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Correlates of the Depression and Hopelessness Relationship in Older Adults: A systematic review and empirical investigation in a rural community sample

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Doctorate in Clinical Psychology

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May 2017

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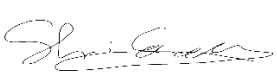

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Contents

Thesis Abstract

Background: Links between later life depression (LLD) and adverse health outcomes are well-documented, with mental ill-health in rural older adults highlighted as a priority area for health care policy. In working age adults, models of depression show that specific psychological factors (e.g. hopelessness, neuroticism, extraversion and insecure attachment) interact with life stress to increase risk of depression. In older adults, however, the direct relationship between depression and hopelessness is inconsistently replicated. In addition, there is little evidence regarding how psychological factors interact with vulnerability to depression in older adults; and whether these factors act in the same manner as they do in working age adults.

Objectives: A systematic review was carried out in order to determine the strength of the depression-hopelessness relationship, and the influence of personality traits (neuroticism/ extraversion) and insecure attachment (anxious/ avoidant) on this relationship. Next, an exploratory study was carried out to determine whether there was a direct relationship between depression and hopelessness in rural older adults living in the community and, secondly, whether this relationship was indirectly influenced by specific psychological factors (e.g. neuroticism, extraversion, and attachment styles).

Methods: The systematic review was carried out using several databases (Psychinfo, Science Direct, EBCOS, Cohrane Library, PROSPERO, WEBCAT and Google Scholar). Studies relating to the variables of interest, meeting inclusion and exclusion criteria, were reviewed and evaluated for methodological biases. The pilot study asked older adults ($N = 58$) living in a remote and rural region to complete and return a packet of self-report questionnaires (Big Factor Inventory-10, Experiences in Close Relationships, Depression, Anxiety and Stress Scale, and the Beck Hopelessness Scale).

Results: The systematic review identified twenty-one studies; four examining the depression-hopelessness relationship and seventeen investigating the effects of neuroticism, extraversion and insecure attachment styles on wellbeing, depression and/ or hopelessness. Findings from the pilot showed a direct relationship between depression and hopelessness in rural community dwelling older adults, with only neuroticism indirectly influencing this relationship.

Conclusions: The systematic review suggests that it is not possible, as yet, to draw robust conclusions from the existing evidence base regarding the influence of psychological variables on depression and hopelessness in older adults. The findings were particularly sensitive to methodological limitations (e.g. variability between sampling methods and small effect sizes). Despite this, studies suggest some evidence for attachment and personality influencing on the depression-hopelessness relationship. Likewise, findings from the pilot study are limited by the small sample size and cross-sectional nature of the data. Preliminary findings, however, suggest that neuroticism, and not beliefs about insecure attachment, strengthens the relationship between depression and hopelessness in non-clinical, rural older adults. These findings are consistent with research on working age adults and could, potentially, represent an emerging relationship in non-clinical older adults. Further research, however, is required as to whether the same patterns are observed in clinical populations.

Part 1: Systematic Review

A Systematic Review of the Inter-Relationships between Depression, Hopelessness, Personality and Insecure Attachment

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Drs MacBeth and Higgon provided input into the thesis as supervisors. This systematic review has been written in accordance with the author guidelines for Ageing, Neuropsychology and Cognition (Appendix item 3).

Abstract: 149

Word Count: 11, 671

Abstract for Systematic Review

Background: Though specific factors (e.g. neuroticism, extraversion and insecure attachment) are consistently linked to depression and hopelessness in working age adults, there is limited understanding about their impact in older adults.

Objectives & Methods: The systematic review aimed to identify the strength of the depression-hopelessness relationship and secondly, to determine the influence of personality and insecure attachment. Several databases (Psychinfo, Science Direct, EBCOS etc.) were used to identify relevant studies meeting the inclusion/ exclusion criteria. Included studies were evaluated for methodological biases.

Results: Twenty-one studies were identified; four examining the depression-hopelessness relationship and seventeen investigating personality and attachment effects on wellbeing and/ or depression/ hopelessness. Though findings suggest a lack of high quality research, a consistent influence of attachment and personality on the depression-hopelessness relationship was observed.

Conclusions: High quality studies are needed to robustly assess the influence of personality and attachment on the depression-hopelessness relationship in older adults.

Introduction

Depression in later life (LLD) is associated with increased mortality rates (Adamson, Price, Breeze, Bulpitt, & Fletcher, 2005), as well as poorer health outcomes (Fiske, Wetherell, & Gatz, 2009). Depressed older adults are estimated to be twenty three times more likely to complete suicide compared to non-depressed (O'Connell, Chin, Cunningham, & Lawlor, 2004). There is also a substantial body of evidence which suggests that LLD is a prodromal indicator for future neurocognitive decline (Ehrt, Bronnick, Leentjens, Larsen, & Aarsland, 2006; Ownby, Crocco, Acevedo, John, & Loewenstein, 2006; Park et al., 2007), regardless of whether the depressive episode was a first-time or recurring episode (Butters et al., 2008). Collectively, these studies suggest that LLD not only impacts mental health but it also affects physical wellbeing. Given the ageing population, LLD is also likely to become an area of growing public health concern (Adamson et al., 2005; Minister of Health, 2017). Research on the correlates of depression in later life, however, are still somewhat limited, with studies often reporting conflicting findings, or highlighting key differences between working age and older adult populations.

Transdiagnostic model of depression and implications for LLD research

The transdiagnostic model proposes that vulnerability to depression is caused by difficulties in three areas:- negative affectivity, positive affectivity and autonomic arousal:- which interact with life stress to create emotional distress (Barlow, 2008) across the lifespan (Barlow, Allen, & Choate, 2004; Ellard, Fairholme, Boisseau, Farchione, & Barlow, 2010). Each component of the transdiagnostic model reflects a particular system implicated in regulating emotions with individual variations in these systems either increasing or decreasing the propensity of developing a psychopathology (Fried & Nesse, 2015).

In working age adults, individual differences in levels of hopelessness, personality characteristics or attachment styles are consistently shown to affect emotional regulation processes and thus, increase the risk of developing psychopathologies (Manning, Chan, & Steffens, 2017; Nock, Wedig, Holmberg, & Hooley, 2008). The implications of this theory, however, are more tentative when applied to older adults. Given that older adulthood is a stage of continuous change and adaption, these changes and adaptions could, potentially, place increased demand on already limited resources. As such, variations in these psychological factors could influence how events and stressors typical of this age stage, such as bereavement, job losses, retirement, and physical ill-health, are processed, interpreted and responded to (Hyer, 2013).

Depression and Hopelessness in Older Adults

There is a lack of consensus over how hope and hopelessness relate to one another. Some researchers suggest that they reflect opposite ends of an emotional continuum (McGee, 1984) whereas others propose that they are related constructs that co-exist (Dufault & Martocchio, 1985). Likewise, hope and hopelessness are thought to be state, or trait-like, processes that influence how an individual copes when faced with adversity based on past successes and failures (Melges & Bowlby, 1969).

What is clear, however, is that hope reflects a future-oriented belief in one's ability and agency to achieve a desired goal. Snyder (2000) defines hope as a belief that meaningful goals can be achieved using purposeful behaviour. To achieve a goal, individuals need to identify meaningful goals, steps involved in attaining them and how they might flexibly re-evaluate behaviour and goals should obstructions appear (Snyder, Feldman, Taylor, Schroeder, & Adams, 2000).

Hopelessness, in contrast, refers to the belief that the individual is powerless to achieve a desired goal (Schneider, 2012) and as such, reflects a key feature of depressed mood (Beck, Weissman, Lester, & Trexler, 1974). Rapkin and Fischer (1992) show that individuals who score lower on trait measures of hope are more likely to use disengagement or avoidant type strategies when faced with obstacles. They are also less likely to try alternative routes to goal resolution with a lack of progress leading to a reduced sense of agency and efficacy (Snyder, 2002), and higher levels of dysphoria (Chang & DeSimone, 2001). Research also shows a symbiotic relationship between levels of depression and state hopelessness (Abramson, Metalsky, & Alloy, 1989) with higher levels of hopelessness consistently increasing suicide risk above all other suicide risk factors (Steeg et al., 2016; Wenzel & Beck, 2008) in working aged adults.

In older adults, however, the relationship between depression and hopelessness appears less clear. Some studies show a direct relationship between hopelessness and depression (Lau, Morse, & Macfarlane, 2010) whereas others suggest that hopelessness indirectly increases the propensity for suicidal ideation but only under conditions of moderate to severe depression (Alloy, Abramson, Metalsky, & Hartlage, 1988; Greene, 1989; Uncapher, Gallagher-Thompson, Osgood, & Bongar, 1998). Studies also suggest that, in depressed older adults, hopelessness is more closely linked to emotional regulation difficulties, negative affectivity, ruminative thinking (Lynch, Cheavens, Morse, & Rosenthal, 2004) or specific personality constructs (Chapman, Duberstein, Sörensen, & Lyness, 2006) compared to depression.

Collectively, these studies suggest that there may be critical differences between working age and older adults and given the critical role that hopelessness plays in depression, there needs

to be a better understanding of what contributes to hopelessness in older adults in order to understand LLD. For instance, when faced with the challenges associated with older adulthood, it may be that variations in underlying levels of hope, personality characteristics and attachment styles influence how individuals view this age stage; as a period of challenge, growth and wisdom enhancement or as a threat over which they have little control over (Geiger, Morey, & Segerstrom, 2017).

Potential Psychological Factors

While the evidence base for the role of personality and attachment on this relationship is unclear, there is evidence to suggest that specific personality traits and attachment styles affect emotional regulation (Bylsma, Morris, & Rottenberg, 2008; Nock et al., 2008) and consequently, levels of depression and hopelessness. There is also evidence to suggest that personality and attachment styles exert reciprocal influences on each other (Carver & Scheier, 2002; Joiner & Coyne, 1999; Magnusson, 1999; Sameroff, 1994), suggesting that, perhaps, specific combinations of personality and attachment styles may increase or decrease psychological resilience when faced with the tasks of older adulthood (Bonanno, 2004).

Personality Characteristics: Risk and Resilience.

Personality characteristics relate to an enduring way of processing events which, in turn, affects how individuals respond to situations (McCrae, Terracciano, & Costa, 2017). Personality theorists propose robust evidence for five higher order personality characteristics; Openness, Conscientiousness, Extraversion, Agreeableness and Neuroticism (Costa & McCrae, 1992; Mu, Luo, Nickel, & Roberts, 2016; Zinbarg et al., 2016).

Openness to experience relates to how individuals respond to new or novel situations (McCrae, 1987). In older adults, being open to adjusting personal goals in a flexible manner is shown to result in lower rates of depression (Dunne, Wrosch, & Miller, 2011) and suicidal ideation (Bamonti, Price, & Fiske, 2014) as well as increasing psychological wellbeing (Hall, Chipperfield, Heckhausen, & Perry, 2010). This is because high rating individuals are more likely to appraise novel situations as intriguing and find creative solutions to manage potential obstacles (Costa & McCrae, 1992). Valuing autonomy and needing control, conversely, is shown to strengthen the relationship between depression and suicide in older men, but not older women (O'Riley & Fiske, 2012; Pasterfield et al., 2014).

Conscientiousness, in contrast, relates to underlying determination, need for conformity and adaptability to social contexts. There are some suggestions that in highly controlling situations (e.g. those involving frequent monitoring and observations), high levels of conscientiousness, rather than openness, help individuals to conform to the expectations of the social environment (George & Zhou, 2001). There are also suggestions that conscientiousness correlates with levels of self-motivation in depressed older adults (Koorevaar et al., 2017).

Extraversion relates to individual differences in levels of cortical arousal which, in turn, influence the desire for social contact (Eysenck, 1967a). As such, individuals rating high on extraversion dimensions may be more likely to seek out social groups in order to reach optimal levels of cortical arousal whereas low raters (e.g. introverts) may not require the same level of social interaction to reach their optimal level of cortical arousal (Apter, 1989; Gray, 1970). Low ratings on this dimension are typically associated with severe depression and poorer treatment outcomes (Kudo et al., 2017), which could be a consequence of the

links between extraversion and post-retirement activity levels (Terracciano, Löckenhoff, & Costa, 2017).

Agreeableness relates to the social domain of compassion; a willingness to trust, forgive and be loyal to others. Whisman, Uebelacker, Tolejko, Chatav, and McKelvie (2006) show that low levels of agreeableness, and high levels of neuroticism, are associated with marital discord in older adults, with marital discord correlating with low levels of life satisfaction and depression. At the opposite end of the spectrum, high agreeableness, combined with low neuroticism, correlate with low levels of reminiscing about past hurts, with reminiscing frequency correlating with psychological distress (Cully, LaVoie, & Gfeller, 2001). Reminiscing frequency, as defined by the authors, could also be considered conceptually similar to ruminative brooding, which is shown to be a transdiagnostic factor for depression (Nolen-Hoeksema & Watkins, 2011).

Neuroticism relates to an overly sensitive amygdala and as such, is thought to represent an increased sensitivity and reactivity to emotions under conditions of stress (Eisenberg, 2000; Gray, 1970; Hyer, 2013). Emotional reactivity and sensitivity are considered to be key features of emotional regulation difficulties (Nock et al., 2008), and sub-components of neuroticism.

Taken as a whole, these studies show that individual variations in the big five traits (openness, conscientiousness, extraversion, agreeableness and neuroticism) influence how older adults appraise situations by increasing adaptability, motivation and use of social supports when confronted with difficult problems, possibly because of their influence on problem solving ability and mood. Compared to working age adults, however, the evidence

base for personality influences on depression and hopelessness in older adult is limited. Likewise, it is not known whether personality traits exert a stable influence over the lifespan, or whether the trait influences change with increasing age.

Attachment Styles.

Attachment styles tend to be assessed using retrospective, in-depth adult attachment interviews (e.g. AAI) or via self-report questionnaires, which reflect beliefs about social relationships. Attachment styles are internalised representations of early caregiver responses which feed into internal working models (Collins & Read, 1990; Hazan & Shaver, 1987). These internal working models influence how confidently an individual is able to manage difficult situations or distress as well as how they perceive themselves and others around them (Bowlby, 1973). These internalised working models develop from infancy into adulthood to create core beliefs about social relationships (Feeney & Noller, 1990).

As such, infants with secure attachment styles may grow into possessing positive beliefs about social relationships and as adults will be more likely to see themselves and others as being good enough or trustworthy. Conversely, those with anxious or avoidant attachment styles may develop negative beliefs about social relationships and are more likely to view themselves and others negatively. When faced with challenging situations, individuals with the latter social beliefs are more likely to feel insecure about their ability to cope because of an inherent lack of confidence in their own, and other people's ability, to meet their psychological needs (Dunkley, Blankstein, & Flett, 1997; Shorey & Snyder, 2006).

These styles of inter-relating, however, do not remain fixed throughout the lifespan (Simpson & Rholes, 2017). Studies show that insecure beliefs about relationships can develop into

secure beliefs in older adulthood (Andersson & Stevens, 1993). Likewise, secure beliefs about relationships can change into detached styles of relating if multiple losses are experienced (Webster, 1997). As such, research shows that internalised working models that are based early caregiver responses can be modified by life experiences across the lifespan (Simpson & Rholes, 2017). In older adulthood, these beliefs about social relationships seem to reflect elements of feeling secure, yet dismissive and less preoccupied, in relationships compared to younger counterparts (Zhang & Labouvie-Vief, 2004) but findings are often inconsistently replicated (Van Assche et al., 2013).

Research also shows that beliefs about social relationships and social interactions influence psychological resilience. Purcell et al. (2012), for instance, show that increasing familial contact reduces levels of suicidal ideation whereas spousal bereavement increases suicide risk (Corna, Cairney, & Streiner, 2010), depending on the level of dependency on the deceased spouse (Johnson, Zhang, & Prigerson, 2008). Likewise, relationships of depressed and suicidal older adults are shown to be characterised by hostility or interpersonal difficulties, with these interpersonal difficulties leading to a perception that their relationships are of poorer quality (Harrison et al., 2010).

Aims of the Review

The above evidence highlights multiple overlapping factors that could collectively, or individually, increase the propensity for later life depression. However, no systematic review has been carried out, as yet, into the role psychological factors such as personality and attachment styles may play in the depression-hopelessness relationship in older adults. This review, therefore, proposes to critically evaluate studies which explore the direct and indirect

effects of personality and attachment on feelings of hopelessness and depression in older adults. The primary aim was to determine the strength of the relationship between hopelessness and depression. The secondary aim was to determine whether openness, conscientiousness, extraversion, agreeableness and neuroticism (OCEAN) and/ or insecure attachment also influence this relationship. As part of the review, we also aimed to identify methodological biases and the strength of the existing evidence base. Given the heterogeneity of the literature, no a-priori directional hypotheses were specified.

Methods

The systematic review was carried out following PRISMA guidelines (Moher, Liberati, Tetzlaff, Altman, & The PRISMA Group, 2009).

Search strategy

A systematic search for studies examining the relationship between hopelessness and depressed mood in older adults was carried out between 21st March and 31st October, 2016, using electronic databases and search engines (Psychinfo, Science Direct, EBCOS, Google Scholar, Cochrane Library, WEBCAT, conference proceedings, PROSPERO). Appendix 1 provides lists of keywords, limits and filters for each search engine. Searches were restricted to 1980-2016 with the specifier that they must be translated or published in English as per the inclusion criteria. The lower limit was set to 1980 to coincide with the release of the Diagnostic and Statistical Manual of Mental Disorders (DSM-III) which contained an objective and measurable criteria for depression (First, 2010). Prior to DSM-III, depression was considered to be a relatively rare phenomenon or it was described by more diffuse symptoms (Horwitz, 2010).

A combination of search terms was used. These search terms reflected the focus of the review and were categorised into four groups (Table 1). The initial search was conducted using at least one variation of the search term from each of the four categories. A category was dropped if no literature was found using all four search terms. The minimum number of category items used to conduct a search was three. The search utilised Boolean logic, with Boolean operators (and, or, +) linking search terms and asterisks (*) to identify related words with different endings.

Search Terms			
Personality	Attachment	Mood states	Older adults
Personality styles, neuroticism, emotional lability, negative affectivity, emotional sensitivity, extraversion, gregarious, sociable, introversion, solitary, reclusive, introspective, openness, broad-minded, receptive, rigidity, flexibility, inflexibility	Attachment, Social beliefs, personal beliefs, relationship style	Depression, low mood, dysthymia, hopelessness	Geriatric, later life, 65+, retiree, senior, pensioner,

Table 1: Categories of search terms used for literature search

The first step involved reviewing titles and abstracts to examine whether they met the inclusion criteria. The second step involved accessing full text articles that were not excluded in the title screening. Reference lists as well as key journals (e.g. The American Journal of Geriatric Psychiatry, Journal of Ageing Studies, Psychology and Ageing, Ageing and Mental Health, Archives of Gerontology and Geriatrics, Suicide and Life Threatening Behaviour, Psychological Bulletin) and authors' academic websites were hand searched for additional articles that might be relevant to the review aims (Figure 1).

