**Predictors of Loneliness during Coronavirus-19**

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# Thesis Abstract

Paper One is a literature review of 11 studies. It reviews what is known about the relationship between resilience and loneliness during Covid-19. Ten studies reported a relationship between loneliness and resilience. There were discrepancies between how resilience was operationalized and defined. Some studies were limited by their cross-sectional design, narrow inclusion criteria and an inability to establish cause and effect. The potential implications for this are discussed.

Paper Two is an empirical study. This details a cross-sectional study, which explored the relationship between loneliness, resilience, social-isolation, video-call use and age, during Covid-19. A total of 262 participants were recruited. Participants completed three validated questionnaires online, as well as questions regarding their video-call use. A multiple regression was used to analyse the data. The results indicated that there was a relationship between loneliness, social-isolation and resilience. Video-call use and age did not predict loneliness. The findings suggest that both social support and resilience may act as a protective factor for loneliness; however, neither account for loneliness fully, so other factors should continue to be researched.

Paper Three is an executive summary of the empirical research project. It is written to be accessible to participants who originally took part in the study. The background, method, results and recommendations are outlined.

# Paper one: literature review

**What is known about the relationship between loneliness and resilience during Covid-19?**

**Target Journal**: Personality and Individual Differences

This paper has been presented in the format that is required for publications in the target journal ‘Personality and Individual Differences’ (Appendix A). Further formatting will be carried out before submission. The referencing style used was APA 7th Edition.

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# 

# Abstract

The aim of this literature review was to explore what is known about the relationship between resilience and loneliness, during Covid-19. The Academy of Medical Sciences interviewed 3288 members of the UK general-population, about the effect of lockdown on their mental health. A prevalent theme was that people were worried about the effects of social-isolation and loneliness on their mental health. There are many risk factors associated with being lonely; these include, anxiety, low mood, suicide, self-harm, heart disease and stroke. Multiple reviews have suggested resilience may protect against negative outcomes such as loneliness and mental health difficulties. One way of reducing loneliness may be through resilience interventions. Alternatively, loneliness may be independent of resilience, and thus alternative interventions may be more effective. Qualitative and Quantitative papers were included for review. The results yielded 140 articles, 11 of which were eligible for inclusion. Results indicated a relationship between resilience and loneliness. However, the studies used narrow inclusion criteria, therefore generalising the findings to a broader population is problematic.

# Introduction

In March 2020, the United Kingdom (UK) government published guidelines, including a national lockdown, physical distancing, and quarantining; all of which may have costs to peoples mental health and the economy (McQuad et al., 2021). A nationwide lockdown was introduced to ease the spread of Covid-19, these guidelines included isolating from others, potentially resulting in multiple mental health outcomes, such as low mood, anxiety and loneliness (Cowan et al., 2020). Additionally, past national outbreaks such as SARS (Severe Acute Respiratory Syndrome), have used national lockdowns; and in a review between 2003- 2004, negative psychosocial outcomes such as anxiety, low mood and loneliness were associated with SARS outbreaks (Rohr et al., 2020).

Furthermore, the Academy of Medical Sciences (AMS) (2020) interviewed 2189 stakeholders and 1099 members of the UK general-population, about the lockdown and their mental health. A prevalent theme was people were worried about the effects of social-isolation and loneliness on their mental health. They called for the need to develop a clear strategy to help people cope with isolation, and services to support people with this.

## 1.2 What is loneliness?

Although at face value the term loneliness and social-isolation seem interchangeable, research has suggested they are two distinct constructs (Valtorta et al., 2016). Social-isolation has been defined in the literature as the objective state of being alone (for example, living alone, not having an active social life etc); whilst loneliness has been defined as the subjective appraisal of the difference between desired relationships vs actual relationships (Holt-Lundstat, 2015). Hawkley and Cacioppo, (2010) state that the quality of relationships is much more meaningful than the quantity; however, often research is conducted within individualistic societies which emphasize independence.

There are numerous theories of loneliness, including evolutionary theory and attachment theory. Evolutionary perspectives posits humans have evolved to rely on others for survival. Feeling lonely motivates individuals to seek social support, and develop meaningful relationships; ensuring survival of the group through relying on others for food, social support and shelter- it is an adaptive response to genetic advancement (Cacioppo et al., 2014).

Alternatively, attachment theory (Bowlby, 1969) suggests the way people respond to people and situations in the world is due to earlier interactions between the child and parent figure. If a parent is responsive and consistent it is likely they may develop a secure attachment style; however, if they are not then the child may be insecurely attached (anxious, avoidant or disorganized attachment style). Erozkan (2011) found that those who are insecurely attached were more likely to be lonely, potentially due to difficulties relating to others. However, this theory dismisses the importance of other attachment figures (Harris, 1998).

## 1.3 Loneliness risk factors

In 2017, a UK commissioned study found around 14% (around 9 million) of the UK population experienced loneliness. Moreover, a study by the British Mental Health Foundation (2010) reported those aged 18-35 were most likely to report feeling lonely. One potential explanation for these findings, is those aged 18-35 are more likely to communicate online and use social media. This has been demonstrated to increase feelings of loneliness, due to the difference between others portrayed life online and the viewer’s life (Pittman et al., 2016).

There are many risk factors associated with being lonely; which include, anxiety, low mood, suicide, self-harm, heart disease and stroke (Elovainio et al., 2017; Turecki et al., 2019; Valtorta et al., 2016). Research by the Co-op and New Economics Foundation estimated the cost of loneliness to private sector employers being up to £2.5 billion (Michaelson et al., 2017).

In a meta-analysis investigating effective interventions for loneliness, those which increase social-cognition (such as Cognitive Behavioral Therapy) produced moderate-large effect sizes (Masi, 2011). Additionally, interventions which increase resilience may also be an effective method of reducing loneliness (Barzilay et al., 2020).

## 1.4 Models of resilience

Resilience is defined as a successful adaptive process in response to threatening, stressful, or traumatic adverse experiences; or the ability to bounce back from difficult life conditions, which enables a person to use adaptive coping strategies (Hildon et al., 2010; Kilgore et al.,2020) .

There are several theories of resilience, which include, resilience as a trait (ie hardiness); resilience as a process (adaptation); and resilience as an outcome (the absence of stress after adverse life events). Several factors can influence the development of resilience: (A) Personal resources, which include openness and self-efficacy (Joseph et al., 2006). (B) Biological influences, for instance earlier aversive experiences can result in changes to several areas of the brain which have been linked to resilience (Curtis et al., 2003). (C) Systemic factors, for example, social support, secure attachment in childhood, positive family and peer relationships (D) Microsystems structures such as good schools, lack of exposure to violence and cultural factors have also been attributed to strong resilience (Luther et al., 2000; Luther et al., 2001). It is likely an interaction between all of these factors is best used to understand individual experiences of resilience (Hermann et al., 2011).

There is research that resilience may protect against reduced mortality rate, ill-health, anxiety and mental health difficulties (Chen and Zeng, 2010; Mehta et al., 2008; Nygren et al., 2005; Windle et al., 2011). Additionally, some research has suggested it is linked to greater self-regulation, which is associated with greater self-efficacy, better adaption to physical-health conditions, greater life-satisfaction, and the use of proactive coping and adaption (Davis et al., 2007; Neri, 2006). A review of seventeen studies aimed at improving resilience, including 11 RCTS (randomised control trials), found a mixture of CBT and mindfulness can be used to improve resilience and other mental health outcomes (Joyce et al., 2018).

## 1.5 Resilience and loneliness during Covid-19

In August 2020, in the USA, (eight months after Covid-19 was first detected and reported in the USA), Kilgore et al. (2020) found psychological resilience was much lower for their sample, than had been reported previously. Additionally, they reported higher levels of mental health difficulties, such as loneliness, low mood and anxiety. Multiple reviews have suggested resilience may protect against negative outcomes such as loneliness and mental health difficulties (Kilgore et al., 2020; Barzilay et al., 2020). Resilience interventions could be effective for reducing loneliness, alternatively loneliness may be independent of resilience, and thus other interventions may be more effective.

# 2.1 Literature review

The aim of this review is to explore what is known thus far about the relationship between resilience and loneliness, during Covid-19. This will be assessed by conducting a literature review of current research on loneliness and resilience during Covid-19. The results from this will then be synthesised. The importance of assessing this is to gain more understanding about the individual’s experience of loneliness, Covid-19 and coping/resilience; which may guide clinical practice. By determining who is more likely to be lonely, and if having higher levels of resilience reduces loneliness, interventions and strategies can be recommended effectively.

# 3.1 Method

## 3.2 Scoping Searches

A scoping review was initially conducted on loneliness during Covid-19. This highlighted gaps in the literature, and established the quantity of existing literature on loneliness and Covid-19, which determined the viability of the review (Booth et al., 2018). Psych articles, Google Scholar and Staffordshire University databases were used to conduct a preliminary search for literature on loneliness and resilience in the context of Covid-19. This revealed reviews had been conducted on loneliness during Covid-19 in older people (Bhunti & Greenwood, 2021). At the time of the scoping search, there were no reviews investigating the relationship between loneliness and resilience during Covid-19, but several studies investigating this link. Once the scoping search was performed, a further literature review on the relationship between loneliness and resilience was conducted in May 2021.

## 3.3 Search Strategy

***Databases***

A further search on Scopus was conducted, along with the following databases: MEDLINE, CINAHL Plus with Full Text, SPORTDiscs with Full Text, eBook Collection (EBSCOhost), PsycINFO, PsycARTICLES. Both title and abstract searches were undertaken.

The search terms used were ‘’lonel\*’’ AND ‘’resilien\*’’ AND ‘’covid\* OR coronavirus\* OR lockdown\* OR pandemic\* OR Sars\*’’.

The term lonel\* was used, rather than social-isolation or isolated, due to literature suggesting the two are separate entities, therefore, this literature review targeted a search for literature on ‘loneliness’

***Inclusion Criteria:***

* Loneliness or resilience being measured, qualitatively or quantitatively
* Participants above the age of 18

***Exclusion Criteria:***

* Articles not in English, as the researcher did not have the resources to get these articles translated
* Any article which did not look at the relationship between resilience and loneliness (for example, they reported the individual means, but did not suggest what this meant about the relationship).

## 3.4 Publication bias

It is important to consider the role of publication bias when conducting a systematic review. It is more likely that a peer reviewed journal will include a statistically significant result than a non-significant result. This means research in journals may not be representative of all the research conducted. Additionally, publications may ignore research which is not in their language, grey literature and research which contradicts their hypothesis.

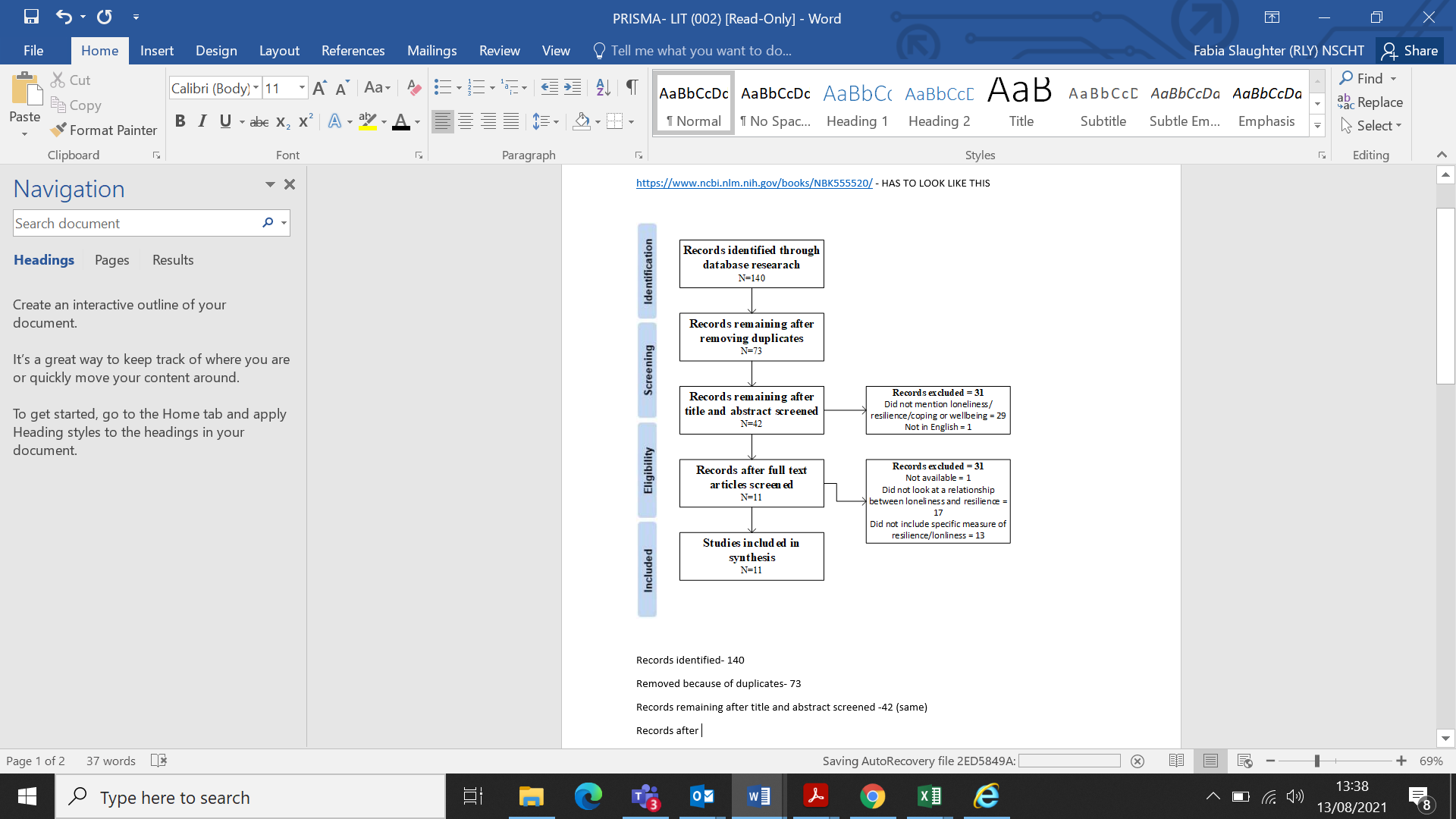
## 3.5 Overview of the Search

The search results and selection process are detailed in figure 1.

140 articles were found initially, which reduced to 73 when duplicates were removed. 31 records were then excluded, based on abstract and title only, and 29 were excluded due to not mentioning loneliness/ resilience in the abstract/ title. One article was not in English, so was excluded. The remaining articles were screened, 31 items were excluded, one paper was not available; 16 did not comment on the relationship between resilience and loneliness (rather commenting on the means of loneliness and resilience separately, but not how these influenced each other); 13 articles did not measure resilience AND loneliness. 11 articles were then included in the final analysis.

