Saito 2012,Kremers, 2006 ,Pynnonen 2018,Hartke 2003; **E:** Mountain 2014

Model 5. Intervention underpinnings

The truth table based on this model examined whether three conditions; if the interventions were based on theory, review findings, and/or past interventions) triggered successful outcomes (Table E). The conditions were informed by the basis of the interventions as reported by the authors in the introduction sections. In Table E below, seven out of the eight possible configurations are presented (i.e. 2^3). There were two successful configurations; one supported by one study in which all three conditions were absent (Creswell et al., 2012) and the other supported by one study with all three conditions present (Cohen-Mansfield et al., 2018). Given the limited number of cases supporting this outcome, a decision was made not to proceed with further analysis.

Table E Program fidelity truth table

Configuration (1=Present; 2=Absent)	Based on theory	Based on review findings	Based on past interventions	Outcome	No of cases in configuration	Consistency score	Proportional reduction in inconsistency
A	0	0	0	1	1	1.000	1.000
B	1	1	1	1	1	1.000	1.000
C	1	1	0	0	2	0.665	0.599
D	0	0	1	0	1	0.660	0.485
E	0	1	0	0	3	0.443	0.375
F	0	1	1	0	1	0.330	0.000
G	1	0	0	0	2	0.000	0.000

A:Creswell, 2012**; B:**Cohen-Mansfield 2018**; C:**Theeke, 2016,Kremers, 2006**; D:** Mountain, 2017**; E:**Saito 2012,Shvedko, 2018,2020,Mountain 2014**; F:**Pynnonen 2018**; G:**Larsson, 2016,Hartke 2003

Model 6. Use of one-to-one sessions

The truth table based on the 'use of one to one session' domain explored whether three conditions triggered a successful outcome; one-to-one sessions offered before, alongside, or instead of group sessions (Table F). The conditions were based on the different ways that interventionists used one-to-one sessions. As can be seen in Table F below, there are five out of eight possible configurations what are supported by the 11 cases. Only one configuration is successful. This configuration is supported by one study with two out of three conditions present (Cohen-Mansfield et al., 2018). Given the low coverage of outcomes, further analysis was not undertaken.

Table F. 'Use of one to one sessions' truth table

Configuration (1=Present; 2=Absent)	1to1 session prior to group sessions	1to1 sessions alongside group sessions	1to1 sessions instead of group sessions	Outcome	No of cases in configuration	Consistency score	Proportional reduction in inconsistency score
A	0	1	1	1	1	1.000	1.000
B	0	1	0	0	3	0.553	0.496
C	0	0	0	0	5	0.532	0.461
D	0	0	1	0	1	0.330	0.000
E	1	0	0	0	1	0.000	0.000

A:Cohen-Mansfield 2018**;B:**Saito 2012,Mountain, 2017,Larsson, 2016;**C:**Theeke, 2016,Creswell, 2012,Shvedko, 2018,2020,Kremers, 2006 ,Hartke 2003;**D:**Pynnonen 2018; **E:**Mountain 2014