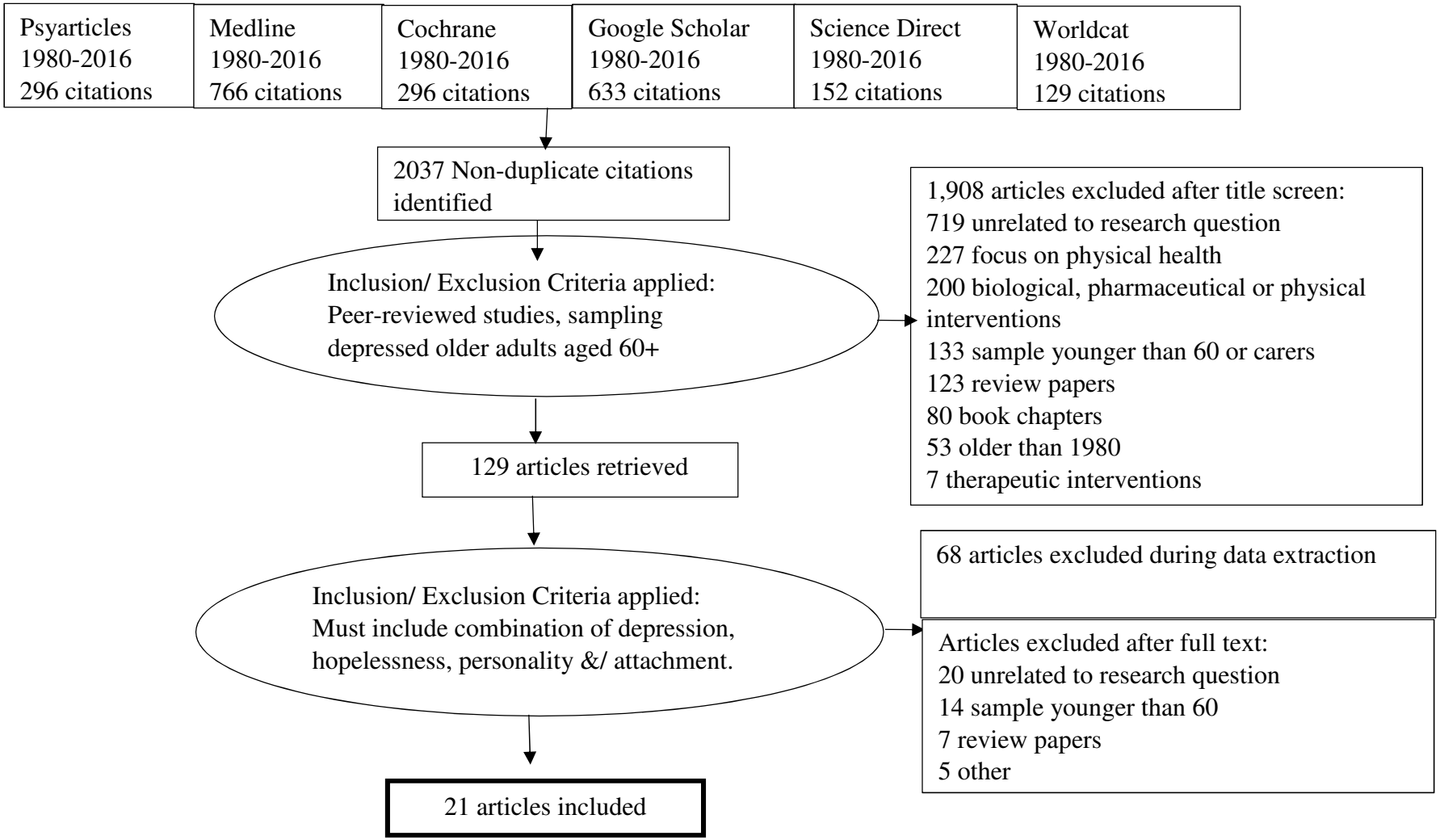

Figure 1: Outline of search procedures

Inclusion and Exclusion Criteria

Articles included in the review were those with (i) a mean sample age of 60 or above (ii) that had been diagnosed with depression according to the DSM –IV or ICD-10 or screened for depressed mood via an interview or clinical tool (e.g. BDI, HADS, SCID), or included a measure of psychological distress, (iii) that were published between 1980-2016, (iv) in English, (v) had undergone a peer review process and (vi) included at least three of the search terms (Table 1).

Given the aims of the systematic review, articles which focused predominately on depressed mood following the diagnosis of a physical health condition were excluded from the review as were non-empirical papers (e.g. review papers, care standards and therapeutic guidelines). Age guidelines were based on the World Health Organisation's definition of an older adult which refers to a cut off age of 60+, which relates to the age at which individuals may start to become eligible for pensionable benefits in highly resourced countries (World Health Organisation, 2002).

Quality Criteria

While a number of other measures exist for assessing the quality criteria of studies included in a systematic review (e.g. QUADAS, the Delphi list, QATSO, Newcastle-Ottawa Scale), the quality indicators proposed by the Agency of Healthcare Research and Quality (AHRQ) were used and adapted because of their specific focus on correlational rather than diagnostic studies and because of the greater number of external and internal validity items (Hartling et al., 2013; Shamliyan et al., 2011; Wong, Cheung, & Hart, 2008) compared to other measures.

The assessment of multiple systematic reviews (AMSTAR) checklist was used to cross reference against other sources of bias (Shea et al., 2007).

The adapted quality criteria (Appendix item 2) assessed external (7 items) and internal validity (4 items), validity of outcomes reported (2 items) as well as additional items (e.g. conflicts of interest, funding sources and ethical approvals). Numerical marks were given to each study based on the presence or absence of a particular item, with higher scores reflecting higher quality studies. To help identify high and low quality studies, an average score was calculated using all the studies included within the review. An independent rater, blind to the study's aims, rated 36% of the short listed articles (n= 8) using the data extraction sheet. Inter-rater reliability was established as moderate, $\kappa = .43$, $p < .00$.

Effect sizes were also calculated using the Gpower software (v3.1) developed by Faul, Erdfelder, Buchner, and Lang (2009) or the statistics calculators developed by Sloper (2017) and in order to determine strength of findings between studies.

Results

A total of 21 individual studies met the criteria for the review. The majority of studies employed a cross-sectional design, with four studies employing a longitudinal design that assessed different cohorts over set time periods. Effect sizes were calculated to allow comparability between findings.

Participant and Study Characteristics

In total, 16, 955 participants, of which 7,232 (42%) were males, took part in the included studies with a mean age of 71.26 years (range; 26 - 90). Two studies exclusively recruited females (Billstedt et al., 2014; Johansson et al., 2014), two studies did not state specific gender ratios (Consedine, Fiori, Tuck, & Merz, 2013; Iliceto, Fino, Sabatello, & Candilera, 2014) and two provided age ranges for participants (Estabrook, Sadler, & McGue, 2015; Gale, Booth, Mõttus, Kuh, & Deary, 2013).

Participants were recruited from either clinical and community samples. Five studies (Britton et al., 2008; Cukrowicz, Jahn, Graham, Poindexter, & Williams, 2013; Duberstein et al., 2000; Heisel et al., 2006; Purcell et al., 2012) recruited clinical populations who were depressed and had experienced suicidal ideation or attempted suicide (*n* = 705, *mean age* = 62.88, *mean S.D* = 9.9, *males* = 42%). While three other studies (Chapman et al., 2006; Hayward, Taylor, Smoski, Steffens, & Payne, 2013; Wiktorsson et al., 2013) also recruited from clinical populations, they did not specifically recruit individuals with mood disorders (*n* = 739, *mean age* = 75.47, *mean S.D* = 5.77, *males* = 39%). The remaining studies recruited from community based samples.

Five of the community samples studies focused on the correlation between emotional wellbeing, personality or attachment (Kim et. al. 2016; Choi et. al. 2013; Consedine et. al. 2013; Lang, Staudinger, and Carstensen, 1998; Barnas et. al. 1991). Four of the cohort studies focused on the relationship between personality, perceived life satisfaction and distress (Billstedt et. al. 2014; Johansson et. al. 2014; Gale et. al. 2013; Chapman et. al. 2006). Two studies focused specifically on wellbeing and attachment (Waldinger et. al. 2014; Zhang and Labouvie-Vief, 2004) whereas one focused on symptoms of LLD (Estabrooks et. al. 2015) and the other explored the impact of a preventative intervention in an at risk group (Choi et. al. 2013). Table 2 provides a breakdown of the studies.

Fourteen studies provided inclusion and exclusion criteria. The main criteria for exclusion included a diagnosis of dementia or other cognitive impairments (Billstedt et al., 2014; Britton et al., 2008; Cheavens, Cukrowicz, Hansen, & Mitchell, 2016; Choi, Marti, Bruce, & Hegel, 2013; Cukrowicz et al., 2013; Heisel et al., 2006; Purcell et al., 2012; Waldinger, Cohen, Schulz, & Crowell, 2014; Wiktorsson et al., 2013), substance misuse (Britton et al., 2008; Cheavens et al., 2016; Choi et al., 2013; Duberstein, Laurent, Conner, Conwell, & Cox, 2001; Heisel et al., 2006), psychosis (Britton et al., 2008; Cheavens et al., 2016; Cukrowicz et al., 2013; Purcell et al., 2012), mania (Britton et al., 2008; Cheavens et al., 2016; Cukrowicz et al., 2013; Purcell et al., 2012), bipolar disorder (Choi et al., 2013; Cukrowicz et al., 2013; Heisel et al., 2006) and suicidal ideation (Choi et al., 2013). Three studies stated that they removed incomplete data (Billstedt et al., 2014; Britton et al., 2008; Purcell et al., 2012). Ten studies did not provide an inclusion or exclusion criterion (Barnas, Pollina, & Cummings, 1991; Consedine et al., 2013; Estabrook et al., 2015; Gale et al., 2013; Hayward et al., 2013; Iliceto et al., 2014; Johansson et al., 2014; Kim, Linton, Cho, & Ha, 2016; Lang, Staudinger, & Carstensen, 1998b; Zhang & Labouvie-Vief, 2004). Response rates varied between 24-

74%. Drop-out rates were analysed in six studies which indicated no age or gender differences between those who took part in the study and those that did not.

Study *Country*	Males (%)	Population	Mean Age (SD)	Response rate (%)	Measures	Exclusion criteria	Study design and Analysis
1. Duberstein et al. (2001) *United States*	39	77 depressed inpatients admitted into hospital after recent suicide attempt	61.3 (9.6)	59	Structured Clinical Interview for Diagnostic Manual of Mental Health Disorders, Hamilton Rating Scale for Depression, NEO -PI-R, Beck's Hopelessness Scale	Physical examination findings, depression due to physical illness, substance misuse	Cross sectional Linear regression models
2. Heisel et al. (2006) *United States*	40	134 depressed in and outpatients	61 (10.5)	Not stated	Structured Clinical Interview for Diagnostic Manual of Mental Health Disorders, Scale for Suicide Ideation, NEO-PI-R, Beck's Hopelessness Scale, Cumulative illness burden scale	Cognitive impairments, psychosis, substance misuse and bipolar diagnosis	Cross sectional Logistic regression
3. Gale et al. (2013) *United Kingdom*	52	2,661 mothers who had a baby in one week in March, 1946 in England, Scotland or Wales as part of MRC National	Age range at last follow up = 60-64	84	Maudsley personality inventory, Warwick-Edinburgh Mental Wellbeing Scale or Diener's	Not stated	Longitudinal cohort study SEM

		Survey of Health and Development study			Satisfaction with Life Scale, General Health Questionnaire		
4. Choi et al. (2013) *United States*	22	121 Low income housebound older adults randomly assigned to one of three groups (problem solving n= 42; telecare n= 36; in person problem solving n= 42)	65 (9.2)	30-35	Augmented Hamilton Rating Scale for Depression, Resourcefulness Scale for older adult	Exclusion: no suicidal ideation, dementia, bipolar, substance misuse or current psychotherapy Inclusion Criteria: over 50, English speaking & scoring higher than 15 on Hamilton depression rating scale for depression	Longitudinal, post intervention study as part of RCT on problem solving therapy. SEM, mediation analysis using latent growth curves
5. Lang, Staudinger, and Carstensen (1998a) *Germany*	16	516 Community and institutionalised participants identified through probability sampling using registration office documents	84 (8.5)	27	Family status, social network size, Emotional Closeness, NEO, UCLA loneliness scale (German version)	Not stated	Cross validation of larger cohort study Correlational, hierarchical regression, mediational analysis, qualitative interviews

6. Estabrook et al. (2015), *Denmark*	2 group split: N_1 = 50% N_2 = 41%	9,045 Twins born in Denmark between 1931-52	Data analysed in 2, 3 or 4 age groupings 2 group split: N_1= 45-57 N_2 71-77 3 group split: N_1= 45-53 N_2= 62 – 68.6 N_3= 75-80 4 group split: N_1= 45-52 N_2= 60 -63 N_3= 70 – 74 N_4= 80-84.6	80	Cambridge Mental Disorders of the Elderly Examination	Not stated	Longitudinal, same sex twin, cohort study Item Response modelling & differential item response functioning
7. Cukrowicz et al. (2013) *United States*	40	239 clients seen in two primary care settings	72.4 (6.9)	19	Beck's Hopelessness Scale, Centre of Epidemiological Studies Depression Scale (CES-D), generic suicidal ideation scale, Interpersonal Needs Questionnaire	No history of cognitive difficulties, psychosis, mania, bipolar or previously participated in similar research conducted by authors	Cross sectional study Regression

8. Britton et al. (2008) *United States*	46	125 clients receiving clinical input for mood disorder from three teaching hospitals	60 (10.1)	45	Reasons for Living Scale- OA, Beck's Hopelessness Scale, Suicide Intent Scale	Individuals diagnosed with dementia, psychosis, current mania, alcohol withdrawal were excluded from the study as were participants who did not fully complete questionnaires	Secondary analysis of cross sectional data Multivariate logistic regression
9. Purcell et al. (2012) *United States*	45	130 in- and outpatients suspected of mood disorder	59.7 (9.5)	39	Mini–Mental State Examination, Structured Clinical Interview for Diagnostic Manual of Mental Health Disorders, Scale for Suicide Intent, Reasons for Living Scale (RFL- OA)	Living in institutional care, no information provided regarding living arrangements, missing data, presence of mild cognitive impairments, psychosis or mania	Cross sectional using self- report Binary logistic regression
10. Billstedt et al. (2014) *Sweden*	0	153 women born in 1918, 1922 or 1930	Ages at 2005 follow-up: Cohort born in 1918 = 87, 1922 = 83, 1930 = 75	40	Eysenck Personality Inventory, bespoke life stress questions, Montgomery-Asberg	Diagnosis of dementia or incomplete data	Longitudinal cohort study Paired t-tests, Spearman's and Pearson's correlation

					Depression Rating Scale		coefficient, Chi square test
11. Johansson et al. (2014) *Sweden*	0	293 women born in 1914, 1918, 1922 and 1930	Ages at baseline: Cohort born in 1914 = 38, 1918 = 46, 1922 = 50, 1930 = 54 Age at 2005 follow-up: Cohort born in: 1914 = 90, 1918 = 87, 1922 = 83 1930 = 75	74	Eysenck Personality Inventory, demented diagnosis according to DSM III, bespoke distress questions	not stated	Longitudinal cohort study Spearman's correlational coefficient, logistic regression
12. Iliceto et al. (2014) *Italy*	$N_1 = 48$ $N_2 = 53$	Older ($N_1 = 339$) and younger adults ($N_2 = 339$) recruited from Nov 2012- May 2013 from universities and community locations	$N_1 =$ 66.4 (3.9) $N_2 = 26.2$ (3.8)	Not stated	Beck's Depression Inventory, Beck's Hopelessness Scale, attachment profile, Zuckerman-Kuhlman Personality Questionnaire	Not stated	Cross sectional group comparison Paired t-tests, chi square, SEM
13. Cheavens et al. (2016)	25	91 primary care clients	70 (7.3)	24	Geriatric suicide ideation scale:=	Current symptoms of	Cross-sectional study

United States					suicide ideation sub-scale, Centre for Epidemiology Studies Depression Scale, Interpersonal Needs Questionnaire, Heartland Forgiveness Scale	memory impairment, mania, psychosis, substance misuse	Hierarchical multiple regression
14. Chapman et al. (2006) *United States*	36	451 participants receiving physical or mental health care from primary care services between 2001-06	75 (6.9)	63	NEO-FFI, Cumulative Illness Rating Scale (CIRS), medical outcome survey, Instrumental Activities of Daily Living, Physical Self-Maintenance Scales, Structured Clinical Interview for the Diagnostic Manual of Mental Health Disorders	Unable to consent or attend on selected recruitment days	Longitudinal study Regression
15. Zhang and Labouvie-Vief (2004) *United States*	48	370 individuals living in three randomly selected suburban communities	43 (19)	30	Relationship Questionnaire, Coping strategies assessed by 6 subscales within the California	None stated	Longitudinal Hierarchical multiple regressions

					Psychological Inventory (CPI), Wellbeing assessed by 1 sub-scale within the CPI, Centre for Epidemiologic Studies Depression Scale		
16. Consedine et al. (2013) *United States*	38	1,118 individuals living in the community who took part in a larger study into stress and coping in older adults	73.8 (5.9)	Not stated	Relationship Questionnaire, Health Risks Questionnaire, physical health and disability assessed by Comprehensive Assessment and Referral Evaluation, Differential Emotions Scale III	Not stated	Cross-sectional Multiple linear regression
17. Barnas et al. (1991) *United States*	0	48 individuals living in the community	72.5	Not stated	Attachment interview, Self-Evaluation of Life Functions Scale, Ways of Coping Checklist, Social Dysfunction Rating Scale	Not stated	Cross-sectional ANOVA

18. Wiktorsson et al. (2013) *Sweden*	42	72 in-patients within an accident and emergency department	81.4 (4.4)	69	Eysenck Personality Inventory, Comprehensive Psychopathological Rating Scale, Montgomery-Asberg Depression Scale, Beck's Suicide Intent Scale	Mini-mental state examination scores over 20	Cross sectional, case comparison Logistic regression
19. Hayward et al. (2013) *United States*	Not stated	216 in and out patients, of which 112 were diagnosed with major depression	70 (6)	Not stated	NEO Personality Inventory, Diagnostic Interview Schedule, Montgomery-Åsberg Depression Rating Scale	Not stated	Longitudinal Regression
20. Kim et al. (2016) *United States*	34	220 individuals living in the community	74.4 (7.8)	86	Eysenck Personality Questionnaire, Beck Hopelessness Scale, Centre of Epidemiological Studies Depression (CES-D) scale.	Not stated	Cross sectional Regression

21. Waldinger et al. (2014) *United States*	50	162 couples from an urban community sample	Males: 80.8 (3.4) Females: 75.7 (6.8)	70-80% for both time points	Time 1: Current Relationship Interview, Short Marital Adjustment Test, Centre for Epidemiologic Studies Depression Scale, bespoke mood state and martial disagreements questionnaires Time 2: Positive and Negative Affect Schedule, Geriatric Depression Scale, Satisfaction with Life Scale, Free and Cued Selective Reminding Test, Trail Making Test Part B, Controlled Oral Word Association Test, and the Category Generation Test	Both couples scoring of 25 or above on Telephone Interview for Cognitive Status, need to have lived together for one year	Longitudinal Factor Analysis, correlation and regression

Table 2: Properties of included studies

Depression and Hopelessness in older adults

There are challenges with trying to investigate relationships between psychological constructs in under researched areas, such as the one under investigation here, because of the limited number of studies that can be used to draw evidence from. With this in mind, in each section, we assess how constructs are measured as well as reported effect sizes before describing the main findings. We start by focusing on the relationship between depression and hopelessness first before moving onto the impact of personality and attachment on general wellbeing, and depressed mood.

Measures

Although the Beck Depression Inventory (BDI and BDI-II) and the Hamilton Depression Rating Scale (HAM-D) are considered to be gold standard measures of depression, only two studies used the HAM-D (Choi et al., 2013; Duberstein et al., 2001) and one study employed the Beck Depression Inventory (Iliceto et al., 2014). Instead, depressed mood was more commonly assessed using the Centre for Epidemiologic Studies Depression Scale (Cheavens et al., 2016; Cukrowicz et al., 2013; Kim et al., 2016; Zhang & Labouvie-Vief, 2004), which is considered to be an adequately specific but less sensitive measure of depression (Vilagut, Forero, Barbaglia, & Alonso, 2016), or the Montgomery-Asberg Depression Scale (Billstedt et al., 2014; Hayward et al., 2013; Wiktorsson et al., 2013). The latter measure is considered to be sensitive to the effects of medication but with a greater focus on psychological, rather than somatic, symptoms with poorer inter-rater reliability (Cusin, Yang, Yeung, & Fava, 2010). As older adults tend to report somatic symptoms more frequently than affective (Fiske et al., 2009), the focus on psychological symptoms may reduce this measure's sensitivity in screening for LLD.