**Figure 1**

*PRISMA flow chart of the search strategy*



## 

## 3.6 Quality Appraisal Tool

A data extraction table was used to record the aims, location, participants, methodology, limitations and CCAT score of the papers included (Table 1). The Crowe Critical Appraisal Tool v1.4 (CCAT) was used, due to the research papers utilising different research designs (Crowe, 2013; Crowe & Sheppard, 2011). The CCAT is a validated quality assessment tool used in various research designs (Crowe, 2013). Critically appraising research papers is important to help the reader ascertain a study’s value (Yardley, 2000). The CCAT contains eight subsections, worth five points each, with a total score of 40. A higher score suggests a better quality of research.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Table 1** *Data Extraction Table* | | | | | | | | |
| **Author, Year & Title** | **Country & Setting** | **Aims** | **Participants** | **Methodology** | **Analysis** | **Findings** | **CCAT Score** | **Limitations** |
| Carbone et al., 2021  Caring for people with dementia under COVID-19 restrictions: A pilot study on family caregivers | Italy | To study the relationship between caregivers rating of Behavioural and Psychological Symptoms of Dementia and own distress. | N=34  Carers of a person with dementia. The person with dementia had been seen in the institution for 18 months prior to Covid-19 | Pre-test, Post-test  Social and emotional loneliness scale  CD\_RISC-10 | Spearman’s correlation | Significant moderate correlations emerged on the neuropsychiatric inventory and emotional, social loneliness and resilience. Resilience and loneliness were not correlated. | 31 (78%) | Small sample size  Limited diversity |
| Conrad et al., 2021  College student mental health risks during the COVID-19 pandemic: Implications of campus relocation. | USA | Investigate psychological experiences and relocation in university students | N=791  Female=82%  Mean age=23 | Cross-sectional UCLA  CD-RISC-10 | Linear regression | Those with higher levels of psychological resilience were less likely to report loneliness | 30 (75%) | Uneven Gender split  Larger proportion of Asian respondents than typically seen in US university |
| Farewell et al., 2020  A Mixed-Methods Pilot Study of Perinatal  Risk and Resilience During COVID-19 | Colorado  . | Assess how perinatal mothers cope during Covid-19 | N=30  Age 18+,  Perinatal or within the first 6-months postpartum | Cross-sectional  BRS  3-item Loneliness Scale | Constant comparative method, quantitative questionnaire | Mothers felt more lonely as a result of Covid-19 and like they had less resources to cope. Parents felt having a partners support, was a great source of resilience. | 32 (80%) | Minimal diversity  Bias sample due to being recruited exclusively online |
| Gossman et al., 2020  COVID-19 related loneliness and sleep problems in older adults: Worries and resilience as potential moderators | Isreal | Examine if resilience moderates the relationship between loneliness and sleep problems | N=243,  Age- 60-92 Recruited online | Cross-sectional UCLA-3  CD-RISC | Pearson and Spearman coefficients  Hierarchal regressions | The loneliness-sleep association was stronger for those with low resilience | 30 (75%) | Unequal gender split  64% rated health and economic status as good/very good  Online recruitment- not all populations may have access to digital methods |
| Muller et al., 2020  Social-isolation and Loneliness during  COVID-19 Lockdown: Associations with Depressive Symptoms in the German Old-Age Population. | Germany-. | To assess the effect of loneliness and social-isolation on depressive symptoms, whilst looking at the effects of resilience. | 65+  N=1005 | Cross-sectional  UCLA-3  BRS | One way ANOVA  Multivariate regression models | Resilience score higher in non-lonely individuals | 37 (93%) | Confounding variables (ie physical health issues, previous psychiatric issues).  Cross-sectional design |
| Padmanabhanunni & Pretorius., 2021a  The Loneliness-Life-satisfaction Relationship: The Parallel and Serial Mediating Role of Hopelessness, Depression and Ego-Resilience among Young Adults in South Africa during COVID-19. | South Africa | Investigate the role of ego-resilience, hopelessness and depression in the loneliness-life-satisfaction relationship. | N=337  Undergraduates (mean age =21) | Cross-sectional UCLA  Ego Resilience | Structural equation model | Higher ego resilience was associated with lower levels of loneliness | 31 (78%) | Undergraduate students  Limited diversity |
| Padmanabhanunni & Pretorius., 2021b  The unbearable loneliness of COVID-19: COVID-19-related correlates of loneliness in South Africa in young adults. | South Africa | Explore social loneliness in young South African adults. | N=340  Female =77%  Mean age=22 | Cross-sectional  UCLA  Three resilience items (adapted from Smith et al., 2005) | Regression, correlation | Loneliness was moderately negatively related to resilience (r=-.25, p<0.001), even when Covid-19 variables were controlled for.  Loneliness scores were higher than any published data to date | 32 (80%) | No validated resilience measure |
| Rohr et al., 2020  Mental wellbeing in the German old age population largely unaltered during COVID-19 lockdown: results of a representative survey. | Germany | Investigate mental wellbeing, social factors and resilience in an older population. | N=1005  65+ | Cross-sectional  UCLA-3  BRS | Linear regression | No relationship between loneliness and social/emotional loneliness. | 37 (93%) | Recruited by telephone- only had a 54% response rate |
| Sams et al. 2021  Understanding Psychological  Distress and Protective Factors  Amongst Older Adults During the COVID-19 Pandemic | USA | Understand emotional difficulties, loneliness,  and resilience among older adults | N=501  Female= (66.3%), college educated (80.6%), White (75.0%)  Age- 60+ | Cross-sectional  UCLA-3  CD\_RISC | Logistic regression | Lower levels of resilience were associated with being lonely (t(191.3) = 7.60, p < 0.0001) | 32 (80%) | Recruited exclusively online- not representative of those who do not use online resources |
| Slyvia et al., 2021  Moderators of a resiliency group intervention for frontline clinicians during the COVID-19 pandemic | The Mass General Brigham (MGB) hospital | Assess the feasibility, and efficacy of a resilience group for frontline clinicians. | N=100  Frontline workers | Intervention  UCLA  CES | Paired sample t-tests, Cohen's D | Loneliness reduced from 3.1 to 2.7, (p<0.01), d=0.44, resiliency went from 6.3 to 7.5 (p<0.01), d=0.56 | 20 (50%) | Limited gender diversity  Attrition rate= 47 people  Only 64% of the sample completed more than 6 sessions |
| Valiente et al. 2021  A symptom-based definition of resilience in times  of pandemics: patterns of psychological responses  over time and their predictors | Spain | Provide validation for measuring resilience as an absence of numerous negative emotions, identify patterns of response (resilient, recovered, sustained distress, delayed) | N=1628 (82% compliance at T1 and T2).  Stratified Quota sampling used | Pre-test-post-test  UCLA-3  BRS | 4 × 2 repeated-measures ANOVA,  Multimodal regression | Significant difference in loneliness between the resilient group and those who belonged to the groups: recovered, delayed or sustained distress . | 31 (78%) | BRS did not predict their resilience category.  No baseline of prior mental health |
| *Note:* Loneliness Measures: UCLA (Russell, 1996); UCLA-3 (Hughes et al., 2004); Social and Emotional Loneliness Scale (De Jong and Van Tilburg, 2006)  Resilience Measures: The Connor-Davidson Resilience Scale, CD\_RISC 10 (Connor & Davidson, 2003); Brief Resilience scale-BRS (Smith et al., 2008); Ego resilience scale (Block and Block 1980) | | | | | | | | |

# 4.1 Results

## 4.2 Critical appraisal tool

The CCAT scores for each article can be seen in Table 1. The highest possible raw score is 40, guidance is not given for what is considered a low or average score, but it can be assumed the papers with the highest scores are of a higher standard. Most of the papers were of good standard ranging from 30 (75%) to 37 (93%). However, one was poor quality scoring 20 (50%) (Sylvia et al., 2021).

Slyvia et al. (2021) scored the lowest on the CCAT (20/40). This is mainly due to it being an efficacy study, which provided very little information on: the background, what the intervention involved, controlling for confounding variables and the discussion. They did not control or comment on numerous confounding variables, such as number of sessions attended, or changes to job structure. They did score highly on sampling, as they included who they recruited and why, although the sample was biased (89% white), this study may be useful as a feasibility project for more methodologically robust and ethnically diverse studies in the future.

The highest rating paper (37/40) was Rohr et al. (2020). The authors clearly explain the background, aims, sampling and results. They controlled for some confounding variables by weighting the sample by age, sex, and including all regions of Germany, to ensure the sample was representative of the general older population in Germany. Not controlling for this may have resulted in the sample being weighted towards a specific gender or region, which may influenced resilience. They critically analyse their findings, considering the limitations and the implications for future research. They provided limited details on ethics and consent, not reporting conflicts of interest, biases or confidentiality.

## 4.3 Study aims and background

All of the studies included in the literature review stated their aims clearly, with most providing a clear background and rationale.

Three studies had unique aims: Valiente et al. (2021) aimed to look at resilience as an outcome of loneliness (magnitude or patterns of symptoms), rather than personality trait. The aims were to detect different psychological response patterns (resilient, recovered, delayed and sustained). Resilience was viewed as both the absence of negative outcomes (i.e. loneliness), and as the presence of positive outcomes such as quality of life. The aim was to draw conclusions regarding specific variables which increase resilience. Slyvia et al., 2021 aimed to assess the feasibility of a resilience group for frontline clinicians, and how effective this may be in the future. Because it was conducted in a hospital setting, this allows the researcher and reader to infer the results of introducing this intervention to other hospital settings. It is useful that this was conducted with frontline workers, as this group of participants may have a unique set of characteristics, not present in other populations (ie. being busy during the pandemic).

Farwell et al. (2020) explored sources of resilience for perinatal mothers. This may have implications for targeting perinatal mothers who are more likely to struggle with resilience. The background is thorough which makes it clear for the reader that the need for the study is to identify which sources of resilience are helpful in preventing mental health difficulties (such as loneliness) during Covid-19 .

Muller et al. (2021), Sams (2021) and Rohr (2020) all aimed to assess the relationship between wellbeing measures, including resilience and loneliness, in an older population. It has been reported this population is more likely to be lonely (Grover et al., 2018), this research may highlight which factors may be targeted to improve loneliness.

Three studies aimed to assess the mediating role of either resilience or loneliness. Grossman et al. (2021) aimed to assess if resilience mitigated the effect of loneliness on sleep, in an older Israeli adult population, potentially helping to suggest particular strategies (such as those which increase resilience) to help sleep-duration and sleep-quality for those who are lonely. Padmanabhanunni & Pretorius (2021a) aimed to assess the mediating role of ego-resilience in the loneliness-life-satisfaction relationship, in a university sample, however they do not make it explicit why this relationship is important to consider, or what the consequences of this relationship might be. Carbone’s et al. (2021) aims were to assess the behavioural and psychological symptoms of dementia and their relationship with various variables including social/emotional loneliness, and resilience of carers. The background is brief, perhaps due to there being limited similar studies, however it is clear why the study was important and the implications for findings.

Two studies looked at psychological symptoms of university students. Padmanabhanunni & Pretorius (2021b) aimed to determine which variables predicted loneliness in South African students (Mean age =22); which may highlight how students in South Africa are coping with the pandemic. Conrad et al. (2021) gave the brief aims of assessing psychological symptoms of relocation experiences on college students. Their background states the potential effects of relocation, but does not specifically mention loneliness or resilience, it is therefore unclear why they included these two measures. However, their research has potential implications in highlighting how students may be experiencing relocation, especially in the USA. This paper was included in the literature review as they make reference to the two variables in the abstract, however do not justify why they included these variables in the background information of their study.

## 4.4 Design

Of the eleven studies, eight studies used regression to analyse their results (Conrad et al., 2021; Gossman et al., 2020; Muller et al.,2021;Padmanabhanunni & Pretorius., 2021b; Rohr et al., 2020; Sams et al., 2021; Sylvia et al., 2021; Valiente et al., 2021)

Two used ANOVA (Muller et al., 2021; Valiente et al., 2021). Three used correlation (Carbone et al., 2021; Gossman et al.,2020;Padmanabhanunni & Pretorius.,2021b). One used a structural equation design (Padmanabhanunni & Pretorius, 2021a). Farewell et al. (2020) used constant comparative method.

Eight studies used a cross-sectional design to assess the relationship between resilience and loneliness (Conrad et al., 2021; Carbone et al., 2021;Gossman et al., 2020; Muller et al..,2021; Padmanabhanunni & Pretorius., 2021a; Padmanabhanunni & Pretorius., 2021b; Rohr et al., 2020; Sams et al., 2021). This type of design is advantageous for research because it is convenient to conduct, and gives a snapshot of relationships between variables at that time-point. However, they are also open to bias, as it is not possible to draw conclusions about cause and effect between the variables, or more generally about the relationship at different times.

Two studies used a pre-test post-test design with one group (Sylvia et al., 2021; Valiente et al., 2021). Valiente et al. (2021) used this design to categorise participants into the following dependent variables: resilient, recovered, delayed, sustained. Slyvia et al. (2021) used this design to assess the effectiveness of a resilience group; using only one experimental group, reduces the internal validity (Barker et al., 2002). For example endogenous changes and interfering events (such as adjustment to changes in job role, and changes in work patterns) could have produced the changes in loneliness, rather than the intervention. Moreover, there are several threats to construct validity such as: confounding variables (different therapists for each group), and expectancy effects (after attending one session the attendee expects a change). All of these may implicate the ability to conclude that the resilience intervention was the cause of these changes in loneliness.

Farewell et al. (2020) used a qualitative design, and analysed data using the constant comparative method. They use analytic auditing (two researchers identified disparities in coding) to enhance study credibility, validity and reliability (Yardley, 2000). Using a constant comparative method design allows for new hypothesis to be generated, as it enhances flexibility in the authors’ approach, to explore a new phenomenon.

## 4.5 Sample

Six studies used an online survey, (Conrad et al., 2021; Gossman et al., 2020;Padmanabhanunni & Pretorius., 2021a; Padmanabhanunni & Pretorius., 2021b; Sams et al., 2021; Valiente et al., 2021) using this type of data collection may be open to bias as certain populations may not have access to digital technology, such as computers or the internet. Additionally, these studies used multiple questionnaires, which may increase the chance of participant burnout or drop out, potentially impacting validity and generalisability. However, online surveys are convenient to complete potentially resulting in a higher response rates, and increasing external validity and power (Barker et al., 2015).

Four studies used a telephone survey (Carbone et al., 2021; Farewell et al., 2020; Muller et al.,2021; Rohr et al.,2020). This is open to bias, as respondents may have felt self-conscious giving particular answers or made it more likely to display demand characteristics.

Four studies recruited only older adults (Gossman et al., 2020; Sams et al., 2021; Muller et al., 2021; Rohr et al., 2020). Three studies used only university students (Conrad et al., 2021; Padmanabhanunni & Pretorius., 2021a; Padmanabhanunni & Pretorius., 2021b). Three studies used narrow inclusion criteria including: first time mothers (Farewell et al., 2020), dementia carers (Carbone et al., 2021), and front line staff (Slyvia et al., 2021).

There was a uneven gender split in six studies, with more women participating (Conrad et al., 2021; Gossman et al., 2020; Padmanabhanunni & Pretorius., 2021a; Padmanabhanunni & Pretorius., 2021b; Sams et al., 2021; Sylvia et al., 2021). Furthermore, there was a lack of ethnic diversity in four of the studies, with predominantly white participants (Farewell et al., 2020; Gossman et al., 2020; Sams et al., 2021; Slyvia et al., 2021). Conrad et al. (2021) report that they recruited a larger proportion of Asian students, than would be enrolled at a US University, due to these students being more likely to participate. These studies may not be representative of the general-population, and thus lack validity.

Sample sizes were scored as good for Valiente et al. (2021) (N=1628), Muller et al. (2021) (N=1005); Rohr et al. (2020) (N=1005); Sams et al. (2021) (N=501); Padmanabhanunni & Pretorius (2021a) (N=371); Padmanabhanunni & Pretorius (2021b) (N=340); Grossman et al. (2021) (N=243); Conrad et al. (2021) (N=791); Farewell et al. (2020) (N=30). Sample size is important to consider as having a greater sample size may mean it is provides more power to detect a significant difference. The sample sizes were small for Slyvia et al. (2021) (N=53) and Carbone et al. (2021) (N=34). However, Carbone et al. (2021) required only 35 participants to have adequate power. Sylvia et al. (2021) does not include a power calculation.

Five studies attempted to ensure their sample was representative of their target population. Valiente et al. (2021) used stratified data in regards to numerous variables, including household income, sex and age. However, participants were part of a research panel (it is unclear who these participants were, or how they became part of the panel), and may display certain characteristics not typical of the general-population, such as enjoying to give back, potentially implicating the external validity; however, Valiente et al. (2021) state the sample was assessed for validity, but it is not clear how. Muller et al. (2021) and Rohr et al. (2020) recruited a large sample of 1005 participants and weighted the sample to be reflective of national statistics on sex, age and area of Germany. The researchers also used a Kisch-selection grid which allows researchers to select a participant in a multi-person household. Sams et al. (2021) attempted to control for false answers by using research platforms that vet for ‘bad actors’, preventing re-participation. Carbone et al. (2021) used a convenience sample from an institute providing support for residential and non-residential services for those with dementia. The participants’ families took part and the person with dementia had been in the institute for at least 18 months prior to the pandemic; in an attempt to control for initial distress and loneliness from newly being part of the institution.

It may be particularly difficult to generalise from two studies. Slyvia et al. (2021) used a convenience sample, allowing all frontline workers to attend their eight-session group, however poor attendance was not accounted for (only 64% completed more than six sessions, and there was a 27-person drop out of completing the follow-up measure). It is unclear if those who did not attend were different in a particular way, for example felt less able to use new skills. Farewell et al. (2020) recruited 27 people for a study based in Colorado where health insurance is necessary for care. Those with health insurance may not be representative of perinatal mothers without health insurance or countries were insurance is not necessary, but may be generalizable to other states in the US where there is standardised health insurance.

## 4.6 Ethical issues

Overall, reporting on ethics was poor, and this affected overall CCAT scores (Valiente et al.,2021; Sams et al., 2021; Farwell et al., 2020; Sylvia et al., 2021; Conrad et al., 2021). Valiente et al (2021); Sams et al. (2021) and Farwell et al. (2020) did not specifically discuss ethical matters such as informed consent, anonymity, relationship with cases, but state they have received ethical approval from their respective ethic committees, and have no conflicts of interest. Sylvia et al. (2021) and Conrad et al. (2021) did not comment on ethical approval. This is problematic as ethical approval is important for ensuring participants were not coerced, were not harmed and anonymity was ensured.

Grossman et al. (2021), Carbone et al. (2021), Rohr (2020) and Muller et al. (2021) state they have informed consent, and ethical approval. Padmanabhanunni & Pretorius (2021 a & b) scored the highest on ethical issues, reporting on ethical considerations, including ethical approval (from the University of Western Cape), informed consent and confidentiality.

# 5.1 Synthesising the findings

This review aimed to explore what was known about the relationship between loneliness and resilience during Covid-19. By synthesising the findings, conclusions may be drawn from the literature on pertinent findings.

Nine of the eleven studies reported a relationship between resilience and loneliness. Moreover, it was not the aim of Farewell et al. (2020) to report a relationship but instead explore experiences of perinatal mothers, however, they reported those who felt resilient also experienced less loneliness. The one study which did not report a relationship was Carbone et al. (2021), although they used a small sample of dementia carers which may not have had enough power to detect a significant difference. There are limitations to the reviewed studies, which suggests further research is necessary.

Many of the studies suggested interventions which boost resilience may be an important next step in research. The only intervention included in this review, found loneliness was significantly lower after attending the resilience group (Slyvia et al., 2021). However, they do not control for multiple variables, such as changes in work patterns, how many group sessions were attended and attrition rates. It would be helpful to know reasons for attrition, such as adjustment to work changes, or dislike of the resilience group- it is difficult to understand how effective the group was and make generalisations from the results. Their resilience group included multiple different elements such as relaxation, CBT, positive psychology. This is supportive of findings from Chmitorz et al. (2018), who analysed 43 resilience interventions and found they vary in methodologies, formats of delivery (individual vs group etc) and efficacy of intervention. Standardising a resilience group and operationalizing resilience, may improve the reliability of research in this area; improving the ability to compare findings across settings and research designs. In fact, simply being in a group may have been adequate enough to improve loneliness, rather than the resilience group.

Several studies used specific cohorts, such as older adults (N=3); undergraduates (N=4); perinatal women (N=1); clinicians (N=1); dementia carers (N=1). It is therefore difficult to generalise, however, all but one paper reported a relationship between resilience and loneliness (Carbone et al., 2020). It may be likely that higher levels of resilience are related to lower level of loneliness, (or vice versa) across the age span.

Several studies looked at the mediating role of resilience (Carbone et al., 2021; Grossman et al., 2021; Padmanabhanunni & Pretorius, 2021a). Padmanabhanunni & Pretorius (2021a); reported: (1) hopelessness, depression and ego resilience mediate the relationship between loneliness and life-satisfaction; (2) loneliness is the antecedent to feeling hopeless; (3) ego resilience is a vital mechanism in protecting health. Only using one university and an online survey, may reduce the generalisability to other populations/ universities, as those from one university may share particular socioeconomic backgrounds, not reflective of the general-population. However, findings may be generalizable to university students of same regional area or country. Furthermore, the average score on life-satisfaction was generally lower than has been reported during the pandemic (Trzebinski et al., 2020), using participants who score lower than average may skew the results.