Appendix 9.1 Matching recommendations to interventions

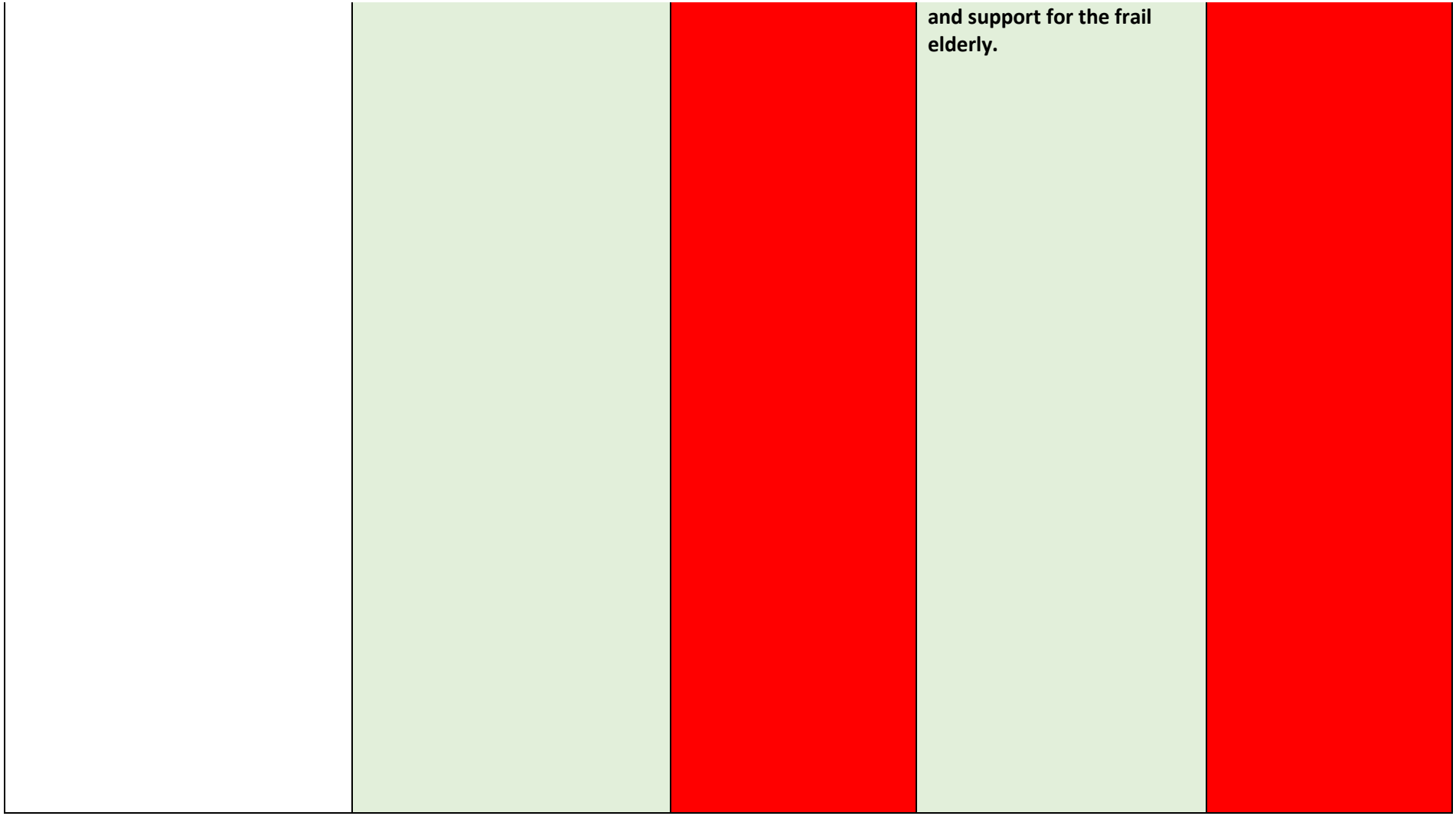
	Cohen-Mansfield et al., 2018	Creswell et al., 2012	Saito, Kai, & Takizawa, 2012	Theeke et al., 2016
Address wider societal barriers	**'local resources to tackle the barriers (e.g., undertaking a mapping of social opportunities in the neighborhood using resources from local governments and senior centers)'**	**x**	**x**	**x**

Avoid label suggestive of reliance & dependency when recruiting	**?We recruited 136 potential participants from many sources, including two local branches of a Health Maintenance Organization (HMO; 36 participants), calling people from a list of local older persons purchased from a commercial vendor (36 participants), local senior centers and university lectures open to the public (19 participants), persons referred from other studies or through other participants of this study (13 participants), responses to posters advertising the study (13 participants), referrals from the municipal social service agency (12 participants), and local residential buildings for older persons (7 participants)**	**? recruited via newspaper advertisements from the Los Angeles area, who indicated an interest in learning mindfulness meditation techniques (a self-selected group).**	**?A total of 999 senior citizens aged 65 years or over who had moved into City A within the last 2 years were selected from the Basic Resident Registration Cards. In July 2006, a recruiting letter and a consent form were sent to the 709 senior residents**	**?Participants were recruited through advertisement in a family primary care center, which was university based and serves as a multi-county area of rural and small urban communities. The study team also placed advertisements in local and regional newspapers.**

Mitigate costs incurred to socially participation	x	**"Participants were compensated up to $200 for participating in this study (part of this compensation was for the fMRI-related study activities)"**	x	**preplanning included parking accommodations that included an option of free valet parking**

