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**University of Southampton**

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**Ageing and Emotion Regulation**

**By**

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**Thesis for the degree of Doctorate in Clinical Psychology**

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**19,999 Words**

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## Thesis Abstract

The thesis commences with a review of trends in declining psychological disorders as a person ages. These findings are understood in terms of differences between older and younger adults' emotion processing. Socio-emotional selectivity theory is introduced as one account of these age differences. Literature is reviewed which illustrates how certain emotion regulation strategies are utilised differently in older and younger adults. The consequences of these emotion regulation strategies on affect, cognition and mental and physical health are illustrated. Inconsistencies and gaps in the literature are discussed and suggestions made for future research. Following from this, the empirical paper examines the use of emotion regulation strategies across the life span and the effect of these strategies on emotional awareness and psychological distress. A cross sectional design was used and the findings suggest that older adults make greater use of the emotion regulation strategy, suppression compared to younger and middle aged adults. This greater use of suppression by older adults was not related to greater reporting of psychological distress. By contrast, younger adults who reported high levels of suppression also reported higher levels of psychological distress. Older adults reported less anxiety and stress than younger adults, with no age differences in depression. Contrary to predictions, we found no relationship between suppression and emotional awareness. These data suggest a decoupling of the use of emotional suppression and psychological distress with age. These findings were understood in terms of differences in types of stressors experienced with age and a shift towards emotion regulation goals.

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**Ageing and Emotion Regulation, a review**

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## **Ageing and emotion regulation, a review**

### **Abstract**

This review explores trends in well-being across the adult life span. The inconsistencies present in this literature are described, and the conclusion drawn that there is mounting evidence to suggest that well-being increases with age. This implies that, contrary to previous assumptions, there is a decrease in psychological disorders such as anxiety and depression as a person ages. These findings are understood in terms of differences between older and younger adults' emotion processing. Socio-emotional selectivity theory is introduced as one account of these age differences. This theory suggests that a motivational shift occurs in ageing which results in older adults being more motivated to regulate their emotions. Gross' (2001) model of emotion regulation guides the exploration of the literature, which suggests that emotion regulation strategies are utilised differently in older and younger adults. The consequences of these emotion regulation strategies on affect, cognition and mental and physical health are then described. The clinical implications of the finding that emotional well-being improves with age, as a result of changes in emotion regulation, are discussed and areas for future research suggested.

Key words: emotion regulation, well-being, age, emotional awareness

## **Ageing and emotion regulation: a review**

### **1. Introduction**

Traditionally, it has been assumed that emotional well-being, the absence of negative affect states such as anxiety or depression, declines in older age in a similar trend to physical functioning (Banham, 1951; Buhler, 1935; Frenkel-Brunswik, 1968). Studies, which measured the prevalence of depression across the lifespan, seemed to support these views (see e.g., Gaitz & Scott, 1972; Zung, 1967). However, problems with the research methodologies used, including the reliance on depression measures (Bolla-Wilson & Bleecker, 1989) and institutionalised samples (Burriss, Powell, & White, 2007) suggest this conclusion is questionable. More recently, evidence suggests greater well-being in older adults compared to middle aged and younger adults (e.g., Lawton, Kleban, & Dean, 1993). This review explores evidence of trends in well-being across the adult lifespan and the difficulties with such research that may explain the discrepant findings. Research is presented which proposes that differences in older and younger adults' emotion processing may account for the evidence thus far. The review was conducted using search engines including Ovid, EBSCO and Google scholar as well as the reference lists of previous papers. The main search terms were age\$, emotion\$ regulation, and well-being and the search spanned the years 1965 to 2009.

### **2. Trends in well being across the adult lifespan**

Bee (1996) suggested that age related declines in physical and cognitive ability lead to increased problems associated with mental and emotional well-being. This 'age of loss hypothesis' suggests that old age represents a period of loss and decline (Lawton, 2001).

This view has found support in studies that compared levels of anxiety and/or depression across the age span (Banham, 1951; Buhler, 1935; Frenkel-Brunswik, 1968; Gaitz & Scott, 1972; Zung, 1967). In her review of this research literature, Malatesta (1981) concluded that ageing was associated with increases in negative mood and decreases in positive mood.

A difficulty with much of this early research was the reliance on measures of emotional distress that are subject to systematic biases (Bolla-Wilson & Bleecker, 1989). Age bias in measures occurs when there is an association between items in the measure and with age. In some depression measures, certain symptoms will occur more frequently in older adults with, or without, depression (Christensen et al., 1999; Gallo, Anthony, Muthén, 1994; Newman, Klien, Jensen, & Essex, 1996). These include sleep problems, fatigue, and thinking about death. The effect of this is that older adults may appear more depressed than they actually are in reality. Therefore, studies that utilise depression inventories that include a large number of somatic items will likely overestimate depression in older participants. Indeed, this has been illustrated by Zemore and Eames (1979) who found that age differences in reports of depression disappeared once questions were removed that were related to somatic symptoms.

A further difficulty associated with these early studies was the reliance on institutionalised older adults (Burriss et al., 2007) or the exclusion of this group altogether (Jorm, 2000). This sample bias affects the generalisability of the research findings. A sample drawn solely from individuals in institutional care (e.g., Ernst & Angst, 1995) is problematic, as this group of older adults has been found to have higher levels of depression (Ames, 1993); by contrast, excluding these individuals from the sample may lead to artificially low depression levels.

Jorm (2000) argues, however, that the effect of excluding those in institutional care is minimal in age trends up to age 70, although is likely to have a greater impact on older age groups.

Since these early studies, more recent research has shown that older adults, compared to middle aged and younger adults, report greater well-being (e.g., Lawton et al., 1993). This appears to be true for studies that involve self-reporting of emotional well-being. For example, in one study, reports of feeling sad, blue or depressed in the 30 days prior to taking part in the study decreased with age (Kobau, Safran, Zack, Moriarty, & Chapman, 2004). Additionally, self reported negative affect was found to be lower in older adults than in middle aged and younger adults (Lawton, Kleban, Rajaopal, & Dean, 1992). Another study found a higher balance of positive to negative affect in older than younger adults (Ryff, 1989).