Grossman et al. (2021) suggests the link between loneliness and poor sleep was much worse for those with low levels of resilience. They did not control for variables such as low mood, these may influence poor sleep rather than loneliness or levels of resilience (Gruber & Cassoff, 2014). Moreover, they do not report on length of sleep issues, some participants may have had a long duration of sleep issues, and thus felt less able to cope / lonelier because of the length of sleep issues, rather than a lack of resilience. Carbone et al. (2021) reported resilience and emotional-loneliness or social-loneliness were not correlated, suggesting that lonely carers of people with dementia did not have lower levels of resilience. A small sample size was used; it may be possible that a type II error occurred, although the power calculation suggested the sample size was only one participant below adequate. Moreover, the sample reported higher rates of resilience and lower rates of personal distress than expected. One potential reason for this may be study participants had received a network of healthcare services which provided techniques and strategies to care for people with dementia, and this may have enhanced the carers coping skills.

Two studies tried to measure loneliness or resilience as outcomes (Rohr et al., 2020; Valiente et al., 2021). Valiente et al. (2021) looked at resilience as an outcome (absence of variables, i.e. anxiety) focusing on the magnitude and patterns of response (resilient, recovery, sustained distress, delayed). This was vastly different to other studies in this review, which view resilience as a predictor. These may be complementary, however, their findings did not confirm this (resilience as an outcome was not correlated to their resilience as a predictor measure- the BRS). Moreover, it is unclear why Valiente et al. (2021) did not include their category of ‘recovery’ as also demonstrating resilience. Recovery was classified as the presence of anxiety, depression and post-traumatic stress at time one (T1) followed by none of these at time two (T2), this appears to be consistent with the definition of resilience (the ability to bounce back from difficult circumstances) (Hildon et al., 2010). Muller et al. (2021) combined social-isolation scores and loneliness scores to make four different variables: lonely and socially-isolated, lonely and not socially-isolated, socially-isolated and not lonely and neither socially-isolated nor lonely. They found those who were only lonely and not socially-isolated had more emotional difficulties, such as low mood and anxiety. Those with higher resilience scores were less likely to be lonely, but they did not report if these findings were significantly different between groups. Furthermore, only 54% of participants who were contacted took part, it may have been those who participated were lonelier, or wanted to appear resilient to the researcher, hence why there was not as a large a difference in resilience scores as expected by the researchers.

Farwell et al. (2020) found perinatal mothers who reported to having emotional support from their partners felt more resilient, and able to cope with having a new-born baby in the pandemic, however most participants felt they had less support currently, and more than half of the sample felt lonely.

Two studies used university samples (Conrad et al., 2021; Padmanabhanunni & Pretorius., 2021b). Conrad et al. (2021) found lower levels of loneliness were related to higher levels of resilience for those who had to relocate campus due to a Covid-19 outbreak. However, they recruited participants through social media and email lists, it is unclear what proportion of university students would see these advertisements. If taking part was mandatory for all attendees of a university, generalisation to the university population may be improved. Padmanabhanunni & Pretorius (2021b) found higher resilience and life-satisfaction were associated with lower levels of loneliness. However, this was only completed in one university, few confounding variables were controlled for, for example, who students lived with, how pressured they felt on their course; these variables may have impacted the results. Additionally, the authors adapted three items from an invalidated resilience measure (Smith et al., 2008), which may reduce the reliability and validity of the measure, and not accurately reflect the relationship between resilience and loneliness.

Furthermore, two studies looked at the relationship between loneliness and resilience in older adults (Sams et al., 2021; Rohr et al., 2020). Sams et al., (2021) found those of lower social economic status were lonelier and were less resilient. However, participants were recruited online and it is difficult to rule out deviations in response patterns to those who took part and those who did not. Rohr et al. (2020) reported resilience explained a large amount of the variance in all mental wellbeing scores, including loneliness. However 11% of those contacted refused to participate in the study, and 35% could not be reached. Rohr et al. (2020) reported levels of loneliness were not different from pre-pandemic findings which is somewhat contrary to what was expected by various researchers/ organisations, as at the beginning of lockdown people had to adjust to potentially isolating alone (Holmes et al., 2020). It may be those households which were not willing to participate or unreachable were lonelier, and this may have produced different findings; meaning results may not be representative of the general-population.

Several studies were cross-sectional (Conrad et al., 2021; Carbone et al., 2021;Gossman et al., 2020; Muller et al., 2021; Padmanabhanunni & Pretorius., 2021a; Padmanabhanunni & Pretorius., 2021b; Rohr et al., 2020; Sams et al., 2021). This may be problematic as it is unclear if other confounding variables, such as whether the initial change of scheduled lockdowns or family members being isolated at the time of the study, influenced feelings of loneliness. Additionally, looking at the relationships between these studies’ findings, it is difficult to establish cause and effect, for example, do people feel lonely as a sudden effect of having to isolate, so feel less resilient; or is it a person has always felt more resilient and so is able to cope with being isolated? It would be useful for more studies to use multiple time points to limit some of these confounding variables. Additionally, measures of loneliness at baseline may help to eliminate the potential effect of confounding variables.

There were disparities in the measures used across studies to measure loneliness and resilience. Nine of ten quantitative studies used validated measures. Padmanabhanunni & Pretorius., (2021b) did not use validated measures, and it is possible studies which do not use valid measures cannot account for the reliability and validity of their findings. Furthermore, there are several meanings for resilience: only one article assessed resilience as an outcome (the presence of positive outcomes and absence of negative outcomes) (Valiente et al., 2020), but when they assessed this against a self-report measure of resilience they found the two were not related. It may be problematic to compare this paper against the others which used self-report measures and assessed resilience as a process.

There was an uneven gender split in six studies, with more women participating (Sams et al., 2021; Sylvia et al., 2021; Padmanabhanunni & Pretorius., 2021a, Gossman et al., 2020 Padmanabhanunni & Pretorius., 2021b; Conrad et al., 2021). Furthermore, there was a lack of ethnic diversity in four of the studies, with predominantly white participants (Sams et al., 2021; Sylvia et al., 2021; Farewell et al., 2020; Gossman et al., 2020), all of which implicates the generalisability of these findings.

# 6.1 Discussion

This review aimed to explore what is known thus far about the relationship between resilience and loneliness during the Covid-19 pandemic. In August 2020, in the USA, (eight months after Covid-19 was first detected and reported in the USA), Kilgore et al. (2020) found psychological resilience was much lower for their sample, than had been reported previously. Additionally, they reported higher levels of mental health difficulties, such as loneliness, low mood and anxiety. Multiple reviews have suggested resilience may act as a buffer against negative outcomes such as loneliness and mental health difficulties (Kilgore et al., 2020; Barzilay et al., 2020). Ten of the eleven studies supported a link between loneliness and resilience. The findings may guide clinical practice. Because if resilience and loneliness are linked, then interventions aimed at improving resilience may be effective for those who are lonely. This literature review explored this current gap in the literature, and highlighted where future studies may be useful.

The critical appraisal demonstrated studies were of varying quality. In general, the literature was of good quality, but was inadequate at addressing ethical issues. The article findings suggested overall loneliness and resilience may be related, with higher levels of loneliness being related to lower levels of resilience. This was primarily measured using a self-report measure of resilience, however, this was also prevalent when resilience was assessed as an outcome rather than a trait (although this was still self-report) (Valiente et al., 2021). Overall, studies reported on relationships rather than suggesting cause and effect, this makes the findings open to confounding variables. It is difficult to establish, from the limited literature on loneliness in Covid-19 whether resilience can be manipulated by an intervention (Sylvia et al., 2021).

## 6.2 Strengths and Limitations

There are multiple strengths and limitations to this literature review. The CCAT was used to assess the strengths of each research article including qualitative, quantitative, cross-sectional and intervention studies. This tool was used because the CCAT has high levels of applicability for critical appraisal of study quality. However, the CCAT is subjective, as researchers are responsible for scoring papers. The CCAT does have instructions, but does not provide examples or clear criteria of what would be specific ratings for poor or medium quality, for example how little detail on the background would class as poor. Instead the CCAT is used to assist rather than provide a definite criteria. This study’s reliability could have been increased by using a inter rater, who could have both appraised articles and undertaken searches, however, due to time constraints this was not possible.

This literature review utilised Scopus, Ebscohost, MEDLINE, CINAHL Plus with Full Text, SPORTDiscs with Full Text, eBook Collection (EBSCOhost), PsycINFO, PsycARTICLES, however, it is possible there are additional studies which were not included for data extraction. A larger sample size of studies would have provided more certainty in the findings. Additionally, the search terms used were restrictive. It is possible that more papers could have been found using broader terms such as ‘social-isolation’ or ‘hardiness’ or ‘coping’, however, the review wanted to focus specifically on loneliness, and resilience as separate constructs to social-isolation and coping, although there may be significant overlap between these variables. This review was completed at the end of national-lockdowns, however, it is possible there are multiple studies which are still awaiting publication, which may mean conclusions are preliminary.

The studies included used one or two time points (Carbone et al.,2021; Sams et al., 2021; Rohr et al., 2020; Muller et al., 2021; Padmanabhanunni & Pretorius., 2021a; Padmanabhanunni & Pretorius., 2021b; Conrad et al., 2021; Gossman et al., 2020; Valiente et al., 2021; Slyvia et al., 2021) which mean they are open to confounding variables (such as changes in job role, changes to economic status), especially as the circumstances of Covid-19 can change relatively fast. By including multiple time points, the likelihood of confounding variables influencing results may be reduced. Moreover, the studies reported here had limited diversity, with a larger proportion being female, or most being done online, this may not be representative of the population. For example, using online methods of data collection will exclude people who do not have digital capital to own electronic devices or have limited access to the internet.

Because of the differences in populations, sample sizes, methodology and location, it is difficult to generalise the findings, other than remarking on the general relationship between loneliness and resilience. These inconsistencies limit the ability to make inferences about future interventions or research as the findings and methodologies are diverse. Additionally, studies used specific age-groups, locations, occupations which may influence the generalisability of these studies.

## 6.3 Clinical implications and Future Research

These findings may suggest strengthening resilience may reduce loneliness. However, these studies all used self-report measures, and these can be open to bias as participants may not represent themselves as others would, or responded in a particular way due to knowing the aims of the study (Keeling et al., 2007). Additionally, Chimitorz et al. (2018) suggest trait resilience measures may not be useful in evaluating changes in resilience after an intervention. It is possible both ways of measuring resilience (resilience as an outcome vs resilience as a trait) are different constructs and different outcome measures would have produced different results; this may be particularly likely due to findings by Valiente et al. (2021), who found the BRS did not correlate with their resilience variable. Future research should aim to clarify the differences between these measures, and use one standard measure, this will ensure resilience research can be generalised and compared.

Moreover, there is a lack of clarity as to what to include in a resilience intervention, for example, Slyvia et al. (2021) included CBT, relaxation and mindfulness, it is unclear with this methodology how it is different from a purely CBT programme. Making the contents of a resilience intervention universal and manualised may help to standardise research and make the conclusions and clinical applications clearer. Furthermore, it may be alternative therapeutic models already increase resilience, for example CBT or DBT, studying this may help to add to the knowledge base, clinical practice and evidence-based interventions.

# Conclusion

The current findings suggest there is a relationship between loneliness and resilience during Covid-19. There was variability in resilience definitions and how resilience was measured. More clarification of what is meant by resilience and how to measure resilience is needed.

Moreover, studies measuring loneliness and resilience at multiple time points, would prove useful in making generalisations about factors which either mediate or show a strong relationship between loneliness and resilience. Clarification of what a resilience intervention includes would facilitate cohesive research and solid recommendations for organisations and individuals.

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# Appendices

## Appendix A: Author guidelines for ‘The Journal of Personality and Individual Differences’

[**https://www.elsevier.com/journals/personality-and-individual-differences/0191-8869/guide-for-authors**](https://www.elsevier.com/journals/personality-and-individual-differences/0191-8869/guide-for-authors)

**Key Points include:**

* Manuscripts should be double spaced and pages numbered (This will be completed before submission)
* Review papers should not exceed 10000 words
* The Abstract should not exceed 200 words
* There is no strict requirement for referencing format
* Article should be defined and numbered in sections, for example 1.1, 1.2…2.1 etc

## Appendix B: Critical appraisal table

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Author, Year** | **1.Preliminaries** | **2.Introduction** | **3.Design** | **4.Sampling** | **5.Data Collection** | **6.Ethical Matters** | **7.Results** | **8.Discussion** | **Total** |
| Carbone et al., 2021 | 4 | 3 | 4 | 4 | 4 | 4 | 4 | 4 | 31 |
| Conrad et al., 2021 | 5 | 4 | 3 | 4 | 4 | 0 | 5 | 5 | 30 |
| Farewell et al., 2020 | 4 | 4 | 3 | 4 | 5 | 2 | 5 | 5 | 32 |
| Gossman et al., 2020 | 4 | 5 | 3 | 4 | 3 | 4 | 3 | 4 | 30 |
| Muller et al., 2020 | 5 | 4 | 4 | 5 | 5 | 4 | 5 | 5 | 37 |
| Padmanabhanunni & Pretorius., 2021a | 5 | 5 | 3 | 4 | 3 | 5 | 4 | 5 | 31 |
| Padmanabhanunni & Pretorius., 2021b | 5 | 3 | 3 | 4 | 3 | 5 | 4 | 5 | 32 |
| Rohr et al., 2020 | 5 | 5 | 5 | 5 | 5 | 4 | 5 | 4 | 37 |
| Sams et al. 2021 | 4 | 5 | 3 | 4 | 4 | 2 | 5 | 5 | 32 |
| Slyvia et al., 2021 | 3 | 3 | 3 | 3 | 3 | 0 | 2 | 3 | 20 |
| Valiente et al. 2021 | 5 | 3 | 4 | 4 | 5 | 2 | 4 | 4 | 31 |

# Paper Two: Empirical Paper

**Can age, video-call use, social-isolation and resilience predict levels of loneliness during coronavirus-19?**

**Target Journal**: Personality and Individual Differences

This paper has been presented in the format that is required for publications in the target journal ‘Personality and Individual Differences’ (Appendix A). Further formatting will be carried out before submission. The referencing style used was APA 7th Edition.

April 2022

Total word count: 7682

# Abstract

Since 2012 there has been an increasing awareness of the negative impacts of loneliness on a person’s quality of life. In 2017, a United Kingdom (UK) commissioned study found that around nine million people experience feelings of loneliness. Coronavirus (Covid-19) has resulted in national lockdowns within the UK, restricting the ability for people to socialise with other households, which may result in a rise in loneliness. Factors such as social-isolation, video-call use and resilience may help people cope during this time. Little is known about the age group most likely to experience loneliness because of the lockdown. This current study therefore aimed to assess if social-isolation, resilience, age and video-call use could predict levels of loneliness. The study used a quantitative cross-sectional design, with 262 participants completing an online survey. Regression analysis identified that resilience and social isolation were significant predictors of loneliness, with both contributing to 34.4% of the variance in loneliness, 34% when adjusted. The implications of these findings are discussed.

# Introduction

## 1.2 Covid-19 (Coronavirus-19) and the impact of isolation and loneliness on mental-health

The Covid-19 pandemic beginning in January 2020 led to periods of national lockdown and isolation, with a consensus that Covid-19 would have an influence on well-being (Douglas et al., 2020; Holmes et al., 2020). The Office of National Statistics (ONS, 2020) reported that two-thirds of British adults surveyed in the opinions and lifestyle survey were worried about the impact Covid-19 would have on their lives. Previous research on the SARS pandemic 2003/2004 demonstrated negative mental-health outcomes (i.e., Anxiety, low mood, and isolation) (Rohr et al., 2020). The Covid-19 pandemic may have resulted similar mental-health difficulties, including loneliness, anxiety, and self-harm behaviours (Holmes et al., 2020; O’Connor et al., 2021).

## 1.3 Why is loneliness important to consider?

Loneliness has been described as a discrepancy between desired and actual social contact (Peplau & Perlman, 1982). Research suggests that, even with a large social-network, a person can feel lonely – the subjective quality of interactions appearing to be more important (Green et al., 2001; Luhmann & Hawkley, 2016; Pinquart & Sorensen, 2003).

The ONS reported that around nine million people in the UK (14% of the population) reported feeling lonely between 2020–2021, and from 2018–2019. Consequently, there is a growing focus in research and public policies on prevention (The British Red Cross, 2020). In 2015, a campaign by the UK government to end loneliness proposed that those who are lonely should be able to access support through a wide range of effective services (Goodman et al., 2015). Prompt detection may help to prevent some of the negative physical- and mental-health issues associated with loneliness (Ferguson, 2011).

Consequences of loneliness can include low mood and suicide. Those who are lonely are more likely to have a greater body mass index, partake in less physical exercise, smoke and consume excessive levels of alcohol, all of which are risk factors for physical health complications including cardiovascular issues, dementia, and stroke. Loneliness also has potential financial impacts on employers due to absences and staff turnover (Elovainio et al., 2017; Valtorta et al., 2016; Perissinotto et al., 2012; Turecki et al., 2019; Michaelson et al., 2017).

## 1.4 Theories of loneliness

Theories as to why loneliness occurs include evolutionary theory and attachment theory.

Cacioppo’s evolutionary model posits that feelings of loneliness are linked to the reproduction and survival of the group (Cacioppo & Patrick, 2008). They suggest that if a person felt lonely in prehistoric times, their body would release a physiological trigger that felt unpleasant and threatening, which would signal them to contact others (Cacioppo & Hawkley, 2009). Loneliness is an evolutionary response to social interactions which could be perceived as threatening, triggering automatic behaviours such as hypervigilance which serve to maintain loneliness (Cacioppo et al., 2017).