Structured and semi-structured clinical interviews tend to reflect gold standard practise when assessing mood. In older adults, however, relying on a single informant is shown to reduce specificity (Davison, McCabe, & Mellor, 2009). Of the included studies, five studies chose to use the Structured Clinical Interview for the Diagnostic and Statistical Manual (Chapman et al., 2006; Duberstein et al., 2001; Hayward et al., 2013; Heisel et al., 2006; Purcell et al., 2012). Three studies used a non-specific measure of negative mood: the General Health Questionnaire (Gale et al., 2013), the Warwick-Edinburgh Mental Health Scales (Gale et al., 2013), Positive and Negative Affect schedule (Waldinger et al., 2014) and the Differential Emotions Scales (Consedine et al., 2013).

Hopelessness was assessed directly using the Beck Hopelessness Scale, a gold standard tool, in five studies (Britton et al., 2008; Cukrowicz et al., 2013; Duberstein et al., 2001; Iliceto et al., 2014; Kim et al., 2016). Nine studies assessed hopelessness indirectly using the Suicide Intent Scale (Britton et al., 2008; Heisel et al., 2006; Purcell et al., 2012; Wiktorsson et al., 2013), Geriatric Suicide Scale (Cheavens et al., 2016; Cukrowicz et al., 2013), Reasons for Living (Britton et al., 2008; Purcell et al., 2012), the Satisfaction with Life Scales (Gale et al., 2013) or the interpersonal needs questionnaire (Cheavens et al., 2016; Cukrowicz et al., 2013).

Findings

The main findings show only four studies (Table 3) within the review exclusively focused on the relationship between depressed mood and hopelessness (n = 9,496). Estabrook et al. (2015) used a factor analytical approach to examine item responses on the Cambridge Mental Disorders in the Elderly (CAMDEX). Their findings suggest that the association between items typically associated with depression in working age adults, such as loneliness,

worthlessness, coping ability, nervousness, weakened with increasing age. The authors concluded that this weakening of constructs may make it harder for older adults to recognise symptoms associated with depression. The study also showed inter-relationships between depression scores, perceived life satisfaction and worthiness of life which strengthened with increasing age. The authors suggest that the above relationships suggest that how older adults perceive their life differs with increasing age. Effect sizes for findings varied between small to large. Choi et al. (2013) add to his by suggesting that, in older adults, low levels of personal resourcefulness has a small effect on depression scores.

Studies examining the impact of hopelessness on mood, in contrast, report more equivocal findings. For instance, Cukrowicz et al. (2013) report a small effect of hopelessness and perceived burdensomeness on increased risk of suicidal ideation whereas Cheavens et al. (2016) report a large indirect effect of self-forgiveness, but not hope, on the relationship between perceived burdensomeness and suicidal ideation. Burdensomeness or being "burdensome" is defined as a subjective belief that one is being a burden on others.

Study	Main Findings	Effect Sizes (where possible to calculate)	Statistics	95% *CI* of reported statistics LL,UL
4. Choi et al. (2013)	Low levels of personal resourcefulness were negatively associated with depression scores at 12 and 24 week follow-ups. With a significant difference between tele-care vs tele-problem solving across time And a significant difference between tele-care vs in-person problems solving sessions across time Personal and social resourcefulness did not vary according to intervention method (tele-care vs tele-problem solving vs in-person problems solving sessions).	Both Small Medium Small	*12 weeks:* r = -.30 24 weeks: r = -.27 Cohen's d = .54 Cohen's d = .45	
7. Cukrowicz et al. (2013)	Findings show that as perceived burdensomeness and hopelessness scores increase, the probability of suicidal ideation also increases. No association between thwarted belonging and suicidal ideation was observed.	All small	*O.R*= 1.11 Loneliness *O.R*= 1.08 Burdensome *O.R* = 1.06	
6. Estabrook et al. (2015),	Three items on the affective subscale ("Are you happy and satisfied with your life at present?", "How do you feel about your future?" and "Do you sometimes feel that life is not worth living?") of the CAMDEX depression sub-scale were found to differ between older and younger aged groups but not on item discrimination.	Large Large Small	*ETS Δ*: Happy = 2.2 Future = -2.2 Life = -0.49	

	Associations between items assessing “Have you felt lonely lately?”, “Do you consider yourself a nervous person?”, “Do you feel worthless, or do you blame yourself for mistakes that you have made a long time ago?” and “Do you find it more difficult to cope with things now than before?” were found to reduce with increasing age, suggesting a weakening of these constructs with age. In contrast, “How often do you feel happy?” and “Do you sometimes feel that life is not worth living?” showed a strengthening of relationship, suggesting that these constructs may become stronger with age.	Small Small Small	Adjusted R^2 Lonely = .02 Adjusted R^2 Nervous = .01 Adjusted R^2 Worthless = .01 Adjusted R^2Coping = .02	
14. Cheavens et al. (2016)	Self-forgiveness was found to positively moderate the relationship between perceived burdensomeness and suicide ideation. Hope scores were not associated with suicidal intent	Large	Cohen's f^2 =1.5	.39, .70

Table 3: Main findings and effect sizes for studies focusing on the relationship between hopelessness and depressed/negative mood.

Impact of Personality and attachment on general wellbeing, depressed mood and hopelessness.

Personality Measures

As shown in Table 2, the majority of studies employed gold standard assessments of personality, such as the NEO (Chapman et al., 2006; Duberstein et al., 2001; Heisel et al., 2006; Lang et al., 1998b) or the Eysenck Personality Inventory, and their subsequent versions. Both measures have greater reliability and validity than the older Maudsley Personality Inventory used by Gale et al. (2013).

Two studies used alternative tools that focused more closely on other aspects of personality while still mapping onto the basic personality factors proposed by the NEO and Eysenck Personality Inventory (Zuckerman, Kuhlman, Joireman, Teta, & Kraft, 1993). The Zuckerman-Kuhlman Personality Inventory, used by Iliceto et al. (2014), places a greater emphasis on the psychobiology of personality constructs whereas the California Psychological Inventory used by Cukrowicz et al. (2013) assesses traits relating to social and interpersonal behaviours.

Findings

Although findings from included studies suggest that specific personality characteristics are consistently associated with mental wellbeing, reported effect sizes for these studies tend to be small (Table 4). For instance, Johansson et al. (2014) show that the risk of developing Alzheimer's dementia was two-fold higher for those scoring within the highest quartile of the neuroticism questionnaire compared to those scoring in the lowest, with this relationship being mediated by longstanding distress. Similarly, there are suggestions that individuals rating high on neuroticism are more likely to endorse General Health Perception Scale items such as 'I seem to get sick a little easier than other people" and less likely to endorse items

such as “my health is excellent”, suggesting that neuroticism increases perceptions of poorer physical health in older adults (Chapman et al., 2006). Another study suggests that lower life satisfaction scores in older adulthood correlates with high neuroticism scores and lower levels of mental wellbeing at the ages of 16 and 26 (Gale et al., 2013). Conversely, high extraversion scores, assessed at ages of 16 and 26 years, were positively associated with general and physical wellbeing in older adulthood (Gale et al., 2013), with high extraversion scores being negatively associated with items such as “I expect my health to get worse” (Chapman et al., 2006), possibly because of the positive links between extraversion and social support (Wiktorsson et al., 2013).

In contrast, studies which examine the impact of personality, depression and hopelessness reported more complex and inconsistent relationships. Billstedt et al. (2014), for instance, found that although neuroticism and extraversion scores were unrelated to depression or cognitive functioning over a longitudinal period, certain cohort effects were observed. Their findings show that in specific birth cohorts (i.e. those born in 1918 and 1922) baseline depression scores were associated with changes to neuroticism and extraversion ratings in the 1992 follow-up, even though the same measures were used through the study. Kim et al. (2016), in contrast, reported large effects of age, income, gender and neuroticism on depression ratings in older Korean immigrants in their cross-sectional study.

In relation to hopelessness, one study indicated that high neuroticism corresponded to high levels of hopelessness and loneliness in recent suicide attempters and that older adults who attempted suicide rated higher on neuroticism and lower on extraversion dimensions compared to those who did not (Iliceto et al., 2014). Duberstein et al. (2001) explored this

relationship between personality characteristics and hopelessness in more depth. Their findings show that when examining the sub-components of neuroticism (e.g. anxiety, angry hostility, depression, self-consciousness, impulsiveness & vulnerability), only low self-consciousness, extraversion and high impulsivity were associated with hopelessness. In contrast, of all the extraversion sub-components (warmth, gregariousness, assertiveness, activity, excitement seeking & positive emotions), only low positive emotions correlated with hopelessness.

The study by Hayward et al. (2013) suggested that personality constructs also have important implications for treatment outcomes. Their findings indicate that high neuroticism scores correlated with severe depression scores after three and twelve months of psychological therapy. The authors report that while specific sub-components of extraversion (e.g. low scores on assertiveness, activity and positive emotions) and conscientiousness (e.g. competence, need for order, dutifulness and self-discipline) were also related to the onset of depression, they did not correlate with treatment outcomes. With the exception of the studies conducted by Duberstein et al. (2001), Iliceto et al. (2014) and Kim et al. (2016), which report medium-large effect sizes, all other studies that investigated the relationship between personality, depression and hopelessness report small effect sizes.

Attachment Measures

None of the studies included in the review utilised the Adult Attachment Interview (AAI), which is considered the gold standard for assessing adult attachment (Maas, Laan, & Vingerhoets, 2011). Only one standardised measure of attachment was reported, The Relationship Questionnaire (Chang & DeSimone, 2001; Consedine et al., 2013). Unlike the AAI, the Relationship Questionnaire uses four underlying attachment styles, in relation to

oneself and others, to determine beliefs about social relationships (Bartholomew & Horowitz, 1991). Five studies used bespoke measures, in interview (Barnas et al., 1991; Iliceto et al., 2014; Waldinger et al., 2014) or self-report questionnaire format (Lang et al., 1998b; Waldinger et al., 2014).

Findings

Findings show that beliefs about relationships influence how individuals interact socially which, in turn, affects perceptions of physical and emotional wellbeing. Lang et al. (1998a) show that although personality traits (e.g. extraversion, openness to experience and neuroticism) have a small effect on the size of social networks, they do not appear to impact on feelings of emotional closeness. Likewise, the authors show that although having a nuclear family in older adulthood exerted a small effect on satisfaction with social contacts and loneliness ratings, it did not increase feelings of emotional closeness. Barnas et al. (1991) indicate that older adults with avoidant attachment to their adult children report the highest levels of extreme scores on well-being measures. The same study reports that insecurely attached older adults were the second most likely to report poor functioning across physical, psychological and social wellbeing measures compared to those who reported feeling securely attached. The authors suggest that this relationship between attachment styles and wellbeing measures could relate to coping strategies, with older adults who have insecure or avoidant attachment frequently using problem focused coping strategies in response to everyday stressors. This proposition is supported by findings from Consedine et al. (2013)'s study which suggests that the relationship between specific attachment styles (e.g. fearful/ avoidant) and health outcomes is mediated by negative affect.

Zhang and Labouvie-Vief (2004) investigated the stability of attachment profiles and their relationship to wellbeing, in more depth, over the course of six years in a community sample. Their findings indicate that attachment styles explain low-moderate levels of variation in relationship stability, with this variance being lower than test-retest reliabilities for personality traits (McCrae et al., 2017). The authors concluded that while attachment styles varied with age, representing fluid elements of attachment, some smaller aspects of attachment styles remained stable.

In the second part of their study, the authors demonstrated that changes in relationship stability correlated with coping strategies and self-reported well-being, so that individuals who were depressed were also more likely to use defensive coping styles and report more insecure attachment styles. When individuals recovered from depression, they more likely to use adaptive coping strategies and report more secure attachment. Similarly, Waldinger et al. (2014) show positive relationships between secure spousal attachment, marital satisfaction, mood and fewer conflicts as well as predicting fewer depressive symptoms and greater life satisfaction for both genders two and a half years later. For women, secure attachment was shown to provide an additional benefit via a positive correlation with memory functioning.

Studies which explore the impact of family on feelings of hopelessness initially appear to be contradictory but could relate to the concept of burdensomeness, which is related to feelings of hopelessness (Joiner et al., 2002), or they may reflect how perceptions of social relationships increase or decrease suicide risk. Britton et al. (2008) report that feeling responsible for family members exerted a small effect on the relationship between

hopelessness and suicidal ideation whereas Purcell et al. (2012) reported that emotional closeness to family members exerted a small, protective, effect on suicide ideation.

Study	Main Findings	Effect Size	Statistics	95% CI of reported statistics
Personality Studies				
1. Duberstein et al. (2001)	Of the six extraversion sub-components assessed (warmth, gregariousness, assertiveness, activity, excitement seeking & positive emotions), only the association between 'low positive emotions' and hopelessness reached statistical significance.	Medium	Cohen's f^2 = 0.28	0.09, 0.35
	Of the seven neuroticism sub-components (anxiety, angry hostility, depression, self-consciousness, impulsiveness & vulnerability), only low self-consciousness, low extraversion and impulsivity were associated with hopelessness.	Large	Cohen's f^2 = 0.40	0.15, 0.43
2. Heisel et al. (2006)	Suicide ideators rated higher on openness to experience measures compared to non-suicidal ideators.		OR = 1.03	1.01, 1.06
3. Gale et al. (2013)	Extraversion ratings at 16 and 26 years exerted direct effects on wellbeing at ages 60-64 years.	Good overall fit for direct model:	β = .23	.15, .30
	Higher ratings on extraversion scales positively correlated with wellbeing measures.	χ^2=2683.47(825), p<.05; CFI=.98; TLI=.98; RMSEA=.022; WRMR=1.726	β = .14	.07, .22
	Neuroticism scores at the age of 16 and 26 years was associated with a smaller, direct, effect on mental wellbeing through lower ratings on satisfaction with life scores.		β = -.18	-.15, -.01
	Neuroticism, however, was also found to be associated with mental wellbeing and satisfaction with life because of indirect paths through general health (GHQ) and physical health.	and indirect model: (χ^2=3066.29(945), p<.05; CFI=.98; TLI=.98; RMSEA=.022; WRMR=1.714)	β = -.08	-.11, -.06
			β = -.02	-.03, .00
11. Billstedt et al. (2014)	Overall, ratings on neuroticism and extraversion measures remained stable over a 37-year period. The exception to this	Small	Cohen's d = −.22	

	were birth cohorts from 1918 and 1922 which showed an increase in neuroticism ratings.			
	Maternal death in childhood was associated with stable neuroticism ratings between 1968 and 1992.	Small	Cohen's d = .34	
	Baseline depression scores correlated with changes to neuroticism and extraversion ratings, over a 24 year follow-up period only for women who took part in the study in 1992.	Small	Cohen's d = .37	
	Depression or cognitive functioning scores were unrelated to extraversion or neuroticism scores.	Small	Cohen's d = .33	
12. Johansson et al. (2014)	The risk of developing AD dementia was 2-fold higher for individuals scoring within the highest quartile of the neuroticism measure compared to those scoring within the lowest quartile.	Small	Hazard risk ratio = 1.99	1.00, 4.00
	This relationship appeared to be mediated by longstanding distress.			
13. Iliceto et al. (2014)	Old and young adults scores did not differ in their scores on suicidal ideation or personality measures	Large effect	(χ2(20) = 70.05; χ2/df = 3.50; CFI = .973; TLI = .959; SRMR = .037; RMSEA = .062)	
	Negative correlations were observed between two latent factors, suicidal ideation and personality in the young adult group (r = −.59) and in the older adult group (r = −.50).			
15. Chapman et al. (2006)	Neuroticism was positively associated with the general health perceptions scale items 'I seem to get sick a little easier than other people"	Small	*ODR* = 0.92	0.85, 1.00
			ODR = 1.06	

	and “My health is excellent”	Small		
			ODR = 0.79	1.00,
	Independently rated greater disease burden scores were also		*ODR* = 1.18	1.13
	positively associated with “I seem to get sick a little easier than	Small		
	other people” and		*ODR* = 1.30	
		Small	*ODR* = 1.08	0.66,
	“I am as healthy as anybody I know”			0.94
	And “My health is excellent”	Small		1.05,
				1.33
	Extraversion scores were negatively associated with “I expect	Small		
	my health to get worse”			
				1.15,
				1.97
				1.01,
				1.15
19. Wiktorsson et al. (2013)	Older adults who attempted suicide rated higher on neuroticism and lower on extraversion dimensions compared to those who did not.	Neuroticism- Medium, Extraversion- Small	Cohen’s *d* = 0.49 Cohen’s *d* = -0.36	
	Lower neuroticism scores were associated with suicide attempters with low levels of depression.	Large	Cohen’s d = .93	
	High neuroticism was also associated with high levels of hopelessness and loneliness in recent suicide attempters.	Large, Large	Cohen’s *d* = -.87	
	An inverse relationship between extraversion and loneliness was observed	Medium	Cohen’s *d* = .88	

			Cohen's d = .72	
20. Hayward et al. (2013)	High neuroticism scores were associated with severe depression after 3 and 12 months of treatment.		β= .24	.05, 0.43
	Though sub-components of extraversion (e.g. low scores on assertiveness, activity and positive emotions) and conscientiousness (e.g. competence, need for order, dutifulness and self-discipline) were related to onset of depression, they were not found to influence treatment outcome.		β= .23	02, 0.44
21. Kim et al. (2016)	Age, income, gender and neuroticism were found to predict depression scores	Large Effect	Cohen's f^2 = 1.04	
	<u>Attachment Studies</u>			
5. Lang et al. (1998a)	Personality traits were related to the size of social networks but unrelated to the average level of emotional closeness of social groups. The positive correlation between social group size, extraversion and openness to experience, suggests that individuals in their 90's who are more outgoing and open to new experiences are more likely to have larger social networks. A small effect of neuroticism was observed on average emotional closeness and network size	Small-medium	Extraversion- r = .26, Openness to Experience- r = .17, Neuroticism- r = -.10)	
	Satisfaction with social contacts and loneliness, however, varied depending on family status (e.g. nuclear vs non-nuclear) and feelings of average emotional closeness, independently of personality traits	Small	Adjusted R^2= *4.2*	
	While having a nuclear family related to increased satisfaction with social contacts and less loneliness, it did not appear to correspond to increased levels of emotional closeness	Small	r = -.17	

9. Britton et al. (2008)	Feelings of responsibility towards one family strengthened the relationship between hopelessness and suicidal ideation	Small	ODR = 0.98	0.96, 0.99
10. Purcell et al. (2012)	Having a stronger connection to family members decreased the likelihood of reporting suicide ideation	Small	ODR = .85	.77, .94
16. Zhang and Labouvie-Vief (2004)	Findings imply that attachment in adulthood have stable and fluid elements because attachment are thought to be relationship driven.			
	Older people were found to rate higher on secure and dismissing attachment but lower on preoccupied attachment ratings at both time points 2 and 3, compared to working age adults, potentially due to a developmental trend.			
	Defensive coping and less integrative coping strategies correlated with higher depressive and insecure attachment at all other measured time points.	All medium with exception of preoccupied ratings at t3 which is small	Time 2: Cohen's f^2 = .26, .20 and .19, respectively	
	Lower defensive coping and depression scores, as well as well as higher scores on integrative coping and well-being were found to be indicative of attachment security. These covariations between attachment security, coping strategies and well-being were observed over a six year period.	Not able to determine	Time 3: Cohen's f^2 = .14, .14 and .06, respectively	
17. Consedine et al. (2013)	Negative affect mediated the relationship between fearful avoidant attachment and health outcomes	Medium	Cohen's f^2 = .18	0.02, 0.29

	Negative affect mediated the relationship between fearful avoidant attachment and functional impairment	Small	Cohen's f^2 = .01	-0.04, 0.22
18. Barnas et al. (1991)	Older adults with avoidant attachment to their adult children showed the highest level of extreme scores on well-being measures, followed by the insecurely attached group.	Large	Cohen's d = 1.4	
	Conversely, the securely attached group had the lowest level of extreme negative wellbeing scores.	Large	Cohen's d = .63	
	Insecure attachment were related to poor functioning across all wellbeing measures (physical, psychological and social).			
	The insecure/ avoidant attachment group (n=29) used more problem focused coping strategies in response to everyday stressors compared to those with secure attachment.	Large	Cohen's d = .63	
22. Waldinger et al. (2014)	Secure attachment to spouse was related to greater marital satisfaction, mood and fewer conflicts. 2.5 years later, secure spousal attachment predicted fewer depressive symptoms and greater life satisfaction for both genders. For women, secure attachment also positively correlated with memory functioning.	Large	r = .61-73 r = .33	

	For women rated as less secure in their spousal attachment, martial disagreements predicted poor memory functioning 2.5 years later. No significant differences in memory functioning were observed in men.	Cohen's f^2 =.49	-1.93, 4.97

Table 4: Studies included in systematic review that focus on personality and attachment

Quality Criteria

Each of the papers included in the review were evaluated against adapted AHRQ quality indicators (Table 5). The majority of studies, eleven out of the twenty-one, included within the review employed a cross-sectional design (Barnas et al., 1991; Britton et al., 2008; Chapman et al., 2006; Cheavens et al., 2016; Consedine et al., 2013; Cukrowicz et al., 2013; Duberstein et al., 2001; Heisel et al., 2006; Kim et al., 2016; Purcell et al., 2012; Wiktorsson et al., 2013), which is considered to be one of the weakest study designs as causality cannot be assumed between variables. A smaller number of studies used stronger retrospective or prospective longitudinal study designs (Billstedt et al., 2014; Choi et al., 2013; Hayward et al., 2013; Johansson et al., 2014; Waldinger et al., 2014; Zhang & Labouvie-Vief, 2004), with data being collected between shorter (2.5 years) and longer-term intervals (37 years).