These findings are supported by studies which have found older adults score more positively than middle aged adults on measures of well-being (Mroczek & Kolarz, 1998) and have shorter periods of distress in their daily lives compared to middle aged adults (Carstensen, Pasupathi, Mayr, & Nesselroade, 2000). Decreases in trait negative and increases in trait positive affect and increased optimism with age are also reported (Lennings, 2000). From their work, Mroczek and Spiro (2005) suggest that life satisfaction tends to increase throughout early and middle adulthood reaching its peak in the sixties to decline thereafter. Additionally, compared to younger age groups, older adults experience lower levels of anxiety and depression (Charles, Reynolds, & Gatz, 2001; Christensen et al., 1999; Trollor, Anderson, Sachdev, Brodaty, & Andrews, 2007). Finally, in a study by Teachman (2006), a curvilinear relationship was found between age and anxiety, neuroticism and depression. All three showed an initial rise until the late thirties, a gradual decline until the late seventies and then a steep rise thereafter (Teachman, 2006). This suggests that the relationship between

age and mental health is not a simple linear picture of decline, but may reflect an improvement with age, either as age increases, or after an initial decline through middle age. However, cross sectional studies are also associated with difficulties. Rates of depression have been consistently rising for each young adult cohort over a number of decades (Bee, 1996; Fombonne, 1994). This finding has implications for studies utilising a cross-sectional design, as they are likely to find a greater disparity between younger and older adults simply because of such cohort effects. The current cohorts of older adults have a unique history and are likely to have lived through at least one world war. This experience, in itself, could be considered a cohort effect. It may have increased their ability to cope with adversity and distress (Davies, 2001) and therefore may account for lower levels of anxiety and depression reported in some studies.

Jorm (2000), in a review of the research evidence, reported similarly mixed findings as those described here. Importantly, he found that trends in well-being were different when males and females were analysed separately, with males and females differing in the peak age of prevalence of disorders across the studies. Other reviews suggest that, after controlling for confounding variables including functional limitations and chronic illness, positive trends in well-being increase and negative trends disappear (Kunzmann, Little, & Smith, 2000).

In a recent study by Blanchflower and Oswald (2008), some of the difficulties associated with measuring well-being across the life span were overcome. Consistent with Teachman's (2006) research, they found evidence for a trend in well-being that was characterised by a U-shape. Their cross sectional study found a convex relationship between well-being and age, with mental distress reaching a peak at age 40 to decline thereafter. This trend was similar for both males and females. This research is of particular importance as it has overcome the

effect of cohort differences by utilising ordered logistic regression equations and multiple data sets collected over a number of years. Their study also controlled for confounding influences including income, education and marriage.

Taken together, the evidence suggests that there does seem to be a trend towards increasing well-being in older age groups, once certain confounding variables are taken in to account.

One explanation for the increased well-being in older adults could be that there are changes in emotional processing with age, or how individuals respond to emotional stimuli. An exploration of differences in older and younger adults' emotional processing now follows.

### **3. Age-related changes in response to emotion**

When an emotional response is activated, experiential, behavioural, physiological and cognitive changes occur. By reviewing studies that have investigated differences in these processes between older and younger adults, light is shed on differences in emotion processing which could explain differences in subsequent well-being.

#### ***3.1 Experiential***

An individual's experience of having an emotion is generally measured through self-report and is likely to be influenced by how the individual processes emotion. If differences in younger and older adults' emotional experience are reported, this may reflect differences in emotional processing between the age groups. However, the empirical evidence in this area is mixed.



Studies utilizing experience-sampling records over the course of a week have found that emotional intensity is similar across age groups (Carstensen et al., 2000). Additionally, when asking people to relive emotional experiences, reported emotional intensity is similar between older and younger adults (Levenson, Carstensen, Friesen, & Ekman, 1991; Malatesta-Magai, Jonas, Shepard, & Culver, 1992). In contrast, other studies utilizing self-report measures, have revealed that older adults, compared to younger adults, report a decrease in frequency and intensity of emotional experience (Gross et al., 1997; Lawton, et al., 1992).

In studies utilizing film clips, higher emotional intensity has been reported by older adults (Charles, 2005; Kunzmann & Grühn, 2005). Charles (2005) investigated emotion heterogeneity (the experiencing of multiple emotions simultaneously) by asking older and younger adults to view film clips depicting social injustice. Older adults reported a greater degree of emotion heterogeneity than younger adults, independent of gender and ethnic background. Older adults also reported higher emotional intensity ratings than younger adults (Charles, 2005).

In a similar study, Kliegel, Jager and Phillips (2007) utilised film clips and music to induce neutral and negative mood. They found that older adults reported greater levels of negative mood than did younger adults. However, Carstensen et al. (2000) found that older adults were more able to return to a positive mood after the negative mood had been induced.

One explanation for these differences could be that memory plays a role in how older and younger adults report their emotional experience. Older adults appear to report greater emotional experience when responding in the present. For example, in Charles' (2005) and Kliegel et al.'s (2007) studies the emotions were elicited during the experiment and

participants' ratings taken at the time. In contrast, in Gross et al.'s (1997) study participants were asked to relive emotional experience from the past, thus memory bias may have influenced responses. Indeed, there is evidence of memory bias in recall of emotional material that is different in different ages. This evidence is explored in greater depth in a later section.

Alternatively, the age salience of the film clips used may have caused inflated levels of emotional experience in the older adult group. For example, Kliegel et al. (2007) included films linked to World War II. This explanation is supported by other research which has found that the use of stimuli more relevant to older adults, such as stories about Alzheimer's disease, elicits more intense emotional responses among older adults (Kunzmann & Grün, 2005). Those situations, which are most in line with an individual's goals, will elicit more intense emotions than less personally salient situations (Frijda, Ortony, Sonnesman, & Clore, 1992).

