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An Exploration of the Role of Emotion
Regulation in Anxiety, Depression and
Fear of Falling in Older Adults

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Doctorate in Clinical Psychology

The University of Edinburgh

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Overview of Thesis

This Thesis follows the portfolio format and a brief overview is given here.

Chapter one is a systematic review of the literature on the relationship between emotion regulation, anxiety and depression in older adults. Chapter two is a research journal which explores the relationship between fear of falling and emotion regulation in community dwelling older adults. The systematic review is written up for publication in the Journal of Affective Disorders. The research article is written up for publication in Aging and Mental Health. Their respective style guidelines were followed.

Thesis Abstract

Purpose The aim of the thesis was to explore the relationship between emotion regulation and psychological distress in older adults. The aim of the systematic review was to explore the relationship between self-reported emotion regulation, anxiety and depression in older adults. The empirical study aimed to look at the relationship between fear of falling, a common type of psychological distress in older adults, and emotion regulation. It also aimed to look at the relationship between fear of falling related avoidance behaviour and emotion regulation.

Methods The literature was systematically searched for research which has explored the relationship between emotion regulation, anxiety and depression in older adults. The papers which met the inclusion criteria were rated according to predetermined quality criteria. An overview of the results and implications were discussed.

The empirical research used a cross-sectional design to examine the research hypothesis. Older adults completed self-report measures of emotion regulation, fear of falling, fear-related avoidance behaviour, anxiety and depression. Correlational analysis explored the relationship between the study variables. A linear regression model examined the unique contribution of emotion regulation to fear of falling after controlling for age, falls history, anxiety and depression.

Results 12 studies met the inclusion criteria for the systematic review. The most prevalent relationship explored was that between rumination and depression with consistent evidence that higher levels of rumination were related to higher levels of depressive symptoms. Common methodological limitations were the lack of valid and reliable emotion regulation measures for older adults, non-random sampling, and failure to control for important confounding factors.

Within the empirical research, a significant relationship between emotion regulation and fear of falling was found. There was also a significant relationship between emotion regulation and fear of falling avoidance behaviour. After controlling for age, number of falls, depression and anxiety, emotion regulation was no longer significantly associated with fear of falling. Depression was the only modifiable variable that retained a significant association to fear of falling.

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Systematic Review: 7,800

Empirical Research Article: 6,900

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Emotion Regulation, Anxiety and Depression in Older Adults: A Systematic Review

Abstract

Background: Emotion regulation is known to be implicated in anxiety and depression in younger adults, but whether the same associations are found in older adults is unclear.

Method: The literature was systematically reviewed for studies examining the relationship between emotion regulation, anxiety and depression in older adults. Studies which met the inclusion criteria were rated according to a standardised checklist which was agreed upon a priori.

Results: Twelve studies met the inclusion criteria. The most commonly explored relationship was between depression and rumination, with consistent evidence that greater reported use of rumination was associated with higher depressive symptoms. There was also preliminary evidence that emotion suppression, non-acceptance of emotions and avoidance of experiencing emotional distress were related to increased anxiety and depressive symptoms. The studies reported well on participant demographics and also used measures of anxiety and depressive symptoms with suitable validity and reliability for use with older adults. Common methodological limitations were: lack of validity and reliability of the measures of emotion regulation for use with older adults, non-random sampling, non-reporting of power, and confounding factors not being controlled for. Furthermore, the majority of studies were cross-sectional, limiting conclusions about causality.

Conclusions: There was consistent support for an association between rumination and depression, suggesting rumination should be targeted in interventions for depressive symptoms in older adults. Additionally, lack of acceptance of emotional response, suppression and avoidance also appeared to be related to anxiety and depression in older adults. This adds support to the utilisation of mindfulness based approaches for older adults which often incorporate encouragement of a non-judgemental acceptance of emotions. Reliability and validity of current measures of emotion regulation for use with older adults should be confirmed. High quality, longitudinal studies which use random sampling and control for confounding factors are recommended.

Introduction

Emotion regulation is increasingly recognised as being implicated in a range of emotional disorders (D'Avanzato et al., 2013; Aldao et al., 2010). Indeed, several theorists have proposed that difficulties in emotion regulation increase the likelihood of developing anxiety and depressive disorders (Mennin et al., 2007). It is hypothesised that individuals who cannot effectively manage their emotions are more likely to experience intense and prolonged periods of distress, predisposing them to develop clinically significant levels of anxiety and depression (Aldao et al., 2010). However, to date, the majority of research has looked at younger adults, with fewer studies on whether these results would apply to older adults. There has been no systematic review of the role of emotion regulation in older adults' anxiety and depressive symptoms. As such, it is unclear which emotion regulation strategies are implicated in the occurrence of anxiety and depressive symptoms or disorders in this population. It is unknown whether the observed associations between some emotion regulation strategies, anxiety and depressive symptoms in younger adults can also be found in older adults. A systematic review of the literature was conducted in order to address the question of whether emotion regulation strategies are associated with anxiety and depressive symptoms as well as anxiety and depressive disorders in older adults.

Emotion Regulation- Conceptualisation

Whilst there is a general unanimity that there are recognisable differences in how people manage or 'regulate' their emotions, and how this impacts on their well-being (Berking and Wupperman, 2012), there is a great deal of variation in how this term has been conceptualised: with the field of emotion regulation and mental health being a relatively new and rapidly expanding area. Theories include those that emphasise the cognitive processes individuals engage in to determine which emotions they experience, for how long and the intensity with which these emotions are experienced and those that emphasise the attitudes people have about their emotions. Gross's (2014) process model falls into the first conceptual grouping; it emphasises the way individuals engage with their environments and the strategies

individuals take to influence the way emotions are experienced. Gross (2014) proposed five ways in which emotions can be regulated. The first four are considered antecedent-focussed as they are proposed to occur before an event gives full rise to a full-blown emotional response and include 1) situation selection, 2) situation modification, 3) attention deployment, 4) appraisal of situation. The final regulation process is 5) response modulation which takes place after the emotion has been fully elicited (Gross, 2014). Within each of these stages, it is recognised that some strategies have more of a negative impact and others a positive. This theoretical underpinning fits well with CBT interventions where participants can be taught, for example how to employ their attention so emotions have a less enduring and negative impact on them as in the case of using distraction in preference to rumination. Similarly, participants can be taught to use reappraisal in the appraisal of the situation stage to alter the impact an emotional stimuli has on them.

Other theorists have conceptualised emotion regulation as people's attitudes to their emotional reactions. For example, Gratz and Roemer (2004) emphasised the importance of being aware of and accepting of one's emotional reactions, as opposed to trying to control them. Consistent with this, the Difficulties in Emotion Regulation Scale (DERS) assesses awareness and acceptance of emotional experiences, in addition to the ability to remain in control of one's behaviour and use strategies when feeling upset. Acceptance and Commitment Therapy, would fit within this theoretical conceptualisation of emotion regulation as it emphasises fostering a different relationship with one's emotional experiences and a non-judgemental acceptance (Harris, 2007).

Berking and Wupperman (2012) expressed concern that the concept of emotion regulation poses the risk of losing meaning and heuristic value. Whilst expressive suppression is widely considered to be an emotion regulation strategy, Berking and Wupperman (2012) suggested it should be excluded on the basis that one does not necessarily strive to regulate emotions when suppressing them. It is possible however, that emotion regulation strategies may have unintended consequences on emotional experience (Wegner and Zanakos, 1994; Aldao et al., 2010). For example,

someone may ruminate in an attempt to better understand their emotional state and to decrease the intensity and duration of a depressed mood. However, research has suggested that engaging in rumination has the opposite effect (Aldao et al., 2010), similar to thought suppression. Research using the White Bear Suppression Inventory (WBSI; Wegner and Zanakos, 1994) has found that suppressing thoughts in an attempt to reduce distressing emotions has the reverse consequence by increasing the likelihood of having thoughts one attempted to suppress thereby increasing levels of distress (Wenzlaff and Wegner, 2000).

Emotion Regulation and Psychopathology

Research has consistently found that there is an association between the use of emotion regulation strategies and experience of psychological distress in younger adults (D'Avanzato et al., 2013; Aldao et al., 2010). Some strategies of emotion regulation, such as reappraisal have been considered more adaptive and less likely to be associated with psychological distress such as anxiety and depressive symptoms (Aldao et al., 2010). Reappraisal entails viewing a potentially upsetting situation in a positive way and Gross (2014) proposes that this is a form of emotion regulation that takes place before an emotion has been experienced. Conversely, some strategies are used after the generation of an emotion, such as suppression and rumination. Suppression entails attempts to block thoughts that generate distress, as well as to avoid the expression of emotions - with its use found to increase physiological arousal (D'Avanzato et al., 2013). Rumination is the tendency to think repetitively about one's depressed mood. Both rumination and suppression have been found to be associated with higher levels of psychological distress and as such, do not appear to be healthy forms of emotion regulation (D'Avanzato et al., 2013). Rumination has been found to have a particular association with depression with a theory that this is because it focuses attention on depressed mood and activates upsetting memories (D'Avanzato et al., 2013). Conversely, suppression has been found to be particularly implicated in anxiety, with a theory that it acts as an avoidance strategy of upsetting emotions (Aldao et al., 2010). However, rumination and suppression have been found to be implicated across psychopathology. A recent meta-analysis for example, has found that suppression and rumination are consistently associated with

depression, anxiety, eating disorders and substance abuse in younger adults (Aldao et al., 2010).

Research has also found that lack of awareness, clarity and understanding of one's emotional reactions together with a lack of acceptance of upsetting emotions is related to higher levels of psychological distress (Gratz and Roemer, 2004). Conversely, being able to accept one's emotions without judging the experience of these emotions has been found to be associated with lower levels of psychological distress (Shallcross et al., 2013).

Emotion Regulation and Older Adults

An emotional paradox (Mather, 2012) has been noted in the literature pertaining to the well-being of older adults. Contrary to the expectation that older adults would report increased levels of negative affect and prevalence of emotional disorders because of experiencing frequent ill health, cognitive decline as well as frequent bereavements, this has not been supported by the evidence. Indeed it has consistently been found that older adults report increased levels of subjective well-being and report higher levels of positive affect and decreasing negative affect compared to younger adults (Urry and Gross, 2010; Mather and Carstensen, 2005; Larcom and Isaacowitz, 2009). It has been suggested that this is because of age improvements in the ability to regulate emotions. The socio-emotional selectivity theory that has been put forward in order to explain this (Mather and Cartensen, 2005) argues that as older adults become increasingly aware of their remaining lifespan, they use strategies to maximise positive emotional experiences and minimise negative ones. Indeed research shows that older adults in comparison to their younger counterparts report lower levels of depression and anxiety (Gum et al., 2009). Older adults also report more use of emotion regulation strategies associated with lower levels of psychological distress, and less use of strategies associated with higher levels of distress compared to younger adults (e.g. Orgeta, 2009). Additionally, Shallcross et al. (2013) found that older adults report experiencing negative emotions to a lesser extent than younger adults, an association that is mediated by acceptance of negative emotions. This research indicates that acceptance may be an emotional regulation strategy that is related to older adults' greater reported positive affect compared to

that reported by younger adults. Similarly, in a meta-analysis looking at positive reappraisal, this strategy was found to be significantly correlated with lower levels of mental health problems in older adults (Nowlan et al., 2015).

Anxiety and Depression

Thus the argument has been made that older adults experience less anxiety and depression because of their more effective use of emotion regulation strategies. There is a debate in the literature as to whether there *is* a true decrease of anxiety and depression in older adults, or whether this finding results from a failure to detect anxiety and depression in older adults which present differently in late life. The use of anxiety and depression measures which were developed for assessment in younger adults may not detect anxiety and depression in older adults (Bassil et al., 2011).

This debate aside, there are a significant proportion of older adults who *do* experience anxiety and depression as well as co-morbid anxiety and depression (Bassil et al., 2011; Fiske et al., 2009). There is some suggestion that sub-clinical symptoms of anxiety may be more common in older adults and that even such sub-clinical symptoms can cause major disability (Bryant et al., 2008; D'Hudson and Saling, 2010). Generalised anxiety disorder (GAD) has been found to be the most common anxiety disorder in older adults, and has been found to be particularly debilitating. Wetherell et al. (2004) found that older adults with GAD had more impairments in nearly every facet of a quality of life measure compared to those with a physical disability, and to the same degree as older adults with major depressive disorder. Depression is also a strong predictor of suicide in older adults compared to younger adults (Fiske et al., 2009). It is also common for depression and anxiety to occur together in older adults. Indeed generalised anxiety and major depression occurrence is especially high in older adults, leading some to suggest that this should be seen as a specific type of distress disorder (Bender, 2008; Bassil et al., 2011, Bryant et al., 2008). Given that relatively little is known about the presentation of these disorders in older adults – especially with regards to anxiety (Bryant et al., 2008) knowing how emotion regulation strategies relate to the presentation of anxiety and depression in older adults would expand our knowledge base and would help to inform interventions as well as highlight gaps in knowledge.