Recruitment was predominately based on self-selection or a systematic selection of participants from a subject pool in the local geographical area. Five studies, however, used non-random selection by medical records (Billstedt et al., 2014; Cukrowicz et al., 2013; Estabrook et al., 2015; Lang et al., 1998b; Purcell et al., 2012). The majority of studies also reported sampling biases and/or results of screening measures, with the exception of one study (Estabrook et al., 2015). In terms of measurement, half of studies relied solely on self-report measures, with the other half corroborating self-report measures with other sources (Billstedt et al., 2014; Britton et al., 2008; Choi et al., 2013; Cukrowicz et al., 2013; Duberstein et al., 2001; Hayward et al., 2013; Heisel et al., 2006; Johnson et al., 2008; Waldinger et al., 2014; Wiktorsson et al., 2013).

The majority of studies also used validated measures with the exception of four studies, which used a mixture of validated and bespoke measures (Barnas et al., 1991; Chapman et al., 2006; Consedine et al., 2013; Kim et al., 2016). Confounding variables were not reported in over half of the studies (Barnas et al., 1991; Britton et al., 2008; Chapman et al., 2006; Choi et al., 2013; Consedine et al., 2013; Estabrook et al., 2015; Gale et al., 2013; Heisel et al., 2006; Kim et al., 2016; Lang et al., 1998a; Purcell et al., 2012; Zhang & Labouvie-Vief, 2004), and two studies did not provide error estimates for the observed effects (Duberstein et al., 2001; Lang et al., 1998b).

Each criterion was given a mark with higher marks representing higher quality reporting on the assessed indicators. The marks were then used to compare how different studies rated on specific quality indicators as well as identifying common strengths and weaknesses across studies. Marks for each study were totalled, to create a hierarchy of high to low quality studies, and then averaged. The average quality score (39) was used to estimate the baseline quality of the included studies. Using this average score, we identified that 15 of the included studies scored 39 or above, with six scoring below. This was mainly because the latter studies rarely reported sampling biases, exclusion criteria or the types of tools used to assess the constructs under investigation.

Reporting Quality					External validity								Internal Validity			Analysis			Total
Study	Funding	Conflict of interest	Ethics	Aims	Design	Sampling method	Recruitment method	Sampling bias	Response rate	Exclusion criteria	Exclusion rates	Participant eligibility	Outcome measures	Reliability & validity of tools	Confounding Factors	Error estimates	Reliability	Analysis of sub-groups	
1. Duberstein, Laurent et al., 2001	2	3	2	1	6	3	3	1	1	2	3	1	1	2	1	3	1	3	39
2. Heisel, Duberstein et al., 2006	2	3	2	1	6	3	3	1	4	2	3	2	1	2	3	3	1	4	46
3. Gale, Booth et al., 2013	2	3	3	1	4	3	3	3	1	3	4	2	2	2	3	1	1	2	43
4. Choi, Marti (et al., 2013	2	3	2	1	5	2	3	1	2	1	3	1	1	1	3	1	3	1	36

5. Lang, Stauding er (et al., 1998	2	3	2	1	4	3	4	1	2	3	4	2	2	4	3	4	1	1	46
6. Estabroo k, Sadler (et al., 2015,	1	3	2	1	3	3	4	3	1	3	4	2	2	1	3	4	2	3	45
7. Cukrowi cz, Jahn (et al., 2013	1	3	1	1	6	3	4	1	3	1	2	1	1	1	1	1	3	1	35
8. Britton, Duberste in (et al., 2008)	2	3	3	2	6	3	2	1	2	2	3	1	1	2	3	1	3	3	43
9. Purcell, Heisel (et al., 2012)	2	3	2	1	6	3	4	2	1	1	3	1	1	1	3	1	3	2	40

10. Billstedt, Skoog (et al., 2014)	1	3	2	2	2	3	4	2	1	2	2	1	1	2	1	1	3	1	34
11 Johansson, Guo (et al., 2014)	2	1	1	1	2	1	5	1	1	1	4	1	1	4	1	1	1	1	30
12. Iliceto, Fino (et al., 2014)	2	3	2	1	5	2	2	1	4	3	4	2	2	2	1	1	3	1	41
13. Cheavens, Cukrowicz (et al., 2016)	2	3	3	2	6	3	3	2	2	2	2	2	2	2	1	1	1	3	42
14. Chapman, Duberstein (et al., 2006)	2	3	2	1	6	3	3	1	1	2	2	1	2	4	3	1	3	2	42

15. Zhang and Labouvie-Vief (2004)	1	3	2	1	1	3	5	1	1	3	4	3	2	2	3	1	3	1	40
16. Considine et al. (2013)	1	1	2	1	6	3	5	1	4	3	4	3	2	2	1	1	3	2	45
17. Barnas et al. (1991)	2	3	2	2	6	2	2	3	4	3	4	3	1	2	3	4	3	2	51
18. Wiktorsson et al. (2013)	1	1	1	2	6	2	3	1	1	1	3	1	1	2	1	1	1	1	30

19. Hayward et al. (2013)	1	1	1	1	1	1	5	1	4	3	4	3	1	2	1	1	1	1	33
20. Kim et al. (2016)	1	1	1	1	6	2	1	1	2	3	4	3	2	2	1	4	1	3	39
21. Waldinger et al. (2014)	1	1	1	1	1	1	2	1	1	1	3	1	1	2	1	1	3	2	25

Table 5: Quality of included studies as proposed by adapted AHRQ indicators

Discussion

This systematic review aimed to investigate the relationship between depression and hopelessness, potential influences of insecure attachment styles and/or specific personality characteristics, as well as appraising the quality of the existing evidence base. Key findings, and their implications, are discussed in turn.

The assessment of depression and hopelessness in older adults.

Two main issues were identified with the assessment and measurement of depression in older adults. These were around sensitivity and reliability. These issues were compounded by the limited number of studies exclusively focusing on the depression-hopelessness relationship in this population. Studies investigating depression in older adults varied in the types of measures they used to assess depressed mood, with only two studies using 'gold standard' assessments. While it would be unrealistic to assume that all studies in a given field would use gold standard assessments, the consistent lack of high quality tools to assess LLD may have contributed to the mixed, and often conflicted, findings due to a lack of precision in assessing symptoms. This is especially important in older adult populations because this population group is shown to be report more somatic, rather than psychological, symptoms compared to working age groups (Gottfries, 1998). As such, it is difficult to determine whether the measures used by existing studies were sensitive enough to accurately assess LLD.

Likewise, Estabrook et al. (2015) show that recognising subtle symptoms of depression may become more difficult with increasing age. Though this is only one study, it proposes a fundamental factor that needs to be considered when assessing depression in older adults, compared to working age groups. In support, Davison et al. (2009) also suggest that assessing LLD requires additional informants because the reliance on a sole informant, using self-report questionnaires and/ or clinical interviews, may not be accurate enough. As only half of the studies used another source of information to collaborate reported symptoms, it may be that the reliability of the information provided is compromised in the studies that did not use additional sources of information.

Hopelessness, in contrast, was consistently assessed using the Beck Hopelessness Scale, enabling greater consistency in comparing findings across studies. Cukrowicz et al. (2013) show a small, cumulative, effect of hopelessness and burdensomeness on suicidal ideation. Cheavens et al. (2016), however, suggested that self-forgiveness had a larger effect on the relationship between burdensomeness and suicidal ideation compared to hopelessness. Self-forgiveness, as such, could potentially represent a third construct of psychological resilience, which has received limited attention in older adult populations. It may be that this construct also impacts the relationship between depression and hopelessness but in a different manner from the personality and attachment risk factors. Further studies, however, are required to investigate these assumptions further.

Personality

Like hopelessness, the majority of studies included in the review used a gold standard tool to assess personality constructs, with the exception of two studies. These two studies (Cukrowicz et al., 2013; Iliceto et al., 2014) used tools that were based on alternative personality models and as such, assessed personality with a greater focus on psychobiology or social interactions. This consistent use of sampling tools allowed for a greater degree of confidence when comparing and interpreting findings across these studies. Overall, findings suggest that specific types of personality characteristics (e.g. neuroticism or extraversion) may have a small effect on depression and/ or hopelessness.

It is challenging to draw concrete and confident conclusions regarding the impact of potential psychological factors given the small number of studies examining the impact of these constructs on depression and hopelessness. Nevertheless, findings seems to suggest that neuroticism increases perceptions of physical and mental ill-health, with the opposite being true for high extraversion ratings (Chapman et al., 2006). The relationship between neuroticism and depression in older adults, however, seems to be more complex with one study highlighting a large direct effect of neuroticism ratings on current depressed mood (Gale et al., 2013), and the other showing a smaller, longitudinal effect in specific cohorts (Billstedt et al., 2014). In terms of hopelessness, included studies show a large effect of

neuroticism on levels of hopelessness, with specific sub-components of neuroticism and extraversion exerting a medium to large effect on levels of hopelessness (Duberstein et al., 2001).

Attachment

Compared to the personality studies, attachment studies report larger effect sizes but greater methodological variations in how beliefs about social relationships were assessed. As such, despite the large effect sizes, variations in measurement reliability and validity affect what can be confidently interpreted, which is compounded, again, by the limited evidence base for this construct in this population. Lang et al. (1998b) reported that having close relationships with nuclear family members had a small effect on self-reported satisfaction with social contacts and decreased feelings of loneliness in older adults, but familial contact in itself did not impact on feelings of emotional closeness. This suggests that relationship quality, rather than access to familial contact, may be the critical factor in how individuals interpret their interactions with social others. This theme was supported by Barnas et al. (1991), who reports that having avoidant attachments with adult children correlated with poor, self-reported, physical and mental health. Britton et al. (2008) also show that individuals who feel overly responsible for family members increase their risk of suicidal ideation. Conversely, this risk can be decreased risk if individuals believe that they have emotional close ties to family members (Purcell et al., 2012).

Given that both studies used similar scales for assessing suicidal intent and reasons for living, this suggests that attachment quality has some impact on mental wellbeing. This view is also supported by Zhang and Labouvie-Vief (2004) who report a small to medium effect of mental wellbeing on perceptions of social relationships and the types of coping strategies used over a longitudinal period. Their study also suggests that, over the lifespan, some aspects of attachment may remain stable whereas other aspects of attachment can be modified based on life experience.

Quality Criteria

Main issues with regards to study quality related to the inconsistent sampling of constructs using tools that may, or may not, be specific enough to detect changes in older adult populations, and study designs. The exceptions to this seemed to be studies which assessed personality and hopelessness, which typically used gold standard measures though there were exceptions to this also. Most studies tended to report small effect sizes, which could be a result of the limitations in the assessment procedure, or observed relationships.

The majority of studies included within the review also employed cross-sectional research designs. While cross-sectional studies are typical in emerging or under-researched fields, they

limit what can be interpreted about the direction of effects. Moreover, over half of the studies did not report any confounding variables. It is, therefore, difficult to draw confident conclusions about findings given the small effect sizes, correlational study designs and variability in how constructs, and overlaps, are measured.

On a more positive note, over half of the studies corroborated self-reported measures with other sources of information (e.g. medical records, professionals, family or friends) as well as reporting sampling biases, error estimates and results of screening measures, which help to improve reliability and validity of the reported findings. Using other sources of information and screening instruments, for instance, may help to ensure the accuracy of symptoms under investigation whereas sampling biases and error estimates help to increase generalisability and reduce the potential for type 1 and 2 errors. Although the number of longitudinal studies were much smaller, they covered short to longer term intervals across the life span.

In conclusion, it is difficult to draw concrete and robust conclusions from the existing research base due to methodological biases within the research base. Despite this, emerging themes seem to suggest that there is a relationship between depression and hopelessness, with attachment and personality factors exerting an indirect influence on this relationship by affecting perceptions of mental well-being.

Limitations

One limitation of this systematic review may be the search strategy used to identify relevant studies because of either the search terms themselves, or the combination of search terms used, or the types of sources used to identify relevant research. Given that LLD is an emerging field, it may be that the literature is not coherently grouped into one specific category of 'depression in older adults'. Instead, it may be that studies are organised more diffusely under other themes (e.g. depression in older adults with physical health difficulties or depression in older adults with caring roles or depression following bereavement), which made it difficult to draw out relevant studies. As such, other search terms, or other combinations of search terms, could have resulted in the identification of studies that were relevant but were not included in this review. To minimise the impact of these limitations, the search terms were developed with support from an expert librarian who had no knowledge of the subject area, and sources other than research search engines were used (e.g. author's webpages, reference lists, thesis search) to identify emerging or unpublished studies. Another limitation of the review may be criteria used to evaluate the studies themselves. It may be that the criteria used were more applicable in fields that have established, consistent evidence bases. Nonetheless, we adapted the quality criteria to assess validity and reliability as best as possible, given the existing evidence base.

Research Implications

This systematic review, first, highlights a need for a more detailed and methodologically robust understanding of LLD and hopelessness. Second, it suggests that there is a need for underlying factors, which contribute to this relationship, to be systematically explored using reliable and valid tools for this population. Future studies may also wish to explore whether

this relationship differs from working age adults, after controlling for contextual factors (e.g. physical ill health, retirement, loss) that may be common to this age population. Doing so may highlight differences that may otherwise remain undetected.

Clinical Implications

In terms of clinical implications, findings from this review suggest that depression in older adults needs to be reliably assessed using tools specific to this population and, ideally, corroborated with other sources. When history taking, it may be interesting to explore whether the relationship between depression and hopelessness is affected by how individuals perceive their social relationships, or longstanding difficulties that affect how problems are perceived, or a combination of both factors, and how this changes over the course of treatment. It may also be interesting to consider factors that may increase psychological resilience, and their impact on treatment outcome.

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Part 2: Empirical Paper

The Impact of Attachment and Neuroticism on the Depression-Hopelessness Relationship in Rural Older Adults

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This study has been written in accordance with the author guidelines for Psychology and Ageing (Appendix item 3).

Abstract: 164

Word Count: 6,365

Abstract for Empirical Study

Background: Psychological models in working age adults suggest that specific psychological vulnerabilities (e.g. personality, attachment) interact with life stress to increase risk for depression. There is limited research to determine whether the same mechanisms apply in older adults

Objectives: An exploratory study was carried out to determine the strength of association between depression and hopelessness in a rural, community sample of older adults, and whether this relationship was indirectly influenced by specific personality traits (e.g. neuroticism and extraversion) and insecure attachment (avoidant/ anxious).

Methods: A sample of 58 older adults completed self-report questionnaires examining personality traits, attachment styles, mood and hopelessness.

Results & Conclusion: As with existing findings in working age adults, depression and hopelessness scores correlated with each other, and with neuroticism and avoidant attachment. Only neuroticism, however, indirectly influenced the relationship between depression and hopelessness. Findings are limited by the small sample size and cross-sectional nature of the data. The study findings suggest that neuroticism strengthens the relationship between depression and hopelessness.

Introduction

Approximately 31% of older adults (aged 60+) are thought to live with depression, a rate twice that of dementia (Alzheimer's Society, 2014; Steptoe, Demakakos, & de Oliveira, 2012). Despite these estimated prevalence rates, only a small minority (6.5%) access talking therapies (Burns, 2015; National Centre for Social Research, 2009). Statistics show that although healthcare staff may be well placed to identify later life depression (LLD), over half of cases go undetected because of difficulties in identifying depression in older adults (Royal College of Psychiatrists, 2010). This under-reporting may potentially limit research, and understanding, of contributing factors. Studies that do focus on later life depression, for example, often show conflicting findings with small effect sizes and methodological biases (see previous chapter in thesis).

Older adults living in rural and remote locations, based on the definition provided by the Scottish Government's urban-rural classification system (Scottish Government, 2014), may represent a hidden sub-group that are at an even greater risk of developing depression. Baernholdt, Yan, Hinton, Rose, and Mattos (2012) show that rural older adults rate lower on social functioning compared to urban older adults. Likewise, emotional wellbeing is shown to be worse in rural older adults compared to urban dwellers (Oguzturk, 2008), potentially due to internal and external factors associated with ageing and rural life. Access to services, for instance, may be limited (Age UK, 2012; Sellick, 2015), expensive (Joseph Rowntree Foundation, 1998) and there may be a lack of anonymity or stigma when attending health services (Elliot-Schmidt & Strong, 1997). As such, these external factors are likely to delay accessing support until problems begin to impede on daily and social functioning (Elliot-Schmidt & Strong, 1997; Scottish Government, 2009; Strasser, 2003). Despite these difficulties, older adults are also more likely to migrate from urban to rural areas (General

Register Office for Scotland, 2005). Unlike man-made retirement communities, these natural retirement communities are often ill-equipped to deal with the physical and mental health needs of an ageing population (Ormond, Black, Tilly, & Thomas, 2004). Challenges in meeting the mental health needs (Jackson et al., 2007) of remote and rural populations are also acknowledged in the Scottish Government's 2017-27 Mental Health Strategy (Minister of Health, 2017).

Developmentally speaking (Erikson, 1998), older adulthood is a period of reflection and re-evaluation of personal life history and goals, with successful adaption depending on frequency of positive emotions (Ong, Edwards, & Bergeman, 2006) and assimilative coping (Boerner, 2004). As such, some older adults, i.e. those who rate lower on these dimensions, may feel doubly disadvantaged in rural settings because of how they appraise their past, manage emotions and view future challenges. Individuals who are more likely to evaluate their past as being full of missed opportunities, regret and failures are shown to reminisce with a past-oriented lens, with this focus on the past increasing psychological distress (Cully et al., 2001). Being overly focused on the past has also been shown to decrease psychological flexibility when faced with obstacles, resulting in feelings of hopelessness (Snyder et al., 2000). Hopelessness is a key feature of depression and refers to a belief that the individual is powerless to achieve a desired goal, no matter how hard they try, reflecting a lack of agency and low levels of psychological resilience when encountering difficulties (Gooding, Hurst, Johnson, & Tarrier, 2012).