The difference between older and younger adults' emotional experience varies between studies. It appears from some of the research that older adults report less emotional intensity whilst other studies report more. These discrepant findings could be explained in terms of study designs that place different levels of burden on memory or use materials that may be more or less salient to one age group. One consistent finding appears to be that, when older adults do experience negative mood, the emotion is less likely to persist for any length of time (Carstensen et al., 2000; Kliegel et al., 2007).

### **3.2 Behavioural responses to emotions**

The behavioural responses considered here include any action resulting from an emotion. Much of the literature has focused on one form of behavioural response, that of emotionally expressive behaviours. These are behaviours that convey information to others about an individual's emotional state. Such behaviours include smiling when happy, or crying when upset. Emotional expressive behavioural responses are often measured through observing facial expression.

Studies that have investigated age related differences in emotional expressivity using behavioural evidence include a study by Malatesta, Izard, Culver and Nicolich (1987). In this study, participants recalled an intense emotional episode. The authors found no age effects in the subsequent accuracy of ratings of participants' emotional facial expressions. Levenson et al. (1991) also found no age differences in spontaneous expressive behaviour during a relived emotions task. Finally, a film-based induction study found equal levels of expressed happiness, laughing, smiling, crying and sadness in older compared to younger adults (Tsai, Leveson, & Carstensen, 2000). None of the studies gave instruction or incentive to reduce emotion expressive behaviour, and the results suggest therefore that in a neutral situation older and younger adults' emotional expressive behaviour does not differ.

In opposition to these findings, a study (also involving a relived emotion task) found that older adults (plus 50 years) as opposed to younger adults (18 to 50 years) actually expressed greater anger, sadness, fear, and interest (Malatesta-Magai et al., 1992). One possible explanation for the discrepancy between this final study and the previous studies is Malatesta-Magai et al.'s (1992) non-representative older sample in terms of education.

Alternatively, it may be that the manner in which they divided their older and younger participants caused discrepant results.

Birditt and Fingerman (2005) found that older adults reported being less likely to engage in negative behavioural responses to upsetting interpersonal situations, during social encounters. Similarly, Carstensen, Gottman and Levenson (1995) observed, middle aged (mean age 44 years) and older couples (mean age 63 years) talking about a conflict in their relationships. Older couples showed less interest, humour, anger, disgust, belligerence and whining than younger couples. Interestingly, positive emotions, such as affection, were shown more by the older couples. The authors conclude that the study illustrates age-related decline in negative emotion expressivity, whilst expression of positive emotions remains intact

The discussion here has presented some mixed findings. One explanation for this is the role of incentive to reduce emotional expressive behaviour. Neither Malatesta et al. (1987) nor Levenson et al.'s (1991) study gave instruction or incentive to reduce emotion expressive behaviour, and the results suggest that in a neutral situation older and younger adults' emotional expressive behaviour does not differ. In contrast, both Birditt and Fingerman (2005) and Carstensen et al. (1995) suggest that reducing negative emotional expressive behaviour could arguably have social benefits. In their studies, reducing negative emotional expression had the benefit of reducing or stabilising the amount of emotion elicited in their partners. It may be that in these situations older adults automatically utilise strategies to reduce their emotional expressive behaviour, whilst younger adults do not.

### ***3.3 Physiological changes in response to emotions***

Physiological responses are those that occur within the Autonomic Nervous System (ANS) in response to an emotion being elicited. For example, blood pressure may increase in response to a situation that evokes fear. These responses can be observed by measuring skin conductivity, temperature, cardiovascular and respiratory rates, and blood pressure (Levenson, 2006). Many studies have investigated differences in older and younger adults' physiological responses to emotional stimuli with somewhat mixed findings.

Physiological responses to emotional stimuli, as measured by heart rate, skin conductance, finger temperature and general movement, were studied by Levenson et al. (1991). In this study, couples were asked to discuss a problem area of continuing disagreement in their marriage whilst the researchers collected information on ANS activity and self-reports of affect. They found that, whilst the patterns of ANS activity for different emotions remains unchanged throughout adulthood, the magnitude of change from resting baseline was smaller for older adults compared to younger adults.

These findings have been supported by a study investigating cardiovascular responses to sad and amusing films (Tsai et al., 2000). Older adults showed lower cardiovascular responses than younger adults, whilst subjective and behavioural responses were not reduced (Tsai et al., 2000). Older couples also exhibited less physiological reactivity when faced with a conflict compared to younger couples (Levenson, Carstensen & Gottman, 1994). These findings are also supported by studies that have utilised questionnaires assessing physiological responses to emotions (Burriss et al., 2007; Gross et al., 1997; Lawton et al., 1992). These studies seem to suggest that, whilst subjective experience remains stable into old age, autonomic reactions reduce in magnitude with age.

A study by Kunzmann and Grühn (2005) however, seems to contradict these findings. They presented older and younger adults with edited films of the loss of loved ones. They measured physiological arousal through heart inter-beat interval, finger pulse transmission time, respiration inter-cycle interval, and skin conductance level, and found no significant differences between older and younger adults. Interestingly, the older adults in this study reported greater sadness than the younger adults. Despite this greater magnitude of negative mood however, no differences were found in physiological arousal.

Most studies indicate that, whilst physiological responses remain similar in form across the age groups, the magnitude of affect reduces with age (Levenson et al., 1991), with one study offering evidence of no age differences in adults' physiological responding (Kunzman & Grühn, 2005). One explanation for these discrepant findings is that in the final study the material presented to the participants was extremely salient to the older adult group and therefore resulted in greater physiological responses. It could be, therefore, that the degree to which older and younger adults engage with the material produces age differences, rather than actual reductions in physiological arousal in response to emotional stimuli in ageing.

### **3.4 Memory**

Memory can be affected by emotion processing in that the way information is processed will affect the likelihood of retrieval ( Craik & Lockhart, 1972). Therefore, the processes of attention and cognition impact on what is remembered (Schacter, 1999). The research literature presents mixed findings on the difference between older and younger adults' memory for emotional material.