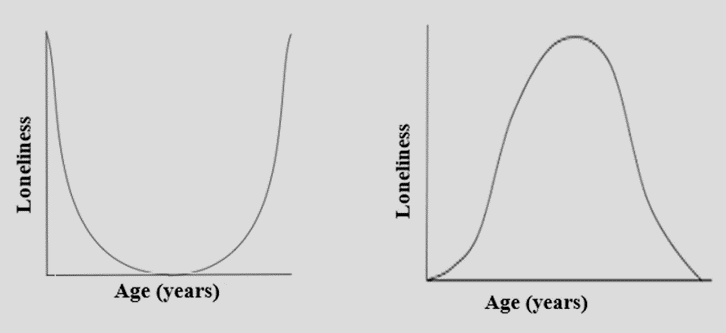
An alternative explanation of loneliness can be found in attachment theory (Benoit & Di Tommaso., 2020). This describes how relationships and interactions in childhood form the template for future relationships, influencing how a person views themselves, others, and their relationships, throughout their life (Bernardon et al., 2011; DiTommaso et al., 2015). The theory posits that if an attachment figure is available and responsive to a child’s needs, they will develop a secure attachment style (Bowlby, 1969). An absent or unresponsive parent, however, increases the likelihood an anxious, avoidant, or disorganised attachment style. Attachment style may influence how individuals perceive social interactions, and impact their ability to establish meaningful relationships (Vanhalst et al., 2013). Dykas and Cassidy (2011) found insecurely-attached individuals may be more likely (than those securely-attached) to perceive others as untrustworthy and unsupportive, and to interpret social interactions that are not overtly positive as being negative. Those who are anxiously-attached are more likely to expect rejection or abandonment from others, and those who are avoidantly-attached may try to avoid intimacy. This, in turn, may lead to unhelpful behaviours socially, such as, avoidantly attached individuals acting unavailable, or anxiously-attached individuals needing excessive reassurance, furthering the likelihood of not forming social bonds and thus loneliness (DiTommaso et al., 2003; Benoit et al., 2020).

## 1.5 The association between age and loneliness

The relationship between loneliness and age is not fully understood, as most research has been conducted on older adults (Franssen et al., 2020). Yang & Victor (2011) and Victor & Yang (2012) suggest loneliness follows a U-shaped trajectory, being highest in adolescence and old-age and lowest in middle-age. Others have suggested that loneliness follows a bell shape (highest in middle-age and lowest in older and younger ages) (Schultz & Moore, 1998) (Demonstrated in Figure 1). Schnittker (2007) suggests that loneliness reduces with aging, whereas Queen et al. (2014) found no relationship between the variables. Differences in methodology may account for the contradictory findings, for example, measurement of loneliness varied from non-standardised Likert scales, which simply ask participants to rate their level of loneliness from 0-5 (Victor & Yang, 2012; Schultz & Moore, 1998), to an adapted standardised 11 question loneliness scale (Queen et al., 2014). Participants’ ages differed too, with Queen et al. (2014) including only those aged 50+, Schnittker (2007) including over 25s, and Victor and Yang (2012) including anyone over 18. It is therefore difficult to compare these studies to determine the effect age has on loneliness.

**Figure 1**

*Figure Demonstrating a U-Shaped Trajectory of Loneliness (According to Age) to the left and a Bell-Shaped Trajectory of Loneliness (According to Age) to the Right*



It is unclear whether levels of loneliness were higher during the Covid-19 pandemic, with some research suggesting it increased (Ausin et al., 2021; Bu et al., 2020) and others reporting loneliness as unchanged (Luchetti et al., 2020; McGinty et al., 2020). Different populations and measures were used, with Ausin et al. (2021) using the 3 item UCLA loneliness scale (Russell., 1996) with Spanish participants; Bu et al (2020) using the same scale with UK participants; and Luchetti et al. (2020) and McGinty et al. (2020) using American participants. Luchetti et al. (2020) used the 11 item UCLA loneliness scale (Lee & Cagle, 2017) and McGinty et al. (2020) used an unstandardised Likert scale asking participants to rate how often they had felt lonely in the past week. The difference between cohorts and measures may explain the disparity in findings.

## 1.6 The relationship between social-isolation and loneliness

Previous research has found only small correlations between social-isolation and loneliness (Coyle & Dugan, 2012), suggesting that socially-isolated people are not necessarily lonely and those who are lonely are not necessarily socially-isolated (Gierveld et al. 2008). Although social-isolation and loneliness are often discussed together, they are described in the literature as being conceptually different (Menec et al., 2019). Loneliness is the subjective interpretation of the discrepancy between desired social contact or relationships, and how a person perceives their relationships (it is not the number of contacts or the quality of these contacts) (Walton et al., 1991). Social-isolation refers to whether a person is alone or part of a social-network (de Jong Gierveld J & Tilburg, 2006), and is an objective measure of the frequency of social contact and the availability of social contacts (Courtin & Knapp, 2017). These definitions suggest an overlap between social-isolation and loneliness, which, both referring to a person’s relationships with others, are sometimes used interchangeably.

The lockdowns of the Covid-19 pandemic (2019-2021) restricted social interaction, something many will not have previously experienced. Much of the current literature has looked at the relationship between social isolation and loneliness in older people (Holt-Lundstad et al., 2015) – a group in which social isolation can often result from bereavements, health and mobility issues, and lower levels of full employment (where many people typically interact most with others). The Covid-19 restrictions may have resulted in an increased prevalence of social-isolation in the general population; with research suggesting that young adults may have been at a higher risk of experiencing social-isolation and loneliness during this time than older adults – perhaps due to this age group typically spending large amounts of time with work colleagues and friends prior to the pandemic, though this will not apply to all (Beam & Kim, 2020). Research from Japan has suggested the change in social-isolation was the best predictor of loneliness during Covid-19 restrictions – those who were not socially-isolated prior to the pandemic and then became so were more likely to be lonely than those who were already socially-isolated pre-pandemic (Koyama et al., 2021).

## 1.7 The relationship between video-call use and loneliness

Video conferencing platforms (video-calls) were a popular form of communication during Covid-19 lockdowns (i.e. Zoom and Facetime) and may have reduced loneliness (Dahlberg, 2021; Shah et al., 2020). In 2020 the World Health Organisation and Age-UK recommended remote social contact to reduce the psychological impact of isolation (WHO, 2020). Previous research on older adults has produced contradictory results on the use of digital communication and loneliness. Kiesler (1999) found that participants reported internet use to be impersonal and unfriendly, while newer research has concluded that remote contact can be positive for mood and levels of loneliness (Kestnbaum, 2002; McKenna, 2002; Sum, 2008; Teo et al., 2019). There is evidence suggesting video-call use may also be helpful for lonely younger adults (Nowland et al., 2018). In contrast, Wetzel et al. (2021) found that smartphone communication resulted in lower levels of loneliness in older adults, but higher levels in younger adults (during Covid-19). This could possibly be down to how different ages use their smartphones to connect, for example, younger users may use more social-media apps, resulting in comparisons with their peers, and thus feeling lonelier, whereas older users connect directly with contacts, strengthening already formed relationships (Wetzel et al., 2021).

Not everyone has access to online technology, and, often due to a lack of confidence/knowledge with technical devices, older people especially may have less access to online resources ('the digital divide' (Dahlberg, 2021)). Furthermore, online resources may not adequately compensate for a lack of in-person interaction for some. It is therefore important to consider how/if adapting to online life may help with social-isolation during Covid-19 (Hwang et al., 2020).

Investigating the relationship between video-call use, isolation and loneliness may provide information on how to predict who will experience loneliness the most during the Covid-19 pandemic, especially during periods of social-distancing.

## 1.8 What is resilience?

Sobeck et al. (2020), suggest that higher resilience enables a person to better adapt and cope with difficult life-events. There are two types of resilience detailed in previous literature: resilience as an outcome and resilience as a trait.

Bonnano and Diminich (2013), argue that resilience is better understood as an outcome, suggesting that if a person can maintain or regain their mental-health (i.e. absence of depression, anxiety etc.) after an adverse life-event, they are resilient (Chmitorz et al., 2018; Kalisch et al., 2017; Kalisch et al., 2015). This perspective suggests that resilience is modifiable and can be influenced by both internal and external resources (Hobfoll & Zalta, 2015). However, there has been considerable variation in which outcomes have been measured to determine an individual's resilience – some studies measure, for example, anxiety whilst others measure depression – leading to difficulties understanding and comparing the implications of findings from study to study (Olsson et al., 2003).

Most research to date has focussed on the concept of resilience as a trait, which suggests people have predetermined personality types (i.e. being hardy) which enhance their ability to adapt to stress (Connor et al., 2003; Hu et al., 2015; Ong et al., 2006). This trait may allow people to feel that they have assurance in their ability to cope in difficult life situations and that the hard event will not last forever. There are several potential process which have negative impacts on trait resilience, including: adverse formative experiences affecting brain structures (i.e., the amygdala and prefrontal cortex), which may affect abilities such as self-regulation, processing fear, and decision-making which, in turn, may impact a person’s ability to be resilient (i.e. self-regulation may reduce one’s ability to regulate emotions after a difficult life experience, fear processing may make adverse events feel life-threatening thus impacting the ability to adapt after an experience) (Curtis et al., 2003); personality traits such as openness (Carpenter et al., 2012); systemic factors such as having family support (i.e. knowing they can rely on others for help during adversity); having a secure attachment (knowing ultimately that you are capable of overcoming difficult circumstances and can rely on others) (Luther et al., 2000). It is likely that all these factors combined are responsible for the development of resilience (Hermann et al., 2011).

Interventions have targeted enhancing resilience in both clinical (Leppin et al., 2014) and non-clinical settings (Macedo et al., 2014; Robertson et al., 2015; Vanhove et al., 2015). Leppin et al. (2014), found in a review of 25 studies that these interventions yielded medium-effect sizes for improving resilience (including Cognitive Behavioural Therapy (CBT)). However, findings were limited due to a lack of standardisation of the interventions and operationalisation of resilience.

## 1.9 The relationship between resilience and loneliness

There is evidence that a higher level of resilience can act as a protective factor against mental-health difficulties (Mehta et al., 2008; Nygren et al., 2005; Windle et al., 2011), and may be predictive of reduced loneliness due to a person adopting helpful coping-strategies (Bennet, 2010), e.g. viewing themselves as capable of overcoming difficult life-events (self-efficacy). Alternatively, the relationship between the two variables may be bi-directional – loneliness may induce strong negative feelings, impairing a person’s ability to use positive coping-strategies and feelings (resilience) to reduce loneliness (Wong et al., 2016). Furthermore, Hawkley et al. (in press) found that in a sample of students (N=135), those who were lonely rated their perceived ability to cope with challenges lower, despite the diversity and frequency of daily tasks being the same as non-lonely students. Moreover, some researchers have reported that interventions such as CBT may increase resilience and reduce loneliness by examining negative thoughts such as ‘I can’t cope with social events’, or ‘I will never make close friends’ whilst also teaching people-skills for communication and problem-solving in social events. This may help individuals feel more confident in social situations and more able to cope with difficult experiences (Barzilay et al., 2020; Kilgore et al., 2020).

Multiple studies have looked at the relationship between loneliness and resilience during Covid-19, with nine reporting a relationship between higher levels of resilience and lower levels of loneliness during this time (Conrad et al., 2021; Gossman et al., 2020; Muller et al., 2020; Padmanabhanunni & Pretorius., 2021a; Padmanabhanunni & Pretorius., 2021b; Rohr et al., 2020; Sams et al. 2021; Slyvia et al., 2021; Valiente et al. 2021). However, some of these studies used samples unrepresentative of the general population, for example, four were conducted exclusively with older adults (Gossman et al., 2020; Muller et al., 2020; Rohr et al., 2020; Sams et al., 2021), one with healthcare staff (Sylvia et al., 2021), and three with university students (Conrad et al., 2021; Padmanabhanunni & Pretorius., 2021a; Padmanabhanunni & Pretorius., 2021b). More research during Covid-19 on the relationship between loneliness and resilience in a broader population is needed to determine if resilience is a protective factor against loneliness.

## 1.1.1 The relationship between loneliness, social-isolation, age and video use during the Covid-19 pandemic

The general consensus is that the unprecedented Covid-19 restrictions will have impacted wellbeing (Holmes et al., 2020), with reports by several researchers and organisations finding that mental-health difficulties have increased since the development of Covid-19. It may be that, due to the uncertainty of Covid-19 and the multiple lockdowns, incidences of loneliness have increased. This may be protected by increased social connectivity, albeit digitally via video-calls, or where individuals have greater levels of internal resilience. It is also important to assess if age is predictive of levels of loneliness, as interventions can be targeted towards specific age groups accordingly.

This study aims to assess the impact of resilience, social-isolation, age, and video-call use on loneliness in the general population during the Covid-19 pandemic.

1.1.2 Hypothesis

The following hypothesis were based on the current literature, and aimed to assess the intersection between Covid-19 and its impact on loneliness

1. Greater levels of social support (from friends and family) will predict lower levels of loneliness
2. Greater levels of resilience will predict lower levels of loneliness
3. Those who use video-calls more frequently (outside of work hours) will feel less loneliness
4. Age will be predictive of loneliness

# 2.1 Method

## 2.2 Epistemological Position

The research methodology aligned with a positivist approach, meaning that the world is objective and can be measured, through the collection of large amounts of data and testing hypothesis about the relationship between variables, which can then be generalised (Easterby-Smith et al., 1991). Additionally, this research used standardised questions, which had been validated and used in prior research, to add to the evidence base. This is contrary to an interpretivist position, which assumes that reality is constructed through language and subjective meaning, and is concerned with the lived experience and individual differences in experiences (Scotland, 2012).

## 2.3 Design

A cross sectional quantitative design was used, as the aim was to investigate the relationship between loneliness and the predictor variables: social-isolation, resilience, age and video-call use in adults 18 years and older. Ethical approval was granted by Staffordshire University Research Ethics Committee (Appendix B) and all participants provided informed consent (Appendix D).

An A-priori statistical sample size calculator was used (Soper, 2020), which calculated that a sample size of 84 participants was needed. This was based on the regression analysis and four predictors: (resilience, social isolation, video-call use and age), with one criterion variable (loneliness). Power was set at 0.8, the probability level was set at 0.05 and a medium effect size of 0.15 was used. The effect size was based on prior research by Jackobsen (2020), in the pandemic, which looked at the relationships between different aspects of resilience (personal competence / planned future / social competence/ social resources) and loneliness, and found a medium effect size. The study was available to participants for 48 hours unchecked, as the recruiter did not anticipate such a large number of participants to complete the questionnaire, and 262 participants were recruited, perhaps due to the novelty of the study or how topical it was. The study was therefore overpowered, which may mean that the study was very sensitive to small effects.

## 2.4 Participants

Two hundred and sixty-two participants were recruited from the general population, using social-media, specifically Facebook. The inclusion criteria were being over 18, and being able to read and understand English. By allowing anyone over the age of 18 to participate it was hoped that a broad range of participants would answer, and thus the study would be generalizable to the wider population.

The demographics of participants can be seen in Appendix J. Participants were aged between 18 and 81 years of age, with the mean age being 39. The majority of participants were university educated (76%), employed (83%), female (81%) and British (85%).

## 2.5 Recruitment

A brief outline of the study was advertised on social media for participants to see (Appendix C), along with the link to the study. An option to contact the researcher by email if participants preferred to participate via a paper copy was also available. The researcher encouraged participants to share the study with other people on social media who wanted to participate. These users were in turn encouraged to share with those not on social media, in an attempt to make the study more representative of this population. The research took place in January 2021, during a third UK national lockdown.

## 2.6 Procedure

After participants clicked the link a participant information sheet (Appendix C) was included at the beginning of the study, including an outline of the risks and whom to contact for support following completion of the survey. This was followed by a consent questionnaire, which comprised of ten yes or no questions (Appendix D). To include the CD-RISC-10 (Connor & Davidson, 2003) in the study, the researcher had to ensure that participants had consented to the terms of use by researchers. If participants failed to consent to both the CD-RISC-10 terms of use or the initial consent form their data was not included in the analysis.

Six demographic questions were asked (Appendix F), such as: age, gender and ethnicity. Ethnicity categories were taken from the UK government website. Participants were asked to state how many hours a week they spent on video-calls for non-work means. Participants were asked to state non-work means, rather than how many they used primarily to contact friends and family as those who are lonely may be more likely to describe people as not being friends than those who are not lonely. Additionally, participants may have been using online platforms for hobby groups, which again participants may not have counted as friends. The survey took no longer than 15 minutes to complete.

Participants were only permitted to complete the survey once, with a block by Qualtrics being used which stopped people from accessing the survey twice from the same device. All of the questions required an answer, reducing the likelihood of missing data, which could affect the power and validity of the results. There were initially 356 responses, but only 262 participants completed the full survey and thus their data were included in the analysis. By closing the study before completing it, the 94 people this pertained to are assumed to have withdrawn their data from the study, as per the details on study withdrawal, on the participant information sheet.

## 2.7 Materials

Loneliness was measured using the University of California at Los Angeles (UCLA) Loneliness Scale (ULS-8) (Hays et al., 1987) (Appendix G). This scale measures the discrepency betweeen a participants desired level of social interaction and their actual level of social interaction. It is a direct measure which does not mention the term loneliness. The scale has eight items, scored on a four point scale (from 1-never, to 4-always), with a maximum score of 32. A higher score indicates a higher level of loneliness. This scale has been demonstrated to have high levels of reliability (α=.84) (WU & Yao., 2008). The internal consistency in this study was acceptable, with a cronbach’s alpha coeficent of 0.608.

Social isolation was measured using the six item Lubben Social Network Scale (LSNS-6) (Luben et al., 2006) (Appendix H). This measure asks people to rate how frequently they see, feel close to and have someone to talk to for both family and friends. It is a six-point Likert scale (from 0- none, 1, 2, 3 -4, 5-8, 9+- nine or more). The scores range from 0-30, with higher scores indicating more social engagement. This scale has been reported to show good validity and reliability (α = 0.83) (Lubben et al., 2006). The internal consistency in this study was good (α=.817).

Resilience was measured using the 10-item Connor Davidson resilience scale (CD-RISC-10, Connor & Davidson, 2003) (Appendix I). Items are rated on a four-point scale (from 0-‘not at all true’ to 4- ‘true nearly all of the time’). A higher score reflects a greater ability to cope with adversity, ie more resilience. The scale has been reported to yield excellent validity and reliability (α = 0.89) (Connor & Davidson, 2003). Additionally, it is one of the most widely used resilience scales (Salisu & Hashim, [2017](https://link.springer.com/article/10.1007/s12144-021-01670-2#ref-CR51)), with Windle et al. (2011) reporting that it was one of the top three resilience scales, with excellent psychometric properties. The internal consistency in this study was good (α=.895).