Neuroticism, extraversion and insecure attachment styles represent three potential factors that may increase negative emotions, maladaptive coping strategies and contribute to feelings of hopelessness. Neuroticism, for instance, relates to a tendency to interpret emotionally neutral

stimuli in an overly negative manner (Suls & Martin, 2005) and attribute unhealthy meanings to past traumas and transgressions (Lilgendahl, McLean, & Mansfield, 2012) because of an increased attentiveness towards negative schematic information (Martin, 1985; Robinson, Schmeichel, & Inzlicht, 2007; Young & Martin, 1981). In older adults who rate high on neuroticism, this negative focus is associated with increased reminiscence about past hurts, higher levels of psychological distress (Cully et al., 2001), and reactivity when faced with daily stressors, which may affect successful adaption to this age stage (Ong et al., 2006).

Likewise, individuals who feel overly anxious or act avoidant in their interpersonal relationships tend to show an attachment style where they deny insecurities, distance themselves from others or become over-vigilant to potential sources of threat because they lack confidence in their own, and other people's ability, to meet their psychological needs (Bowlby, 1973). In support, Mikulincer and Orbach (1995) show that insecurely attached individuals (e.g. those with avoidant or anxious attachment) report shorter retrieval times for negative memories and a greater sense of feeling overly overwhelmed by negative memories whereas securely attached individuals are more able to allow unpleasant or negative memories into mind without being overwhelmed. In turn, the authors suggest, this provides a means of containing and processing emotionally difficult information. Zhang and Labouvie-Vief (2004) also show that feeling insecure in relationships is associated with a greater use of defensive coping strategies and vice versa.

As such, specific personality traits and attachment styles could add something more, over and above environmental stressors and ill-health, to understanding what contributes to the relationship between LLD and hopelessness in rural older adults. Beekman et al. (1995) show that while stressors associated with ageing tend to correlate with mild to moderate levels of

depression, personality and social relationship histories represent longstanding risk factors for major depression. In rural communities, factors that affect sociability (e.g. interpersonal style, outlook on life) may amplify a sense of integration and wellbeing or not. Rubio, Dumitrache, and Rubio-Herrera (2016), for instance, show that older adults who rate high on extraversion are more likely engage in social activities in rural communities, with taking part increasing physical and psychological wellbeing compared to low raters. Individuals who rate high on extraversion and conscientiousness are also shown to be more motivated to seek out social relationships and adhere to social norms and expectations (Hill, Weston, & Jackson, 2017), which may be advantageous in rural settings. Likewise, Ponzetti (2003) suggest that older adults who choose to retire in rural communities, despite the hardships, do so because of their attachment to a particular location which, in turn, influences micro and macro level attachments within the area.

In sum, there is some evidence to suggest that depression in later life is likely to be undetected and under-reported by older adults and healthcare professionals alike. Given that remote and rural populations are already less likely to access treatment for mental health difficulties, some older adults living in these types of locations could be, hypothetically speaking, at a higher risk for developing LLD. Intrinsic factors that affect emotional regulation, sociability and how challenges are perceived, for instance, may affect the successful adaption to the dual tasks of older adulthood and rural life, over and above any environmental stressors, and increase feelings of hopelessness. This study, therefore, focused on estimating the extent to which interpersonal factors, such as personality and attachment, affected the direct relationship between depression and hopelessness in a population of older adults who live in remote and rural locations. First, it was hypothesised that personality traits indicative of increased emotionality and decreased sociability (e.g. high neuroticism and low

extraversion), would be positively associated with feelings of depressed mood and hopelessness. Second, it was hypothesised that avoidant attachment, a distancing interpersonal construct, would also positively correlate with depression and hopelessness. Finally, exploratory mediation analyses were used to determine which of these three risk factors (neuroticism, extraversion and avoidant attachment) had the largest effect on the relationship depression and hopelessness. It was hypothesised that only neuroticism and avoidant attachment would indirectly strengthen this relationship but no a priori hypothesis about the strength of these factors was made.

Methods

Study Design

A cross-sectional study design was used.

Participants

In total, n=58 participants completed the questionnaires (42 female, 16 male) with a mean age of 72.4 (*S.D* = 6.1).

Inclusion/ Exclusion Criteria

All adverts about the study included a brief statement about the inclusion and exclusion criteria. The inclusion criteria stipulated that individuals aged 65 or over, residing in Scotland, who did not have any neurological impairments and had a good understanding of English were eligible to take part. The exclusion criteria stated that individuals with a self-reported neurological condition (e.g., stroke, dementia, epilepsy or brain-injury), learning difficulty, history of addiction, self-reported moderate-severe cognitive impairment or in severe psychological distress were ineligible to take part. To assess the latter, a screening question was included in the demographic information sheet which asked participants to self-report whether they, or someone close to them, had observed changes in their mood and memory over the past six months. Given the cross-sectional nature of the study, it was not possible to obtain corroborating case-notes or interview evidence to determine the veracity of mood and memory changes

Measures

The Social Relationships Questionnaire (Cameron, unpublished). Although other existing measures also assess social relationships, they focus on one particular relationship, such as Hendrick (1988)'s Relationship Assessment Scale, are too lengthy for the population

group or measure similar constructs but not those that we wished to assess. The Adult NIH Social Relationship scale (Cyranowski et al., 2013), for instance, is a 45-item measure that contains two scales of interest (emotional support and companionship) which are rated in relation to non-specific relationships. Likewise, although the UCLA Loneliness Scale (Russell, Peplau, & Cutrona, 1980) assesses relational and collective connectedness via 5 items in total, the scale's primary focus is on loneliness. We, therefore, created a bespoke questionnaire to assess four different aspects of social relationships; frequency of contact, perceived importance of relationships, level of care towards important people in their lives and likelihood of sharing problems (Appendix item 4).

The first section assessed frequency of social contact ranging from daily to annual contact. Responses were rated on a 7-point Likert scale with a maximum score of 44. The second section, perceived importance of relationships, asked participants to rate how important family, friends, community groups and professionals contacts were to them using a 4-point Likert scale, with a maximum score of 20. The third section asked participants to list all the important individuals in their lives at the moment and rate how important they were, the level of care they felt towards them and the likelihood of sharing problems with them using a 4-point Likert scale. The latter two scales had a maximum score of 28. Higher responses indicated more frequent contact, higher levels of importance and care attached to the social contacts in their life. Given the bespoke nature of the questionnaire, it is primarily used to provide additional contextual information about social network size and quality of those relationships.

Depression, Anxiety and Stress Scale - DASS-21 (Lovibond & Lovibond, 1995). This 21-item state measure asks participants to rate their levels of depression, anxiety and

stress over the past week using a 4-point Likert scale based on how applicable each statement is to them (Appendix item 4). Scores above 14 on the depression scale are considered to indicate moderate to severe levels of depression. Similarly, anxiety scores above 10, and stress scores above 19, are thought to reflect clinically significant levels of moderate to severe levels of anxiety and stress, respectively. Depression scores ranging between 0-9, anxiety scores between 0-7 and stress scores between 0-14 are considered to fall within clinically non-significant thresholds. A total composite score was used in the analysis instead of individual sub-scales to control for the observed tendency for older adults to report physiological and somatic symptoms more frequently than affective symptoms (Fiske et al., 2009; Gottfries, 1998). Individual sub-scale results are included in the appendix (Appendix item 7). The DASS-21 is shown to have good internal consistency and validity for measuring symptoms in older adult populations (Gloster et al., 2008). Internal consistency, using the sampled population within this study, was established as $\alpha = .99$, suggesting a high degree of consistency in how participants responded across the three sub-scales.

Big Factor Inventory- BFI-10 (Rammstedt & John, 2007). This questionnaire assesses the big five personality constructs (Openness, Conscientiousness, Extraversion, Agreeableness and Neuroticism) using 2 items per sub-scale. Responses are based on a 5-point Likert scale, ranging from not at all like me and most like me (Appendix item 4). Scores of 1 indicate low ratings whereas scores close to 10 indicate high ratings on a particular trait. The scale is shown to good test-retest reliability, statistical validity and maps onto similar constructs assessed by longer trait measures (Rammstedt & John, 2007). Its brevity is considered to be advantageous when assessing personality traits in older adults (Shuman-Paretsky, Belser-Ehrlich, & Holtzer, 2014). Internal consistency, using the sampled population within this study, was established as $\alpha = .82$ for the extraversion sub-scale, $\alpha = .73$

for neuroticism, α = .18 for openness, α = .14 for agreeableness and α = .48 for conscientiousness.

Experiences in Close Relationships - Relationship Structure Questionnaire - ECR-RS (Fraley, Heffernan, Vicary, & Brumbaugh, 2011). This questionnaire assesses avoidant and anxious adult attachment using four potential attachment figures (mother, father, romantic partner, and best friend). Participants are asked to agree or strongly disagree with each of the nine statements in response to each of the four attachment figures, with a maximum score of 7 (Appendix item 4). Lower scores indicate higher levels of anxiety and avoidant styles of attachment (Fraley et al., 2011). Given the high levels of missing data, an average anxious and avoidant attachment score was derived using responses for each the attachment relationships reported. Individual sub-scale results are shown in the appendix (Appendix item 7). The scale is shown to have good statistical reliability and validity (Wei, Russell, Mallinckrodt, & Vogel, 2007). Internal consistency, using the sampled population within this study, was established as α = .80.

Beck Hopelessness Scale – BHS (Beck et al., 1974). This scale is a reliable and valid clinical indicator of hopelessness. Participants rate their responses as being true or false according to the 20 items presented. Scores between 4-8 are represent mild levels of hopelessness, scores of 9-14 relate to moderate levels of hopelessness and 15+ indicate high levels of hopelessness and suicide risk. This scale has been reliably used within older adult populations (Satorres et al., 2016). Internal consistency, using the sampled population within this study, was established as α = .95.

Procedure

Following ethical approval from the University of Edinburgh research ethics committee (Feb 2016- Appendix item 5), poster adverts were placed in community halls that were used for community groups as well as libraries and supermarket noticeboards across the region. NHS staff teams involved in delivering community groups or community liaison work were also contacted, as were teams involved in the local third sector interface, to advertise the study (March 2016 & Dec 2016). As this strategy yielded no enquiries, the study was then advertised through two radio, social media and press releases across the rural region (July and Nov 2016).

Given difficulties with recruitment, the study was expanded Scotland-wide using an internet based version of the study (August 2016). Contrary to expectation, this strategy only resulted in four responses. National third sector agencies were also contacted as well as regional older adult teams across Scotland to advertise the study in their local news bulletin. Unfortunately, this did not result in any interest from potential participant groups. The final phase of the recruitment strategy involved contacting local community groups to present a short talk on emotional wellbeing in later life and hosting a stall at the main local library for the region (February and March 2017).

If participants indicated they were interested in taking part, they were asked to make contact with the researcher by telephone, email or in person at one of the talks. The researcher provided a brief overview of the study before sending a packet of questionnaires. During the initial contact, participants were reminded that they were free to opt out of the study. If they wished to take part, however, they would need to complete the questionnaires and return them in the pre-paid envelopes provided in the packet. The packet contained a participant

information sheet, consent form, demographic and social contact information sheet, ECR-RS, BFI, DAS and the BHQ. The information sheet included contact details of support organisations should participants wish to talk about their experiences further, as well as contact details for the research team.

Response rates were calculated using the number of enquiries divided by the number of completed packs returned, expressed as a percentage. The press releases resulted in an 87% response rate with thirty three participants agreeing to take part in the study whereas the community talks resulted in a 29% response rate, with twenty one participants taking part. It was not possible to calculate the response rate for the internet survey. Data from the completed questionnaires were identified by a numerical code and entered into a statistical software package (SPSS V.22).

Analysis plan

A-prior power calculations suggested that approximately 128 participants would be required for a medium effect size at a significance level 0.05 to achieve a power level of .08 (Cohen, 1992).

Missing Data. The missing data analysis indicted that the ECR scales for mother, father, partner and friend all contained a large amount of missing data, ranging between 24.1 – 34.5%. Little's Missing Completely at Random test (MCAR) was, therefore, conducted to determine whether there was a pattern to the missing data. The non-significant results suggest that data were missing completely in a random way (X^2 (233) = 245.77, p = .27). Missing

values were, therefore, imputed with predicted values using the expectation-maximisation algorithm.

Tests of Normal Distribution. Shapiro-Wilk tests for normality indicated that the data was not normally distributed. Therefore, non-parametric tests and bias corrected bootstrapped confidence intervals used. With the exception of avoidance attachment to father figure, all other avoidant and anxious attachment scores were negatively skewed to the left, suggesting that the majority of participants had secure attachment. Depression, anxiety and stress, in contrast, were positively skewed to the right indicating low or minimal levels of psychological distress. Personality traits showed more variation in their distribution but were non-normally distributed.

Mann Whitney tests were used to test for group differences relating to gender or preference for more social contact. Inter-relationships between factors were investigated using Spearman's rank correlation coefficient, with a Bonferroni correction applied to correct for multiple comparisons.

Analysis of Indirect Effects. An exploratory analysis of indirect paths was carried out to explore direct and indirect effects of personality and attachment factors on the depression-hopelessness relationship using the PROCESS macro (V2.16) developed by Hayes (2013). Indirect effects are reported using bias-corrected percentile based bootstraps, based on 1000 repetitions, to provide conservative and precise estimates. Adjusted R^2 statistics are also reported to provide reliable estimates of effect sizes (Fairchild, MacKinnon, Taborga, & Taylor, 2009).

Results

Demographic information. The majority of individuals who took part reported that they were married (*n*= 25), widowed (*n* = 15) or divorced (*n* = 8), with a small minority classing themselves as single or cohabiting (*n* = 9). The majority of respondents were from one rural region (*n* = 56) with a small minority from other rural Scottish regions (*n* = 2). All participants classed themselves as British Caucasians. The majority of respondents stated they lived in a town (*n* = 37), hamlet (*n* = 11) or village (*n* = 10). The International Standard Classification of Occupations (ISCO– 08) was used to categories occupations. The majority of respondents reported being employed in professional (*n* = 19), managerial (*n* = 7), associate technical/ professional (*n* = 7) or clerical/ agricultural (*n* = 14) roles. The remaining 10 participants had been employed in occupations associated with machinery operation, sales work or elementary professions. Participants reported being retired for a mean number of 13.3 years (*S.D* = 8.1).

Descriptive Data. Table 1a shows descriptive data for attachment, personality and mood measures. A total avoidant and anxious attachment score was calculated by average responses relating to mother, father, partner and friend for each respective scale. Likewise, a total distress measure was calculated by averaging responses to depression, anxiety and stress scales on the DAS. Individual sub-scale results are shown in Appendix item 8.

The data suggests that participants rated higher on anxious attachment, compared to avoidant attachment, across their current and past relationships. Participants also reported being open to new experiences, highly conscientious, agreeable and extroverted. The hopelessness scores

imply that participants were experiencing mild levels of hopelessness, but there were wide variations within individual scores.

	Mean	Std. Deviation
Attachment Measures		
Total Avoidant	5.2	1.3
Total Anxious	5.9	1.5
Personality Measures		
Openness	6.9	2.1
Conscientiousness	7.4	2.1
Extraversion	6.3	2.1
Agreeableness	6.9	2.0
Neuroticism	5.7	2.6
Measures of Mood		
Total distress	7.8	8.2
Hopelessness	6.2	4.8

Table 1a: Descriptive Statistics for Attachment, Personality and Mood Measures.

Social Characteristics. A Mann-Whitney Test was used to determine if gender impacted on social characteristics, attachment, personality and mood self-reports. Findings show that males and females did not differ in the number of important people they listed ($U = 268.5$, $p = .48$), frequency of meetings attended ($U = 188.5$, $p = .12$), avoidant attachment to mother ($U = 316.5$, $p = .74$), anxious attachment to mother ($U = 242.5$, $p = .10$), avoidant attachment to father ($U = 321$, $p = .80$), anxious attachment to father ($U = 274.5$, $p = .28$), avoidant attachment to partner ($U = 324.5$, $p = .80$), anxious attachment to partner ($U = 321.5$, $p = .80$), avoidant attachment to friend ($U = 267.5$, $p = .24$), anxious attachment to friend ($U = 291.5$, $p = .42$), openness ($U = 322.5$, $p = .82$), conscientiousness ($U = 318.5$, $p = .76$), extraversion ($U = 329$, $p = .90$), agreeableness ($U = 253$, $p = .15$), neuroticism ($U = 366$, $p = 1.00$), depression ($U = 285.5$, $p = .38$), anxiety ($U = 301.5$, $p = .55$), stress ($U = 302.5$, $p = .56$) or hopelessness ($U = 328.5$, $p = .90$).

Next, given the variations in number of weekly groups attended, we investigated whether weekly group attendance differed according to personality, attachment or mood measures. The majority of participants reported attending between 1-3 social groups (n = 29). Fourteen participants reported attending between 4-6 social groups and eleven reported that they did not attend social groups. Findings indicate that the number of weekly groups attended only varied based on depression scores (H = 6.68, p = .04). Findings were followed up with a post-hoc analysis which indicated that individuals attending no weekly groups rated higher on depression scores (Mdn = 18.4) compared to those attending 3-6 weekly groups (U = 54.5, p = .03, Mdn = 11.4), as would be expected.

Three of the questions in the social relationships focused specifically on participants' satisfaction with their current level of social contact. The majority of respondents reported that they were happy with their current level of social contact (82%). Despite this, 55% reported that they would like more social contact. When asked about barriers to social contact, 16% cited distance or rural location, 14.5% stated their own physical disability and 11% reported psychological ill-health as the main barriers. The majority of respondents (44%) reported no barriers to accessing social contact while only 4% reported a lack of opportunity.

To explore this further, a Mann-Whitney test was used to assess whether individuals who asked for more social contact rated higher on personality, attachment or mood states compared to those did not ask for more social contacts. Findings indicated no statistical differences between requests for social contacts and dimensions of neuroticism (U = 374, p = .99), extraversion (U = 305, p = .23), avoidant attachment (U = 359.5, p = .79), anxious

attachment (U = 337, p = .52), distress (U = 309.5, p = .27) or hopelessness (U = 312, p = .29).

Correlation results. Spearman's rank order correlation co-efficient was used to calculate inter-relationships between variables (Table 2a). Key findings of interest show a positive inter-relationship between total distress score and hopelessness as well as total distress score and neuroticism. Total distress score was also negatively related to extraversion and total avoidant attachment. Like the total distress score, a negative relationship between hopelessness and extraversion as well as between hopelessness and total avoidant attachment was observed. Hopelessness also positively correlated with openness. Frequency of social contact was positively associated with extraversion and number of important people listed.

	Total Distress Score	Hopelessness	Openness	Conc.	Extraversion.	Agree.	Neuro.	Total. Avoid. Attach.	Total. Anxious. Attach.	Freq. of Social Contact	No. of Important People
Total Distress Score	1	.59**	.02	-.10	-.30*	-.17	.64**	-.39**	-.24	.03	-.04
Hopelessness	.59**	1	.34**	-.16	-.35**	-.11	.60**	-.27*	-.24	-.15	-.05
Openness	.02	.34**	1	-.16	.04	-.16	.33*	.06	-.05	-.03	.06
Conc.	-.10	-.16	-.16	1	.29*	.35**	-.22	.06	-.00	.02	.06
Extraversion	-.30*	-.35**	.04	.29*	1	.14	-.30*	-.05	-.04	.30*	.16
Agreeableness	-.17	-.11	-.16	.35**	.14	1	-.05	.11	.20	-.03	.18
Neuro	.64**	.60**	.33*	-.22	-.30*	-.05	1	-.10	-.27*	.01	-.02
Total Avoid. Attach	-.39**	-.27*	.06	.06	-.04	.11	-.10	1	.41**	.02	.06
Total Anxious Attach	-.24	-.24	-.05	-.00	-.04	.20	-.27*	.41**	1	.12	-.12
Freq. of Meetings	.03	-.15	-.03	.02	.30*	-.03	.01	.02	.12	1	.36**
Number of Important People	-.04	-.05	.06	.06	.16	.18	-.02	.06	-.12	.36**	1

*. Correlation is significant at the 0.05 level (2-tailed). **. Correlation is significant at the 0.01 level (2-tailed).

Table 2a: Correlational Matrix for Attachment, Personality and Mood measures.