Physical Health

Physical health problems are common in older adults. The relationship between physical ill health and depression and anxiety is complex (Fisk et al., 2009). Symptoms of physical health problems can overlap with symptoms of anxiety and depression in older adults. Furthermore, physical ill health can increase the risk of developing anxiety and depression in late life (Murrell et al., 1983). In addition, the presence of anxiety and depression can interfere with the recovery from physical health problems. For example, fall-related anxiety in older adults after a fall-related injury can cause older adults to restrict their behaviour, hence interrupting their physical rehabilitation (Vellas et al., 1997). Anxiety and depression which is related to physical health in older adults may have a different association with emotion regulation than anxiety and depression which *does not* occur in the context of physical health. Physical ill health is therefore an important confounder to consider when exploring associations between emotion regulation, anxiety and depression

Cognitive Abilities

An association between cognitive difficulties with both anxiety and depression has been found (Weisenbach, Boore, and Kales, 2012; Lenze et al., 2014). There are high rates of anxiety and depression in older adults with cognitive impairment, and cognitive impairment can also precede depression and anxiety. This has been explained as reactionary to the stress of declining cognitive abilities, as well as because of a change in neural pathways which also affect the development of psychological conditions (Weisenbach et al., 2012) with suggestions that the neural mechanisms of late onset depression may be qualitatively different from those of early onset depression (Hippel et al., 2008).

Additionally, it has been theorised that the mechanisms involved in the use of specific emotion regulation strategies may change as adults age (Mather, 2012). It is possible that cognitive changes may interfere with the use of some of the processes required for emotion regulation. However, as discussed, improvements in the rates of reported positive affect amongst older adults does not suggest such age related decline. On the other hand, it is possible that some strategies are used to a greater degree if cognitive decline intervenes with the use of other strategies. It is beyond the

scope of this review to investigate this relationship. However, cognitive ability is an important confounding factor to be considered when looking at the association between emotion regulation, anxiety and depression in older adults. It is possible that anxiety and depression presentations may be accounted for by cognitive difficulties and also that cognitive difficulties may be associated with emotion regulation in a different way than if cognitive ability was fully intact.

Summary

There is a general assumption that emotion regulation strategies which have been found to be associated with depression and anxiety in younger adults will also be predictive of psychopathology in older adults, despite the fact that older adults face different types of difficulties. As such, the aim of this systematic review is to explore the relationship between emotion regulation in older adults and anxiety and depression. The focus will be on self-reported emotion regulation strategies and their association with anxiety and depressive symptoms as well as with anxiety and depressive disorders.

Method

Search strategy

The following search terms were used:

emotion* regulat* or emotion* dysregulat* or regulation of affect or self-regulation or affect regulation or rumination or reappraisal or suppression or mindfulness or avoidance or emotion regulation strateg* or mood regulation or emotion* focused coping or emotion* coping or cognitive emotion* regulation

AND

anx* or panic or worry* or depression or depress* symptoms or mild anxiety or low mood or fear or dysphoria or mood difficulties or affect difficulties or non-clinical depress* or non-clinical anx* or dysthymia

AND

Older adults or older adult population or over 65s or geriatrics or elders or elderly people or old people or older people or late adulthood or age differences or seniors or senior citizens or older aged pensioners or pensioners or old age pensioners

Four database were searched; Embase 1980 to Jan 27th 2015, Ovid Medline 1946 to August 10th 2015, PsycInfo 1806 to Jan 27th 2015 and ASSIA 1987 to 10th August 2015. A hand search was also carried and the references of included papers were checked for further potentially appropriate papers. Two key authors of studies included in the review were contacted to ascertain whether they were aware of any unpublished literature in the field.

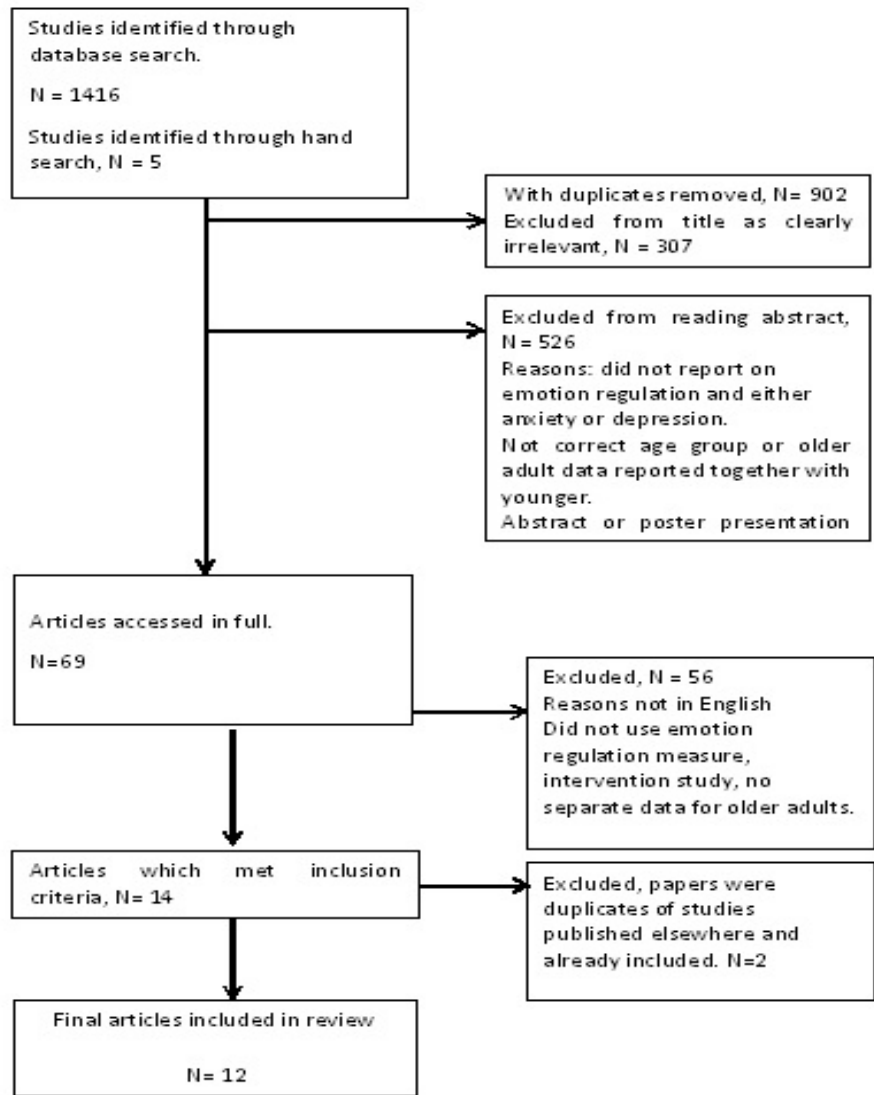
This review searched for studies that included data on depression, anxiety or comorbid-depression and anxiety and at least one emotion regulation strategy as measured via self-report. As discussed previously, there is variation in the literature about what should be considered to be under the realm of emotion regulation. It is beyond the scope of this review to attempt to give any clarity on this debate. The term 'coping' was included as a search term as some researchers have defined cognitive emotion regulation strategies as cognitive coping. However, only studies that had used a measure of at least one cognitive emotion regulation strategy were included. Studies which looked at general coping, as measured by the coping inventory 'COPE' (Carver, 1997), for example, were excluded. Coping defined in this way is a related but a different concept (Gross, 2014). This was to allow a focus of emotion regulation and to increase clinical utility about the specific emotion regulation strategies that have been investigated in relation to depressive and anxiety symptoms and disorders. Given the finding that many older adults may present with sub-clinical levels of anxiety and depression with major consequences, we included studies of both sub-clinical and clinical levels of depression and anxiety which meant that studies of both general older adults and clinical populations of older adults were included. Studies that looked at the neural mechanisms involved in emotion regulation in older adults were included if they also used a self-report measure of at least one emotion regulation strategy and either anxiety, depression or both. Both cross-sectional and longitudinal studies were included.

There has been great variation in the definition of an older adult, ranging from over 50 to over 70 (with an average of 65). To be as inclusive as possible, the lower age limit of 55 was chosen.

Exclusion Criteria

- Studies that included an older adult population, as well as a younger population, but did not report on findings for older adults separately.
- Studies in languages other than English.
- Studies looking at dementia populations, which are not likely to be generalisable to the general older adult population.
- Studies that investigated specific types of anxiety, such as phobias, OCD or health anxiety which was beyond the scope of this review and to allow a focus on anxiety and depressive symptoms as well as clinical levels of anxiety and depression.
- Intervention studies including randomised control trials because of the possibility that an intervention may be a confounding factor.
- Experimental manipulations of emotion regulation which did not provide measures of self-reported emotion regulation utilised outside the laboratory setting.

Figure one shows the Flowchart of the Selection Process



Overall, 12 studies met the inclusion criteria. Their design and results are summarised in Table 1. Two papers were duplicates of other included papers. A paper by Garnefski and Kraaij (2006) utilised the same sample and correlational analysis data as Kraaij et al. (2002). The latter paper expanded on the Garnefski and Kraaij (2006) study by having a longitudinal follow up in addition to the correlational data given by Garnefski and Kraaij (2006). As such the Garnefski and Kraaij (2006) paper was not included. Similarly, the sample from Orgeta (2009) was the same used in the Orgeta (2011a) paper and, as such, the 2009 study was excluded from the review.

Table 1, Summary of Included Studies

Study	N	Participants	Measures pertinent to current review	Summary of Key Findings
Andrew & Dulin (2007)	208	Community-dwelling older adults aged 70-90. 67% female 5.8% in clinical range for anxiety 21.% in clinical range for depression.	A)GAI D) GDS-SF ER)AAQ	Experiential avoidance positively correlated with depression, $r=0.37$, $p<0.01$ and with anxiety, $r=.0.43$, $p<0.01$.
Brinker & Dozois (2013)	150,	Community-dwelling older adults aged 60-93. 70% female Mean scores in non-clinical range	D) DHS ER)RTSQ	Rumination was related to higher depressed mood at time 1, $r=0.41$, $p<.05$ And at time 2, $r=0.56$, $p<.05$. Rumination was a predictor of depressed mood at time 2, even after controlling for depressed mood at time 1, $R^2 =0.9$, $p<.05$.
Brummer et al. (2014)	85	Community-dwelling older adults aged 65-91 65% female Mean scores for stress, anxiety and depression fall in mild clinical range.	A and D) DASS 21 ER)ERQ	Did not report on relationship between reappraisal and anxiety and depression. Expressive suppression was not significantly correlated with depression or anxiety in older adults. depression, $r=0$, $p = 1.0$ anxiety, $r= -0.7$, $p = .85$

Catanzaro et al. (1995)	96	Community-dwelling older adults aged 65 and over. 70% female Mean depression score in non-clinical range	D) DSM ER) NMR	Negative mood regulation expectancy scores were significantly negatively correlated with depressive symptoms P = -.33, p<.001
D'Hudson and Saling (2010)	138	Community-dwelling older adults aged 65-97. 65% female Mean anxiety score is in non-clinical range	A) GAI ER)aRRS	Anxiety scores significantly positively correlated with: Rumination score total, r=0.57, p<.01 as well as subscales: Brooding, r=0.55, p<.01 Rumination, r=0.46, p<.01 Worry, r=0.38, p<.01
Erskine et al. (2007)	65	Community-dwelling older adults aged 64-84. 49% female Depression and anxiety scores not reported	A)STAI D)BDI-SF ER)WBSI ER)RI	Thought suppression significantly positively correlated with anxiety (r=0.46, p<.001) but not with depression, (r=0.13, p>0.05). Rumination also significantly positively correlated with anxiety (r=0.39, p<.01) and depression (r=0.39, p<.01).
Kraaij et al. (2002)	99	Depression scores not reported.	D)GDS ER) CERQ	Positive significant correlations were found between depressive symptoms and:

Acceptance, $r= 0.27$,
 $P<0.265$
Rumination, $r=0.42$, $p<.001$
Catastrophizing, $r=0.46$,
 $P<.001$
Negative significant correlations were found between depressive symptoms and positive reappraisal
 $r = - .27$, $p<.05$
Non- significant relationship between depressive symptoms and:
Self-blame, $r= .01$
Positive refocusing, $r= -0.15$
Refocus on planning, $r=-0.01$
Putting into perspective, $r= 0.07$
Other blame, $r= -.03$
After controlling for prior depression and negative life events, Acceptance and Positive Reappraisal retained a significant relationship with depression at follow up.
Rumination and catastrophizing were no longer relevant.
59% of variance in depression was explained.