## 2.8 Statistical assumptions and analysis

Data were analysed using Statistical Package for Social Sciences (SPSS) version 27 (IBM, 2017). The relationship between the predictor variables (video-call use, age, social isolation, and resilience) and the criterion variable (loneliness), was explored using a multiple regression analysis both with and without bootstrapping, as noted below.

To check the data met the assumptions for a multiple regression, data were checked for normality of distribution and linearity, that the variables were independent of each other (collinearity), and homoscedasticity. Spearman’s correlation was used to determine if there was multi-collinearity between the predictors and it was found that the data did not violate this assumption. The assumption of normality was assessed using histograms, Q-Q plots, p-p plots, box plots, skew and kurtosis scores (Seen in Appendix K). Age and video-call use violated these checks. Age was moderately positively skewed, with ages tending to be younger, and there was one outlier. Additionally, video-call use was strongly positively skewed, and kurtotic, however there were 24 outliers for video-call use, which could account for this. As a result, the outliers for video-call use were removed to see if they significantly impacted on skew and kurtosis and the regression was re-run; the results for the regression remained similar with and without the outliers and thus they were kept in the analysis. The data for this can be seen in Appendix N.

Bootstrapping of the multiple regression was used, because the assumptions of normality for the variables age and video-call were violated(Field, 2013). Bootstrapping is a resampling procedure that uses the data set to produce many stimulated samples, this allows for estimates of the sampling distribution to be produced. Field (2013) suggests 2000 samples in the bootstrapping model is adequate. Bootstrapping produces standard errors and confidence intervals that enable a comparison between the original regression and bootstrapped regression, to determine if there are significant differences between the regression model and the bootstrapped model. The similarities between the bootstrapped model and the original model can be seen in Table 3 (and Appendix M).

# 3.1 Results

## 3.2 Descriptive Statistics

The mean, standard deviation and range of scores for each variable can be found in table 1.

**Table 1**

*Descriptive statistics of the predictor variables (resilience, social-isolation, video calls and age) and the criterion variable (loneliness).*

|  |  |  |  |
| --- | --- | --- | --- |
| **Variable** | **Mean** | **SD** | **Minimum- Maximum** |
| **Loneliness** | 18.0 | 4.83 | 8-31 |
| **Resilience** | 25.5 | 6.81 | 2-39 |
| **Social-Isolation** | 15.6 | 5.36 | 2-28 |
| **Video-call** | 2.74 | 4.01 | 0-30 |
| **Age** | 39.1 | 12.9 | 19-81 |

*Note:* Loneliness (ULS-8, University of California at Los Angeles Loneliness Scale); Resilience (CD\_RISC-10, 10 item Connor Davidson Resilience Scale); Social-isolation (LSNS-6, 6 item Lubben Social Network Scale).

The average loneliness score (M=18, S.D=4.83) suggests that on average people did not feel lonely. However, there is no cut off defined for what constitutes lonely vs not lonely, making it difficult to determine what percentage definitively felt lonely. The average score for the loneliness (M=18.0, S.D=4.83) is slightly higher than the average 17.5 which was found in the general public during the pandemic (Hoffart et al., 2020).

The average resilience score (M=25.5, S.D=6.81), was lower than that found in a community survey in the USA (M= 31.8, SD = 5.4)  (Connor & Davidson, 2007; Campbell-Sills et al., 2009).

The average social isolation score (M=15.6, S.D=5.36) was lower than was found in an older adult population in the UK (M=17.4, S.D=5.5) (Lubben, 2006).

The standard deviations for social-isolation, loneliness, resilience were relatively small, suggesting there was less variation in the responses for these variables. However, the standard deviation for age in this current study was high (S.D=12.9), which suggests that the data was more dispersed across ages.

The average age of participants was 39.1 (S.D=12.9). However, there was a large age range of 19-81 years old, contrasting with the above study by Lubben (2006), whose sample comprised only older adults. Full participant demographics can be seen in Appendix J.

## 3.3 Correlations

As part of the regression analysis, correlations between the variables were analysed. Table 2 demonstrates Pearson’s correlations between all the variables. The loneliness and CD-RISC-10 was moderately negatively correlated (r=-.53, p=0.001), therefore, as loneliness increases, resilience scores decrease. There was also a weak moderate negative correlation between loneliness and social isolation (r=-.44, p=0.001); thus, as loneliness increases social isolation decreases. There was, however, no significant relationship between loneliness and age (r=-.030, P=.632) and loneliness and video-call use (r=-.029, p=.646).

**Table 2**

*Pearson’s r correlations between loneliness (criterion variable) and resilience, social isolation, video-call use and age (predictor variables).*

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | 1 | 2 | 3 | 4 | 5 |
| 1. Loneliness | 1 | -.531 \*\* | -.439 \*\* | -0.29 | -.030 |
| 2.Resilience | -.531\*\* | 1 | -.369\*\* | .108 | .101 |
| 3.Social Isolation | -.439\*\* | .369\*\* | 1 | .177\*\* | -.116 |
| 4.Video-Calls | -.029 | .108 | .177\*\* | 1 | -.028 |
| 5.Age (Years) | -.030 | .101 | -.116 | -.028 | 1 |

\*\* Correlation is significant at the 0.001 level (p <0.001)

*Note:* Loneliness (ULS-8, University of California at Los Angeles Loneliness Scale); Resilience (CD\_RISC-10, 10-item Connor Davidson Resilience Scale); Social isolation (LSNS-6, 6-item Lubben Social Network Scale).

## 3.4 Regressions

All of the variables were entered into a multiple regression model (Appendix L), and the comparisons between the bootstrapped model (Appendix M) and the original model can also be seen in Table 3. Predictor variables were age, video-call use, the social isolation and resilience; the criterion variable was loneliness.

**Table 3**

*Multiple regression analysis of resilience (CDRISC-10), social isolation (LSNS-6), video-use, and age as predictors of loneliness (ULS-8).*

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Multiple Regression | | | | | Bootstrapping | | | |
|  | B | SE | **β** | Sig. | 95% CI | Bias | SE | Sig. | 95% CI |
| Constant  (Loneliness) | 29.8 | 1.24 |  | .001 | 27.3-32.2 | -.022 | 1.250 | .001 | 27.3-32.2 |
| Resilience | -.300 | .039 | -.423 | .001 | -.378- -.222 | .002 | .044 | .001 | -.386--.209 |
| Social Isolation | -.258 | .051 | -.286 | .001 | -.358 - -.158 | -.001 | .048 | .001 | -.354--.164 |
| Video-Calls | .081 | .067 | .067 | .721 | -.040 - .203 | -.004 | .055 | .116 | -0.42-.180 |
| Age | -.007 | .018 | -.018 | .190 | -.045 - .031 | 7.320 | .018 | .700 | -.043-.029 |

*Note*: R2 = 35%; Adjusted R2 = 34%. B=unstandardised regression coefficients, SE=standard error, β=standardised regression coefficients, CI=95% confidence intervals, along with bootstrapped comparisons. Bootstrap results are based on 2000 bootstrapped samples. Loneliness (ULS-8, University of California at Los Angeles Loneliness Scale); Resilience (CD\_RISC-10, 10-item Connor Davidson Resilience Scale); Social isolation (LSNS-6, 6-item Lubben Social Network Scale).

The model was significant F(4, 257)=34.4, p=0.01), and accounted for 35% (R²) of the variance, 34% (adjusted R²). Age (β=-.018, p=.190) and video-use (β=-.067, p=.721) were not significant predictors of loneliness scores; but social isolation (β=-.286, p=.001) and resilience (β=-.423, p=.001) were significant predictors of loneliness scores.

The regression model was then re-run with only social isolation and resilience scores to improve the precision of the model. The results of this can be found in Table 4 (Appendix O). When only the significant variables (social isolation and resilience) were included in the model, both social -isolation (β=-.272, p=.001) and resilience (β=-.423, p=.001) remained significant predictors. The model was significant (F(4, 259)=67.8, p=.001), and accounted for 34.4% (R²) of the variance, and 34% (adjusted R²).

**Table 4**

*Multiple regression analysis of resilience (CD\_RISC-10), social isolation (LSNS-6) as predictors of loneliness (ULS-8).*

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | B | SE | Β | *P* | 95% CI |
| Regression 1 | 29.57 | 1.01 |  |  |  |
| Constant  (Loneliness) |  |  |  | .001 | 27.5-31.5 |
| Resilience | -.300 | .039 | -.423 | .001 | -.377- -.224 |
| Social Isolation | -.245 | .049 | -.272 | .001 | -.342 - -.148 |

*Note*: R2 = 34.4%; Adjusted R2 = 34%. B=unstandardised regression coefficients, SE=standard error, β=standardised regression coefficients, CI=95% confidence intervals.

Loneliness (ULS-8, University of California at Los Angeles Loneliness Scale); Resilience (CD\_RISC-10, 10-item Connor Davidson Resilience Scale); Social isolation (LSNS-6, 6-item Lubben Social Network Scale).

# 4.1 Discussion

This study aimed to assess the impact of resilience, social-isolation, age, and video-call use on loneliness in the general population during the Covid-19 pandemic.

In this study higher levels of resilience and lower levels of social-isolation were both significant predictors of lower levels of loneliness. Resilience and social-isolation accounted for 34.4% of the variance in loneliness, which suggests that those with more social-support and resilience experienced less loneliness. Contrary to the study’s hypothesis, video-call use and age were not significant.

65.4% of the variance in loneliness was not predicted by the variables included, which suggests that other variables not included in the study will also impact loneliness. Occupation, for example, has been shown to be a predictor of loneliness (Bu et al., 2020) and may have been an important factor as this research was conducted during the third lockdown when many people were restricted from going to work, whilst others were not. Disability has also been demonstrated to impact loneliness (Macdonald et al., 2018), and this may have been particularly relevant during the Covid-19 lockdowns when some people with disabilities may have been unable to rely on their usual support-networks, or may been more fearful of contracting Covid-19.

This study found that more socially-isolated participants were also more likely to be lonely, suggesting that the quantity of social contacts a person has can reduce levels of loneliness. Social-isolation, however, could not fully account for the variance in loneliness, indicating that, for some, more social contacts does not predict less loneliness. For these people the quality of relationships may be important. The finding that social-isolation was only partly predictive of loneliness is consistent with previous findings suggesting the two variables are separate constructs with some overlap (Coyle & Dugan, 2012; Harden et al., 2020). This may suggest that social-isolation can predict levels of loneliness but other variables (e.g. changes in social-isolation or disability) may also be important to consider. Koyama et al. (2021), found that individuals who found their levels of social-isolation to change because of Covid-19 were more likely to rate themselves as lonely than those who were socially-isolated both before and during Covid-19. This suggests that an individual's perception of their social-isolation is an important consideration.

The results of the regression analysis suggest greater levels of resilience can predict lower levels of loneliness. This finding is consistent with prior research during Covid-19 (Conrad et al., 2021; Gossman et al., 2020; Muller et al., 2020; Padmanabhanunni & Pretorius., 2021a; Padmanabhanunni & Pretorius., 2021b; Sams et al. 2021; Slyvia et al., 2021; Valiente et al., 2021). A person who is resilient may adopt helpful coping-strategies which prevent them from feeling lonely (Bennet, 2010); such as viewing their life with optimism and developing a routine (i.e. keeping busy etc.). On the other hand, higher levels of loneliness may reduce resilience; for example, Wong et al. (2016) suggest that loneliness induces strong negative feelings, which impair a person’s ability to use positive strategies (such as resilience) to reduce loneliness. Resilience could not completely account for loneliness in this study – potentially due to the lower resilience in this sample compared to previous research (Campbell-Sills et al., 2009), perhaps because participants were less able to adopt helpful coping-strategies they may have used prior to the lockdown, e.g. visiting friends, going to the gym, keeping busy, etc.

In this study, age was not predictive of loneliness, contrary to research by Shovestul et al. (2020), but consistent with research by Queen et al. (2014). Findings in this study may have been impacted by the relatively young mean age of the sample (39). There is some research to suggest that loneliness remains stable across the lifespan until old-age when likelihood of loneliness increases (Tomstad et al., 2017). Additionally, the age range of participants may not have been wide enough to show loneliness following a bell-shaped trajectory (loneliness highest in middle age) (Schultz & Moore, 1998) or U-shaped trajectory (loneliness highest in young and old age) (Victor and Yang, 2012; Yang and Victor, 2011). It may be that the sample was not representative enough of the age span to detect a relationship between age and loneliness.

The use of video-calls was not predictive of loneliness. This was contrary to advice from Age UK and WHO (2020), who suggested that video-calls may mitigate the effects of isolation. One potential explanation is that most of the literature has focussed on the benefits of video-calls on loneliness in older adults (Sum, 2008), with a mean sample-age of 39 in this study, this may suggest that the relationship between video-call use and loneliness is mitigated by age. Research during Covid-19 has found an association between phone use and lower levels of loneliness was only present in older adults, whilst the opposite was true for younger adults. Wetzel et al. (2021) hypothesised this was due to older people using their mobiles to stay connected to already-formed relationships, and younger people using their mobiles to expand their social-networks. Additionally, video-call use might have lost its novelty, so been less helpful, by the third lockdown when this study was conducted, or perhaps video-call use made individuals feel more isolated from physical interaction, which may explain the lack of relationship between the two variables.

## 4.2 Limitations

The survey was overpowered after recruiting too many participants, this may mean that the study was very sensitive to small effect sizes. Additionally, abnormalities in the data distribution, such as violations to normality in the variables video-call use and age, may affect its generalisability to settings beyond this sample. The standard errors and confidence intervals, however, remained similar between the bootstrapped model and the original model, therefore it can be assumed that the original model is accurate. 94 participants did not complete the full study – while the reason for this is unknown, it may have been that these individuals felt the study was not relevant to them, did not identify with it, or found it was too long. It is important to acknowledge that the participants who did not complete the study may have differed from the sample in some way, and thus may have affected the results.

Self-report measures were utilised to encourage participation due to their ease of use. The measures used were also shown to be reliable and valid. Self-report measures, however, do have disadvantages, such as: a limited range of answers which may not fit participants’ desired response; social desirability bias; questions being misunderstood; and inaccurate reporting. Moreover, the accessibility of the research may be limited by being online-only and recruited via social-media. There is research to suggest a digital divide, with certain groups having less access to online communication (Dahlberg, 2021). While the researcher advertised that paper copies could be provided for anyone who knew potential participants without online-access, these were not asked for; suggesting that the research did not represent those who were not on Facebook (suggesting a biased and unrepresentative sample). Additionally, it is not possible to verify participants’ identities on social-media, which may have had implications for the results. Participants also may not have understood items on the questionnaire, and due to its online nature could not easily ask the researcher, which may also reduce the validity. It would be useful for future research to determine how those who use social-media to participate in research differ from those who do not use social-media.

## 4.3 Future research

This research adds to current knowledge regarding loneliness across different ages. Research across the age span is limited, with most being completed on older adults, and findings producing contradictory results (Mund et al., 2020). Video-call research has primarily also been done on an older adult populations (Fan, 2016; Nowland et al., 2018; Poscia et al., 2018), it may be beneficial to understand the ways in video-call use differs with age. For example, younger adults may be less likely to use video-calls than older adults, or may use them only for larger, group-calls which make them feel more excluded and lonelier. Understanding how video-call use and loneliness are linked, and if this is mediated by age, is important to consider for understanding loneliness and giving advice to those experiencing loneliness. This could be assessed by asking various ages how exactly they use video-calls and with whom, and their levels of loneliness after these calls.

Furthermore, 76% of participants stated that they were university-educated (compared to 42% in the general population aged 65 and below (ONS, 2017)). Most participants were female (81%). Recruiting a sample that is not representative of the general population limits generalisability, for instance, Hoffart et al. (2020) found that females are more likely to feel lonely compared to males and those who are non-binary, whilst Nicolaisen et al. (2014) and De Jong Giervel et al. (2015) suggested that men are more likely to be lonely. Therefore, future research may benefit from using a sampling method such as stratified sampling, to ensure the sample is reflective of the general population and can be generalised (Barker et al., 2015).

The associations between loneliness, social-isolation, and resilience should continue to be studied. One factor which may underpin the relationship between these variables is attachment theory. Past research has found insecurely-attached individuals are more likely to be lonely (Vanhalst et al., 2013), for example, those who are avoidantly-attached may fear intimacy, and thus may avoid close relationships, but equally feel more lonely; whereas, those who are anxiously-attached may fear abandonment, as such they may perceive interactions which are neutral or not overtly positive as rejection or abandoning, and thus feel alone (Benoit & Di Tommaso., 2020). Those who are insecurely-attached may also state they have fewer social-contacts, despite having the same number as those who are securely-attached. Those who are avoidantly-attached may be less likely to count contacts as friends (Dykas & Cassidy, 2011), due to their perception of wanting to be independent (due to fear of intimacy). Additionally, prior research has suggested attachment style can affect resilience (Rasmussen & Storebø, 2019), those who are avoidantly-attached may be less resilient as they may avoid strategies that rely on others in adverse events, thus being unable to always respond helpfully to stressful events. Meanwhile, anxiously-attached individuals may place importance on seeking closeness from others and view themselves as incapable, possibly making them less able to cope with stressful events. Furthermore, research has suggested that attachment theory may help to explain the relationship between resilience and loneliness (Pakdaman et al., 2016). Future research could use attachment-based self-report measures along with resilience, social-isolation, and loneliness measures to determine if there is a mediating effect of attachment style on the relationship between loneliness, resilience, and social isolation.

## 4.4 Clinical Implications

These findings suggest that friendships and family relationships can be imperative for preventing loneliness, providing important implications for interventions aimed at reducing loneliness. Friendships, for instance, could potentially be cultivated through services and charities, by recommending or prescribing groups such as hobby groups and befriender systems. Research suggests that befriender services can be helpful for reducing loneliness in older adults (Noone & Yang, 2021). There is less research on the benefit of these initiatives on working-age adults, however, Foster et al. (2020) reported that in a study of 2,250 service users, prescribing social support to under 50s was associated with a greater reduction in levels of loneliness than for those aged 50+. It is important to consider this when thinking about interventions across the age span, as typically these services are targeted at those aged 65+ (Gardiner et al., 2018).