In order to correct for the multiple comparisons within the correlational matrix, a Bonferroni correction was applied at the 0.017 level. This is shown in the table by the symbols '**'. Only the inter-correlations between total distress score, hopelessness, neuroticism and avoidant attachment remained statistically significant. Hopelessness, in contrast, remained positively correlated with neuroticism, introversion and openness, but not with avoidant attachment. Inter-correlations for attachment sub-divisions were found to be weaker, as shown in Appendix item 8.

Indirect path analysis.

From the literature, and supported by the correlational analysis, it appears that depression and hopelessness were directly related to each other, with neuroticism, extraversion and avoidant attachment emerging as potential mediators of this relationship.

As shown in Figure 1a, the path analysis showed a significant direct relationship (path c) between depressed mood and hopelessness (F (4, 53) = 13.47, p = .00, Adjusted R^2 = .50), which reduced following the inclusion of neuroticism and total avoidant attachment as mediators (path c': F (1, 56) = 31.65, p = .00, *Adjusted* R^2 = .36). The inclusion of neuroticism accounted for 26% of the observed variance in the model (F (1, 56) = 20.04, p = .00, *Adjusted* R^2 = .26), whereas extraversion accounted for 7% of the observed variance (F (1, 56) = 4.51, p = .04, Adjusted R^2 = .07) and total avoidant attachment accounted for 14% of the observed variance (F (1, 56) = 9.37, p = .00, Adjusted R^2 = .14).

As paths b_2 and b_3 were not significant, only neuroticism appeared to have an indirect impact on the distress-hopelessness relationship. The standardised effect size suggests that 1 S.D difference on total distressed mood would correspond to a 0.18 change in the S.D of hopelessness using neuroticism as a mediator (β = .18, *S.E* = .07, 95% *BCa CI* [.06, .33]). To increase accuracy in the indirect findings, the analysis was re-run using only the depression sub-scale. Including depression, instead of total distress score, was found to reduce overall model fit.

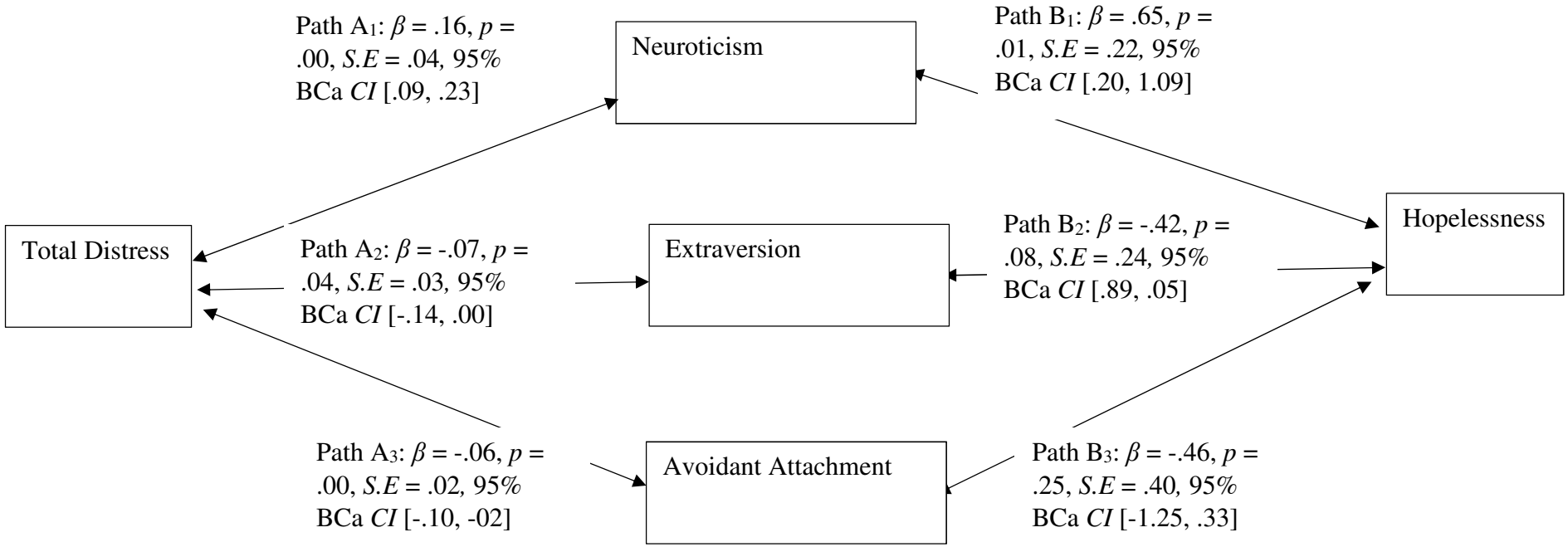

Figure 1a: Indirect Effects of Neuroticism, Extraversion and Avoidant Attachment on the Depressed Mood-Hopelessness Relationship

In sum, the path analysis suggests that the relationship between depressed mood and hopelessness is indirectly influenced by neuroticism, rather than extraversion or avoidant attachment styles.

Discussion

The current study investigated whether factors that affect emotional regulation and sociability, such as neuroticism, extraversion and avoidant attachment styles, strengthen the relationship between depressed mood and hopelessness in a non- clinical population of older adults living within a remote and rural region. The relationship between depression and hopelessness (Alloy et al., 1988; Greene, 1989; Uncapher et al., 1998) has often elicited contradictory findings. Our findings add to this by providing further support for a direct relationship between depression and hopelessness, even when sampling from a highly educated and non-clinical population of older adults. These preliminary findings are consistent with more recent research which provides evidence for a direct, lifespan relationship between depression and hopelessness (Lau et al., 2010). Our second set of findings suggest that the relationship between depression and hopelessness is strengthened by neuroticism rather than extraversion and avoidant attachment. This finding is of particular relevance because few studies compare and contrast known correlates and being able to differentiate between factors that exert the strongest influence on this relationship may help clinical understanding.

There seems to be a paradox within the field of LLD, with some highlighting LLD as a growing and under-reported area of concern (Crabb & Hunsley, 2006; Department of Health, 2011; Information Services Division Scotland, 2012; Jacoby & Oppenheimer, 2002; McIntosh, Santos, Hubbard, & Over-Hosler, 1994) and others reporting a positivity bias in older adults (Carstensen, 1995; Zhou, Lu, Chen, Dong, & Yao, 2017). Within the literature, there seems to be two, potentially, competing explanations for this. One explanation put forward by the socioemotional selectivity theory (Carstensen, 1995; Carstensen & Charles,

1998) suggests that as time becomes limited, older adults become more reward-oriented in their outlook. This shift towards more meaningful relationships and activities results in an attentional and memory bias for positive events, and a pruning of negative and unrewarding experiences. The other explanation put forward by Estabrook et al. (2015) suggests that older adults may find it more difficult to identify subtle changes or symptoms that are typically associated with depression (e.g. feelings of loneliness, worthlessness, nervousness, and difficulties in coping) and that difficulties may only be reported once they have reached higher ends of the distress spectrum.

The variations in hopelessness and depression scores observed within our sampled population suggest a potential third explanation: that perhaps only a small proportion of older adults experience depressed mood in later life, with interpersonal factors functioning as protective or risk factors. For instance, it may be that individuals rating high on neuroticism may have always experienced some form of emotional distress and have either accepted this as their normal way of life or become despondent at being unable to resolve their distress (Suls & Martin, 2005). When faced with tasks and challenges typically associated with older adulthood, these difficulties may become more apparent (Sneed & Whitbourne, 2003). The positive inter-correlations between neuroticism, total distress score and hopelessness are supportive of this observation and there is good research evidence to suggest that left untreated, the combination of low mood and high levels of hopelessness increases suicide risk (Chioqueta & Stiles, 2005), which is also more common in rural populations (*Scottish Suicide Database 2012 report: 2009-2010 data*, 2012). From this perspective, the impact of personality on role transition in individuals who are due to retire, recently retired and long-term retired may be worth exploring.

Findings in relation to sociability factors were more complex. The descriptive data implies that older adults report feeling happy with their current level of social contact and although they report wanting more social contact, there were no perceived barriers to achieving this for the majority of respondents. The tests of difference indicated that satisfaction with social contact did not vary according to mood, personality traits or attachment styles but depressed mood was associated with attending fewer social groups. Moreover, although the correlational matrix implied a positive inter-relationship between introversion, total distress, hopelessness and neuroticism, and secondly, a positive relationship between extraversion and frequency of social contacts, extroversion did not mediate the relationship between hopelessness and distressed mood.

Though these findings initially appear to contradict assumptions around loneliness, depression and feelings of social exclusion in rural older adults (Barg et al., 2006; Walsh & Ward, 2013), they support other research which suggests that the relationship between social contact, perceived isolation and social exclusion may depend on a complex interplay between environmental and interpersonal pathways (Cornwell & Waite, 2009; Social Exclusion Unit, 2006). This pattern of findings is also consistent with the socioemotional selectivity theory (Carstensen, 1995) which suggests that older adults become more selective in how they allocate emotional resources in their relationships with increasing age. Further studies, however, may help to identify whether interpersonal factors exert an influence on this relationship.

The high levels of missing, or non-reported, data for parental attachment figures represents another interesting finding and may relate to a potential cohort effect. Given the average age of the sampled population, most of the individuals who took part in the study would have

been born close to 1945, around the time of World War II. There are some suggestions that cohorts are affected by the value systems in the cultural environments that they grow up in which, in turn, affects development of specific personality and interactional styles (Twenge, 2000, 2002). Individuals born around the time of the war, for instance, are shown to be less extroverted, narcissistic and more adherent to social norms compared to those born in the 1960's and 1970's (Roberts & Helson, 1997).

Elder (1998) show that even after the end of the war, families faced a number of hardships that, hypothetically, may have affected their availability as caregivers. Likewise, studies show that both, evacuated and non-evacuated, children show anxious attachment to their caregivers depending on the level of nurture in their home environments, with this inter-relationship style increasing psychological vulnerability in later life (Foster, Davies, & Steele, 2003; Rusby & Tasker, 2008). While some of the observations within this study fit with this (e.g. comments written on questionnaires about attachment to parental figures 'I did not know her/ him/ did not have a parent'), the indirect analysis indicated that avoidant attachment did not influence the depression-hopelessness relationship.

Limitations

In terms of limitations, the study sampled a high number of retirees who had held professional occupations. As such, this population may, potentially, show different inter-relationships with the factors under investigation than those who had, perhaps, grown up locally or those with different types of occupations. Likewise, it is unfortunate that we were mainly able to access older adults who lived in towns rather than smaller communities, possibly because of the limitations in the recruitment strategies used. It may be that choosing to live in a small town allows greater access to resources, which may also account for some

of the findings on social characteristics, compared to more rural environments. Alternatively, it may be that more rural dwelling older adults are harder to reach because of their reluctance to report psychological distress.

A further limitation is the low response rate and sample size. The systematic review, however, shows that that 5 out of the 17 larger scale studies included in the review also reported similar response rates (Cheavens et al., 2016; Choi et al., 2013; Cukrowicz et al., 2013; Lang et al., 1998b; Zhang & Labouvie-Vief, 2004), implying that older adults may be a difficult population to recruit from, with this recruitment difficulty enhanced in rural older adults. As a consequence of the recruitment issues, it is also likely that this study is underpowered due to the small path size of b1. Moreover, given the cross-sectional of the data, causality cannot be assumed. Likewise, due to a lack of corroborating evidence, the study places a heavy reliance on self-report measures. This is more problematic for three of the BFI sub-scales of openness, agreeableness and conscientiousness which showed poor internal consistency within the recruited sample.

Clinical Implications

In terms of clinical implications, the findings suggest that not all distressed older adults may experience social isolation, and that other factors may contribute to distress. As such, it may be worth exploring cohort effects on styles of inter-relating, and how challenges are perceived and processed. Future clinical studies may also wish to investigate whether targeting emotional reactivity reduces symptoms of distress and hopelessness in rural older adults. Psychological resilience is a third construct which has received limited attention in older adults and may be worth exploring further because it could represent a parallel pathway that buffers against psychological distress (Wells, 2009).

Research Implications

Despite the aforementioned caveats, the main findings suggest that the relationship between depression and hopelessness is indirectly influenced by neuroticism, which is consistent with existing literature in working age adults. The current study adds to this body of work by comparing and contrasting other known risk factors for this relationship in working age adults, such as avoidant attachment styles, and introversion in older adults.

The study also highlights a number of differences that could, potentially, be specific to older adults belonging to a specific cohort. For instance, the inter-relationships between introversion, neuroticism and hopelessness could be a consequence of ageing, or specific to a cohort who grew up around during a time of heightened uncertainty, stress and conflict. Likewise, the high number of non-reported data for attachment figures could also reflect styles of interpersonal relating that are specific to this cohort, or a general observed trend in how older adults perceive their attachment. The inter-correlations between extraversion and frequency of social contact also suggest that, perhaps, extraversion functions as a protective factor against distress and hopelessness as opposed to a mediator.

Despite these limitations, the recruitment strategy attempted to maximise generalizability across the region by using a variety of multi-media methods. The reported analyses include statistics that are likely to sufficiently powered (e.g. correlational matrix) as well as cautious, conservative estimates of indirect effects and R^2 statistics as estimates of the overall model effect. Given the limited, and discrepant findings on the relationship between depression and hopelessness, the study highlights some important preliminary findings that could be explored further using large samples. It would also be interesting to explore whether the same

pattern of findings are observed in the ‘oldest old’ or individuals living in highly remote areas as opposed to individuals aged 65+ living in towns within a rural region. Future studies may also wish to explore the impact of cohort effects on styles of interpersonal relating and personality traits.

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Appendix Items

Appendix Item	Title
1	Keywords, limits and filters applied search strategies
2	Adapted Quality Indicators
3	Journal selections
4	Copy of non-copyrighted measures
5	Ethical Approval Letter
6	Thesis proposal form
7	Descriptive data for attachment and DAS sub-scale items
8	Inter-correlations including sub-scale items for attachment and DAS

Appendix Item 1: Keywords, limits and filters applied search strategies.

Search Engine	Keywords	Limits and Filters
Medline (n= 766)	'Depression, Older adults, hopelessness'; 'older adults AND Attachment AND hopelessness AND depression'; Older adults and personality and hopelessness	Limits: 1980-2016, English Language, all aged over 65 and journals only
Psyarticles (n=296)	'older adults AND neuroticism AND hopelessness'; 'Elderly* AND Attachment* AND hopelessness*'; 'Elderly AND Attachment AND hopelessness'	Limits: 1980-2016, English Language, all aged over 65 and journals only
Cohrane (n=80)	Mental health> depression> depressive disorders and major depression,	Limits: Interventions only
Google scholar (n=633)	emotional lability extraversion openness hopelessness attachment "later life" neuroticism extraversion openness hopelessness attachment "later life" older adults, neuroticism, extraversion, openness, hopelessness, ECR geriatric, neuroticism, extraversion, openness, hopelessness, AAI neuroticism extraversion openness hopelessness attachment+ geriatric	1980-2016
Science direct (n=152)	"older adults" AND hopelessness AND Depression; "older adults"/ "geriatric"/ AND Neuroticism AND Hopelessness; "older adults" AND attachment AND Hopelessness	Limits: 1980-2016, subscribed and open access psychology journals only Filters: "depression,suicide,mental health,suicidal,patient,social,suicidal ideation,life,adult,anxiety,personality,suicide attempt,age,mental,clinical psychology"
WorldCat (n= 129)	older adults AND personality AND hopelessness; elderly,	Limits: 1980-2016, non-juvenile, English: 729 results. Filters: thesis/ dissertation

	hopelessness, personality; elderly, personality, depression; personality; elderly, personality, depression	

Appendix Item 2: Adapted Quality Indicators.

	Quality Criteria	Assigned ratings	
Reporting Quality	1. Funding	A	Reported
		B	Not reported
	2. Conflict of interest	A	Reported as no conflict of interest
		B	Reported as having conflict of interest
		C	Not reported
	3. Ethical approval	A	Reported
		B	Not reported
		C	Secondary data analysis
	4. Aims	A	Stated in relation to overall population and sub-groups
		B	Stated in relation to overall population
		C	Stated without reference to population or sub-groups
		D	Not stated or vague
	5. Study design evaluated based on Cochrane criteria	A	Prospective cohort with controls
		B	Prospective cohort study without controls
		C	Retrospective study with controls
		D	Retrospective study without controls
		E	Case controlled study
		F	Cross sectional
		G	No clear aims

External Validity Indicators	1. Sampling methods	A	Random population based
		B	Random geographic location based
		C	Non-random population based
	2. Recruitment Methods	A	Random
		B	Self-selection
		C	Convenient
		D	Medical Records
	3. Assessment of sampling bias	A	Reported
		B	Not reported but used screening tools
		C	Not reported
	4. Response Rate	A	Above 40%
		B	Between 21-40%
		C	Less than 21%
		D	Not reported
	5. Exclusion Criteria	A	Reported with rationale
		B	Reported without rationale
		C	Not reported
		D	Applied Retrospectively
	6. Exclusion rates	A	Less than 10%
		B	Between 10-20%
		C	Above 20%
		D	Not reported
	7. No of participants eligible to take part	A	Reported and screened
		B	Reported
		C	Not reported
Internal validity indicators	1. Measures of outcomes	A	Self and other sources
		B	Self-report only
		C	Medical records

		D	Registries
	2. Reliability and Validity of tools	A	Well known measures validated to specific population
		B	Well known, validated general population measures
		C	Mostly bespoke questionnaires
		D	Mix of validated and bespoke questionnaires
	3. Confounding factors	A	Stated and included in analysis
		B	Stated but not included in analysis
		C	Not stated
	4. Error estimates	A	Reported as error margins or CI intervals or odds ratios
		B	Post-hoc analysis and corrections applied
		C	None applied
		D	Not stated
	5. Reliability	A	Assumed because of previous published analyses
		B	Intra-observer variability is within outcome standards reported by other studies

		C	Subjective judgement of reliability made
	6. Analysis of sub-groups	A	Analysis includes sub-groups in detail
		B	Some sub-groups analysed
		C	No sub-groups analysed
		D	Not reported

Appendix Item 3: Journal selections

Name	Psychology and Ageing (empirical paper)	Ageing, neuropsychology and cognition (systematic review)
Impact Factor	2.7	1.25
Scope	Psychology and Aging ® publishes original articles on adult development and aging. Such original articles include reports of research that may be applied, biobehavioral, clinical, educational, experimental (laboratory, field, or naturalistic studies), methodological, or psychosocial. Although the emphasis is on original research investigations, occasional theoretical analyses of research issues, practical clinical problems, or policy may appear, as well as critical reviews of a content area in adult development and aging. Clinical case studies that have theoretical significance are also appropriate. Brief reports are acceptable with the author's agreement not to submit a full report to another journal.	The purposes of Aging, Neuropsychology, and Cognition are to (a) publish research on both the normal and dysfunctional aspects of cognitive development in adulthood and aging, and (b) promote the integration of theories, methods, and research findings between the fields of cognitive gerontology and neuropsychology. The primary emphasis of the journal is to publish original empirical research. Occasionally, theoretical or methodological papers, critical reviews of a content area, or theoretically relevant case studies will also be published. Emphases of interest include information processing mechanisms, intellectual abilities, the impact of injury or disease on performance, cognitive training, cognitive and pharmacological approaches to treatment and rehabilitation, metacognition, and the social and personal aspects of cognitive functioning. Articles on both normal and dysfunctional development that are relevant to the interface between cognitive gerontology and neuropsychology are particularly welcome. Multiple approaches to

		issues of aging and cognition (e.g., basic, applied, clinical), and multiple methodologies (e.g., cross-sectional, longitudinal, experimental, multivariate correlation) are appropriate.
Abstract	250 words typed on a separate page & five keywords or brief phrases.	150 words.
Word length	Manuscripts should not exceed 8,000 words (approximately 27 double-spaced pages in 12-point Times New Roman font). Shorter manuscripts are equally welcomed. The word count does not include references, tables, and figures. If you feel that you need extra space, please contact the editor. For example, you may have a complex methodology or statistical approach or a new theoretical framework that requires more text. Please include the word count for the main text below the keywords.	There is no word limit for manuscripts submitted to this journal. Authors should include a word count with their manuscript.
Other guidelines	Prepare manuscripts according to the Publication Manual of the American Psychological Association (6th edition). List references in alphabetical order. Each listed reference should be cited in text, and each text citation should be listed in the References section.	Manuscripts should be compiled in the following order: title page (including Acknowledgements as well as Funding and grant-awarding bodies); abstract; keywords; main text; references; appendices (as appropriate); table(s) with caption(s) (on individual pages); figure caption(s) (as a list). Follow APA 6th format Each manuscript should have 1 to 5 keywords. Section headings should be concise

Appendix Item 4: Copy of Non-Copyrighted Measures

Questionnaires for study

Demographic information Sheet

Thank you very much for taking part in this study. I will start by asking you for some information about yourself. This will help me to make sure that I have collected a variety of different viewpoints from different ages, genders, locations and backgrounds.