There is little doubt that for both older and younger adults, emotional information is more likely to be remembered than non-emotional information (reviewed by Murphy & Isaacowitz, 2008). Some studies have shown that this advantage is greater for older than younger adults (Carstensen & Charles, 1994), whilst other studies suggest that this is only true for positive information (Mikels, Larkin, Reuter-Lorenz & Carstensen, 2005). For example, in one study, older adults performed better than younger adults on working memory tasks but only in relation to positive stimuli (Mikels et al., 2005). Older adults do not show improved memory if presented with negative emotional material (Grady, Hongwanishkul, Keightley, Lee, & Hasher, 2007), such as negative pictures (Charles, Carstensen, & Mather, 2003). This finding is consistent for both genders, for low and high socioeconomic status and for both African and European Americans (Charles et al., 2003). This effect has been called the “positivity shift” in memory (Kensinger & Leclerc, 2008).

This positivity shift was also found in a study utilising a test of face recognition (Mather & Carstensen, 2003). Mather and Carstensen (2003) showed participants pairs of faces matched for their emotional expression and asked participants which faces they had seen before. Older adults were most accurate at discriminating between ‘happy new’ and ‘happy old’ faces. This result suggests that older adults recognised positive faces better than negative faces, a bias not found in younger adults (Mather & Carstensen, 2003).

Lokenhoff and Carstensen’s (2007) findings replicated those of the previous study. They studied information acquisition and recall in 60 younger and 60 older adults, using computer-based decision-making scenarios. The participants were asked to review positive, negative and neutral details regarding several physicians and health care plans. Older adults attended to and recalled a greater proportion of positive than negative information compared to

younger adults. These differences were eliminated when the participants were asked to focus on information gathering goals.

Other studies have found no effect of age on memory for positive or negative emotional stimuli (Comblain, D'Argembeau, Van der Linden, & Aldenhoff, 2004; D'Argembeau & Van der Linden, 2004; Kensinger, Brierley, Medford, Growdon, & Corkin, 2002). For example, Grühn, Scheibe and Baltes (2007) investigated younger (20-30 year old) and older (65-75 year old) adults' recognition memory for emotional pictures by comparing their performance on heterogeneous (mixed valence) and homogeneous (single valence) lists. They did not find a bias towards recognition of positive material in their older adult age group (Grühn et al., 2007). Others have found only a marginally significant age difference (Denburg, Buchanan, Tranel, & Adolphs, 2003). In their review, Murphy and Isaacowitz reported that "generally...emotional information processing remains fairly consistent across the lifespan" (2008: p. 279)

There are two possible reasons for these discrepant findings. Firstly, study design is thought to impact on the results, with open-ended encoding sessions more likely to show the effects of emotional goals (Mather & Carstensen, 2005). Additionally the use of recognition tasks, in contrast to tasks using recall paradigms, has been associated with greater age effects (Murphy & Isaacowitz, 2008). Murphy and Isaacowitz (2008) conclude that such study characteristics constitute moderating variables in subsequent recall or recognition. Secondly, the personal relevance of the information may affect the likelihood of the individual to use emotion regulation strategies when processing the information (Mather & Carstensen, 2005). Indeed, in those studies which used more age salient material, the gap between older and younger adults' memory was greatest, with older adults recognising more positive information



(see for e.g. Mather & Carstensen, 2003). Finally, how arousing the material is also influences retrieval. Kensinger (2008) found that the positivity effect in memory did not extend to arousing emotional words (e.g. elation vs. slaughter), with older and younger adults equally adept at remembering such words. However, a positivity effect was found for non-arousing emotional words (e.g. serenity vs. sorrow) with older adults remembering positive non-arousing words better than negative and younger adults remembering negative non-arousing words better. The author suggests that this illustrates preserved responses to arousing information in older adults (Kensinger, 2008). The processing of non-arousing information is thought to be related to controlled, elaborative encoding strategies. In contrast, arousing information is thought to be processed automatically. It is suggested therefore that the above findings support other research, which suggests that changes in older adults' emotion processing occur in circumstances which rely on controlled but not automatic processes (Kensinger, 2008; Mather & Knight, 2006).

In terms of autobiographical memory, studies have found similar differences between older and younger adults. Mather and Johnson (2000) found that older adults were more likely than younger adults to remember past decisions in a more positive light (Mather & Johnson, 2000). Older adults were also more likely to recall events that elicited positive affect and less likely to remember those events that elicited negative affect (Grühn et al., 2007; Kennedy, Mather & Carstensen, 2004). This research supports the previous findings that only emotionally gratifying information becomes more memorable with age.

One important consideration of the research findings presented is the lack of attention paid to gender differences. A difficulty with studies that rely on retrospective reporting is the disparity between males and females' memory ability. Because men have poorer autobiographical

memories (Pohl, Bender, & Lachmann, 2005), studies that use this approach tend to find greater discrepancies in emotional experience than actually exist (Fujita, Diener, & Sandvik, 1991; Seidlitz & Diener, 1998). When study participants are asked to recall emotional reactions on a moment-by-moment basis, however, sex differences disappear (Feldman Barrett, Gross, Christensen, & Benvenuto, 1998; Feldman Barrett & Morganstein, 1995). It is hypothesised, that women possess more detailed and interconnected mental representations of emotion than men (Feldman Barrett et al., 1998). This results in women being more able to demonstrate greater complexity and detail in the recalled emotional experience (Feldman Barrett et al., 1998; Feldman Barrett, & Morganstein, 1995). This is an important consideration when studying emotion in men and women and is particularly important in comparing age groups if gender is not matched.

In summary, a positivity effect appears to exist in older adults' memory. Older adults selectively remember a greater amount of positive than negative material compared to younger adults and recall autobiographical memories in a more positive way.

It is clear from the above research that differences exist in older and younger adults' emotional processing, with subsequent differences in older and younger adults' emotion experience, emotional expressive behaviour, physiological responses, and memory. In terms of emotional experience, older adults appear to recover from negative affect quicker than younger adults (Charles et al., 2001; Kliegel et al., 2007). Older adults appear to have reduced emotional expression in situations in which there may be benefits such as during conflict situations (Birditt & Fingerman, 2005; Carstensen, 1995), but not during neutral situations (Levenson et al., 1991; Tsai et al., 2000). Additionally, the magnitude of physiological responses to emotion seems to decline with age (Levenson et al., 1991).