Nolen-Hoeksema & Aldoa (2011)	297	Community-dwelling older adults aged 65-75. 55% female	D) BDI-SF ER) RRS	<u>Females</u> Significant positive relationship at $p < 0.001$ between depressive symptoms and rumination, $r= 0.61$, <u>Men</u> Significant positive
		Mean depression score in		

		non-clinical range-		relationship at $p < 0.001$ between depressive symptoms and rumination, $r = 0.31$
Orgeta (2011a)	167	Community-dwelling older adults aged 60-90. 60% female 80.4% in non-clinical range for anxiety. 17.1 in mild clinical range for anxiety. 2.5% in severe clinical range for anxiety.	A) HADS D) GDS ER) DERS	Anxiety was positively and significantly related to greater difficulties in emotion regulation, $r = 0.38$, $p < .001$, as well as subscales: Goals, $r = 0.49$, $p < .001$ Impulse, $r = .39$, $p < .001$ None-acceptance, $r = 0.39$, $p < .001$ and Strategies, $r = 0.44$, $p < .001$ Anxiety was not significantly correlated with subscales Awareness, $r = -0.13$ And Clarity, $r = -0.2$ Anxiety also made significant contribution to DERS total after depression was controlled for. ($B = .26$, $p < .01$).
Orgeta (2011b)	70	Community-dwelling older adults aged 60-82. 61% female. 32 scored in the mild clinical range for depression and the remainder were controls with depression	D) GDS D) BDI –II ER) ERQ and DERS	Older adults with mild depression symptoms (MDS) scored significantly higher on DERS total compared to normal controls, $F = 65.61$, $p < .001$ For subscales, older adults with MDS also reported significantly greater difficulties in: Awareness, Clarity, Goals, Non-Acceptance of Emotions No significant difference for subscale Impulse

		scores in the non-clinical range		Normal controls reported making significantly more use of reappraisal than those with MDS, $T = -3.60$, $P < .01$ Those with MDS reported using expressive suppression significantly more often, $t = -2.61$, $p < .05$
Petkus et al. (2012)	142	Homebound older adults aged 60-93 79% females 19.7% in clinical range for depression and 14.1% in clinical range for anxiety	A and D) BSI- 18 and DSM-IV, SCID ER) WBSI	Higher thought suppression associated with increased likelihood of experiencing clinically significant depressive symptoms, Odds Ratio (OR) = 1.243, $p = .003$ And clinically significant anxiety symptoms, OR = 1.362, $p = .001$ And increased likelihood of meeting criteria for depressive disorder if they used higher levels of thought suppression, OR = 1.287, $p = .008$. Thought suppression was not associated with increased likelihood of meeting criteria for anxiety disorder, OR = 1.160, $p = .072$ current physical health disability and cognitive functioning controlled for
Thomsen et al. (2005)	302	Community-dwelling older adults aged 70-85 54% females Mean depression	D) BDI-II A and D) POMS-SF ER) ECQ-R	Rumination was positively correlated with depression For BDI-II, $r = 0.42$, $p = .01$ For POMS depression, $r = 0.34$, $p = .01$ Rumination was also positively correlated with anxiety, $r = 0.38$, $p = .01$

score in
non-clinical
range.

Depression and Anxiety Measures

Anxiety Geriatric Anxiety Inventory, GDS-SF = Geriatric Depression Scale Short form, DHS = Depression Happiness Scale, DASS 21 = The Depression Anxiety Stress Scale 21, DSM = The depressive symptoms measure, STAI = Speilberger State Trait Anxiety Inventory, BDI = Beck Depression Inventory, GDS = Geriatric Depression Scale , BI-SF = Beck Depression Inventory short form, BI-SF , HADS = Hospital and Anxiety Depression Scale, , BDI –II = Beck Depression Inventory- II, BSI- 18 = Brief Symptom Inventory-18, DSM=IV (SCID) = structured clinical diagnosis, POMS-SF = Profile of mood states short form, GDS-15, RRS-SF = Ruminative Response Scale – short form

Emotion Regulation Measures

AAQ = Acceptance and Action Questionnaire, RTSQ = Ruminative Thought Style Questionnaire, ERQ = Emotion regulation questionnaire, NMR = Negative Mood Regulation Scale, aRRS = adapted Ruminative Response Scale, WBSI =White Bear Suppression Inventory, RI= Rumination Inventory, CERQ = Cognitive Emotion Regulation Questionnaire, RRS= Ruminative Response Scale, DERS = Difficulties in Emotion Regulation Scale, ECQ-R = Emotional control questionnaire- Rehearsal (rumination),

A = Anxiety

D = Depression

ER = Emotion Regulation

Description of Studies

Refer to Table 1 for details

Study Characteristics

Five of the studies examined the relationship between at least one emotion regulation strategy and depression and two of the studies examined the relationship between at least one element of emotion regulation and anxiety. Five of the studies looked at the relationship between at least one emotion regulation strategy and both anxiety *and* depression. Included studies were made up of populations whose anxiety and depression scores were predominantly in the non-clinical range as determined by the cut off on self-report measures. Erskine et al. (2007) and Kraaij et al. (2002) did not report the mean scores of anxiety and depression or the percentage of participants who scored within each range and as such, it is unknown whether participants in these studies endorsed anxiety and depressive symptoms in the clinical or non-clinical range. Participants in most studies were predominantly female. In seven of the studies, females made up at least 60% of the sample and in the remaining five, the gender proportions were more evenly split. The majority were either married or widowed. Most were community dwelling. Ten of the studies were cross-sectional, and two were longitudinal. Participants included were 60 years and over and the majority were retired. Most participants were recruited from retirement complexes, senior centres or were university volunteers or church members.

Cognitive ability

In four of the studies, participants were excluded if they scored below a cut off on the Mini-Mental State Exam (MMSE, Folstein et al., 1975) cognitive screen. Erskine et al. (2007) excluded participants with a score of less than 24, whilst Orgeta (2011a and 2011a) excluded those who scored less than 25. Thomsen et al. (2005) report they excluded those whose scores indicated cognitive impairment, but do not report the cut off they used. Petkus et al. (2012) excluded participants with a known diagnosis of dementia but how this was assessed was not reported. Petkus et al. (2012) also say that 11 people were unable to take part due to cognitive impairment

but do not make it clear whether this was determined by the use of the modified MMSE (Teng and Chui, 1991) which was one of their measures, or if this was due to participants dropping out because their impairment prevented them from completing. This gives some assurance that the presence of dementia (and cognitive impairment in the Thomsen et al., 2005 study) did not confound the findings of these studies. It is possible that the remaining studies included participants who had dementia which may have confounded the results.

Emotion Regulation Measures

Across studies, ten different emotion regulation measures were used. Rumination was the most common facet of emotion regulation being examined. Six studies looked at rumination in relation to either anxiety or depression symptoms. In two studies the Ruminative Response Scale (RRS) was used, (a different version in each was used). Other rumination measures included: the Rumination Thought Styles Questionnaire (RTSQ), the Rumination subscale from the Cognitive Emotion Regulation Questionnaire (CERQ) and the Rehearsal (rumination measure) subscale from the Emotional Control Questionnaire (ECQ-R). Other measures of emotion regulation used included: the Emotion Regulation Questionnaire (ERQ), a ten item measure of expressive suppression and reappraisal; the Cognitive Emotion Regulation Questionnaire (CERQ), which measures various cognitive emotion regulation strategies including, self-blame, acceptance, rumination, positive refocusing, planning, positive reappraisal, catastrophizing and other blame; the Difficulties in Emotion Regulation Scale (DERS), and the Acceptance Action Questionnaire (AAQ), a measure of experiential avoidance. The White Bear Suppression Inventory (WBSI) measuring thought suppression was used in two studies. The Negative Mood Regulation Scale (NMR) assesses expectancies in the ability to regulate negative mood and was used in one study.

Depression and Anxiety Measures

Anxiety was measured by a diverse range of measures. The Geriatric Anxiety Inventory (GAI) was used twice. Other measures used included: the Hospital

Anxiety and Depression Scale (HADS), the Depression, Anxiety and Stress Scale (DASS), Spielberger Trait Anxiety Inventory (STAI-18), Brief Symptom Inventory-18 (BSI-SF) and Profile of Mood States short form (POMS-SF). These measures were all used once. Depression was measured with seven different scales. The most common measure used was the Geriatric Depression Inventory (GDS) (short and long version), which was used five times. Four studies used the Beck Depression Inventory (BDI) (including version II and short form). The DASS, BSI-18, POMS-SF, DHS and the Depressive Symptoms Measure were used once. Some studies used more than one measure of depression.

Study Quality

Quality criteria were adapted from the criteria used by Boyle (1998) and Li et al. (2011). All studies were rated according to a predetermined set of criteria. For cross-sectional studies, points were awarded as follows:

- Representative sampling method; random sampling including random digit dialling. 1 point.
- Participants who opted to take part comparable to participants who were invited and opted not to take part in terms of average age, gender and depression and anxiety symptoms or at least 80% of the invited sample took part, 1 point.
- Reliability and validity; for each, 0.5 point if measures of anxiety, depression and emotion regulation used have been validated in the target population, 0.25 points if validated only in another population. For reliability, measures had to have demonstrated test-retest reliability as a minimum for points to be awarded. For validity, the measure had to have either predictive or convergent validity as a minimum to be awarded a point. Validity and reliability were determined by searching the literature to determine if the measures had documented validity and reliability in older adult populations, rather than being based on whether the papers author reported it to have reliability and validity in the current population.

- Confounding factors: 1 point if at least two confounding factors were controlled for, one of which had to be gender or physical health, as measured by a standardised measure.

Criteria Related to Reporting of Study

- The study reported that power based on the relationship between emotion regulation strategies and anxiety and or depression was achieved 1 point.

For longitudinal studies, the following additional criteria were also applied.

- Followed up for at least six months, 1 point.
- Proportion followed up was at least 80% of the original population who took part, 1 point or mean scores on key study variables of age, depression and anxiety symptoms of those who took part in follow-up were compared to those who dropped out and determined to be similar

Whilst points were rewarded, the overall quality of each study was not rated. Rather, the number of criteria that had or had not been met across studies was summarised. This is because of the finding that such categorisation of studies is problematic (Centre for Reviews and Dissemination, 2008). Such a rating assumes that measures are equally weighted and the validity and reliability of such scales has not been established. The same study could be deemed high quality according to one set of criteria and low quality according to another (Centre for Reviews and Dissemination, 2008). All studies were reviewed by the author and an independent researcher (except the two studies of which the independent researcher was the author, which were reviewed by the author and academic supervisor). Disagreements about ratings were settled through discussion between reviewers. Quality Ratings are in Table 2.