May I ask how old you are?:

Are you male or female?

Are you married/ single/ divorced/ cohabiting/ widowed?

Do you normally live in Scotland? Y/N

Do you live in a hamlet/ village/ town/ city?

What ethnic group do you consider yourself to belong to?

What is your current occupation/ What was your occupation before you retired?

If you have retired, can you please tell me how many years you have been retired for?

May I also ask if you have ever been told by a doctor that you have had a stroke, dementia, brain injury or any other memory problems?

Have you, or anyone close to you, noticed any changes to your mood, behaviour or memory in the last 6 months? If so, could you please describe them below:

Social Relationships

The next section is about your social relationships with friends, family members (including extended family members), groups or social activities and contact with professional services. I would like to ask you about how often you meet with each of these groups, how important they are to you and how you feel about the level of contact you currently have. There are no right or wrong answers so please answer as openly as possible.

First, I would like to start by asking you some questions about how often you see other people and what types of people you might meet with. Can you please tick the box that describes your situation best?

	Every day	**Every week**	**Every fortnight**	**Every month**	**Every few months**	**Twice a year**	**Once a year**	**Longer than a year**
How often do you normally meet with other people?								
How often do you meet with family members?								
How often do you meet with friends?								
How many groups do you attend?_____ If you attend any social or community groups, how often would you meet with them?								

If you have contact with professionals, how often do you meet with them?								

Next, I would now like to ask you how important each of these contacts are to you?

	Very important	**Somewhat Important**	**In the middle**	**Not very important**	**Not important at all**
Other people in general					
Family members					
Friends					
Social or community groups					
Professionals					

- Are you happy with the level of contact you have with other people? Yes/No
- Would like to have more contact with other people? Yes/ No

- What stops you from having contact with other people?

Next, I would like to ask you about the people that are important to you.

- Can you list all the people that are important to you now?

Please tick how often you see each of these individuals?

	Less than once	Monthly	fortnightly	Weekly	Daily

	a month				
Person 1:					
Person 2:					
Person 3:					
Person 4:					
Person 5:					
Person 6:					
Person 7:					

If you were upset or had a problem, how likely would you be to turn to this person?

	Not very likely	Somewhat likely	Neither likely or unlikely	Likely	Most Likely
Person 1:					
Person 2:					
Person 3:					
Person 4:					
Person 5:					
Person 6:					
Person 7:					

How much do you care about these individuals?

	Don't care very much	Care about them somewhat	Indifferent	Care about them a little	Care about them a lot	Other

Person 1:						
Person 2:						
Person 3:						
Person 4:						
Person 5:						
Person 6:						
Person 7:						

Standardized instruction for questionnaires

Each of the following questionnaires assesses different aspects of your personality. There are no right or wrong answers and please try and answer as honestly as possible. Please answer each question by ticking the appropriate box. For some questions, you may find that the answers provided are not the ones that you would like. However, please answer them based on how you would generally react/ behave, or choose the statement that applies to you best. Work quickly and do not spend too long thinking about the exact meaning of the questions. Remember, there are no trick questions.

The Relational Structures Questionnaire (ECS-R)

This questionnaire is designed to assess the way in which you mentally represent important people in your life. You'll be asked to answer questions about your parents, your romantic partners, and your friends. Please indicate the extent to which you agree or disagree with each statement by placing a tick or a cross under a number for each item. **Please answer in retrospect, if needed.**

	Strongly Agree 1	2	3	4	5	6	Strongly disagree 7
Please answer the following questions about your mother or a mother-like figure							
1. It helps to turn to this person in times of need							
2. I usually discuss my problems and concerns with this person							
3. I talk things over with this person							
4. I find it easy to depend on this person							
5. I don't feel comfortable opening up to this person							
6. I prefer not to show this person how I feel deep down							
7. I often worry that this person doesn't really care for me							
8. I'm afraid that this person may abandon me.							
9. I worry that this person won't care about me as much as I care about him or her							
Please answer the following questions about your father or a father-like figure							
10. It helps to turn to this person in times of need							
11. I usually discuss my problems and concerns with this person							
12. I talk things over with this person							

13.I find it easy to depend on this person							
14.I don't feel comfortable opening up to this person							
15.I prefer not to show this person how I feel deep down							
16.I often worry that this person doesn't really care for me							
17.I'm afraid that this person may abandon me.							
18.I worry that this person won't care about me as much as I care about him or her							
Please answer the following questions about your dating or marital partner. Note: If you are not currently in a dating or marital relationship with someone, answer these questions with respect to a former partner or a relationship that you would like to have with someone							
19.It helps to turn to this person in times of need							
20.I usually discuss my problems and concerns with this person							
21.I talk things over with this person							
22.I find it easy to depend on this person							
23.I don't feel comfortable opening up to this person							
24.I prefer not to show this person how I feel deep down							
25.I often worry that this person doesn't really care for me							
26.I'm afraid that this person may abandon me.							
27.I worry that this person won't care about me as much as I care about him or her							
Please answer the following questions about your best friend							
28.It helps to turn to this person in times of need							
29.I usually discuss my problems and concerns with this person							
30.I talk things over with this person							

31.I find it easy to depend on this person							
32.I don't feel comfortable opening up to this person							
33.I prefer not to show this person how I feel deep down							
34.I often worry that this person doesn't really care for me							
35.I'm afraid that this person may abandon me.							
36.I worry that this person won't care about me as much as I care about him or her							

The Big Five Inventory-10

How well do the following statements describe your personality?

I see myself as someone who is….

	Disagree strongly (1)	**Disagree a little (2)**	**Neither agree or disagree (3)**	**Agree a little (4)**	**Agree strongly (5)**
Reserved					
Generally trusting					
Tends to be lazy					
Is relaxed and handles stress well					
Has few artistic interests					
Is outgoing, sociable					
Tends to find fault with others					
Does a thorough job					
Gets nervous easily					
Has an active imagination					
Is considerate and kind to almost everyone					

The Depression and Anxiety Stress Scale

Please read each statement and circle a number 0, 1, 2 or 3 which indicates how much the statement applied to you *over the past week*. There are no right or wrong answers. Do not spend too much time on any statement.

	Did not apply to me **0**	**Applied to me to some degree, or some of the time** **1**	**Applied to me a considerable degree, or most of the time** **2**	**Applied to me very much, or most of the time** **3**
1. I found it hard to wind down				
2. I was aware of dryness of my mouth				
3. I couldn't seem to experience any positive feeling at all				
4. I experienced breathing difficulty (eg, excessively rapid breathing or breathlessness in the absence of physical exertion)				
5. I found it difficult to work up the initiative to do things				
6. I tended to over-react to situations				
7. I experienced trembling (eg, in the hands)				
8. I felt that I was using a lot of nervous energy				
9. I was worried about situations in which I might panic and make a fool of myself				
10. I felt that I had nothing to look forward to				

11.I found myself getting agitated				
12.I found it difficult to relax				
13.I felt down-hearted and blue				
14.I was intolerant of anything that kept me from getting on with what I was doing				
15.I felt I was close to panic				
16.I was unable to become enthusiastic about anything				
17.I felt I wasn't worth much as a person				
18.I felt that I was rather touchy				
19.I was aware of the action of my heart in the absence of physical exertion (eg, sense of heart rate increase, heart missing a beat)				
20.I felt scared without any good reason				
21.I felt that life was meaningless				

Appendix item 5: Ethics approval letter

Dear ,

Application for Level 2/3 Approval

Reference: CLIN252

Project Title: Understanding Depression in Older Adults

Academic Supervisor:

Thank you for submitting the above research project for review by the Department of Clinical and Health Psychology Ethics Research Panel. I can confirm that the submission has been independently reviewed and was approved on the 25th January 2016.

Should there be any change to the research protocol it is important that you alert us to this as this may necessitate further review.

Appendix Item 6: Thesis Proposal Form

Doctorate in Clinical Psychology

Thesis Research Proposal (for Research 1 assessment).
This form should be completed and submitted as the assessment for Research 1. It will then be reviewed by a member of the academic team and will receive a grade and detailed feedback. The feedback will include an evaluation of the viability of the project and any recommendations. If there are significant concerns about viability, the project will be flagged to the research director and the research committee will decide whether the project can proceed in its current form.

Provisional Thesis Title: Understanding Depression in Older Adults

Exam number:

Allocated Thesis Project Supervisors

Clinical

Academic 1

Academic 2

(where applicable)

Others involved as part of project team (if applicable)

Proposed setting(s):

(Where research will be carried out)

Anticipated Month & Year of Submission of Thesis: 1st May 2017

(please delete as applicable)

(Must be in final year for full time trainees. For flexible trainees, the month & year of submission will depend on their Individual Training and Development Plan. Trainees from 2011 intake onwards must submit in May, trainees who started in 2010 or earlier are advised to submit in May to reduce potential for HPC registration difficulties)

Please Note: Whilst this is not an ethics review process, where questions have some similarities to questions contained in the NHS IRAS Research Ethics form, the corresponding IRAS question numbers are given in parentheses. This is intended to facilitate completion of NHS ethics where such approval is needed.

Version (date): 29.10.15

Introduction

1) Please provide a brief critical review of relevant literature, which should clearly demonstrate the rationale and scientific justification for the research. (Relevant to IRAS A12)
(Guideline 1000 to 1500 words)

Depression in later life (LLD) is considered to be prodromal indicator of neurocognitive decline in conditions such as Parkinson's (Ehrt et al., 2006), Alzheimer's (Olin et al., 2002) or vascular dementia (Park et al., 2007), with first and reoccurring episodes increasing subsequent risk (Butters et al., 2008). LLD is also thought to increase mortality rates through self-neglect, non-adherence to medication as well as increasing susceptibility to physical illnesses and suicidal thoughts (Fiske et al., 2009). Thus, given the ageing population, LLD is considered to be an area of public health concern (DoH, 2011; ISDScotland, 2012). Despite

this, there are limited theoretical models that are able to account for LLD and many of the risk factors (e.g. neuroticism, hopelessness, anxious/ insecure attachment styles) that are applicable to working age adult show mixed relationships with depression in older adults. There is also limited understanding of the psychological processes that underlie LLD. In part, these difficulties may relate to recruitment issues, stigma (Sirey et al., 2001), under-reporting (Crabb & Hunsley, 2006), detection rates or a positivity bias (Carstensen & Charles, 1998) in this population. Alternatively, given that older adulthood represents a stage of change, deteriorating health and potential losses (Mirowsky & Ross, 1992), it may be that different psychological processes operate in older adults compared to working age groups.

The transdiagnostic model is one of the few perspectives that can provide a holistic account of emotional disorders across the lifespan (Barlow et al., 2004; Ellard et al., 2010). This tripartite model proposes that all emotional disorders have similar underlying structures and that there may be a unified approach to treating depression and anxiety based disorders (Barlow, 2008). Rather than focusing on discrete diagnostic categories, the model proposes that there are three components that interact with each other under conditions of life stress. These are negative affectivity, positive affect and autonomic arousal. Each component can be assessed along a continuum of severity, with clinical features being maintained by underlying cognitive processes. From a developmental perspective, this means that the propensity for developing depression can be enhanced due to stressors associated with specific age stages (e.g. bereavement, job losses, retirement, physical ill-health). Similarly, pre-dispositional vulnerabilities (e.g. personality characteristics and attachment styles) towards depression may also be expressed in different ways throughout the lifespan and interact with life stage stressors to increase vulnerability (Hyer, 2013).

Therefore, according to this model, specific personality factors with high inheritability (e.g. neuroticism, introversion and openness) could fit within the negative, positive affect or autonomic arousal components (Hyer, 2013) because of their influence on underlying psycho-biological processes (Eisenberg, 2000). Neuroticism, for example, refers to a pervasive tendency to view the self (Gunthert, Cohen, & Armeli, 1999) and situations in an overly pessimistic manner (Eysenck, 1967b), independently of depressed mood (Bowen, Wang, Balbuena, Houmphan, & Baetz, 2013). There is recent evidence to indicate that, when presented with negative stimuli, higher levels of neuroticism increase sensitivity within the amygdala and reduce connectivity within the amygdala-anterior cingulate cortex (ACC) (Ormel et al., 2013). The amygdala is shown to be involved in storing and processing of emotional memories as well as regulating sexual and threat responses. The ACC is involved in self-referential processing and emotional regulation strategies. These findings appear to be consistent with other studies which suggest that individuals rating high on neuroticism measures tend to misinterpret ambiguous situations in an overly emotional manner (Gunthert et al., 1999; Hervas & Vazquez, 2011). Over time, this implies that repeated exposure to life stressors, perceived or actual, may result in overly responsive limbic system in individuals rating high on this dimension (Gray, 1970).

Repeated and prolonged exposure to stress also increases cortisol production which, over the lifespan, may contribute to the atrophy of higher order cognitive processes, such as executive processes, memory, attention, behavioural inhibition (Sapolsky, 2001), which are often

considered to be early indicators of cognitive impairments in older adults. In support, Butters et al. (2004) show that individuals with LLD showed a substantial clinical and statistically significant increase in cognitive impairments compared to those without LLD. Neuroticism may add to this by increasing the propensity for recent, rather than general, cognitive decline (Jorm et al., 1993) or by increasing the likelihood of developing depression (Os & Jones, 1999), even after controlling for life events (Ormel, Oldehinkel, & Brilman, 2001). There is also evidence to indicate that the personality constructs measured by the NEO personality inventory are associated with serotonergic pathways (Sen, Burmeister, & Ghosh, 2004) as are depression and anxiety mood states (Lavretsky, Sajatovic, & Reynolds, 2013). While links between serotonergic and cortical pathways remain unclear (Cowen, 2002), there is some indication that reductions in serotonin are also associated with degeneration in frontal-temporal lobes (Franceschi et al., 2005).

As older adulthood is a period of change, individual variations in trait openness could also influence how well individuals adapt to different circumstances, and as such represent the positive affect component in the model. There is some evidence to suggest that, in older adults, being able to adjust personal goals in a flexible manner relates to fewer rates of depression (Dunne et al., 2011), suicidal ideation (Bamonti et al., 2014)and increased psychological well-being (Hall et al., 2010). Conversely, valuing autonomy and needing control strengthened the relationship between depression and suicide in men but not women (O'Riley & Fiske, 2012; Pasterfield et al., 2014).

Feelings of hopelessness may also add to the interaction between negative affect and autonomic arousal by either increasing the severity or chronicity of the depressive episode. In support, hopelessness is identified as a key risk factor that is consistently linked to depression severity and increased risk for suicidality in working age adults (Wenzel & Beck, 2008). In older adults, however, hopelessness is shown to increase propensity for suicidal ideation, but only under conditions of moderate to severe depression (Alloy et al., 1988; Greene, 1989; Uncapher et al., 1998). Feelings of hopelessness have also been shown to affect engagement with therapeutic treatments (Szanto et al., 2001) and, along with social contact, mediate the relationship between psychological distress and perceived life quality (Scogin, Morthland, DiNapoli, LaRocca, & Chaplin, 2015). There is also some indication that in depressed older adults, hopelessness may be related to difficulties with emotional regulation, a trait sensitivity towards negative affect and ruminative thinking (Lynch et al., 2004) or, as other studies suggest, hopelessness may relate to levels of introversion whereas depressed mood may relate to neuroticism (Chapman et al., 2006). Nonetheless, these studies indicate while hopelessness may be a key feature of depressed mood, there may not be a direct connection between these two constructs in older adult populations.

Like personality characteristics, differences in attachment styles can also result in negative appraisal and cognitive processing styles (Dunkley et al., 1997; Shorey & Snyder, 2006). Understanding variations in attachment styles may also provide a means of understanding how individuals relate to themselves and others (Bowlby, 1982). Given the importance of social factors in older adults, attachment styles are included in this study as a measure of relationship quality and as another potential indirect factor that could influence the relationship between personality traits and depressed mood in older adults. This would also

be in keeping with Beck's (2005) cognitive model of psychopathology which suggests that underlying schematic representations can influence negative information processing styles, and with other studies that suggest that, in working age groups, increasing perceived social support reduces levels of hopelessness (Tan & Karabulutlu, 2005).

Carver's (2002) Control Theory and models of dynamic interactionism (Magnusson, 1999; Sameroff, 1994) propose that interactions between personality and life experiences can influence ways of relating to others (Joiner & Coyne, 1999). These ways of relating, however, can alter over the lifespan (Bowlby, 1969). For instance, insecure childhood attachment can change into secure attachment in older adulthood (Andersson & Stevens, 1993), and secure attached styles can change to detached styles following multiple losses (Webster, 1997). Similarly, Purcell et al. (2012) show accessing familial contact can reduce suicidal ideation whereas a spousal bereavement may increase suicide risk (Corna et al., 2010), with this risk varying according to dependency levels in the surviving spouse (Johnson et al., 2008). There is also evidence from longitudinal studies that older adults tend to be more secure, dismissive and less preoccupied in their attachment than younger cohorts (Zhang & Labouvie-Vief, 2004) but these findings are not replicated by all studies (Van Assche et al., 2013). Harrison et al. (2010) add to this by suggesting that relationships of depressed and suicidal older adults tend to be marked by hostility or interpersonal difficulties, with these inter-relational styles resulting in poorer perceived relationship quality. Similarly, You et al. (2015) show that attachment anxiety influenced perceptions of support, depression and increased conflict within relationships across eastern and western cultures.

Therefore, in line with the transdiagnostic model, LLD may be associated with underlying personality characteristics that strengthen the association between negative affect and autonomic arousal, and reduce the positive affect component. Moreover, it may be that this relationship between personality characteristics and depressed mood is maintained by hopelessness and insecure attachment styles, both of which contribute to a negative appraisal style. While we acknowledge that there will be a mutual impact of neurocognitive processes on the proposed relationship, the aim of this study is to conduct an exploratory study on the relationship between personality characteristics and depressed mood in older adults. Similarly, while it would be more advantageous to conduct a longitudinal study, given previously reported difficulties with recruitment and engagement, we propose to use an analogue design to investigate the associations between personality characteristics (neuroticism, introversion and openness), attachment styles (anxious and insecure), feelings of hopelessness and depressed mood in a group of older adults. Our first hypothesis assumes that there will be a direct relationship between specific personality characteristics (neuroticism and introversion) and depressed mood. Secondly, we assume that this relationship would be mediated by hopelessness and anxious/insecure attachment styles. Third, that adding openness to this mediating model would render one of these paths insignificant, as shown in figure 1.