Finally, a positivity effect appears to exist in older adults' memory (Mather & Carstensen, 2005). Theories are now presented which attempt to account for these differences.

#### **4. Accounting for age-related changes in emotion processing**

The previous section has described how there are many differences in older and younger adults' emotional processing. Two major accounts have been proposed to explain these age differences: the neurological change hypothesis and socio-emotional selectivity theory.

##### ***4.1 The Neurological Change Hypothesis***

The neurological change hypothesis suggests that neurological changes in the brain (McDowell, Harrison, & Demaree 1994), which occur with normal ageing, lead to a decline in the ability to identify or recognize emotions in both others and oneself (Macpherson, Phillips, & Della Sala, 2002; Malatesta et al., 1987; McDowell et al., 1994). One proposal, the hemispheric hypothesis, is that the right brain ages faster than the left (Elias, 1979). The amygdalae are associated with the recognition of emotionally arousing information, with the right amygdala particularly associated with the recognition of threatening and negative stimuli, and the left with positive stimuli (McGaugh, 2002; Hamaan, 2001; Whalen et al., 1998). Some suggest that this accounts for older adults' ability to recognise positive emotions well, such as happiness, whilst having a reduced response to negative emotions such as anger and sadness (McDowell et al., 1994). Support for this comes from studies which illustrate that older adults show lower activity in the amygdala when viewing negative stimuli (Fischer et al. 2005; Gunning-Dixon et al. 2003; Iidaka et al. 2002; Mather et al. 2004; Tessitore et al. 2005).

However, other evidence suggests that decline in brain regions does not explain differences in emotion recognition between older and younger adults. Firstly, older adults are equally adept at detecting and orientating to threatening information (Mather & Knight, 2006; Rosler, Mapstone, Hays-Wicklund, Gitelman, & Weintraub, 2005). Secondly, older adults gain as much benefit as younger adults from emotionally arousing information relative to non-emotionally arousing information when it comes to recall (Comblain et al., 2004; Denburg et al., 2003; Kensinger et al., 2002). Taken together, this evidence suggests that older adults' ability to process emotional information remains relatively intact (Mather & Carstensen, 2005). Additionally, neuroanatomical studies illustrate that, compared to other brain regions, those regions associated with emotional processing, for example the amygdalae, show relatively little decline in normal ageing (Grieve, Clark, Williams, & Peduto, 2005; Mather, 2004). Finally, older adults' brains appear to engage in compensatory activity when presented with emotional stimuli (Grady, 2008). For example, Keightley, Winocur, Burianova, Hongwanishkul, and Grady (2006) explored emotional processing in older and younger adults using fMRI. In their study, participants were asked to look at and label faces displaying a range of emotions or no emotion. Older adults showed increased activity in the ventromedial prefrontal cortex (PFC) lingual gyrus, and premotor cortex for happy expressions, whereas younger adults recruited a wider set of regions, including the amygdalae, ventromedial PFC, lateral PFC, and bilateral inferior parietal areas. The findings suggest that, although there are differences in brain activity during emotional processing between younger and older adults, this does not result in older adults having poorer emotional processing abilities possibly, because of compensatory brain activation (Grady, 2008).

#### **4.2 The Socio-emotional Selectivity Theory**

An alternative theory put forward to explain changes in emotional processing is that of socio-emotional selectivity theory (Carstensen, Isaacowitz, & Charles, 1999). According to this theory, as adults' age they increasingly experience an awareness of time being limited and therefore shift their motivational goals. Goals that focus on the future, such as knowledge acquisition, become less important with age. Instead, the focus changes to emotional well-being and meaningful emotional aspects of life. Preparing for the future is replaced by feeling emotionally satisfied in the present. Social behaviour changes, so that goals around acquiring new friendships in youth are replaced by a focus on a small selected group of close social contacts. It is suggested that this pattern reflects the fact that spending time with acquaintances may be less emotionally meaningful than time spent with close friends. Greater investment is, therefore, made in close relationships.

A range of studies exploring age differences in emotion regulation appears to provide support for socio-emotional selectivity theory. With age, individuals appear to reduce their social contact with others (Cumming & Henry, 1961; Lee & Markides, 1990; Palmore, 1981). Carstensen, Fung, and Charles (2003) describe how prioritising emotionally meaningful social partners over acquaintances or strangers represents one of the most effective antecedent emotion regulation strategies (Carstensen, Gross, & Fung, 1997) (see section 5.1 for description of antecedent emotion regulation strategy). Carstensen et al. (2003) suggests that, in youth, a knowledge driven goal will lead to preferences for novel social partners, as these partners are likely to result in new information being gained. With age, however, the preference is for feelings of social connectedness and therefore close relationships are preferred (Carstensen et al., 2003).

A time limited perspective may also lead to greater use of strategies to cope with stresses in the present, over problem solving barriers to future outcomes (see for example Heckhausen & Schutz, 1995; John & Gross, 2004). Studies with younger people with terminal illness show that they utilise more emotion focused coping strategies than their healthy peers (Carstensen & Fredrickson, 1998). This suggests that a limited time perspective alters an individual's goals towards becoming more focused on and coping with the present rather than concentrating on future goals. Support for this idea comes from a study of mental representations of social partners in older and younger adults (Fredrickson & Carstensen, 1990). In this study, participants were asked to sort cards of 18 prospective social partners. The cards were sorted into three dimensions; (1) potential emotional rewards, (2) potential for information gathering, and (3) possibilities for future contact. Compared to younger adults, older adults were much more likely to sort their cards into the emotion dimension (Fredrickson & Carstensen, 1990).

Carstensen et al. (2003) argues that it is not age that is critical to this shift in focus, but time left to live. In a subsequent study, a sample of young homosexual men, some HIV positive, were asked to sort the cards (Carstensen & Fredrickson, 1998). Those men who were HIV positive and symptomatic performed the card sort in an indistinguishable way from the older adults in the first study. The men perceived time as limited and the motivational shift, posited in socio-emotional selectivity theory, may have affected their choices.