Table 2, Quality Ratings of Studies

Study	Power	Representative Sampling	R & V Depression	R & V Anxiety	R & V E R	Participants and non-participants comparable	Confounding	Longitudinal: six month follow up	Longitudinal: At least 80% followed up, similarity with those who dropped out
Andrew and Dulin (2007)	0	0	R,0.5 V,0.5	R,0.5 V,0.5	R,0.25 V, 0.25	1	0	N/A	N/A
Brinker, (2013)	0	0	R, 0.25 V, 0.25	N/A	R,0.25 V, 0.25	0	0	0	0
Brummer et al (2014)	1	0	R,0.5 V,0.5	R,0.5 V,0.5	R,0.25 V, 0.25	0	0	N/A	N/A
Catanzaro et al. (1995)	0	0	R,0.25 V,0.25	NA	R,0.25 V, 0.25	0	0	N/A	N/A
D'Hudson	N/A	0	N/A	R,0.5	R,0.5	0	0	N/A	N/A

and Saling (2010)				V,0.5	V, 0.25				
Erskine et al. (2007)	0	0	R,0.5	R,0.5	WBSI	1	0	N/A	N/A
			V,0.5	V,0.5	R,0.25				
					V, 0.25				
					Rumination Inventory				
					R,0.25				
					V, 0.25				
Kraaij et al. (2002)	0	1	R,0.5	N/A	R,0.25	0	0	1	0
			V,0.5		V, 0.25				
Noel- Hoeksema and Aldoa, (2011)	0	1	R, 0.5	N/A	R,0.25	1	0.5	N/A	N/A
			V, 0.25		V, 0.25				
Orgeta, (2011a)	0	0	R,0.5	R,0.5	R,0.25	0	0	N/A	N/A

			V,0.5	V,0.5	V, 0.25				
Orgeta, (2011b)	0	0	BDI-II	N/A	DERS	0	0	N/A	N/A
			R,0.5		R,0.25				
			V,0.5		V, 0.25				
			GDS		ERQ				
			R,0.5		R,0.25				
			V,0.5		V, 0.25				
Petkus, Gum, Wetherell (2012)	0	0	R,0.5	R,0.5	R,0.25	0	0	N/A	N/A
			V,0.5	V,0.5	V, 0.25				
Thomsen, et al. (2005)	0	1	BDI-II	R,0.5	R,0.25	1	1	N/A	N/A
			R,0.5	V,0.5	V, 0.25				
			V,0.5						
			POMS						

R,0.5

V,0.5

R= reliability, v = validity

Quality of studies

Sampling

Three of the studies used random sampling (Kraaij et al., 2002; Noeln-Hoeksema and Aldoa, 2011; Thomsen et al., 2005). The remaining studies used convenience sampling, which limits conclusions being applied to the general older adult population. In three of the studies, respondents replied to advertisements to take part in the study (2008; Andrew and Dulin, 2007; Brummer et al., 2013; Catanzaro et al., 1995). In the remaining studies, participants were invited to take part and some were specific older adult populations, such as university volunteers (Orgeta 2011a and 2011b; Brummer et al., 2014) or members of a church community (Brinker, 2013). These older adults may have lower or indeed higher levels of anxiety and depression than those who did not take part or may differ in other ways, such as in educational attainment, and levels of social support, meaning limited generalisability can be made to other groups.

Furthermore, only five studies met the criteria for demonstrating that participants were similar to those who did not opt to participate, adding to the uncertainty about the representativeness of the samples recruited.

Validity and Reliability of Measures

Emotion Regulation

Only one author used a measure of emotion regulation that was specifically developed for older adults (D'Hudson and Saling, 2010). This was the adaptive Ruminative Response Scale (aRRS), which was adapted from the Rumination Response Scale (RRS) owing to its problems with the measurement of rumination in older adults (D'Hudson and Saling, 2010). This measure has been found to be reliable for use with older adults. However, the validity of it is doubtful (D'Hudson and Saling, 2010). Indeed the purpose of this study was not specifically to explore the relationship between rumination and anxiety, but to actually explore the factor structure of the measure. None of the other measures have been found to have reliability and validity with older adults.

Depression and Anxiety

The measures used to assess anxiety and depression had good psychometric properties. All authors used a measure of anxiety which has good reliability and validity for older adults. For studies of depression, 9 out of 11 studies used a measure of depression with adequate validity in older adults, and 8 measures used had adequate reliability.

Confounding factors in studies

Only one study (Thomsen et al., 2005) met the quality criteria of confounding for which a point was awarded if at least two variables were controlled for; at least one of which had to be gender or physical health. Only two studies (Thomsen et al., 2005 and Noeln-Hoeksema and Aldoa, 2011) controlled for gender differences. Thomsen et al. (2005) examined gender differences across both old and young participants meaning gender differences in the older group only cannot be ascertained. Evidence suggests that males and females differ in their use of emotion regulation strategies (Thomsen et al., 2005) and that so few studies controlled for differences is problematic. On the other hand, a large proportion of studies had a higher percentage of females than males, which may limit the generalisability of the findings to males. Only one study (Petkus et al, 2012) controlled for cognitive ability. Two other studies (Orgeta, 2011a and 2011b) found that DERS scores were associated with cognitive ability, but did not then control for cognitive ability. Two studies reported that they controlled for physical health (Petkus et al 2012; Andrew and Dulin, 2007)) but as they did not use a validated measure of health, they were not considered to have met the quality criteria required for confounding,

It is also noteworthy that whilst the aim of this review was to explore the specific relationship in older adults, the possibility that any differences may arise because of cohort effects, rather than age per se, cannot be ruled out. It may well be that older adults of a particular generation were socialised into more use of some ways to manage their emotion and less of others. For example, Laidlaw (2015) has emphasised the importance of considering cohort beliefs amongst older adults who may have been socialised to deal with emotions in a way particular to the generation they belong to. Andrew and Dulin (2007) for example report that older adults in New

Zealand may come from a generation where people were taught that to display emotions was a sign of weakness. The possibility that some relationships are unique to certain groups of older adults cannot be ruled out. Research which compares the use of emotion regulation in older adults across time periods would allow this to be explored.

Relationship between Emotion Regulation, Depression and Anxiety

Expressive Suppression and Depression

One of the studies found no relationship between depression and expressive suppression (Brummer et al., 2014) whereas Orgeta (2011b) found that older adults who reported mild depressive symptoms reported significantly greater use of expressive suppression compared to a control group who reported no or minimal depressive symptoms. The results of Brummer et al. (2014) are in contrast to a widely reported relationship in the literature between expressive suppression and depressive symptoms in younger adults. The authors suggest a possible ‘decoupling’ of emotion regulation where expressive suppression may be useful in older adults who face stressors which are not controllable. The results of Orgeta (2011b) however, suggest that older adults with mild depressive symptoms also use expressive suppression more, which is in line with previous research. Different measures of depressive symptoms were used in each of these studies, which may account for the different findings. Additionally, different methodological approaches were used. Whilst Brummer et al. (2014) correlated depressive symptoms with suppression, Orgeta (2011b) compared whether older adults with mild depressive symptoms used suppression significantly more than those with depressive symptoms in the non-clinical range. Future research should explore this relationship and it is advisable that separate analyses are conducted for those who meet clinical criteria for depression and those who are in the normal range.

Expressive Suppression and Anxiety

Only one study looked at the relationship between anxiety and expressive suppression and found no significant association (Brummer et al., 2014). This is in contrast to a wide literature indicating that expressive suppression is related to anxiety in younger adults by reinforcing anxiety through avoidance. Participants in

this study just met the threshold for mild anxiety symptoms as measured by the DASS and it may be that a relationship, if one exists would be found for those with higher anxiety symptoms. Furthermore participants in this study were volunteers and it would be pertinent to repeat this study with older adults who are demonstrated to be representative of the older adult population.

Thought Suppression and Depression

One study found that higher thought suppression, as measured by the WBSI, significantly increased the likelihood of experiencing clinically significant depressive symptoms and meeting the DSM-IV criteria for a depressive disorder (Petkus et al., 2012) amongst homebound older adults, after controlling for physical health and cognitive functioning. Within this sample, 12% met the criteria for a DSM-IV depressive disorder. However, Erskine et al. (2007) did not find thought suppression, as measured by the WBSI, to be associated with depressive symptoms. Different methodological approaches may account for these differences as one looked at the degree of correlation and one used an Odds Ratio approach. Additionally, the differences may result from there being a higher proportion of older adults who had clinically significant levels of depression in the Petkus et al. (2012) study. A strength of Petkus et al. (2012) was that cognitive functioning was controlled for.

Thought suppression and Anxiety Symptoms

Erskine et al. (2007) found a significant positive association between thought suppression (WBSI) and anxiety symptoms in community dwelling older adults. Similarly, Petkus et al. (2012) found that higher thought suppression (WBSI) was associated with an increased likelihood of experiencing clinically significant anxiety symptoms in homebound older adults, but not for meeting the DSM-IV criteria of an anxiety disorder. Both studies used validated measures of anxiety but as yet, the WBSI has not been demonstrated to have validity and reliability with for use with older adults. As such, whilst this indicates thought suppression is linked to increased anxiety, a measure with validity and reliability with older adults should be used

Experiential Avoidance Anxiety and Depressive Symptoms

Experiential Avoidance (EA) is closely related to thought and expressive suppression. It refers to a tendency to avoid cognitions and environmental cues that

an individual associates as unpleasant, in an attempt to avoid distress. Andrew and Dulin (2007) found a significant correlation between experiential avoidance, as measured by the Acceptance and Action Questionnaire (AAQ), and depressive and anxiety symptoms. They also found that EA moderated the relationship between self-reported physical health and both anxiety and depressive symptoms. Limited conclusions can be drawn from this due to it being the only identified study exploring this relationship.

Rumination and Depressive Symptoms

Five studies looked at the relationship between rumination and depressive symptoms (Brinker, 2013; Erskine et al., 2007; Kraaij, 2002; Nolen-Hoeksema and Aldao 2011; Thomsen et al., 2005). All of these studies found significant positive associations between self-reported rumination and depressive symptoms. Nolen-Hoeksema and Aldoa (2011) looked at the relationship for men and women separately, and found rumination to have a stronger association with depression amongst females, though the relationship was significant for both males and females. Nolen-Hoeksema and Aldoa (2011) found that across age groups females reported using rumination to a greater extent than men. The greater use of rumination amongst females may account for the stronger association with depressive symptoms than for males. Four of the studies were cross-sectional. Brinker's (2013) was a longitudinal study which found that depression was associated with rumination at baseline and when participants were followed up 2-4 weeks later. Rumination also predicted depression at follow up, with depression at baseline controlled accounted for. This strengthens the notion that rumination predicts higher rates of depressive symptoms in older adults. However, the follow up period was very short (2-4 weeks) and a longer follow up is required. In contrast, Kraaij et al. (2002) found that after controlling for prior depressive symptoms and prior life events, rumination was no longer significantly related to depression at a two and a half year follow up. Different measures of rumination were used across the studies. The Ruminative Response Scale measures a tendency to think about why one is depressed and of intrusive thoughts related to upsetting events. Others, such as the Ruminative Thought Style Questionnaire,

measure a more general style of ruminative thinking regardless of valence. The results provide consistent evidence that rumination, either in the context of depressed mood or ruminating about one's mood more generally as measured by the RTSQ, is related to higher levels of depression in older adults. However, additional longitudinal studies, which control for factors that are known to be related to depression in older adults, are required.

Rumination and Anxiety Symptoms

Three studies looked at the relationship between rumination and anxiety (D'Hudson and Saling, 2010; Erskine et al. 2007 and Thomsen et al., 2005). They all found rumination to be significantly positively related to anxiety in community dwelling older adults indicating that rumination is associated with increased anxiety as well as depression in older adults. Rumination has been conceptualised as having a closer link with depression than anxiety, because of the tendency to repeatedly reflect on why one is feeling depressed. However there is some evidence that rumination is also associated with increased anxiety symptoms in older adults. Different measures of rumination were however used across the studies and it is unclear if they are all measuring the same construct. Future studies should be consistent with the measure used and ensure this is one that has been validated with the older adult population.

Difficulties in Emotion Regulation and Depressive symptoms

Orgeta (2011b) found that older adults with mild depressive symptoms reported greater overall difficulties in emotion regulation as well as greater difficulties on the subscales of awareness, clarity, goals and non-acceptance of emotions. This provides initial support that greater emotion dysregulation is related to increased depression in older adults as in younger age groups. Not being able to engage in strategies to change the experience of emotions and a lack of clarity and acceptance of emotions when in distress were related to an increase in depressive symptoms. Lack of acceptance is conceptually and theoretically related to both experiential avoidance, as measured by the Acceptance and Action Questionnaire, and expressive and thought suppression, as measured by ERQ and the WBSI. Thus, these results provide further support for the limited evidence that lack of acceptance, avoidance of and attempts to

suppress upsetting emotions may increase depressive symptoms. However, as previously, this was an isolated study which used a sample of older adults (university volunteers) who may differ from the general older adult population. Further studies to determine the relationship between difficulties in emotion regulation and depressive symptoms are required.

Difficulties in Emotion Regulation and Anxiety Symptoms

Orgeta (2011a) found that greater difficulties in emotion regulation overall (DERS) were significantly associated with higher anxiety symptoms in older adults, as well as to subscales of: Goals, Impulse, Non-Acceptance, and Strategies. The relationship between DERS total and anxiety symptoms remained significant after controlling for depressive symptoms. As above, interpreting these results should be done with caution given this was an isolated study and used an opportunistic sample.