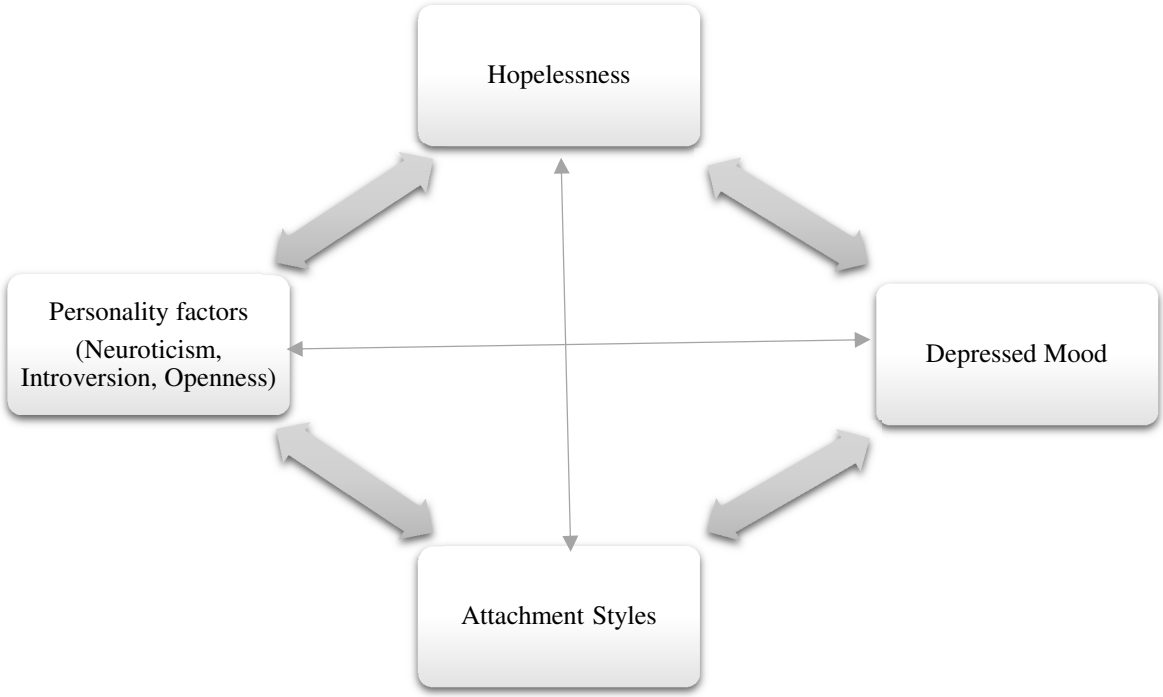


Figure 1: Proposed analysis of pre-dispositional and state factors and their relationship to depressed mood in older adults

Research Questions / Objectives:

(Keep these focused and concise, with a maximum of five research questions).

2) What is the principal research question / objective? (IRAS A10)

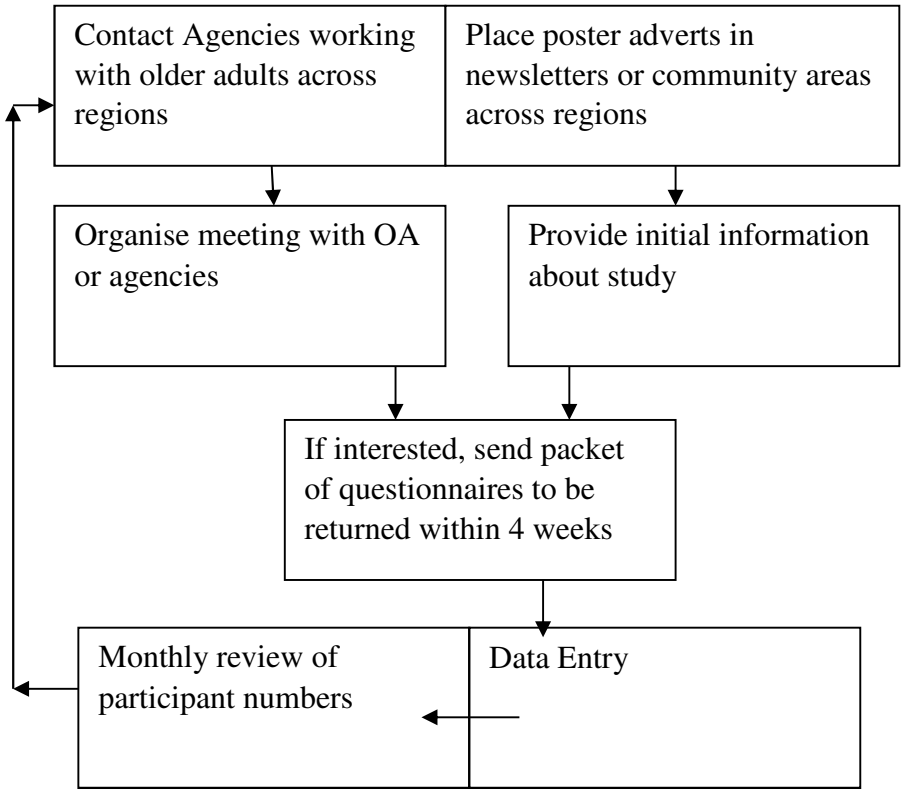
a. That the relationship between specific personality characteristics (neuroticism and introversion) and depressed mood would be mediated by feelings of hopelessness

3) What are the secondary research questions / objectives if applicable? (IRAS A11)

a. That the addition of attachment styles would have an additional impact on the proposed model.
b. That adding Openness (Personality Characteristic) to the mediation model would render one of these paths insignificant,

Methodology

4) Please give a full summary of your design and methodology. It should be clear exactly what will happen at each stage of the project. (Relevant to IRAS A13)



As shown in Figure 2, the study will be advertised across different regions by contacting key organisations that are involved with older adult groups and asking them to place an advert in their newsletter or by meeting up with potential participants to provide verbal information. Poster adverts will also be placed in key community areas (e.g. via community groups, third sector organisations, libraries) asking individuals aged 65+ to take part in a study about factors that influence depressed mood in older adults. Recruitment will start initially in X location and expand to X location via liaison with stakeholder organisations. Advertisements will provide contact details via a tear-off slip for participants to get in contact with the researcher.

Interested participants will be mailed a packet of questionnaires (Big Five-10, ECR-S, DASS, Beck's Hopelessness Scale), the participant information sheet and consent form. Participants will also be asked to complete a demographic information sheet which will ask for background information (e.g. age, martial status, occupation, approximate population of residing area) as well as information on their current level of social contact. A self-addressed envelope will be enclosed in the packet asking participants to return the initial set of questionnaires within 4 weeks. The information sheet would detail procedures in place to ensure confidentiality and anonymity of the participant as well as contact information should any psychological distress be experienced. Participants are asked to sign and return the consent form along with their completed questionnaires to indicate that they were happy to take part.

Once questionnaires are returned, a final information sheet detailing the study aims, along with an invitation to hear about the study findings, will be sent. Participants would also be

given the opportunity to access a short written summary of the research findings, if requested. It is estimated that the study should take between 30-40 minutes to complete in total.

5) Please list the principal inclusion and exclusion criteria (IRAS A17-1 and A17-2)

The inclusion criteria (specified in the adverts, verbally assessed during initial contact and based on self-reports of participants) states that:

- Participants must be over 65 and
- have good understanding of English and
- be able to provide informed consent

The exclusion criteria, therefore, would apply to anyone

- with a self-reported diagnosis of neuropsychological conditions (e.g., stroke, dementia, epilepsy or brain-injury) or
- learning difficulties or
- history of addictions or
- in severe psychological distress
- or with self-reported moderate-severe cognitive impairments.

6) How will data be collected?

If quantitative, list proposed measures and justify the use of these measures. If qualitative, explain how data will be collected giving reasonable detail. (Don't just say 'by interviews')

Data will be collected through questionnaires. These are:

1. *The Big Five Inventory (BFI-10):* The BFI-10 utilises pre-existing and reliable measures of the big five personality traits;- Extraversion, Agreeableness, Conscientiousness, Neuroticism, and Openness to Experience. The measure has been tested for convergent validity against the NEO-PI-R and the full scale Big Five Inventory. Each domain is measured by 2 items that were selected to reflect the optimal aspect of that domain. Rammestedt and John (2007) indicate that the shortened version of the scale is able capture 70% of the observed variance of the full scale (α =.74 to .89) with good test-retest reliability based on test administration with 6-8 weeks delay ($\geq$ .75). Intercorrelations between domains were also found by the authors to be lower (.11) compared to the NEO-I-R (.40) and the Big Five Inventory (.21) implying good discriminant reliability. One additional item in the agreeableness domain was added to improve convergent validity on this scale as per the authors' suggestions. Similar findings have been replicated by other researchers (Gosling, Rentfrow and Swann, 2003; Lechner and Rammstedt, 2015).
2. *Beck's Hopelessness Scale*; This scale measures three distinct aspects of hopelessness feelings: emotions, cognitions and motivations. The scale has 20 items which are rated on a dichotomous yes/no scale. Internal consistency is shown to be good α =.93 with other researchers showing similar findings (Szabó et al., 2015) which suggest that it is a reliable and valid measure of hopelessness that can be used with older adults (Holm & Severinsson, 2015).
3. *Depression Anxiety Stress Scale (DASS):* This scale has a total of 21 items that measure depression, anxiety and stress symptoms (7 items each) over the past week on a 4 point Likert scale. Reliability statistics indicate that anxiety (α =.90; 95% CI

.89-90), depression (α =. 95; 95% CI = .94–.95) and stress scales (α =.933; 95% CI = .93 – .94) are reliably replicated (Crawford and Henry, 2003).

4. *The Relational Structures Questionnaire (ECS-R; Fraley, Niedenthal et al, 2006):* This scale measures three attachment patterns (secure/ anxious/ avoidant) in four types of relationships (mother, father, partner and best friend) using the same 9 items. Test-retest reliability over 30 days was adequate for romantic partners (.65) and higher for parental figures (.80).
5. *Demographic Information sheet*: There will be two parts to the demographic information sheet. Part 1 will ask participants for information like age, gender, years since retirement, whether they live in rural or urban area and asked to report whether they have any diagnosed neurological or memory impairments that may affect participation. The second part will ask about the frequency and type of social contact they have as well as the quality of this social contact using 5 point Likert scales for self-reporting.

Sample Size

7) What sample size is needed for the research and how did you determine this? For quantitative projects, outline the relevant Power calculations and the rationale for assuming given effect sizes. For qualitative projects, outline your reasoning for assuming that this sample size will be sufficient to address the study's aims. (IRAS A59 and A60)

An a-priori sample size analysis indicated that a minimum sample of 113 would be required in order to conduct a multiple regression analysis with nine predictors. Participant numbers were calculated based on a medium effect size at a significance level of 0.05 and a power level of .08 (Soper, 2015).

However, we aim to sample 200 participants to account for potentially unusable data (e.g. incomplete measures, outliers etc.) based on 44% drop out rate in older adults (Chatfield, Brayne, & Matthews, 2005).

8) Outline reasons for your confidence in being able to achieve a sample of at least this size. (e.g. by giving details of size of known available sample(s), percentage of this type of sample that typically participate in such studies, opinions of relevant individuals working in that area)

To maximise recruitment the researcher will advertise the study across regions, starting with Dumfries and Galloway and then expanding to Edinburgh, by contacting key agencies that are involved with older adults, and by poster advertisements either placed within their newsletters or in key community areas. Recruitment will be reviewed on a monthly basis and if sufficient numbers have not been recruited within a 6 month period then a different type of statistical analysis will be used. This will allow a meaningful contribution to be made to the research area although it may not contain as much detail as the original proposed analysis.

Analysis

9) Please describe the methods of analysis (statistical or other appropriate methods, e.g. for qualitative research) by which the data will be evaluated to meet the study objectives. (IRAS A62)

Statistical analyses carried out will aim to test the following hypotheses, after normality checks have been carried out:

a. A correlational matrix will be used to establish direct relationships between neuroticism, introversion and depressed mood
    i. The correlational matrix will also help to identify inter-relationships between these factors (neuroticism, introversion and depressed mood) and other factors that are being investigated within this study (openness, anxious/insecure attachment style and hopelessness). Only statistically significant inter-relationship will be employed in subsequent analyses.
b. Next, we propose to use Hayes (2012) PROCESS macro to carry out concurrent regression analyses using neuroticism and introversion as the independent (X) variables and depressed mood as the dependent (Y) variable. Insecure/ anxious attachment styles and hopelessness are included into this model as potential indirect factors (M1 and M2) of this relationship. This path analysis should allow us to determine whether the relationship between specific personality traits and depressed mood is indirectly influenced by either attachment styles or hopelessness or by an interaction between the two. Bias corrected confidence intervals will be used to provide a conservative estimate of the indirect effects as will model fit statistics (adjusted R^2).
c. If there are insufficient participant numbers, then a test of difference will be used to identify whether there is a difference between high and low raters, defined as 1 SD from the mean, on personality, attachment and mood variables.

Project Management: Timetable

10) Outline a timetable for completion of key stages of the project. (E.g. ethics submission, start and end of data collection, data analysis, completion of systematic review).

Proposed Timelines

2015

1st year 2nd Year

Jun	Jul	Aug	Sep	Oct	Nov	Dec
16th July: Thesis Proposal deadline						
Prepare & Hand in thesis proposal		Amend thesis proposal, Prepare and hand in Ethics				Recruitment: Meet potential collaborators. Advertise study and send out envelopes, start systematic review

2016

2nd Year 3rd Year

Jan	Feb	Mar	April	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Recruitment							Recruitment (if extra time is needed)				
Complete systematic review, write up methods, data entry							Start data analysis, amend methods section if required				

2017, 3rd Year

Jan	Feb	Mar	April	May
	Send discussion & Conclusion	Prepare to submit, viva preparation		
Complete data analysis and methods chapter section, begin discussion & conclusion				
Re-draft and review of thesis				

Risk Management

11) Please summarise the main potential risks to your study, the perceived likelihood of occurrence of these risks and any steps you will or have taken to reduce these risks. Outline how you will respond to identified risks if they should occur.

Participant Numbers: The researcher will keep supervisors up to date about response rates at regular (possibly monthly intervals) in order to review project deadlines and feasibility of obtaining a realistic sample size. In order to maximise recruitment and improve generalisability of findings, the researcher will recruit across regions. If participant numbers are likely to be close but below expected levels then, after agreement with supervisors, it may be possible to apply bias corrected bootstraps to the analysis. In the eventuality that response rates are too far below what might be possible to conduct this type of analysis, then a simple test of difference will be used to examine differences between groups (high hopelessness & depressed vs High hopelessness, low depressed vs low hopelessness & high depressed, low hopelessness and low depressed)

Not Achieving deadlines: Regular supervision sessions will be scheduled throughout the project, to ensure that timelines are being met. The researcher will continue to work on other areas of the project (e.g. literature review, methods) even if one phase of the project may take longer than expected (e.g. recruitment). Any potential delays will be communicated to the supervisors via a monthly progress report.

Knowledge Exchange

12) How do you intend to report and disseminate the results of the study? (IRAS A51)

Findings are hoped to be disseminated via a conference presentation and journal publication. The conference and journal selected will be based on their relevance to the topics under investigation (e.g. Crisis/ Journal of Gerontology). The researcher will also aim to hold 3-4 group feedback sessions for participants who took part. Findings will also be presented within the local trust at a CPD slot.

13) What are the anticipated benefits or implications for services of the project? (E.g. If this is an NHS based project, in what way(s) is the project intended to benefit the NHS?)

While governmental documents highlight older adults as a potentially vulnerable group at risk of mental health difficulties, little is known contributing factors that may influence the relationship between depression and hopelessness. By presenting findings at team meetings and local events (e.g. Mental Health Awareness Week), it is hoped that this research would begin a discussion about the importance of addressing and being aware of factors which may increase hopelessness and depressed mood in older adults.

14) Are there any potential costs to this project?

Outline any potential financial costs to the project, including the justification for the costs (why are these necessary for the research project?) and how funding will be obtained for these costs (how will cost be met?). Please separate these into potential costs for the University and potential costs for your NHS Health board and note that you should ask your NHS Health board to meet stationery, printing, postage and travel costs.

Potential Costs for NHS Board listed below have all been agreed by the local tutor:

- Telephone calls to organisations
- Postage, printing and envelopes
- Cost of Becks Hopelessness Scale

15) Any other relevant information.

17) Confirmation of Supervisors' Approval

I confirm that both my academic and clinical supervisors have seen and approved this research proposal and have both completed the supervisors' appraisal forms below.

(Insert 'yes' below if true) **Yes**

Appendix Item 7: Descriptive data for attachment and DAS sub-scale items

	Mean	Std. Deviation
Attachment Measures		
Avoidant Attachment – Mother	4.5	1.9
Avoidant Attachment – Father	4.7	1.6
Avoidant Attachment – Partner	5.8	1.5
Avoidant Attachment – Friend	5.7	1.4
Total Avoidant	5.2	1.3
Anxious Attachment – Mother	5.9	1.6
Anxious Attachment – Father	5.9	1.6
Anxious Attachment – Partner	5.8	1.7
Anxious Attachment – Friend	5.9	1.7
Total Anxious	5.9	1.5
Measures of Mood		
Depression	8.5	10.8
Anxiety	5.2	7.8
Stress	9.7	8.8
Total distress	7.8	8.2

Appendix 8: Inter-correlations between mood, attachment and personality, including sub-scale items.

	Mat. Avoid. Attach	Mat. Anx. Attach	Pat. Avoid. Attach	Pat. Anx. Attach	Part. Avoid. Attach	Part Anx. Attach	Fri Avoid. Attach	Fri Anx. Attach	Openness	Conc.	Extra	Agree	Neuro.	Dep.	Anx.	Stress	Hopelessness
Mat. Avoid		.30	.71†	.18	.46†	.13	.33	.12	-.08	.13	-.06	-.01	-.17	-.50†	-.32	-.38*	-.46†
Mat.Anx	.30		.00	.71†	.08	.47†	.19	.75†	-.03	.14	.24	.21	-.31	-.32	-.44*	-.25	-.48*
Pat. Avoid	.71†	.00		.11	.41*	.21	.54†	.09	-.10	.07	-.18	.27	-.09	-.56†	-.28	-.32	-.33
Pat. Anx	.18	.71†	.11		.09	.52†	.09	.77†	.03	.07	.13	.11	-.26	-.21	-.39*	-.31	-.30
Part. Avoid	.46†	.08	.41*	.09		.22	.26	.04	.29	.02	.08	.10	.12	-.31*	-.18	-.12	-.19
Part. Anx	.13	.47†	.21	.52†	.22		.14	.71†	-.03	.03	.10	.03	-.17	-.31*	-.27	-.09	-.29
Friend Avoid	.33	.19	.54†	.09	.26	.14		.38*	.08	-.13	-.18	.07	.10	-.06	-.10	-.07	.02
Friend Anx.	.12	.75†	.09	.77†	.04	.71†	.38*		-.03	-.02	-.05	.09	-.10	-.04	-.28	-.10	-.04
Open.	-.08	-.03	-.10	.03	.29	-.03	.08	-.03		-.15	.06	-.23	.31*	-.09	-.12	-.08	.25
Conc.	.13	.15	.07	.07	.02	.03	-.13	-.02	-.15		.25	.35†	-.18	-.29*	-.08	-.05	-.12
Extro.	-.06	.24	-.18	.14	.08	.10	-.18	-.05	.06	.25		.09	-.36†	-.29*	-.12	-.29*	-.43†
Agree	-.01	.21	.27	.11	.10	.03	.07	.09	-.23	.35†	.09		-.10	-.13	-.18	-.13	-.17
Neu	-.17	-.31	-.10	-.26	.12	-.17	.10	-.10	.31*	-.18	-.36†	-.10		.45†	.38†	.53†	.58†
Dep	-.52†	-.32	-.56†	-.21	-.31*	-.31*	-.06	-.04	-.09	-.29*	-.29*	-.13	.45†		.74†	.65†	.61†
Anx	-.32	-.44*	-.28	-.39*	-.18	-.27	-.10	-.28	-.12	-.08	-.12	-.18	.38†	.74†		.74†	.55†
Stress	-.38*	-.25	-.32	-.31	-.12	-.09	-.07	-.10	-.08	-.05	-.29*	-.13	.53†	.65†	.74†		.47†
Hope.	-.46†	-.48*	-.33	-.30	-.19	-.29	.02	-.04	.25	-.12	-.43†	-.17	.58†	.61†	.55†	.47†	

*. Significant at the 0.05 level, 2-tailed. † Significant at the 0.01 level, 2-tailed

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