Prompt detection of loneliness is essential, as this can help to prevent some of the associated negative physical- and mental-health issues (Ferguson, 2011). There is still a prevalent societal conception that loneliness is predominantly experienced by older people, with a body of research focusing on loneliness in this age group (Barretto et al., 2021; Griffin, 2010). It would helpful for clinicians to consider that loneliness can be experienced at any age, especially in assessments, perhaps by explicitly asking clients if they are feeling lonely. Moreover, loneliness should be considered in clinical formulations, as it may affect how a person interprets social situations and experiences.

The findings in this research support the hypothesis that loneliness can be predicted by levels of internal resilience and objective levels of social-support. There is some support for the use of CBT for improving loneliness, where CBT could challenge unhelpful thinking styles and unhelpful hypotheses about social situations (Masi et al., 2011). Lonely individuals may be more likely to perceive others as more popular than themselves. Thought-challenging may enable individuals to first, recognise they have friends, and second, take action to acquire friends using techniques like problem-solving or role-play. These techniques may help individuals make friends and also enhance their confidence in social situations. Moreover, in a meta-analysis of 111 studies, CBT was demonstrated to increase resilience (Joyce et al., 2017), perhaps by allowing participants to examine situations where they felt helpless or hopeless in a more objective way and think about ways to equip themselves to cope difficult situations (i.e. through gaining support, communicating with others when they needed help etc).

Although the current study did not support the use of video-technology for loneliness, previous research by Wetzel et al. (2021) found that older participants felt less lonely if they used more video-technology (during Covid-19). Support or hobby groups could be adapted to work virtually for those unable to attend physical appointments, such as those with caring responsibilities or physical-health difficulties. This would require adaptation on a case-by-case basis as it may not be helpful for individuals with sensory impairments (Wilson et al., 2022).

# Conclusion

This study aimed to assess the impact of video-call use, age, resilience and social-isolation on loneliness in the general population. This was assessed using an online survey with participants recruited from social-media. Findings supported a relationship between social isolation, resilience and loneliness, however, a relationship between video-call use, age and loneliness was not supported. Limitations are addressed, however, there are important implications for clinicians working with people who are lonely. Further research should determine if the relationship between resilience and loneliness changes over time; if the relationship between video-call use and loneliness changes depending on age; and how loneliness may be different across age groups.

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# Appendices

## Appendix A: Author guidelines for ‘The Journal of Personality and Individual Differences’

[**https://www.elsevier.com/journals/personality-and-individual-differences/0191-8869/guide-for-authors**](https://www.elsevier.com/journals/personality-and-individual-differences/0191-8869/guide-for-authors)

**Key Points include:**

* Manuscripts should be double spaced and pages numbered (This will be completed before submission)
* Research studies should not exceed 5000 words (The word count will be reduced before submission)
* The Abstract should not exceed 200 words
* There is no strict requirement for referencing format
* Article should be defined and numbered in sections, for example 1.1, 1.2…2.1 etc

## Appendix B: Ethical Approval received from Staffordshire University Ethics Committee



## Appendix C: Participant Information Sheet

****

Staffordshire University

College Rd,

Stoke-on-Trent

ST4 2DE  
Department of Psychology

**Participant Information Sheet**

**What is this study about?**

Social distancing has been recommended to help slow the spread of Covid-19, this involves creating and keeping distances between individuals, as well as reducing the number of times individuals come into close contact with each other.

One of the major consequences of Covid-19 may be an increase in both loneliness and social-isolation.

As a result, this study aims to look at the ways in which people are coping during this time, and which factors may be able to predict loneliness.

**What is involved?**

If you agree to take part you will be asked to complete an online questionnaire, which should not take longer than 30 minutes. This will be in English and you will have the opportunity to stop taking part at any time. Before starting, you will be asked to consent to your information being used for the study.

**Am I eligible for the study?**

Anyone above the age of 18 is eligible for this study.

**What are the benefits of taking part?**

There will not be a reimbursement for taking part, however, by taking part we may be able to predict who will be the loneliest as a result of Covid-19, which may then help us to target future interventions accordingly.

**Possible Risks**

When filling out the questionnaire, you may come across questions which make you find upsetting. For example, there are questions which ask you to think about loneliness.

You may feel that you need to respond in a particular way to the questions, however, there is no right or wrong answer.

If you do feel distressed during taking part, the Samaritans can be contacted 24/7 at 116123, or your GP if you feel you need more support.

**Will my information be shared?**

Your answers will be kept anonymous, this means that your identity will be protected. Personal identifiable details, such as your name will not be asked for. Your data will be given a code to protect your answers from being identifiable, and no one will be able to tell which answers are yours. All data will only be available for the research team, and will be stored securely

**What will happen to the data collected, and the results of the research project?**

If you decide to withdraw from the study, it will not be possible to withdraw any data that you have provided prior to the point at which you decide to end your participation. Likewise, as all data will be anonymised during collection it will not be possible to withdraw your data once you have completed the study.

The results from this study will be written up and submitted as a thesis for the clinical psychology doctorate at the Staffordshire University. Additionally, the results may be disseminated through publishing in a peer-reviewed journal. No participants will be identifiable in any publications as data will be pooled from all participants.

The anonymised data we collect will be stored electronically on the research supervisor’s university computer account. After ten years, the data will be disposed of in line with the University of Sheffield guidelines and legislation.

**What if something goes wrong and I wish to complain about the research?**

If you wish to make a complaint about your treatment by researchers or something serious occurring during or following your participation in this project, you should contact the research supervisor via email: Dr Helen Combes (h.a.combes@staffs.ac.uk) and Dr Kim Gordon ([kim.gordon@staffs.ac.uk](mailto:kim.gordon@staffs.ac.uk)). Alternatively you can contact Dr Tim Horne ( Chair of the University Research Ethics Committee):

Research, Innovation and Impact Services

Cadman Building, Staffordshire University, College Road Stoke-on-Trent

ST4 2DF

Tim.horne@staffs.ac.uk

+441782295722

**GDPR Statement:**

*Your data will be processed in accordance with the General Data Protection Regulation 2016 (GDPR).*

*The data controller for this project will be Staffordshire University. The university will process your personal data for the purpose of the research outlined above. The legal basis for processing your personal data for research purposes under the GDPR is a ‘task in the public interest’. You can provide your consent for the use of your personal data in this study by completing the consent form that has been provided to you.*

*You have the right to access information held about you. Your right of access can be exercised in accordance with the GDPR. You also have other rights including rights of correction, erasure, objection, and data portability. Questions, comments and requests about your personal data can also be sent to the Staffordshire University Data Protection Officer. If you wish to lodge a complaint with the Information Commissioner’s Office, please visit*[*www.ico.org.uk*](http://www.ico.org.uk/)*.*

## Appendix D: Consent Form

****Staffordshire University

College Rd,

Stoke-on-Trent

ST4 2DE

Department of Psychology

**Consent form**

Please take time to read all of the following information carefully before indicating that you would like to participate in the study If you agree with each statement, please tick to indicate this.

|  |  |
| --- | --- |
| I have read and understood the project information sheet |  |
| I have been given the relevant details for asking questions about the project |  |
| I understand that no personally identifiable information will be required |  |
| I understand that taking part in the project will involve answering a series of questionnaires |  |
| I understand that taking part is completely voluntary and that I can withdraw at any point (without reason), and that this will be without any adverse consequences |  |
| I understand that although I can withdraw at any point, I will not be able to withdraw any data that has been collected prior to me deciding to withdraw. |  |
| I understand that all of my responses to this study are anonymised. |  |
| I understand that my data will be stored in accordance with Staffordshire University guidelines for data storage. This data will be stored securely for ten years. |  |
| I agree to the authorised researchers having access to the data on this study. |  |
| I understand and agree that the authorised researcher can use my data in reports, publications, webpages and other academic outputs. |  |
| I consent to begin the study |  |

**Please sign here: Date : Here**

## Appendix E: Debrief Form

Thank you for taking part in the study. It is hoped that the data you have provided may provide insight into how people have coped during the coronavirus pandemic.

If you have any questions regarding the study, or how your data will be used please contact the researcher on: [s024502j@student.staffs.ac.uk](mailto:s024502j@student.staffs.ac.uk). Alternatively, if you wish to complain about your treatment by researchers or something serious occurring during or following your participation in this project, you should contact the research supervisor via email: Dr Helen Combes (h.a.combes@staffs.ac.uk) and Dr Kim Gordon ([kim.gordon@staffs.ac.uk](mailto:kim.gordon@staffs.ac.uk)). Alternatively you can contact Dr Tim Horne (Chair of the University Research Ethics Committee):

Research, Innovation and Impact Services

Cadman Building, Staffordshire University, College Road Stoke-on-Trent

ST4 2DF

Tim.horne@staffs.ac.uk

+441782295722

**What about if I feel distressed after taking part in the study?**

If you do feel distressed the Samaritans can be contacted 24/7 at 116123, or please contact your GP if you feel you need more support.

## Appendix F: Demographic, Video-Call use and Health Questions included in the questionnaire

Please specify your age: (drop down box from 18-110)

Please choose the high degree of education you have: high school, college, university

Which of these categories best describe your current relationship status: Married, In a relationship, Single, Divorced, Widowed

Which of these categories best describe your current employment status- employed/ unemployed/ student/ retired/ retired and working/ carer

Which of these categories best describes your gender: Male, Female, non-binary, other, prefer not to say

Which of these categories best describe your ethnicity:

White

English / Welsh / Scottish / Northern Irish / British

Irish

Gypsy or Irish Traveller

Any other White background

Mixed / Multiple ethnic groups

White and Black Caribbean

White and Black African

White and Asian

Any other Mixed / Multiple ethnic background

Asian / Asian British

Indian

Pakistani

Bangladeshi

Chinese

Any other Asian background

Black / African / Caribbean / Black British

African

Caribbean

Any other Black / African / Caribbean background

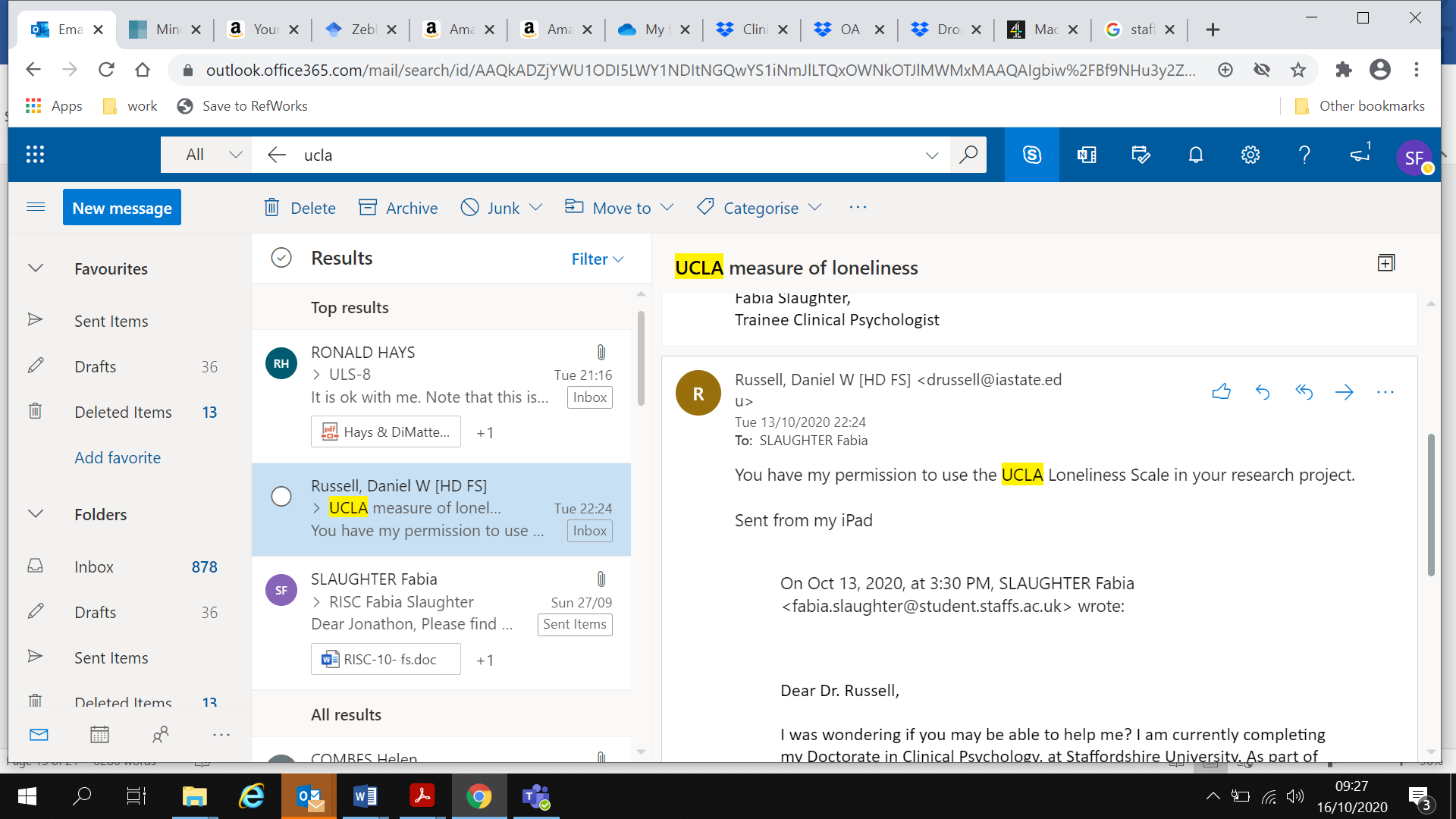
Other ethnic group

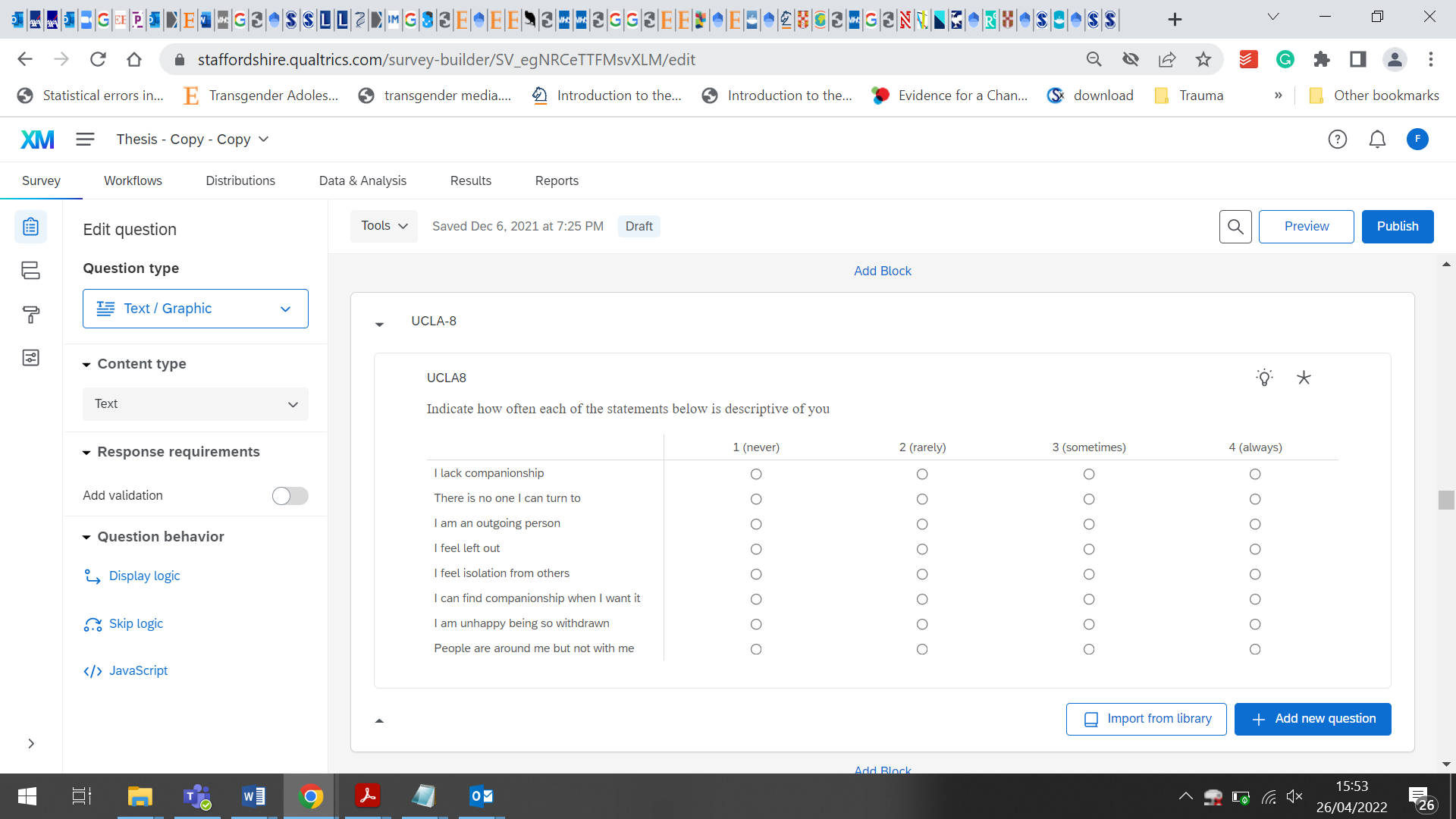
Arab

Any other ethnic group

Please specify how much time you spend video calling, for personal use **(not work use)**, during a typical week: ( drop down box from 0-80 hours)