Reappraisal and Depressive Symptoms

Orgeta (2011b) found that older adults with no or minimal depressive symptoms used reappraisal significantly more than older adults with mild depressive symptoms. Kraaij et al. (2002) found reappraisal (CERQ) to be significantly negatively correlated with depression in older adults at baseline and at a two and a half year follow up. The association between reappraisal and depressive symptoms was still significant after controlling for baseline levels of depression and negative life events. The strength of this longitudinal study adds to current evidence that reappraisal is related to lower depressive symptoms in older adults, and is in line with the systematic review of Nowlan et al., 2015 which found that reappraisal is related to depression in the wider context of coping. The current review did not identify any studies that looked at the relationship between reappraisal and anxiety in older adults. This provides a degree of support for there being an association between reappraisal and depressive symptoms. However, the small sample sizes involved and that the CERQ has not been validated for use with older adults mean the results should be interpreted with caution.

Cognitive Emotion Regulation Questionnaire and Depressive Symptoms

The relationship between the subscales of the CERQ and depression was explored in one study (Kraaij et al., 2002) (reappraisal and rumination results have already been discussed). Acceptance was significantly positively correlated with depression and retained a relationship with depression at follow up after negative life events and prior depression were controlled for. The acceptance subscale of the CERQ is conceptually different from the DERS non-acceptance subscale as it measures submission to a situation and acceptance that nothing can be done to change it. Sample items are 'I think that I have to accept the situation' and 'I think that I cannot change anything about it'. There was also a significant positive relationship between the catastrophizing subscale and depression at follow up, which no longer remained significant however when prior depression and negative life events were controlled for. There was no significant relationship between depression and the remaining subscales; self-blame, positive refocusing, planning and other blame. These results should be interpreted in light of the fact that the CERQ has not been validated for use with older adults and that the number of participants involved in this one study was low. This review found no studies that looked at the relationship between cognitive emotion regulation and anxiety.

Expectancies for Mood Regulation and Depressive Symptoms

One study used the NMR and found that belief in one being to be able to regulate mood was negatively related to depressive symptoms in older adults. Gratz and Roemer (2004) have argued that the NMR emphasises the elimination and avoidance of negative emotions which is not necessary synonymous with emotion regulation. For example, it does not assess awareness and non-judgemental acceptance of emotion as does the DERS, and indeed some of the facets of it appear in contrast to acceptance. Nevertheless, in the one study that used the NMR higher self-reported belief in the tendency to regulate negative mood was negatively related to reporting of depressive symptoms. As this was the only study we could find using the NMR and it did not confound for important factors conclusions can be drawn are limited.

Discussion

This systematic review looked at the relationship between emotion regulation strategies and depression and anxiety amongst older adults. This is the first review to explore the evidence in this important area. As the older adult population rapidly expands, so does the need to increase our knowledge of common psychological disorders and symptoms which have a detrimental impact on the quality of life of older adults. Increasing our understanding of emotion regulation strategies that are implicated in anxiety and depressive symptoms and disorders can guide more effective treatment and can also help direct future research. Strengths of the studies which met the inclusion criteria were the use of validated measures of anxiety and depression in the majority of studies. This review identified several methodological limitations of the studies which met the criteria. These included: the lack of reliable and validated emotion regulation measures for older adults, use of non-random sampling, and a consistent lack of reporting power analyses. Difficulties with confounding, particularly of gender, physical health and cognitive difficulties were also identified. This poses limitations on the conclusions that can be drawn from the studies that have been undertaken in the field. There is a clear need for emotion regulation measures which have been found to have good reliability, construct and predictive validity in younger adults to be validated in older adults. There are numerous measures already in existence and suitability of their use for older adults should be determined, rather than additional measures created.

There was some evidence to suggest that rumination was positively related to depression and, to a lesser extent, anxiety. There is also preliminary evidence that non-acceptance of emotions (implying a judgement of self for experiencing such emotions), avoidance of upsetting emotions, and attempts to suppress emotions is linked to increased anxiety and depression.

Clinical Implications

That rumination was found to be related to psychological distress suggests it should be targeted in clinical interventions for older adults with depressive and anxiety symptoms. Brinker (2013) also points out that life review is a common treatment approach which may lead to rumination if not carefully managed. The findings of

this review lend support to this concern and suggest that, clinically, older adults should be helped to reduce rumination and a careful balance should be sought between processing and accepting difficulties as opposed to repetitive dwelling on past and current difficulties. On the other hand, one study found rumination was no longer significant at the two and a half year follow up when prior depressive symptoms were controlled for. Future research could look at whether ruminative tendencies remain significant at shorter follow up periods (albeit longer than the two to four weeks follow up in Brinker's 2013 study). It could also highlight whether there are particular groups of older adults for whom rumination remains a significant predictor of depressive symptoms including adults with executive dysfunction.

Preliminary evidence that non-acceptance of emotions as well as attempts to suppress and avoid distressing emotions was linked to increasing anxiety and depressive symptoms. This has important implications for clinical practice. There is accumulating evidence for the applicability of third wave Cognitive Behavioural Therapy (CBT) models such as Acceptance and Commitment Therapy (ACT) and mindfulness approaches for older adults. These approaches encourage a non-judgemental approach to emotions (Lenze et al., 2014). These may be particularly relevant for older adults who face conditions which are progressive in nature. The finding that EA also mediated the relationship between self-reported physical health and anxiety symptoms is significant. Ill health is a frequent and realistic experience for older adults. This research suggests that older adults, who try to deal with such experiences by attempts to avoid them, experience increased levels of psychological distress. If this is found to be a robust finding in future research, clinical interventions should aim to encourage engagement in and acceptance of experiences that provide discomfort. This adds weight to clinical interventions of mindfulness which significantly reduce clinically relevant anxiety and depression in older adults (Young and Baimie, 2010). Additional research which explores associations between emotion regulation strategies, (which are theorised to underlie mindfulness approaches) with anxiety and depression would enhance the theoretical understanding of why they may be effective, as well as highlight which strategies may be more important and key in terms of clinical interventions. Traditional CBT approaches which focus on challenging negative thoughts and thinking errors, such

as predicting the future, may therefore be less appropriate for older adults who have health conditions or cognitive disorders that are progressive in nature. On the other hand there was limited evidence that reappraisal expressed as finding something positive about a potentially upsetting situation, was related to lower levels of depression. This suggests that CBT approaches which encourage cognitive restructuring may hold clinical utility for some older adults with depressive symptoms. It is unclear, however, whether the benefits of reappraisal would still hold true for older adults facing progressive physical illness or cognitive difficulties.

All of the studies included non-clinical populations who generally had low levels of anxiety and depressive symptoms. Whilst the results would therefore apply to a larger proportion of the older adults' population (limitations with non-random sampling aside), it is unclear what the relationship between emotion regulation and older adults in clinical samples is. Petkus et al. (2012) found thought suppression was associated with meeting the DSM-IV criteria for depression, but not anxiety. Where studies did include participants who met the threshold for clinical levels of anxiety and depression, there was not separate analysis of the relationship between anxiety and depression and emotion regulation. Replicating this research with clinical populations is warranted. One study which did not meet the inclusion criteria looked at an intervention for older adults with GAD, the most common type of anxiety disorder in older adults (Bender, 2008) and found greater difficulties in emotion regulation to be related to increased anxiety in this population. Unfortunately, however, Bender (2008) explored the relationship between DERS and anxiety for older adults with GAD and controls together, limiting the conclusion that can be made about DERS being related to GAD exclusively. High quality studies looking at the relationship between emotion regulation, anxiety and depression in clinical as well as non-clinical samples is required.

Limitations

Due to the overall quality of the studies being low, pooling of effect sizes was not considered. Additionally, whilst a hand-search was conducted, and two authors contacted, unpublished literature was not identified, which may bias the results. Additionally, only studies of English language were included. Studies in non-English

language were not considered eligible and their findings on the association between emotion regulation strategies and anxiety and depressive symptoms in older adults is unknown.

In terms of the study design, the majority of the studies were cross-sectional in nature, meaning causality cannot be ascertained. The possibility that depression and anxiety led to the observed relationships with emotion regulation, rather than the other way around, should be considered. Only two studies were longitudinal in nature, one of which only followed participants for 2–4 weeks (Brinker, 2013). Studies therefore should follow older adults over longer time, and control for differences between those followed up and those that are not. This will increase the evidence about the association between emotion regulation strategies to both anxiety and depression and allow for causality to be determined. It would also allow exploration of whether mild symptoms of anxiety and depression would progress to clinically significant anxiety and depression through the use of specific emotion regulation strategies.

That being said, this review is important for a number of reasons. It is the first review which has systematically reviewed various emotion regulation strategies and their relationship to depressive and anxiety symptoms in older adults. It highlights that the research in this area is, overall, very limited, with the research that has been done being characterised by methodological weaknesses. However, it is indicative that there is consistent evidence of the relationship between rumination and both depressive and anxiety symptoms. The finding of the review also suggests that a tendency to avoid and suppress emotions is related to increased anxiety and depressive symptoms in older adults.

This review focused on the role of emotional regulation in depression and anxiety. As discussed, physical illness and cognitive difficulties are also linked with emotional regulation and mood difficulties. As such, further exploration between these important variables would be very helpful in improving the well-being of older adults and informing the development of psychological interventions.

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Research Article

Abstract

Background: Fear of falling is common amongst older adults with and without a prior experience of falling. It is related to decreased quality of life, isolation, and institutionalisation. It also poses a risk for future falls when activity is avoided because of a fear of falling and muscle deconditioning occurs. Relatively little is known about the psychological correlates of fear of falling. This paper explored the relationship between difficulties in emotion regulation and fear of falling in community dwelling older adults.

Method: older adults were recruited from community based exercise classes, falls reduction classes, NHS and charity organisations. The questionnaires were completed and returned by post. Self-reported measures included the Falls Efficacy Scale-International (FES-I), the Fear of Falling Behaviour Questionnaire (FFABQ), the Difficulties in Emotion Regulation Scale (DERS) and the Hospital and Anxiety Depression Scale (HADS).

Results: 117 older adults over 65 completed the research packs of which 82 were fully complete. A significant positive correlation was found between emotion regulation and fear of falling, as well as between fear-related avoidance behaviour and emotion regulation. A regression model found that after controlling for depression and age, emotion regulation was no longer significantly related to fear of falling.

Conclusions: Emotion regulation was associated with fear of falling as well as with fear of falling avoidance behaviour. When depression and age were controlled for, emotion regulation no longer retained a significant relationship with fear of falling. Depression was the only modifiable variable that retained a significant relationship with fear of falling. The results suggest that depression is an important factor to assess in older adults with fear of falling. Future longitudinal research should assess

the relationship between fear of falling, depression and emotion regulation strategies which previous research has found to be associated with depression.

Introduction

Fear of falling is a major health problem affecting older adults (Landers, Durand, Powell, Dibble & Young, 2011) and has been found to be as significant a problem as falling itself, being linked to many adverse consequences. These include: functional decline, reduction in social participation, decreased quality of life, depression and anxiety, institutionalisation, and indeed, an increased risk of falling (Landers et al., 2011; Kempen, van Haastregt, McKee, Delbaere & Rixt Zijlstra, 2009). Older adults experiencing a fear of falling may restrict their movements to prevent a fall, but in doing so, their physical agility is reduced and, therefore, the likelihood of a fall increases. Prevalence rates for fear of falling in older adults vary. For example, Kempen et al. (2009) cited a range of between 20% and 60% in a community dwelling sample of older adults, whilst Scheffer, Schuurmans, van Dijk and de Rooij (2008) in a systematic review, noted that the majority of studies found a prevalence of 20.8% to 85%. This varied according to the population being surveyed and also the fear of falling measure that was used. Many measures assess the cognitive element of fear – that is the anticipation and concern that one may fall. This fear may or may not translate into the behavioural aspect of fear of falling, namely, avoidance. Kempen et al. (2009) cited that amongst older adults with a fear of falling; between 15% and 55% of them restrict their activity, owing to a risk of falling, whilst Chung et al. (2009) reported that 25% of older adults with a fear of falling restrict their movements after falling.