A final area of research, which seems to support the theory, is the finding that motivation affects cognitive processes so that older adults are more likely to attend to, and better remember, positively valenced information. Indeed older adults show both attention bias towards positive information (for example, Isaacowitz, Wadlinger, Goren, & Wilson, 2006;

Mather & Carstensen, 2003) and recall biases (for example, Charles et al., 2003; Mather, Knight, & McCaffrey, 2005) which together seem to support this.

Socio-emotional selectivity theory represents a strong theoretical account of the changes in emotion processing which have been explored in this paper. Evidence was presented which illustrates the strength of this theory in explaining the differences in emotion processing between younger and older adults. The theory suggests that, with age, a motivational shift occurs away from knowledge acquisition goals and towards emotion regulation goals. This paper will now turn to a more detailed exploration of evidence for differences in emotion regulation between older and younger adults, which may reflect the argument that differences in emotional processing can be accounted for by differences in emotion regulation between older and younger adults and therefore lend further support for the socio-emotional selectivity theory.

## **5. Age related changes in emotion regulation**

A clear prediction of socio-emotional selectivity theory is that older adults are increasingly likely to engage in the goal of emotion regulation. Emotion regulation is described as the use of strategies to change an emotional response (Gross, 1999). The process can be a conscious or an unconscious one (Gross, 1999). Such strategies can be implemented by an individual to influence which emotions are experienced, and when and how they are experienced (Gross et al., 1997). According to Koole (2009), emotion regulation refers to the ease with which an individual can depart from one emotional state for another. As Koole (2009) asserts, this is in contrast to emotional sensitivity, which refers to how easily an individual enters such a state.

Gross (2001; 2002) suggests that the way we regulate our emotions influences how we experience and express them. He proposes a process model of a timeline of unfolding emotional responses from situation selection and modification, through attentional deployment, cognitive change, to response modulation. According to the model, specific strategies are activated at varying points along the timeline. Gross (2001) divides these strategies into two broad categories; antecedent-focused and response-focused emotion regulation strategies. Gross' (2001) model provides a theoretically driven method of ordering the range of emotion regulation strategies. His model, therefore, provides a useful framework within which to examine the evidence for changes in emotion regulation across the age span.

### ***5.1 Antecedent focused emotion regulation***

Antecedent-focused emotion regulation describes strategies that are used at the early stages of the emotion regulation process, before the emotion has an impact on behaviour or physiology (Gross, 2001). Antecedent focused emotion regulation strategies include situation selection, situation modification, attentional deployment and cognitive change. It is thought that older adults may use antecedent focused emotion regulation strategies to a greater extent than younger adults (Gross, 2001). Evidence for differences between older and younger adults in each of these areas is now discussed.

#### ***5.1.1 Situation selection***

Situation selection is the process by which individuals will actively seek out situations which they know will lead to positive affect, and actively avoid situations which they know will lead to negative affect (Gross, 2001). Situation selection is a very effective form of emotion regulation (Richards & Gross, 2000) and if older adults are utilising this strategy more than younger



adults it will likely explain at least some of the findings that older adults experience increased emotional well-being.

Older adults may well be selecting the types of activities in which they are involved, in order to gain the maximum emotional benefit (Carstensen et al., 2003). Many forms of situation selection exist, for example, older adults may chose to watch different programmes on television to younger adults. The literature in this area focuses upon socially directed forms of situation selection, that is, older adults' choice of social contacts (Carstensen et al., 1997). Despite having smaller social networks, older adults have disproportionately more close relationships within their networks (Fung, Carstensen, & Lang, 2001; Lang & Carstensen, 1994). With age, older adults also focus more on their close friends, reducing the number of contacts with those with whom they are less close (Lang, 2000). Compared to younger adults, older adults derive greater pleasure from these social encounters (Carstensen, 1992; Lang & Carstensen, 1994). Older adults are also less willing to engage in activities centred on increasing their social network (Carstensen, 1986).

In line with socio-emotional selectivity theory, older adults are engaging in the earliest of the emotion regulation strategies, situation selection. It appears that this takes the form of focusing social time with close friends or family. These findings suggests that older adults increasingly focus upon maintaining emotionally meaningful relationships, limiting less satisfactory relationships and avoiding the process of developing new relationships. This ensures that older adults are most likely to experience positive emotions by spending time with those friends that elicit these. In addition, by spending less time with contacts known to, or who might cause negative emotions, older adults are able to reduce the likelihood of experiencing negative affect.

### **5.1.2 Situation modification**

Situation modification describes the processes whereby an individual modifies a situation in order to alter its emotional impact (Gross, 1998). For example, an individual who does not wish to speak about a particular topic of conversation may ask their friends to avoid talking about it, or change the subject. No published literature could be found which directly compares the use of this type of emotion regulation strategy between older and younger adults. However, studies have investigated the use of problem-focused action in older and younger adults, and these provide some insight into this area. Problem-focused action describes direct actions taken to solve a problem. It is arguably a similar process to what might occur in situation modification in that an individual is required to act in order to control or change a situation. Age differences exist between older and younger adults in the use of this strategy, but only for emotionally charged situations (Blanchard-Fields, Jahnke, & Camp, 1995). In these situations, younger and middle-aged adults are much more likely, than older adults, to engage in proactive problem solving action (Blanchard-Fields & Coats, 2008; Watson & Blanchard-Fields, 1998). These findings suggest that the emotion regulation strategy, situation modification, may be more likely to be utilised by younger and middle aged adults than older adults. Due to the lack of direct investigation in this area, suggestions for future research are made later in this paper.

### **5.1.3 Attentional deployment**

Attentional deployment describes how individuals may selectively attend to certain elements of their environment in order to achieve the aim of emotion regulation (Gross, 1998). Individuals engage in focusing their attention on certain elements of their environment in order to meet their current goals and filter out large amounts of additional, but irrelevant, information (Simons & Chabris, 1999). By averting attention (measured through eye gaze)

away from negative images, positive mood is maintained (Isaacowitz, 2005; Isaacowitz et al., 2006). Individuals with positive affective profiles, such as optimists, have been found to avert their attention away from negative stimuli to a greater extent than those with more pessimistic outlooks (Isaacowitz, 2005; Isaacowitz et al., 2006). When younger adults are explicitly instructed to regulate their emotions while viewing emotional stimuli, they will look less at negative images (Xing & Isaacowitz, 2006). It seems, therefore, that affective attentional biases serve an important function for the regulation of emotion (Rothermund, Voss, & Wentura, 2008).