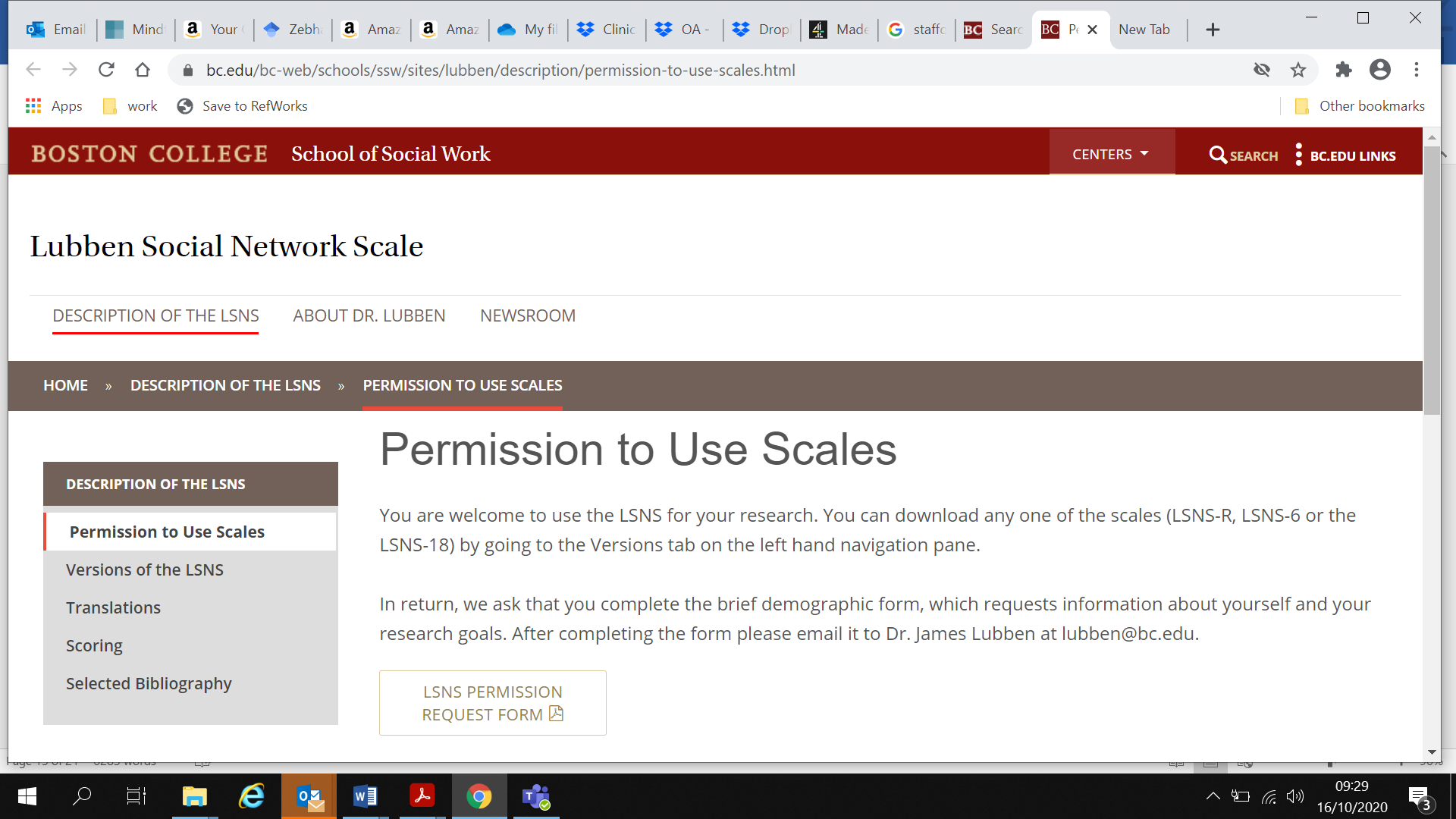
## Appendix G: Permission to use the UCLA Loneliness scale and the scale

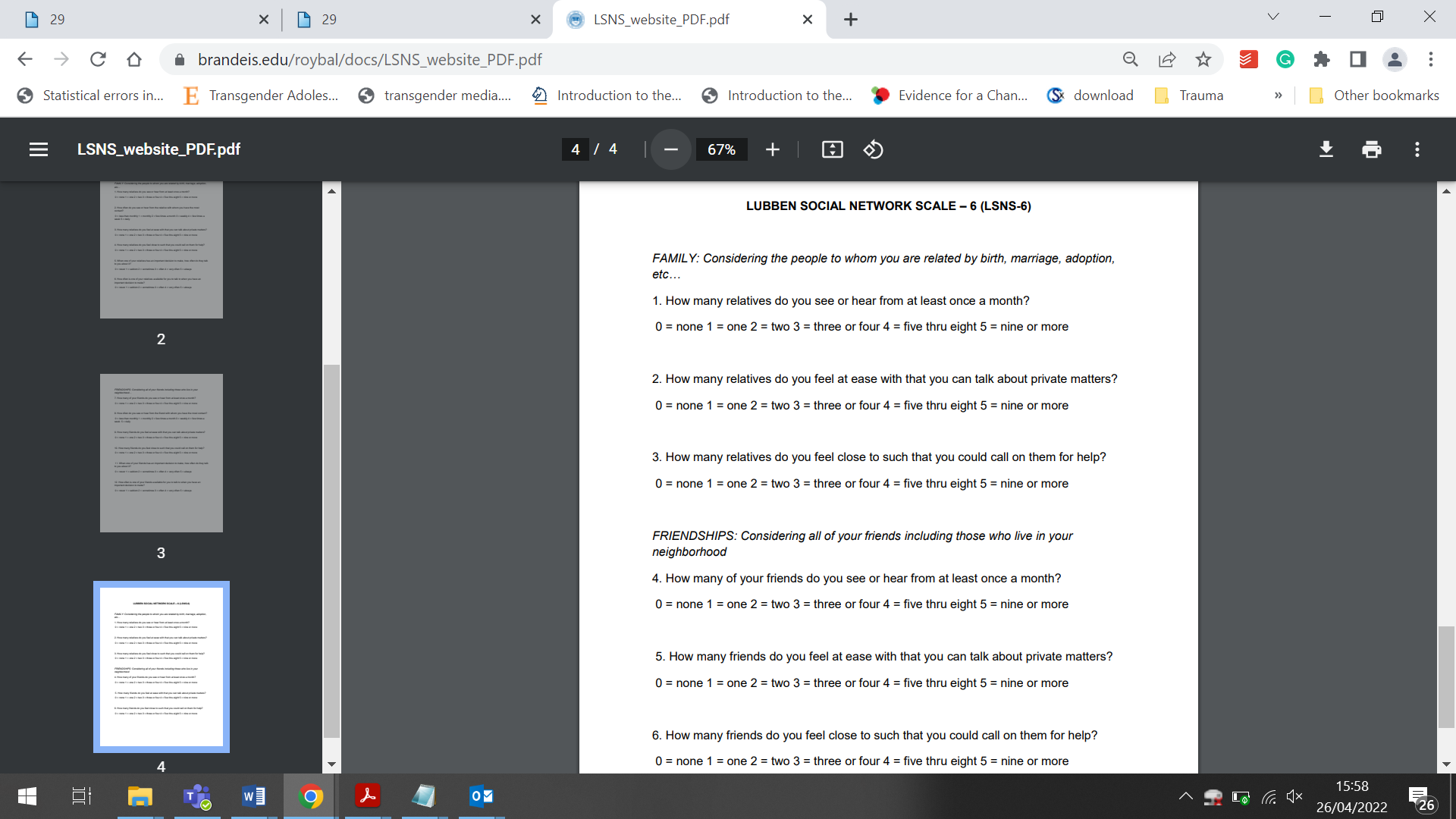




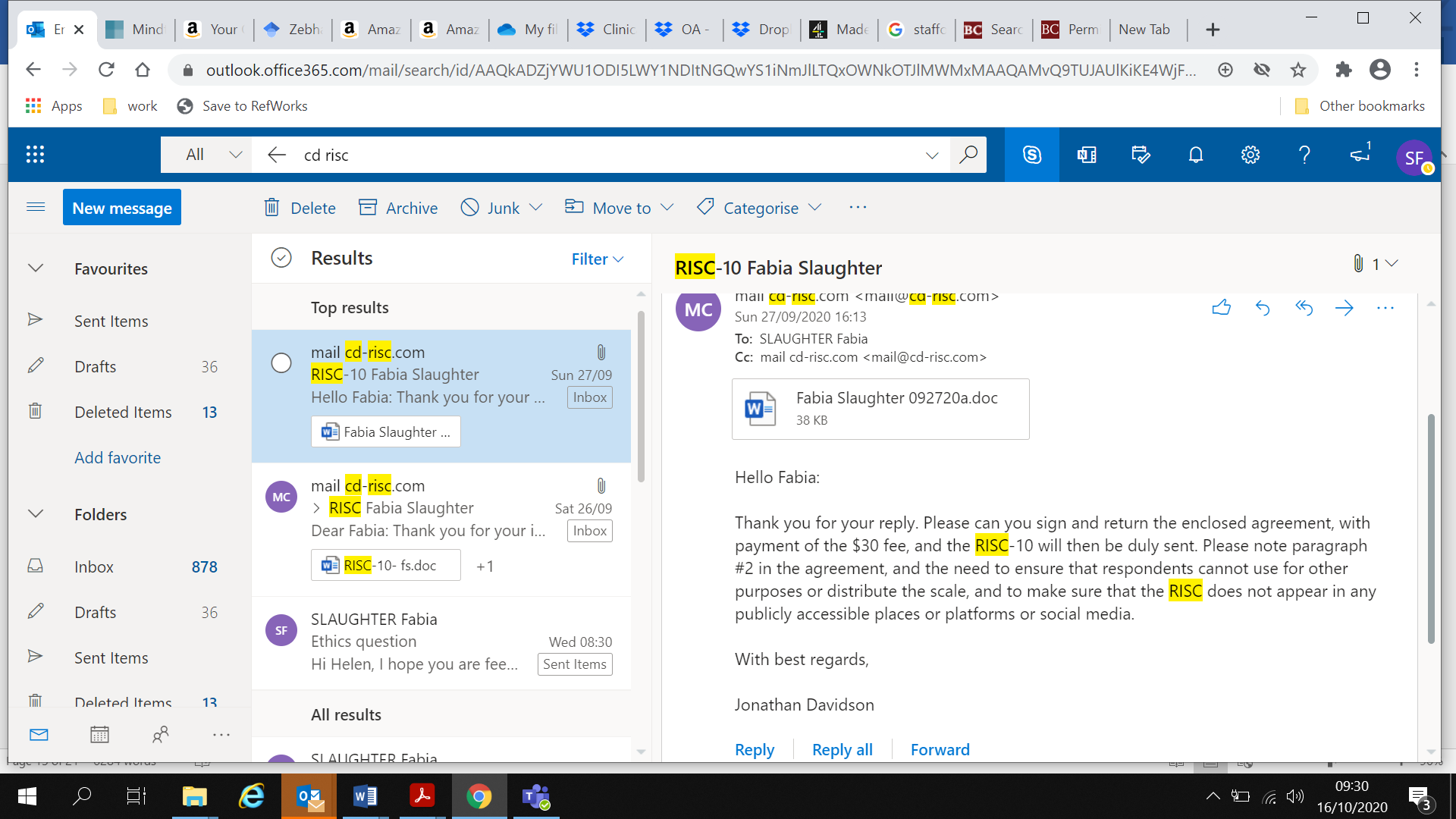
## Appendix H: Permission to use the LSNS-6 scale and the scale

**The following form was completed, which gave me consent to use the scale:**





## Appendix I: Permission to use the CD-RISC



**The CD\_RISC could not be included in the appendix due to copyright restrictions**

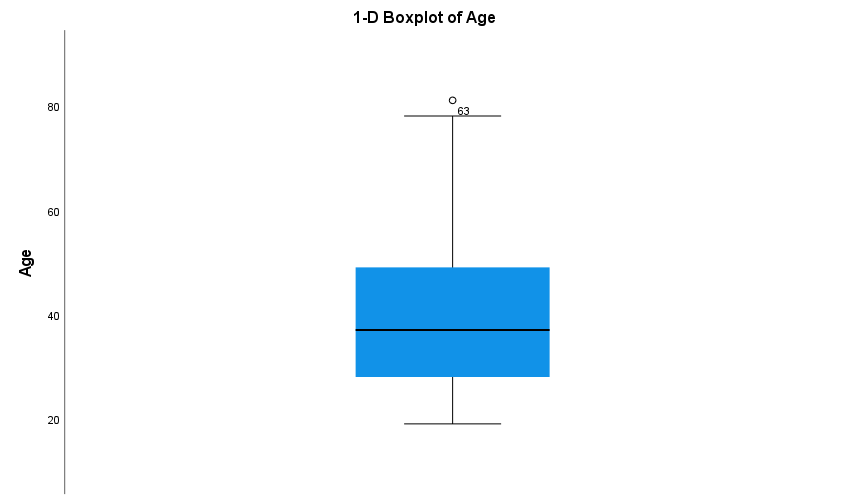
## Appendix J: Descriptive statistics of demographics

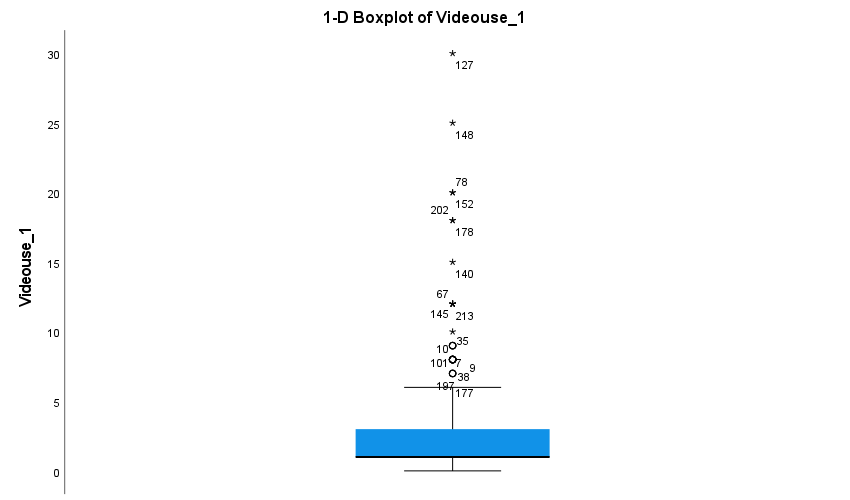
|  |  |  |
| --- | --- | --- |
| **Characteristic** | **Subgroups** | **N = 262 (%)** |
| Age (years) Mean, Medium (Range, SD) |  | Mean=39.16  Medium= 37  Range=19-81 (SD=13.0 3 S.F) |
| Education | High school  College  University | 6.1  18.3  75.6 |
| Relationship Status | Married  In a relationship  Single  Divorced  Widowed | 27.9  36.3  25.6  7.6  2.7 |
| Employment Status | Employed  Unemployed  Student  Retired  Retired and working  Carer | 82.8  4.6  2.7  6.1  1.5  2.3 |
| Gender | Male  Female  Non-binary / third gender  Prefer not to say | 18.3  80.9  .4  .4 |
| Ethnicity | English / Welsh / Scottish / Northern Irish / British  Irish  Gypsy or Irish Traveller  Any other White background  Mixed / Multiple ethnic groups  White and Black Caribbean  White and Black African  White and Asian  Black British  Asian / Asian British  Indian  Pakistani  Bangladeshi  Chinese  Any other Asian background  African  Caribbean  Any other Black / African / Caribbean background  Arab  Any other ethnic group  PLEASE STATE: Latino | 84.7  2.7  0  6.1  1.5  0.8  0  0.4  0  1.5  0  0.8  0  0.4  0.4  0  0.4  0  0  0.4  0.4 |
| Number of people in the household |  | Mean= 1.55 (SD=1.34 3 SF)  Range =0-6 |

## Appendix K: Normality test outputs – showing violations to normality for age and video-call use (issues with assumptions highlighted in yellow)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | | **Age** | **Video-call use** | **Social-isolation** | **Resilience** | **Loneliness** |
| **N** | **Valid** | **262** | **262** | **262** | **262** | **262** |
| **Missing** | **0** | **0** | **0** | **0** | **0** |
| **Skewness** | | **.757** | **3.333** | **-.185** | **-.559** | **.090** |
| **Std. Error of Skewness** | | **.150** | **.150** | **.150** | **.150** | **.150** |
| **Kurtosis** | | **-.126** | **14.550** | **-.393** | **.135** | **-.716** |
| **Std. Error of Kurtosis** | | **.300** | **.300** | **.300** | **.300** | **.300** |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Tests of Normality** | | | | | | |
|  | Kolmogorov-Smirnova | | | Shapiro-Wilk | | |
| Statistic | df | Sig. | Statistic | df | Sig. |
| Age | .122 | 262 | .000 | .934 | 262 | .000 |
| Video-call use | .257 | 262 | .000 | .636 | 262 | .000 |
| Social-isolation | .064 | 262 | .012 | .989 | 262 | .036 |
| Resilience | .084 | 262 | .000 | .974 | 262 | .000 |
| Loneliness | .086 | 262 | .000 | .979 | 262 | .001 |
| a. Lilliefors Significance Correction | | | | | | |





## Appendix L: Regression output for the initial regression model with the predictors: age, video-call use, social isolation, and resilience for loneliness

|  |  |  |  |
| --- | --- | --- | --- |
| **Variables Entered/Removeda** | | | |
| Model | Variables Entered | Variables Removed | Method |
| 1 | Video-call, Age, resilience, social-isolation | . | Enter |
| a. Dependent Variable: Loneliness | | | |
| b. All requested variables entered. | | | |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Model Summaryb** | | | | | |
| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate | Durbin-Watson |
| 1 | .591a | .349 | .339 | 3.93373 | 1.933 |
| a. Predictors: (Constant), Video-call use, Age, Resilience, Social-isolation | | | | | |
| b. Dependent Variable: Loneliness | | | | | |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **ANOVAa** | | | | | | |
| Model | | Sum of Squares | df | Mean Square | F | Sig. |
| 1 | Regression | 2129.277 | 4 | 532.319 | 34.400 | .000b |
| Residual | 3976.876 | 257 | 15.474 |  |  |
| Total | 6106.153 | 261 |  |  |  |
| a. Dependent Variable: Loneliness | | | | | | |
| b. Predictors: (Constant), Video-call use, Age, Resilience, Social-isolation | | | | | | |