Kempen et al. (2009) noted that there is a lack of research looking at factors which are related to fear of falling and to fear-related avoidance of activity. Their research findings showed that being female, having limitations in activities of daily living, as well as having had a fall in the past six months, correlates independently with fear of falling. With respect to avoidance of activity because of a fear of falling, they found that severe avoidance correlated with age and with limitations of daily living.

However, level of fear of falling was rated by participants as severe or mild rather than by a validated measure. As Moore and Ellis (2008) pointed out, such single-item measures do not assess the full psychological impact of a fear of falling and their reliability and validity has not been ascertained.

Fear of falling was previously considered a natural reaction to the trauma of a fall (Scheffer et al., 2008) and also an understandable phenomena in older age, because of the threat that falling poses to this group. However, it is now accepted to be a real health concern and not a normal part of ageing (Scheffer et al., 2008; Legters, 2002). It is clear that the relationship between falling and fear of falling is complex. Whilst a significant proportion of older adults develop a fear of falling after a fall, a significant proportion of them *do not* go on to develop this post-fall fear. Furthermore, it is now widely accepted that a prior fall is not a prerequisite for developing a fear of falling, which is found in a significant proportion of older adults who have not had a fall (Legters, 2002). Additionally, the observed phenomenon of fear of falling leading to an increased risk of falling suggests that it is not a logical way to prevent falls in older adults. It is apparent that older adults are at risk of developing a fear of falling that is an exaggeration of the actual threat of a fall, warranting exploration of this public health problem.

It is well established that many physical and cognitive factors predict increased risk of fear of falling and indeed a lot of interventions have been based on modifying these elements. However, research suggests that the reasons for fear of falling are multifactorial and include psychological factors which should be taken into account when developing interventions (Legters, 2002). Anxiety is one such factor which has been found to predict a higher risk of fear of falling (Young & Williams, 2015). Indeed some researchers have conceptualised fear of falling as an expression of generalised anxiety amongst older adults. For example, Howland et al. (1993) found that fear of falling was highly associated with other fears that older adults had, including fear of robbery, losing a precious item or developing a serious health

problem. It is acknowledged that anxiety may also be a consequence of fear of falling and hence this relationship is bi-directional.

In a study that aimed to examine the role of anxiety in fear of falling and its correlates, Delbaere, Close, Brodaty, Sachdev and Lord (2010) compared those who overestimated their risk of falling with those who underestimated it. An anxious group of individuals perceived their risk of falling in excess of their physiological risk. This group had higher depressive symptoms and scored higher on a neuroticism measure of emotional stability and reactivity to stress. In contrast, low perceived risk in comparison to higher physiological risk acted as a protective factor against future falling and this relationship was moderated by lower scores of neuroticism and depression. Another study also found self-reported neuroticism to predict fear of falling in community-dwelling older women (Mann, Birks, Hall, Torgerson & Watt, 2006). It is clear that exploring the relationships between psychological factors and fear of falling is warranted. This could expand the knowledge base about why some older adults do develop a fear of falling whilst others do not, highlighting which facets should be targeted in interventions. Indeed, intervention models which have targeted the psychological aspect of fear have been found to be effective. For example, a randomised control trial for fear of falling found that Cognitive Behaviour Therapy (CBT) was more effective in addressing fear of falling compared to a control group (Tennstedt et al., 1998). However, there is still a dearth of knowledge about which particular psychological processes are related to the development and maintenance of fear of falling and hence which should be targeted in interventions.

A related construct that has not been explored in relation to fear of falling is emotion regulation. Emotion regulation is the process that determines which emotions a person experiences, for how long, and the intensity with which emotions are experienced (Thompson, 1994). Emotion regulation has been conceptualised as what people do to alter their emotional experiences, as well as their attitude towards their emotions. Gross's process model (Gross, 2014) falls under the former and proposes that the experience can be modified either before an emotion is 'full blown', such as

situation selection, or choosing to deploy or not to deploy attention to potentially emotionally eliciting stimuli. An individual may also respond to fully developed emotions, for example by suppressing their expression of that emotion. Emotion regulation has also been conceptualised in a wider sense to include awareness and level of acceptance towards emotions as well as responses to such emotional reactions and the degree to which they hinder ones goals being met. Gratz and Roemer (2004) would take this theoretical stance and their corresponding measure, the Difficulties in Emotion Regulation Scale (DERS) assesses awareness of and acceptance of emotions as well as strategies undertaken. Process models such as that of Gross would indicate strategies that could be taught to alter emotional reactions and the impact of them such as behavioural response to an emotions, reappraisal of a situation to alter the emotional experience as in cognitive behavioural therapy. Alternatively, the latter conceptualisation of emotion regulation would be implicated in approaches such as ACT (Harris, 2007) and mindfulness where the target is to increase awareness of emotions and enhance an acceptance of these without necessarily trying to alter them. Both frameworks would address what people do behaviourally following their emotions.

Research has found that older adults report more use of emotion regulation strategies considered to be adaptive, for example, reappraisal and less use of strategies considered to be maladaptive, e.g. rumination (Garnefski & Kraaij, 2006). Older adults have also been found in experimental research to be better at increasing positive affect and decreasing negative affect (Urry & Gross, 2010; Mather & Carstensen, 2005; Larcom & Isaacowitz, 2009). One proposed explanation for this observed tendency for older adults to be better at regulating their emotions is the socioemotional selectivity theory (Mather & Carstensen, 2005). This postulates that as people age, they become more aware of their decreasing lifespan. Realising their future time is limited, older adults make attempts to maximise positive experiences. This would be in contrast to younger adults who are not as future-time oriented and who are still learning which strategies are the most effective to use.

Indeed the enhancement of older adults' abilities in emotion regulation has been postulated as a possible explanation for why older adults generally report experiencing less psychological distress than younger adults. For example, lower levels of anxiety and depression are reported in older adults (Gum, King-Kallimanis & Kohn, 2009). There is some debate about whether this is a result of these disorders presenting differently in older adults and consequently being under-detected or if there is in fact a real decrease (Bassil, Ghandour & Grossberg, 2011). However, despite this debate, it is generally accepted that, in spite of declining physical and cognitive health, and as well as the frequent loss of family and friends, older adults generally report levels of subjective happiness at least on a par with those of their younger counterparts.

Whilst it appears that improvements in the ability to regulate emotions may serve as a protection for older adults from psychological distress, there is also evidence to suggest that emotion regulation difficulties in older adults are similarly linked to increases in psychopathology as with younger adults. For example, Orgeta (2011) found that older adults, who reported greater difficulties in regulating their emotions, also reported higher anxiety symptoms. Similarly, Orgeta (2011) found that older adults with mild depressive symptoms reported significantly greater difficulties in emotion regulation than older adults who did not report depressive symptoms. Those without depressive symptoms also reported significantly greater use of the strategy reappraisal and less use of expressive suppression. Reappraisal entails an individual thinking about a difficult or stressful event in a way that acknowledges something positive about the experience (Nowlan, Wuthrich & Rapee, 2015). Expressive suppression is the tendency to avoid displaying or communicating one's emotions (Gross & John, 2003). Research also found that greater difficulties in emotion regulation are associated with greater psychological distress in older adults with physical comorbidities (Petkus, Gum & Wetherell, 2012). Thus, whilst physical ill-health is a risk factor for depression in older adults, emotional regulation difficulties have been found to increase this risk. The related literature on Acceptance and Commitment Therapy (ACT) has looked at the impact of having a non-judgemental stance towards one's emotional reactions (Lenze et al., 2014). Acceptance, as opposed

to judging oneself about having such emotions and therefore trying to suppress them, has been found to be linked to better outcomes (Lenze et al., 2014) and research has found that emotion regulation can have an impact on the severity of psychological distress, over and above depression and anxiety. For example, Roemer, Lee et al (2009) found that greater self-reported difficulties in emotion regulation as measured by the DERS predicted generalised anxiety disorder of higher severity over and above the variance which was explained by anxiety and depressive symptoms in both a clinical and a non-clinical sample. Additionally, Shallcross et al.(2013) found that older age predicted lower levels of anger and anxiety and this relationship was mediated by greater acceptance towards negative affect after baseline negative affect at baseline. Whilst the majority of research has been cross-sectional, making it difficult to be certain about the direction of this relationship, it is clear that emotion regulation is implicated in psychopathology amongst older adults. Despite growing evidence that emotion regulation is related to psychological distress amongst older adults, there has been no previous research looking at the relationship between emotion regulation and fear of falling in older adults. Therefore, the main aim of this study was to explore the relationship between difficulties in emotion regulation and fear of falling in community dwelling older adults. Secondary aims are to examine the relationship between emotion regulation and fear of falling avoidance behaviour. Anxiety and depression have also been found to be correlated with emotion regulation difficulties in older adults. Furthermore, anxiety and depression have also been found to be associated with fear of falling. As such, the relationship between anxiety and depression and emotion regulation, as well as between anxiety and depression and fear of falling, was also investigated. This allowed exploration of whether anxiety and depression moderated any relationship between fear of falling and emotional regulation, if there was one. Based on previous research the following was hypothesised.

Hypotheses

Primary Hypotheses

- 1) Higher levels of fear of falling will be positively related to greater self-reported difficulties in emotion regulation.
- 2) Higher levels of fear of falling avoidance behaviour will be positively related to greater self-reported difficulties in emotion regulation.

Secondary Hypothesis

- 3) To explore whether any association between fear of falling and emotion regulation remains when other variables (including previous falls, age, anxiety and depression) related to fear of falling are controlled for.

Method

Ethical Approval

The research was given ethical approval by the South East Scotland Research Ethics Committee (Appendix 1).

Recruitment Procedure

Participants were recruited from various community sites, including gym based classes for older adults, a falls reduction group for older adults, a nationwide charity, a local charity a day centre for older adults (which provided falls reduction advice) and NHS sites (including an older adults' psychology department, a rehabilitation post-fall service and an osteoporosis service). See Table 1 for Source of Recruitment. Participants were informed about the study by staff in their respective group, and were given research packs which contained participant information sheets, informing them about the study. Participants could either complete the research at their own pace, or else request support from the researcher to complete. For participants who chose to complete the research by post, consent was implied by participants completing and returning the questionnaires. This procedure was adopted following advice from the ethics committee. If participants requested to meet the researcher in person, written consent was required. A hundred per cent of participants completed the research via post and none requested to meet with the researcher to complete the research. The packs were returned by prepaid envelopes provided. A total of 425 packs were given to staff within the above organisations to distribute to potential participants. However, it is not clear how many of these staff

gave to potential participants and so the return rate is unknown. Data on those who opted not to take part was not available and so it is uncertain how they compared to those who did participate. To be included, participants had to be over 65 and living in the community. There was no other inclusion or exclusion criterion.

Table 1 Source of Recruitment

Exercise Classes for older adults	Falls Prevention Programme	Day Centre classes	National Older Adult Charity	Local Older Adult Charity	NHS	Source Unknown
N 27, 32.9%	23 28%	1 1.2%	19 23.2%	3 3.7%	5 6.1%	4 4.9%

Top line reflects N, number of participants, bottom is percentage

Sample

117 packs were returned of which 82 participants had completed the measures relevant to the primary hypothesis, - the FES-I, DERS and FFABQ. Participants were community dwelling older adults aged 65–94. Mean age was 76 (sd 6.5). The majority was female (75%) and were educated to secondary education (47.6%). A hundred per cent of the sample reported their ethnicity to be white. The majority of respondents were married or widowed. A hundred per cent of the sample was retired. 36.7% of the sample had never had a fall. See Table 2 for Demographics of Participants.

Table 2 Demographics of Participants, N = 82

Marital Status	Level of Education	Self-rated health	Number of falls in past five years	Hospitalised as a result of fall	Injury from Fall
Married 32 39%	Primary school 4 4.9%	Good 53 64.6%	None 29 35.4%	Yes 12 14.6%	Yes 42 51.2%
Widowed 38	Secondary 39	Not too good	One fall 17	No 66	No 37

46.3%	47.6%	19	20.7%	0.5%	45.1%
		23.2%			
Single & Never married	Undergraduate degree or above	Poor	Two falls	Not reported	Not reported
3	21	2	14	4	3
2.2%	25.6%	2.4%	17.1%	4.9%	3.7%
Divorced	Other	Not reported	Three or more falls		
6	9	8	19		
7.3%	11%	9.8%	23.2%		
Not reported	Not-reported		Not-reported		
3	9		3		
3.7%	11%		3.6%		

Top line reflects N, number of participants, bottom is percentage

Measures

The packs contained information about the research as well as four self-report questionnaires and a demographic information form. As participants completed the measures independently, the order in which they completed them is unknown.