Older adults have been found to attend to positive emotional information to a greater extent than negative information and it is suggested that they utilise this strategy as a means of emotion regulation (Gross, 2001). If older adults were found to do this to a greater extent than younger adults then this may help to account for improved emotional well-being in older age.

Indeed, older adults' attention does appear to be biased against emotionally negative material, as they have been found to divert their attention away from a negative stimulus proportionally faster than younger adults (Isaacowitz, et al., 2006; Mather & Carstensen, 2003). In Mather and Carstensen's (2003) study, participants were shown a pair of photographs of the same person expressing positive or neutral expressions. The photographs were then replaced with a dot probe. Older adults were slower to respond to dot probes that were located in the position of an angry or sad face than in the location of a neutral face. This was true for both genders. This attention bias was not found in younger adults. This suggests that compared to younger adults, older adults' attention had focused away from the negative image resulting in slower reactions when the image was replaced by a dot probe. The

researchers concluded that in line with socio-emotional selectivity theory, older adults' emphasis on emotional goals directs their attention away from information that is not emotionally gratifying (Mather & Carstensen, 2003).

These findings were replicated in a study using eye tracking. Older and younger adults were presented with a negative and neutral picture. Both initially glanced at the negative image, but younger adults spent longer attending to the image before averting their attention away from the image (Rosler et al., 2005). Likewise, Mather et al. (2005) gave adults both positive and negative information to read about models of cars. Older adults spent disproportionately more time on the positive information compared to younger adults who in turn spent disproportionately more time on the negative information (Mather et al., 2005). However, such age-related positivity effects have been eliminated in some studies using distraction (Knight et al., 2007; Mather & Knight, 2005) whilst other studies report they are maintained even during dual task conditions (Allared & Isaacowitz, 2008).

One possible consequence of preferentially attending to positive emotional information is a reduction in the ability to recognise important negative emotional information. For example, a number of studies have found differences between older and younger adults' ability to label emotions in other peoples' faces. The greatest difference is found in naming of negative faces (Calder et al., 2003; Keightley et al., 2006; Macpherson et al., 2002; McDowell et al., 1994; Oscar-Berman, Hancock, Mildworf, Hunter, & Weber, 1990; Phillips, Smith, & Gilhooly, 2002). These findings suggest that rather than older adults having a deficit in the ability to identify negative emotions, as suggested by the neurological hypothesis, the differences between older and younger adults are a consequence of the strategy of avoiding negative emotions. This would likely have important social implications. However, despite showing a preference

for positive emotional material, older adults' ability to detect threat is not compromised (Mather & Knight, 2006). It seems likely, therefore, that older adults are not disadvantaged by their tendency to preferentially attend to positive over negative emotional information.

These studies suggest that goal directed emotional control processes influence older adults' attention so that there is a bias in attending to positive emotional information. This bias ensures that older adults preferentially absorb greater levels of positive information from their environment and less negative information, thus helping to maintain positive mood. Importantly, threatening stimuli still attract attention in a preferential way. It appears, therefore, that emotion regulation goals may direct attention, but if a threat stimulus is present, an automatic emotion activation process takes over (Mather & Knight, 2006). This finding is important as, without the ability to detect threat, older adults would be in danger of being unable to respond appropriately to hostile encounters.

#### ***5.1.4 Cognitive Change***

Once individuals have selectively attended to information in their environment, how they make sense of this information depends on which of the many possible interpretations for a situation they choose to make. Unless the first interpretation made by the individual is automatic, it involves some form of appraisal. Thinking about that initial interpretation differently involves reappraisal. For example, when individuals choose to make an interpretation, or chose to change their interpretation into a positive or neutral one, they have utilised a strategy known as cognitive reappraisal (Gross, 2001). Reappraisal may also result in negative interpretations. For example, there is considerable evidence in the cognitive emotion literature that those who are vulnerable to anxiety, i.e. have high levels of trait anxiety, are more likely to make a negative interpretation or appraisal of relatively neutral

materials (Amir, Beard & Bower, 2005; Hirsch, Mathews, Clark, Williams, & Morrison, 2003). Reappraisal represents one form of cognitive change which has received particular focus in the literature (Gross, 2001).

John and Gross (2004) argue that older adults make greater use of cognitive reappraisal approaches than younger adults. They asked 106 women in their early sixties to complete the Emotion Regulation Questionnaire (ERQ, Gross & John 2003) twice. Once for how they were now and once for how they were in their twenties. As predicted, these participants reported greater use of cognitive reappraisal now than in their twenties. The retrospective design of this study, however, made it problematic as participants were being asked to recall information about how they were 40 years previously. In response to this, the researchers compared the responses with an actual sample of 735 twenty-year-old women and found a similar pattern in the young women to that reported by the older women, for when they were young.

Older adults are also more likely to use strategies that allow them to focus on positive aspects of an outcome. Older adults are much more likely to agree with statements such as "I usually find something positive even after giving up something I cherish" (Brandtstädter & Renner, 1990; Heckhausen & Schutz, 1995). Again, by finding the positive in situations older adults are able to avoid the negative emotions that would otherwise result from these situations.

Similarly, in response to stressful situations, older adults make greater use of positive reappraisal than do younger adults who report more confrontational coping (Folkman, Lazarus, Pimley, & Novacek, 1987). Additionally, during emotionally charged situations, older adults are more likely to engage in internal emotion regulation strategies such as reappraisal,

whilst younger adults will engage in direct action (Blanchard-Fields et al., 1995; Blanchard-Fields & Coats, 2008). The use of these internal strategies may benefit older adults as they avoid further negative affect, which may result from taking action. The socio-emotional selectivity theory might suggest that older and younger adults may have different goals in these types of situations (Carstensen et al., 2003; Gross, 2001). For younger adults it may be necessary to assert themselves in response to a future goal. Thus, experiencing short-term negative affect because of this is perhaps a relatively small price to pay. For older adults, however, the need to regulate their emotions takes priority and, therefore, in stressful situations they will use cognitive reappraisal to help manage their emotions.