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Coefficientsa** | | | | | | | | | | |
| Model | | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. | 95.0% Confidence Interval for B | | Collinearity Statistics | |
| B | Std. Error | Beta | Lower Bound | Upper Bound | Tolerance | VIF |
| 1 | (Constant) | 29.817 | 1.247 |  | 23.907 | .000 | 27.361 | 32.273 |  |  |
| Social-isolation | -.258 | .051 | -.286 | -5.088 | .000 | -.358 | -.158 | .802 | 1.247 |
| Resilience | -.300 | .039 | -.423 | -7.607 | .000 | -.378 | -.222 | .820 | 1.220 |
| Age | -.007 | .019 | -.018 | -.358 | .721 | -.045 | .031 | .961 | 1.041 |
| Video-call use | .081 | .062 | .067 | 1.315 | .190 | -.040 | .203 | .967 | 1.034 |
| 1. Dependent Variable: Loneliness | | | | | | | | | | |

## Appendix M: Regression output for the regression model with bootstrapping the predictors: age, video-call use, social isolation, and resilience for the constant loneliness

|  |  |  |  |
| --- | --- | --- | --- |
| **Variables Entered/Removeda** | | | |
| Model | Variables Entered | Variables Removed | Method |
| 1 | Video-call use, Age, Resilience, Social-isolation | . | Enter |
| a. Dependent Variable: Loneliness | | | |
| b. All requested variables entered. | | | |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Model Summaryb** | | | | | |
| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate | Durbin-Watson |
| 1 | .591a | .349 | .339 | 3.93373 | 1.933 |
| a. Predictors: (Constant), Video-call use, Age, Resilience, Social-isolation | | | | | |
| b. Dependent Variable: Loneliness | | | | | |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Bootstrap for Model Summary** | | | | | |
| Model | Durbin-Watson | Bootstrapa | | | |
| Bias | Std. Error | 95% Confidence Interval | |
| Lower | Upper |
| 1 | 1.933 | -.672 | .118 | 1.034 | 1.491 |
| a. Unless otherwise noted, bootstrap results are based on 2000 bootstrap samples | | | | | |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **ANOVAa** | | | | | | |
| Model | | Sum of Squares | df | Mean Square | F | Sig. |
| 1 | Regression | 2129.277 | 4 | 532.319 | 34.400 | .000b |
| Residual | 3976.876 | 257 | 15.474 |  |  |
| Total | 6106.153 | 261 |  |  |  |
| a. Dependent Variable: Loneliness | | | | | | |
| b. Predictors: (Constant), Video-call use, Age, Resilience, Social-isolation | | | | | | |

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Coefficientsa** | | | | | | | | | |
| Model | | Unstandardized Coefficients | | Standardized Coefficients | T | Sig. | Collinearity Statistics | |
| B | Std. Error | Beta | Tolerance | VIF |
| 1 | (Constant) | 29.817 | 1.247 |  | 23.907 | .000 |  |  |
| Social-isolation | -.258 | .051 | -.286 | -5.088 | .000 | .802 | 1.247 |
| Resilience | -.300 | .039 | -.423 | -7.607 | .000 | .820 | 1.220 |
| Age | -.007 | .019 | -.018 | -.358 | .721 | .961 | 1.041 |
| Video-call use | .081 | .062 | .067 | 1.315 | .190 | .967 | 1.034 |
| a. Dependent Variable: Loneliness | | | | | | | | | |

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Bootstrap for Coefficients** | | | | | | | |
| Model | | B | Bootstrapa | | | | |
| Bias | Std. Error | Sig. (2-tailed) | 95% Confidence Interval | |
| Lower | Upper |
| 1 | (Constant) | 29.817 | -.022 | 1.250 | .000 | 27.284 | 32.220 |
| Social-isolation | -.258 | -.001 | .048 | .000 | -.354 | -.164 |
| Resilience | -.300 | .002 | .044 | .000 | -.386 | -.209 |
| Age | -.007 | 7.320 | .018 | .700 | -.043 | .029 |
| Video-call use | .081 | -.004 | .055 | .116 | -.042 | .180 |
| a. Unless otherwise noted, bootstrap results are based on 2000 bootstrap samples | | | | | | | |

## Appendix N: Regression output for the regression model with the predictors social isolation, resilience, age and video-call use (with outliers for video-call use removed)

|  |  |  |  |
| --- | --- | --- | --- |
| **Variables Entered/Removeda** | | | |
| Model | Variables Entered | Variables Removed | Method |
| 1 | Video-call use, Age, Social isolation, resilience | . | Enter |
| a. Dependent Variable: Loneliness | | | |
| b. All requested variables entered. | | | |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Model Summary** | | | | |
| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate |
| 1 | .589a | .347 | .335 | 3.99117 |
| a. Predictors: (Constant), Videouse\_1, Age, Totalcdrisc, TotalallLubben | | | | |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **ANOVAa** | | | | | | |
| Model | | Sum of Squares | df | Mean Square | F | Sig. |
| 1 | Regression | 1936.312 | 4 | 484.078 | 30.389 | .000b |
| Residual | 3647.842 | 229 | 15.929 |  |  |
| Total | 5584.154 | 233 |  |  |  |
| a. Dependent Variable: Loneliness | | | | | | |
| b. Predictors: (Constant), Video-call use, Age, Resilience, Social-isolation | | | | | | |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Coefficientsa** | | | | | | |
| Model | | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. |
| B | Std. Error | Beta |
| 1 | (Constant) | 30.396 | 1.362 |  | 22.316 | .000 |
| Resilience | -.300 | .042 | -.416 | -7.167 | .000 |
| Social-isolation | -.252 | .055 | -.272 | -4.596 | .000 |
| Age | -.013 | .021 | -.035 | -.635 | .526 |
| Video-call use | -.204 | .171 | -.065 | -1.193 | .234 |
| a. Dependent Variable: Loneliness | | | | | | |

**When the outliers for video- call use were removed, the total cases equated to 234. However, removing the outliers for video-calls did not make a difference to the significance of video-call use in this model (β=-.0.65, p>0.01). When these outliers were removed, the model accounted for 34.7% % (R²), and 33.5% (adjusted R²), and remained significant ((F=30.3), p<0.00).**

## Appendix O: Regression output for the regression model with the predictors social isolation and resilience

|  |  |  |  |
| --- | --- | --- | --- |
| **Variables Entered/Removeda** | | | |
| Model | Variables Entered | Variables Removed | Method |
| 1 | Resilience, Social Isolationb | . | Enter |
| a. Dependent Variable: Loneliness | | | |
| b. All requested variables entered. | | | |
|  | | | |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Model Summaryb** | | | | | |
| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate | Durbin-Watson |
| 1 | .586a | .344 | .339 | 3.93275 | 1.938 |
| a. Predictors: (Constant), Resilience, Social Isolation | | | | | |
| b. Dependent Variable: Loneliness | | | | | |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **ANOVAa** | | | | | | |
| Model | | Sum of Squares | df | Mean Square | F | Sig. |
| 1 | Regression | 2100.315 | 2 | 1050.157 | 67.899 | .000b |
| Residual | 4005.838 | 259 | 15.467 |  |  |
| Total | 6106.153 | 261 |  |  |  |
| a. Dependent Variable: Loneliness | | | | | | |
| b. Predictors: (Constant), Resilience, Social-isolation | | | | | | |

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Coefficientsa** | | | | | | | | | | |
| Model | | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. | 95.0% Confidence Interval for B | | Collinearity Statistics | |
| B | Std. Error | Beta | Lower Bound | Upper Bound | Tolerance | VIF |
| 1 | (Constant) | 29.576 | 1.017 |  | 29.092 | .000 | 27.574 | 31.578 |  |  |
| Social-Isolation | -.245 | .049 | -.272 | -4.961 | .000 | -.342 | -.148 | .843 | 1.186 |
| Resilience | -.300 | .039 | -.423 | -7.721 | .000 | -.377 | -.224 | .843 | 1.186 |
| a. Dependent Variable: Loneliness | | | | | | | | | | |

# Paper Three: Executive Summary

**Can age, video-call use, social-isolation and resilience predict levels of loneliness during coronavirus-19?**

Fabia Slaughter

Total word count: 2132

Executive Summary

***Predictors of Loneliness during Covid-19***

# Who is this summary for?

This report is an executive summary of a research project. It was carried out in the third national lockdown, during Covid-19. This report is for participants who took part or anyone with an interest in the topic, and wishes to read about the study and its findings.

When preparing this report a draft version was read by two individuals, one of whom had been lonely during Covid-19. They provided recommendations on how to improve this document, to make it as accessible as possible. Changes were made based on these comments.

**Research by Fabia Slaughter (Trainee Clinical Psychologist) and Dr Kim Gordon (Lecturer in Clinical Psychology)**

# Background to the Research

## *Covid-19 and Loneliness*

The Office of National Statistics (ONS, 2020) reported that of 3134 people surveyed 2/3rds said they were worried about their wellbeing as a result of Covid-19. Wellbeing is complex, and is a mixture of feeling well and feeling that quality of life is good. Previous national outbreaks, such as SARS (Severe Acute Respiratory Syndrome) have resulted in the following:

* Anxiety
* Low mood
* Loneliness
* Feelings of lack of support (Rohr et al., 2020).

It might be likely that Covid-19 will result in these feelings also, and it would be useful to determine if Covid-19 has made people feel more lonely (Holmes, 2020).

## *What is Loneliness?*

Loneliness refers to a when a person believes they would like more social contacts than they currently have and feel alone as a result (Peplau & Perlman, 1984). For example, a person may want to talk to another person (such as, a friend or family member) about a personal issue, but may also feel like they do not have this person in their life (Green et al., 2001). Alternatively, a person may not have anyone to talk to about a personal issue, but might not feel lonely because they choose not to be around other people.

It is currently estimated that 14% of people in the United Kingdom (UK) are feeling lonely (ONS, 2017). Some of the negative effects of loneliness may be:

* Feeling anxious or low in mood
* Self-harm
* Heart disease and stroke, as those who are lonely are more likely to have a higher body-mass index, partake in behaviors such as smoking, having a higher alcohol consumption and doing less physical exercise, be economically deprived, and perhaps be more likely to be depressed (Elovainio et al., 2017; Turecki et al., 2019; Valtorta et al., 2016).

It is also important to acknowledge that there are multiple causes for the above difficulties, other than loneliness.

*The Current study*

It is unclear how to reduce loneliness. There may be four potential factors which influence this:

1. Social integration (is the opposite of social isolation): this is when a person interacts with others, for example they have lots of friends and family they feel close to. Research has shown that increasing who a person can talk to and the activities they do, only has a small impact on how much loneliness a person feels (Menec et al., 2019). During Covid-19 however, people may have less access to support systems, people may feel more lonely.
2. Resilience: this is a person’s individual level of hardiness or grit; or a person’s ability to bounce back from or manage stressful life circumstances (Bonanno et al., 2011). This may make people feel less lonely as they see the situation as temporary, and feel that they can cope despite these tough times.
3. Keeping connected by video-call use (i.e. zoom, Facetime etc.): Age UK, and the World Health Organisation recommended that people use more video-calls during Covid-19. These can help people to still keep in touch with others, despite not being able to be physically with them due to social-distancing guidelines.
4. Being a certain age: The evidence on whether certain age groups experience more loneliness is mixed. Some research suggests that older people feel more lonely (Victor & Yang, 2012), whilst, other studies suggest loneliness is lowest in older age groups (Schnittker, 2007); whereas there is some evidence that those who are middle age experience the most loneliness (Schultz & Moore, 1998). Alternatively, some research suggests age and loneliness are not related (Queen at al., 2014).

Covid-19 is an unprecedented time, and it is important to understand how periods of lockdowns, may have affected feelings of loneliness. It is also important to understand what makes some people more likely to experience loneliness than others. Some factors which may have an impact on loneliness are: Video-calls as these may reduce feelings of loneliness by ensuring people can still keep in contact with others; Remaining socially connected to others despite physical distancing guidelines; Using resilience to enable individuals to feel they can cope through the difficulty of a national lockdown. Understanding what factors influence loneliness, could help to target intervention for reducing loneliness (i.e. resilience strategies, social support groups)..

# Study Aims

Previous research, suggests that Covid-19 restrictions may result in loneliness and negative health outcomes. This study, therefore, aimed to investigate which factors may predict which factors predict loneliness. In particular, the empirical study aimed to assess if resilience, social-isolation, age and video-call use could predict how much loneliness a person may experience during this time.

Based on a review of research on loneliness, it was thought that the following would predict lower levels of loneliness:

1. Greater resilience,
2. More video-call use
3. Greater levels of social connectedness
4. Age would have an impact

# The Study Design

The study involved asking people to complete questionnaires on loneliness, resilience, social-isolation, their age and how many hours per week they spent video-calling people. Participants were informed that taking part was anonymous, meaning that any information which would identify them (such as name, or date of birth) was not required to take part.

People were asked to take part through social media (Facebook). A link to the online website was advertised where people could read more about the study, and then go onto complete the questionnaires. Additionally, contact details were included for any queries. Participants were encouraged to share the study with people who were not on social media. Moreover, it was highlighted that paper copies could be provided for anyone who might like to take part, but did not have access to a computer or preferred to complete these by hand.

## *Approval to Carry out The Study*

Ethics approval was gained from the Staffordshire University Ethics committee. They reviewed the information about the study, which was provided before completing the piece of research.

## *Who Participated?*

262 people took part in the study, the average age of participants was 39 years old, and the range was 19-81 years old. Some more information about these participants, such as level of education and relationship status can be seen in table 1, and the gender of participants can be seen in figure 1.These were asked of participants to gain a more accurate understanding of who took part in this research.

**Table 1**

*Demographics of participants, level of education and relationship status*

|  |  |  |
| --- | --- | --- |
| **Characteristic** | **Subgroup** | **Percentage (%)** |
| Highest level of education | High school  College  University | 6.1%  18.3 %  75.6% |
| Relationship Status | Married  In a relationship  Single  Divorced  Widowed | 27.9%  36.3%  25.6%  7.6%  2.7% |

**Figure 1**

*Pie chart to show percentage of male and female participants.*

## *Method of Data Collection*

Participants could either take part online or through a paper copy of the survey. Participants were directed to an information sheet, which included details of the study. The survey took no more than fifteen minutes to complete.

The questionnaires included in the research had previously been created by researchers, and had been used in healthcare settings; they are commonly used scales which are reliable and valid. The questionnaires included were:

1. Loneliness was measured using the University of California at Los Angeles (UCLA) Loneliness Scale (ULS-8) (Hays et al., 1987). The measure asks people how often they feel close to others, or could discuss difficult topics with others. A higher score suggests more loneliness.

2. Social-isolation was measured using the six item Lubben Social Network Scale (LSNS-6) (Lubben et al., 2006). This measure asks people to rate how often they see, feel close to and have someone to talk to for both family and friends. A higher score suggests less social-isolation.

3. Resilience was measured using the 10-item Connor Davidson resilience scale (CD-RISC-10, Connor & Davidson, 2003). This asks people how often they are able to use coping strategies such as telling themselves they can cope or remaining positive during stressful events. A higher score reflects a greater ability to cope with adversity, i.e. more resilience.

*Data Analysis*

Lots of data was collected from the responses to the online survey. A statistical method called ‘multiple regression analysis’ was used. A regression highlights if there is a relationship between two or more concepts, for example, if one concept (i.e. social isolation) can predict another concept (i.e. loneliness). These concepts are called variables, loneliness, resilience, social isolation, video-call use and age are all variables.

If one variable does can predict another, then we could say that it significantly predicts the other (for example, social isolation significantly predicts loneliness). A multiple regression looks at how much several variables (i.e. age, social isolation, resilience and video-call use) can predict one variable (i.e. loneliness). It does not mean, however, that one causes the other, simply that there is a relationship between the two factors.

# Main Findings

The following factors were found to be significant predictors/ not significant predictors of loneliness:

**Lower loneliness was predicted by:**

* Less social Isolation
* More resilience

**Loneliness was not predicted by:**

* Age
* Video-Call use

Social-isolation and resilience significantly predicted loneliness scores, meaning that this result is unlikely to have been found by chance. The analysis showed that social-isolation and resilience explained 34.4% of loneliness scores (this is demonstrated in Figure 3). This means that 66% of loneliness was not predicted by resilience and social-isolation.

*Figure 3*: Pie chart to show how much of loneliness was predicted by social isolation and resilience

# Conclusions and Recommendations

The study findings showed that people’s loneliness was predicted by:

* Feeling able to cope with stress (resilience)
* Feeling able to contact a greater number of people

The study’s findings suggest that loneliness was not predicted by:

* A person’s age
* The amount of time a person spent using video-calls

More research is needed before we can be certain of the findings, however, results from this study may be insightful for clinicians and individuals when considering loneliness. It is important to note that although social isolation and resilience can predict loneliness. It cannot be concluded that these factors cause loneliness.

The analysis also showed that a large proportion of loneliness was explained by factors other than social isolation and resilience. In this study the majority of participants were female and the average age was 39 years old, which means that we cannot know that the same variables would predict loneliness in other genders of different ages (i.e. older ages). Social media was used to recruit participants, however many people do not have access this. These individuals may experience loneliness differently, for example, they may be less or more lonely.

*Recommendations:*

* This study did not support that age was related to loneliness. This is important to consider, as clinicians (i.e. psychologists/ GPs etc.) should ask all ages of people if they experience loneliness.
* People should be made aware that loneliness is a personal experience, meaning that what causes loneliness for one person may not for another. Allowing people to know this may help people explore what may help reduce their own personal loneliness.
* Clinicians should try and help people make sense of their experiences of loneliness. For example, why they might feel lonely, or what impact feeling lonely is having on their day-to-day life.

*Recommendations for researchers:*

* The study looked at how resilience, social isolation, video-call use and age affected levels of loneliness. However, it would be helpful to conduct this research on a more representative sample (larger age range, a more even gender split etc.).
* It would also be useful to perhaps conduct this study over a longer time period, so that the effect of social-isolation and resilience on loneliness can be can be assessed, which may provide insights into which factor may cause the other.
* It would be helpful to assess the benefits of using video-calls when other forms of communication are available, and who video-calls are still useful for.

# Distributing the Findings

This study was carried out as part of the researcher’s requirements for their professional qualification in Clinical Psychology. The executive summary will be available to anyone on request from the researcher. The main empirical paper will be submitted to an academic journal, which may add to the evidence base on people’s experiences of loneliness during Covid-19.

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