Demographic Information

Participants were asked for their age, gender, ethnicity, level of education, marital, and occupational status. They were also asked how many falls they had experienced in the last five years, number of hospital admissions and injuries related to falls, as well as to indicate their general health status.

Fear of falling

The Falls Efficacy Scale International (FES-I, Yardley et al, 2005)

This is a 16-item questionnaire that measures the degree of a person's concern about falling and so can be considered to be measuring the cognitive aspect of fear of falling. It asks participants to rate their degree of concern about falling in a range of situations from not at all concerned (1) to very concerned (4) and yields a maximum total score of 64 with higher scores indicating more concern. Sample items asked about are: cleaning the house, answering the telephone and walking on an uneven surface. It expands on the Falls Efficacy Scale (Tinetti, Richman & Powell, 1990) which asks about the confidence to perform activities without falling. The FES-I also asks about more demanding activities than the FES, thereby increasing the sensitivity of the measure to detect fear experienced by more active older adults. It was validated on 704 adults aged between 60 and 95 and has good internal reliability and test-retest reliability: both 0.96. The FES from which it was modified has good concurrent validity, being correlated with measures of balance and gait and it predicts falls. Additionally, it has also proven sensitive to changes in fears following interventions (Yardley et al., 2005). In the current study, internal consistency was good with a Cronbach's alpha of 0.96.

Fear-Related Avoidance

The Fear of Falling Avoidance Behaviour Questionnaire (FFABQ) (Landers *et al.* 2011)

This is a 14-item self-report measure which looks at avoidance of activity as a result of fear of falling and is rated on a Likert scale. Participants are asked to rate how much they avoid a variety of activities because of their fear of falling, from 0 to 4. It yields a total possible score of 56 with higher scores indicating more avoidance. It was found to have good test-retest reliability and also predictive validity of time spent sitting and lying, as measured by an activity monitor (Landers et al., 2011). In the current study internal consistency was good with a Cronbach's alpha of 0.95.

Anxiety and Depression

Hospital Anxiety and Depression Scale (HADS) (Zigmond & Snaith, 1983)

The HADS is a 14-item, quick to administer, scale of anxiety and depression. It was specifically designed for use on people with physical health problems, who may, as a result of their ill health, experience some of the somatic features of anxiety and depression, including fatigue. As such, the measure reduces the likelihood of symptoms attributable to their physical problems being mistaken as anxiety and depression. Participants rate each item from 0 to 3. The subscales for anxiety and depression can range from 0-21 with scores categorised as follows: normal (0-7), mild (8-10), moderate (11-14), severe (15-21). A sample anxiety item is: 'worrying thoughts go through my mind' and a sample depression item is: 'I can still see the funny side of things'. In the current study internal consistency was good with a Cronbach's alpha of .837 for the overall scale. Cronbach's alpha for the Anxiety subscale was 0.77 and for the Depression subscale was 0.78.

Emotion Regulation

The Difficulties in Emotion Regulation Scale (DERS) (Gratz & Roemer, 2004)

This is an easily administered questionnaire which assesses six domains of emotion regulation: (a) awareness of emotional responses; (b) understanding of emotions; (c) non-acceptance of emotions; (d) the ability to engage in goal-directed behaviour when upset; (e) the ability to refrain from impulsive behaviour when experiencing negative emotions; and (f) access to emotion regulation strategies perceived as effective. It contains 36 items and respondents are asked to rate how much each statement applies to them on a scale from 1 (almost never) to 5 (almost always). Higher scores signify greater difficulties with emotion regulation. The DERS has been found to have high internal consistency ($\alpha = .93$), good test-retest reliability, and adequate construct and predictive validity (Gratz & Roemer, 2004). The DERS displayed good construct validity as assessed through correlation with the Generalised Expectancy for Negative Mood Regulation Scale (NMR; Catanzaro & Mearns, 1990). It has also been used with older adults (Orgeta, 2011) in a study which explored differences in emotion regulation in older, as opposed to younger

adults. In the current study, internal consistency was good with a Cronbach's alpha of 0.89

Data Analysis

All analyses were conducted in the Statistical Package for the Social Sciences (SPSS) version 19. All data was anonymised before analysis. The N values reflect the number of people who had completed data for each measure.

Missing Data

For measures in which participants had an acceptable amount of data missing according to the guidelines for dealing with missing data for each measure (Appendix 2), a score for the missing item was entered as the mean of the items completed. This meant data was imputed as follows: five participants for FES-I, six participants for FFABQ, three participants for the DERS, five participants for HADS Anxiety and three participants for HADS Depression. This has been deemed to be an acceptable strategy for handling missing data where the number of items missing is minimal (Tabachnick & Fidell, 2007).

To investigate the relationship between fear of falling and difficulties in emotion regulation (hypothesis 1) as well as the relationship between emotion regulation and fear of falling avoidance behaviour (hypothesis 2), bivariate correlations were performed. The data was checked to see whether it met assumptions required for parametric analysis. The Kilmorgorv-Smirnov test was carried out to assess whether the data was normally distributed. The assumption of normally distributed data was not met for FES-I, HADS-Depression, FFABQ and number of falls. It was not possible to transform the data to normal distribution. As such, non-parametric correlations were calculated. To avoid a type II error occurring as a result of multiple correlations, a Bonferroni corrected P value of is 0.025 was used (based on the two primary hypotheses). Based on a priori power calculations, to achieve power of 0.8 with a medium effect size for the two main hypotheses, a sample of 82 was required. Power was therefore achieved.

To determine whether difficulties in emotion regulation contributed unique variance in the fear of falling total scores, a linear regression analysis was performed to address Hypothesis 3. To account for the data being non-normally distributed, bootstrapping was performed (Field, 2009).

Results

Descriptive Data

On the HADS anxiety subscale 88.9% of the participants scored between 0 and 9 indicating no clinical symptoms or mild symptoms, 11.1% scored between 10 and 14 indicating moderate symptoms. On the HADS depression scale, 95% scored between 0 and 9 indicating no or mild clinical symptoms and 7% scored between 10 and 14% indicating moderate depressive symptoms.

Mean scores for the measures are presented in Table 3. Associations between variables were explored using correlation coefficients and their significance levels are presented in Table 4.

Table 3 Mean scores for study variables

Measures	n	M	SD
FES_Total	82	26.4268	9.71575
DERS_Total	82	70.3171	18.55315
FFFABQ_Total	82	12.8049	12.95618
HADS_Total	80	9.8125	5.32986
DERS_NonAccept	79	12.1266	5.28512
DERS_Goals	78	10.3846	3.67240
DERS_Impulse	80	9.6375	3.24230
DERS_Aware	79	15.5190	5.18346
DERS_Strategies	80	13.8750	5.28761
DERS_clarity	79	8.8101	3.85997
HADSDEPRESSION_Total	80	4.1875	3.06509
HADSANXIETY_Total	81	5.5556	3.19374

Table 4 Zero Order correlations between study variables

	1 age	2falls	3DERS	4FESI	5FFABQ	6HADS-A	7HADS-D
1.Age	1	.148	.261*	.372**	.411**	.158	.258**
n	79	79	79	79	79	77	77
2.Falls	.148	1	.176*	.464**	.419**	.040	.135
	79	79	79	79	79	78	102
3.DERS	.261*	.176*	1	.395**	.431**	.452**	.489*
	79	79	82	82	82	81	80
4.FES-I	.372**	.464**	.395**	1	.845**	.250*	.514**
	79	79	82	82	82	81	80
5.FFABQ	.411**	.419**	.431**	.845**	1	.452**	.489**
	79	79	82	82	82	81	80
6.HADS A	.158	.040	.452**	.250*	.306**	1	.452**
	77	78	81	81	81	81	80
7.HADS D	.258**	.135*	.489**	.514**	.4951**	.452**	1
	77	77	80	80	80	80	80

Values represent correlation coefficient r (top line) and sample size n (bottom line)

* Correlation is significant at the 0.05 level

**Correlation is significant at the 0.01 level

***Correlation is significant at the 0.001 level

Hypothesis 1

There was a significant positive correlation between fear of falling and difficulties in emotion regulation, DERS total positively correlated with FES-I total. $r = .39$, $p < .01$. This was a medium effect size (Field, 2009). Fear of falling was also correlated with the five of the DERS subscales in that higher reported FES-I scores significantly positively correlated with non-acceptance of emotional responses ($r = .24$, $p = .021$), greater difficulties in engaging in goal directed behaviour ($r = .29$, $p = .005$), less awareness of emotional responses ($r = .30$, $p = .005$), greater difficulties in accessing effective emotion regulation strategies ($r = .23$, $p = .029$) and lack of emotional clarity ($r = .26$, $p = .012$). By contrast fear of falling was not significantly related to greater impulse control difficulties ($r = .17$, $p = .119$).

Hypothesis 2

Difficulties in emotion regulation were also correlated with greater fear of falling behaviour avoidance, DERS total positively correlated with FFABQ, $r = .43$, $p < 0.01$. However, FES-I and FFABQ were highly correlated, $r = .85$, suggesting collinearity. As in this study FES-I and FFABQ appeared to be measuring the same construct; FFABQ was dropped from further analysis. Table four shows correlations between the study variables.

Hypothesis 3

A regression model with fear of falling as the predicted variable was used to explore whether emotion regulation accounted for unique variance in fear of falling after other variables were controlled for. At step 1, demographic variables which were known to be associated with fear of falling were entered first. These included age and number of falls, which have been found in the literature to be related to increased fear of falling. Including falls as a variable allowed investigation of whether falls' history was related to fear of falling. In the first step, age and number of falls were significantly related with fear of falling. The model was significantly different from zero, $F(2, 85) = 9.17$, $p < .001$. In total 18% of the variance was explained. The

higher N value reflects the number of participants who had complete data for the variables implicated in hypothesis three; FES-I, DERS, HADS-D, HADS-A, age and number of previous falls.

At step 2, HADS Anxiety and HADS Depression were entered. The model was significantly different from zero, $F(4, 85) = 8.38$. An additional 11% of the variance was explained. In total 29% of the variance was explained. Depression was significantly related to fear of falling but anxiety was not. Age remained significantly related to fear of falling, number of falls did not.

At Step 3, DERS was entered to determine the unique contribution of emotion regulation to fear of falling. The model was significantly different from zero, $F(5, 85) = 6.70$. Adding difficulties in emotion regulation did not add anything to the variance in fear of falls scores with DERS not being significantly related to fear of falling. The model still explained only 29% of variance. Only age and depression remained significantly related to fear of falling.

Table 5 Summary of hierarchical regression analysis for variables predicting fear of falling in older adults (n = 85)

	B	SE B	Confidence intervals	B
Step 1				
Constant	-13.56	12.7	-38.20 to 11.11	
Age	0.50	0.17	0.16 to 0.81	.35***
Number of falls	1.44	0.56	0.41 to 2.70	.22*
Step 2				
Constant	-10.13	12.61	-34.3 to 14.07	
Age	.40	.17	0.53 to 0.73	.28**
Number of falls	1.20	.60	0.65 to 2.58	.18
HADS D	1.03	.39	0.31 to 1.83	.32**
HADS A	.160	.36	-.58 to .86	.05
Step 3				
Constant	-11.10	12.77	-35.69 to 14.38	
Age	.38	.18	.03 to .74	.27**
Number of falls	1.16	.63	-.02 to 2.62	.18
HADS D	.97	.40	.27 to 1.86	.30**
HADS A	.10	.34	-.58 to .76	.03
DERS	.03	.08	-.13 to .17	.06

$\Delta R^2 = 0.18$ for Step 1, $\Delta R^2 = .11$ for step2, $\Delta R^2 = .002$ for Step 3

* significant at the 0.05 level

** significant at the 0.01 level

*** significant at the 0.001 level

HADS D = HADS Depression, HADS A= HADS Anxiety

Discussion

This study examined the relationship between fear of falling, fear of falling avoidance behaviour and emotion regulation. In line with the primary hypotheses, this study found that both fear of falling and fear of falling avoidance behaviour were correlated with greater self-reported difficulties in emotion regulation, with medium effect sized detected.