Utilise naturally occurring groups	**'local resources to tackle the barriers (e.g., undertaking a mapping of social opportunities in the neighborhood using resources from local governments and senior centers)'**	**x**	**We prepared seven small booths where participants could make face-to-face contact with each gatekeeper specializing in specific themes such as health and welfare issues, volunteering, and leisure activities for seniors in City A; history or historical places in City A; transportation and commercial facilities in City A; or the department in City A that provides information on activities and support for the frail elderly. The findings of this study suggest that programs aimed at preventing social isolation are effective when they utilize existing community resources, are tailor-made based on the specific needs of the individual, and target people who can share similar experiences.**	**x**

Support to continue with current activities/roles	**The intervention included: (1) identifying the barriers for the specific person; (2) up to ten individual meetings with an activities counselor, which focused on helping the person address personal barriers to social integration and included discussions concerning options for social contacts as well as using techniques and local resources to tackle the barrier**	**x**	**The third session was conducted to find out what information each participant was interested in and for meetings with gatekeepers who could support each participant based on their interests. We prepared seven small booths where participants could make face-to-face contact with each gatekeeper specializing in specific themes such as health and welfare issues, volunteering, and leisure activities for seniors in City A; history or historical places in City A; transportation and commercial facilities in City A; or the department in City A that provides information on activities**	**x**


and support for the frail elderly.

Assign participants active roles	x	x	x	x

Be adaptable to participants needs	**"The study is pioneering in its individualization of treatment options to the needs of the participants, as it is the first study that combines individual and group intervention options, and it allows the participants to choose based on what is acceptable to them" p.73**	**x**	**room to address personal circumstances "The third session was conducted to find out what information each participant was interested in and for meetings with gatekeepers who could support each participant based on their interests. We prepared seven small booths where participants could make face-to-face contact with each gatekeeper specializing in specific themes such as health and welfare issues, volunteering, and leisure activities for seniors in City A; history or historical places in City A; transportation and commercial facilities in City A; or the department in City A that provides information on activities**	**The fact that in the process evaluation notes that the intervention was designed to offer both self-help and mutual group help may be some evidence that the intervention was adaptable. "This resulted in the decision that an intervention should target impaired thinking processes, be delivered in the group setting, and have the potential for both self-help and mutual group help with the possible benefit of befriending"**

Recruit participants who share similar characteristics	**interest in having additional company "(2) feeling lonely based on the questions of degree (moderate level and above) and frequency (several times a week and above) of loneliness on the screening questionnaire, as well as not participating in social activities and expressing at least moderate desire to have additional company"**	**Interest in MBSR - "Randomized participants (N=40) were healthy older adults (age 55-85 years; M= 65 SD= 7) recruited via newspaper advertisements from the Los Angeles area, who indicated an interest in learning mindfulness meditation techniques (a self-selected group)"**	**"The program participants in this study could share their common experiences of residential relocation, which helped reduce loneliness and/or improve subjective well-being. "They targeted migrants who shared the experience of moving from one are to another.**	**"Moreover, the participants were not assessed for being native to Appalachia. Given that Appalachian women identify strongly with their kin, this factor is also a limitation" and "They must have a minimum loneliness score of 40 on the revised 20-item UCLA Loneliness scale [40]. 3) Participants should be living in the community. 4) They have been diagnosed with at least one chronic illness" - Participants shared an Appalachian identity, experiences of loneliness and chronic illness**

Provide avenues for social interaction	**up to seven group sessions of participants and the activities counsellors were held in order to provide opportunities to increase social competence by practicing social skills within a protected setting, and as a venue to discuss barriers and ways to address them in the group sessions, they were given the chance to practice and share solutions with each other which is strong evidence of trying to get them to connect. Also there is some evidence of this in that they used the one to one sessions to address barriers to social integration so this may have helped them bond in the group sessions.**	**"The daylong seven-hour retreat during week six or seven of the MBSR intervention focused on integrating and elaborating on the exercises learned during the course." They went on a 7hour retreat so this may have been an opportunity to integrate what they had learned. This is evidence of giving them an opportunity to connect during the seven hour retreat**	**The second session was used for a focus group discussion about the effects of participants' relocation experiences on their lives. This activity aimed at making the participants aware of their own needs and, by sharing personal relocation experiences, to promote the formation of networks among the participants. 'There were group discussions and the way they structured their sessions allowed for group cohesion**	**The format sequence and activities in the group helped to foster strong connections 'LISTEN is the first group intervention designed to bring lonely people together to offer their narrative of loneliness in a therapeutic environment and in a sequenced way, aiming to facilitate cognitive restructuring.'**