To assess whether difficulties in emotion regulation contributed to the variance in fear of falling when other variables were controlled for, a multiple regression was carried out. Older age, increased number of falls, and higher self-reported anxiety and depression were associated with an increased fear of falling in the present study which is consistent with previous research. As such, these variables were entered into the model first to allow the unique contribution of difficulties in emotion regulation to be assessed. Previous research has also found that being female is related to increased fear of falling (Lawrence, et al., 1998). However, as the majority of the sample was female, it was not possible to compare gender differences.

The regression analysis showed that age and depression significantly contributed to the variance in fear of falling. Difficulties in emotion regulation, previous number of falls and anxiety did not account for any significant variance. That there was a stronger association between depression and fear of falling, than between anxiety and fear of falling in this study, is contrary to the conceptualisation of fear of falling as a specific type of anxiety (Bryant, Jackson & Ames, 2008) or an expression of generalised anxiety (Howland et al., 1993) and the finding that fear of falling was the most commonly reported worry among older adults. However, it is consistent with Gagnon, Flint and Naglie (2005) which found that there was a much stronger association between depression and fear of falling, than there was between anxiety and fear of falling, and indeed depression was the factor most strongly associated with fear of falling in this study, which also looked at a range of physical correlates.

Difficulties in emotion regulation was no longer significant when depression was accounted for, suggesting that the relationship between difficulties in emotion regulation and fear of falling can be accounted for by the relationship between depression and difficulties in emotion regulation. This is consistent with previous research (Orgeta, 2011) which found depression to be related to the use of specific emotion regulation strategies. It is also consistent with the proposed model of anxiety and depression being postulated to arise from greater difficulties with regulating emotions (D'Avanzato, Joormann, Siemer & Gotlib, 2013).

It is possible, therefore, that a pathway for the development of fear of falling occurs via increased difficulties in emotion regulation increasing the likelihood of psychological distress generally – including depression and anxiety – and that depression in particular increases the risk for the development of fear of falling in older adults. However, this study, similar to Gagnon et al. (2005) and most previous research was cross-sectional. As such, the temporal onset of symptoms and the direction of relationships cannot be ascertained. It is possible that fear of falling causes an increase in depressive symptoms, rather than the other way around. Gagnon et al. (2005) suggested that depression may be a consequence of activity restriction in older adults with a fear of falling, because it can lead to social isolation and decreased quality of life. Consistent with this Chou and Chi (2008) found that fear of falling predicted depression at long term follow-up and that this relationship was mediated by social support. This study did not however find that depression predicted fear of falling. This adds support to the proposed pathway by which fear of falling may lead to depression. However, in this study, the participants were dichotomised into those with a fear and those without based on whether they did, or did not restrict their behaviour. However, older adults may restrict some, but not all of their behaviours due to a fear of falling and measuring the construct in this way may fail to account for this variance. Furthermore, fear of falling does not always translate to avoidance behaviour, and thus the link between the cognitive element of fear of falling and depression is not conclusive from this study. As mentioned, other research has found that depression predicts activity restriction in fear of falling (for example, Painter et al., 2012). It appears that the relationship between fear of falling and depression is bi-directional. Longitudinal research in the future would allow for investigation of the time course of depression, anxiety, fear of falling, avoidance behaviour and emotion regulation in older adults.

As discussed, fear of falling has been previously conceptualised as a specific type of anxiety. However, the results of this study and that of Gagnon et al. (2005) suggest that depression may be associated with fear of falling to a greater degree. This suggests that careful assessment of depression as well as anxiety should be conducted with older adults. Whilst anxiety may be easier to detect than depression, for example, because of observable hyper-arousal, depression may be relatively

harder to detect. The findings of this study suggest that depression should be given specific attention in older adults presenting with a fear of falling.

On the other hand, whilst in this study, depression was found to be more related to fear of falling than anxiety, it is important to consider the mechanisms by which this may occur. In older adults, comorbid depression and anxiety has a high prevalence. Furthermore, there may be less distinction between these two disorders in older adults (Bassil et al., 2007). As such, this may artificially give rise to depression and anxiety being conceptualised as two separate disorders.

There has been a recent increase in the interest of the psychiatric correlates of fear of falling, and the current study paves the way for further research. Previous research has argued for multifactorial interventions for fear of falling (Legters, 2002), although as Legters points out, relatively little research has investigated such approaches. The regression model in this study accounted for only 29% of the variance of fear of falling. Previous research has highlighted the importance of physical factors that may account for fear of falling, as well as cognitive difficulties. A model which accounted for these correlates, simultaneously allowing for psychological correlates to be assessed, would increase understanding of the relative importance of each of these. Previous research found that neuroticism is related to fear of falling as well as to depression in previous research (Delbaere e al., 2010; Mann et al., 2006) and as such could be added to exploratory analyses of the associations between variables. Interventions which have focused on developing physical ability, for example with specific exercise programmes (Sattin, Easley, Wolf, Chen, & Kutner, 2005), have been found to reduce fear of falling. Gagnon et al. (2005) point out that it is unclear whether such programmes would also lead to a decrease in depression and anxiety. CBT for fear of falling has also been found to be effective in a randomised control trial (Tennstedt et al., 1998) and indeed, Tennstedt et al. (1998) argue that cognitive-behavioural changes must take place for fear of falling to be addressed, and for avoidance of activity to be reversed. However, it is still unclear which older adults are most suitable for these interventions and whether interventions aimed at strengthening physical agility, such as exercise based classes may also lead to cognitive-behavioural changes via encouraging activity, or whether change would only occur through specific CBT interventions.

The main aim of this study was to investigate the relationship between fear of falling and emotion regulation. This study demonstrates that there is a link between these two variables. However, the link no longer exists once age and depression were controlled for. Due to the study being cross-sectional it is not possible to say with certainty which variables are most important. On the other hand, limitations to detect a unique contribution of emotion regulation to fear of falling may have arisen from the measure used. The DERS assesses difficulties in regulation of emotions including a lack of acceptance, awareness and clarity of emotions, as well as difficulties accessing strategies and meeting goals. Therefore, whilst it is a comprehensive measure of emotion regulation difficulties, it does not assess all specific strategies which have been found to be related to depression and anxiety in older adults. Rumination has been found to have a specific relationship with depression, because of the tendency to reflect and dwell on depressed mood (D'Avanzato, Joormann, Siemer, & Gotlib, 2013). This may be done in an attempt to decrease the intensity of upsetting emotions. However, research has suggested it may have the opposite effect (Aldao, Nolen-Hoeksema & Schweizer, 2010). Given the relative importance of depression in accounting for the variance of fear of falling in this study, future research could expand on this. Research could assess whether variance in depression amongst older adults with fear of falling can be accounted for by an increased tendency to use the emotion regulation strategy such as rumination, as well as other strategies.

It is noteworthy in this study that the number of falls ranging from none to over six did not account for variance in fear of falling. This is in contrast to previous research which has found that an increased number of falls was related to an increased fear of falling (Kempen et al., 2009). However, the finding is consistent with the widely reported finding that a prior fall is not a prerequisite for development of fear of falling.

In this study, a high correlation between fear of falling and the fear of falling behaviour questionnaire suggests that both measures were tapping into the same

construct. This is in contrast to previous research which has suggested that only a proportion of older adults restrict their behaviour as a result of a fear of falling. It is unclear whether the FFABQ and the FES-I are truly measuring the same construct, or whether the finding in this study was specific to this sample. In its development, the FFABQ was found to be moderately correlated with the FES, suggesting that these constructs, whilst overlapping, were distinct. The sample used in the development of the FFABQ was similar to the one in this study in that participants had low levels of fear of falling and were community dwelling older adults. The FES-I has greater construct validity as a fear of falling measure in that it asks about *concern* about falling, in comparison to the FES which asks about *confidence* in the ability to perform tasks without falling. This suggests that FFFBQ may be more strongly associated with worry about falling than with measures that assess efficacy of performing activities without falling. In both the present study and in Landers et al. (2011), there were generally low levels of fear of falling. Future studies should aim to recruit older adults with higher levels of fear of falling to assess the proportion who also avoid activity. This would allow further exploration of the factors that are associated with increased levels of activity avoidance and, similarly, those factors that appear to act as protective factors against a cognitive worry about fear translating into avoidance behaviour. It may be that amongst older adults who report greater fear, there is also greater variance in the degree older adults restrict their behaviour. Theoretically, the high fear/low avoidance group may have more effective ways of dealing with their emotions allowing them to still engage in their desired goals. From a CBT perspective they could be conceptualised to be undertaking behaviour that allows them to reality check their fear of falling and from an ACT perspective they could be conceptualised to be aware and accepting of the inner emotional experiences related to falling but to nevertheless undertake activities in line with their values.

Limitations

The cross-sectional nature of this study mean it is not possible to be certain about causality. Future studies which utilise longitudinal study design are required to further unpack the relationship between hypothesised predictors.

The majority of participants in this study were from a non-clinical sample who generally reported low levels of fear of falling, difficulties in emotion regulation, anxiety and depression. Whilst this study was sufficiently powered to test the main hypothesis, and also the secondary hypothesis, there were only a small percentage of older adults with higher levels of fear of falling. The recruitment strategy targeted older adults attending rehabilitation owing to risk of falls and also older adults attending psychological intervention. As such, they were likely to have greater falls risk or psychological morbidity than the other participants. Consequentially, it may be speculated that older adults from these sources would present with increased fear of falling. However, they made up only a small proportion of the sample. Anecdotally, feedback from staff at a physical rehabilitation service reported that potential participants had been deterred by the number of forms they were required to complete. Whilst the researcher offered to meet with participants to assist completion of the research, this option was not taken up. It is possible that those who took part were more able than those who did not, or those who did not take part may have had increased anxiety and depression which may have affected their motivation to take part. Extrapolating the findings of this research to older adults who express significantly greater degrees of fear of falling should be done with caution. Targeting a sample to ensure representativeness in future studies is required. This could be done by inviting at random older adults referred to physical rehabilitation services or to other services due to their fear of falling to take part and making participation dependent on face to face completion rather than through postal completion exclusively. The sample was also predominantly female. This mirrors previous research investigating fear of falling (Yardley et al.2005; Sattin et al., 2005). Fear of falling has previously been found to be higher in females (Kempen et al. 2009) and consequentially this may increase the clinical utility of the results. On the other hand it poses limitations about the applicability of these findings to men.

Older adults in the sample also varied in regards to the interventions they had received and it is recognised that they may have exhibited a decreased fear of falling owing to such approaches potentially confounding the results. Future research should aim to recruit older adults, before they receive interventions for falling, or fear of falling. Lastly, the DERS, whilst showing good internal consistency within this study and having been used with older adults in previous studies, (Orgeta, 2011) does not measure all of the facets of emotion regulation that may be implicated.

Despite the above limitation this is the first study that explored the relationship between emotion regulation and fear of falling in older adults. It adds to the research which has found that depression is associated with fear of falling in older adults, and suggests that the mechanisms by which this occurs should be investigated further. An additional strength of this study was that the sample included older adults with a previous fall as well as those who have not fallen. A good sample size was achieved which demonstrates the feasibility and acceptability of collecting data from older adults by post. Good engagement with the services and organisations involved facilitated the recruitment.

Conclusion

Fear of falling was associated with emotion regulation in community dwelling older adults. However, emotion regulation did not predict fear of falling once depression was controlled for. This suggests the relationship between fear of falling and emotion regulation can be accounted for by the relationship between emotion regulation and depression. This key clinical implication of this study is the importance of the assessment of depression in older adults with a fear of falling. Future research should assess whether other emotion regulation strategies are implicated, especially those that have been found to be associated with depression.

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List of Appendices

Appendix 1 Letter of Ethical Approval including letter dated 14th May

Appendix 2

Handling Missing Data

Guidelines for handling missing data were followed according to the guidelines for each measure as follows:

Fewer than four for FES-I (Yardley et al., 2005)

Fewer than three for FAFBAQ (Landers, persons communication, 23rd March, 2015)

Fewer than six and no more than one item per subscale for DERS (DERS Quick guide, COUNTY OF LOS ANGELES DEPARTMENT OF MENTAL HEALTH)
[http://dmhoma.pbworks.com/w/file/69382243/DERS%20Quick%20Guide%208-9-12%20\(2\).pdf](http://dmhoma.pbworks.com/w/file/69382243/DERS%20Quick%20Guide%208-9-12%20(2).pdf)

Fewer than one item per subscale for HADS (<http://www.gla-assessment.co.uk/products/hospital-anxiety-and-depression-scale/hospital-anxiety-and-depression-scale-faqs#FAQ4>).