These studies suggest that older adults may use cognitive reappraisal to a greater extent than younger adults. In particular, older adults seem to use this strategy following a potentially negative outcome to an event and during stressful situations. This type of emotion regulation strategy is relatively sophisticated as it involves a conscious process of selecting one of many possible interpretations. The result of this strategy changes both behavioural and many neural responses (Ochsner & Gross 2005), addressed later in this paper.

### ***5.2 Response-focused emotion regulation***

The second set of strategies, response-focused strategies, occur when the experience of an emotion is already in motion (Gross, 2001). These strategies are designed to suppress the experiential, behavioural and physiological responses that are elicited during the experiencing of an emotion, thus decreasing expressive behaviour. Suppression is one such response-focused emotion regulation strategy. Suppression describes an active process, which inhibits an emotion response. The term has been used to refer to the inhibition of feelings, behaviour and thoughts and emotional expressive behaviour (Gross, 2001).

John and Gross' (2004) study compared younger and older adults' use of suppression of emotional expressive behaviour. Their study, described previously, suggested that older adults report making less use of expressive suppression than younger adults. This study was limited to a sample of women only and therefore this pattern cannot be generalised to the population as a whole. One study was also identified which explored thought suppression (Cheavens, Rosenthal, Banawan, & Lynch, 2008). Thought suppression can be defined as the process of actively and purposefully attempting to stop thinking about a particular thought (Wegner, 1989). Cheavens et al. (2008) evaluated emotion regulation in a sample of older and younger adults with and without psychiatric co-morbidity. The authors found that younger adults reported significantly more thought suppression than older adults (Cheavens et al., 2008).

There is some evidence to suggest that younger adults use suppression more than older adults. It appears this is true for both expressive suppression (John & Gross, 2004) and thought suppression (Cheavens et al., 2008). Unfortunately, both these studies are limited in their generalisability by being restricted to, or disproportionate in the numbers of female participants in their sample.

This section has reviewed studies that have explored younger and older adults' use of emotion regulation. Differences have been reported between younger and older adults in their use of the emotion regulation strategies situation selection, cognitive reappraisal and attentional deployment and suppression. The patterns found in the use of certain emotion regulation strategies are consistent with those predicted by the socio-emotional selectivity theory providing further support for the proposal that older adults may be motivated to prioritise the goal of emotion regulation over other goals. The fact that older and younger



adults were found to differ in their use of emotion regulation, may account for their increased wellbeing. Indeed, research is now explored which reveals that emotion regulation strategies, such as the ones described above, have consequences for affect, cognition, social behaviour and mental and physical health.

## **6. Consequences of emotion regulation**

Socio-emotional selectivity theory suggests that, with age, goals change to become increasingly focused upon emotion regulation. Evidence has been presented to suggest that there are a number of differences in older and younger adults' emotion regulation strategies. Indirect evidence for these changes comes from research which reports a number of positive gains in engaging in certain emotion regulation strategies above others, including affective, cognitive, social and health gains.

### ***6.1 Affective consequences of emotion regulation***

The previous sections suggest that older adults may make greater use of several antecedent emotion regulation strategies compared to younger adults. Gross and colleagues (Gross, 1998; Gross & Levenson, 1993; 1997) propose that these antecedent-focused emotion regulation strategies, for example reappraisal, occur early on in the emotion generation process and, therefore, lead to lower levels of experiential, behavioural and physiological responding. In contrast, if response focused emotion regulation strategies are utilised, the active inhibition process will actually increase physiological activation whilst behavioural responses are reduced (Gross, 1998; Gross & Levenson, 1993; 1997).

Indeed, goal-orientated attentional deployment can reduce levels of frustration and increase ability to continue with a stressful task (Johnson, 2009). There also appears to be an association between suppression and increased physiological responses including constriction of the blood vessels (Gross, 2001; Gross & Levenson, 1993; 1997). Gross (2001) suggests this illustrates that the use of suppression causes the physiological responses because of the individual's attempt to inhibit outward emotional expression in the face of emotion-eliciting material. Generally, physiological responses to negative emotions are unpleasant experiences and therefore suppression may be a less helpful emotion regulation strategy compared to antecedent focussed strategies<sup>1</sup>.

Very limited literature was found that explores the affective consequences of emotion regulation strategy use in older and younger adults. Only one study was identified. Magai, Consedine, Krivoshekova, Kudadjie-Gyamfi and McPherson (2006) used a re-lived emotions task and found that when older, middle aged and younger adults were asked to suppress emotional expressive behaviour no significant differences existed between the age groups. However, suppression resulted in lowered emotional intensity and a lowered frequency of use of emotion words in subsequent narratives, but only in older adults (Magai et al., 2006). This study suggests that, contrary to Gross and Levenson (1993), suppression can have a positive emotion regulation function, but only for older adults.

In summary, whilst limited evidence exists which explores the affective consequences of emotion regulation strategy use in older and younger adults, there is some tentative evidence to suggest that suppression is a more effective strategy in older adults than it is in younger adults.

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<sup>1</sup> This is not to suggest that expressive suppression is always an unhelpful response. There are clearly times when suppressing one's true feelings to preserve another's is socially appropriate and therefore advantageous.

## **6.2 Cognitive consequences**

The use of emotion regulation strategies can also have cognitive consequences. One possibility is that older adults may be motivated to engage in more efficient forms of emotion regulation more than younger adults so as not to compromise further their already declining cognitive resources (Gross 2001). Reappraisal, for example, is thought to be cognitively more efficient than suppression (Gross, 2001; Richards & Gross 2000; 2006). With expressive suppression found to make particular demands on working memory (Schmeichel, Volokhov, & Demaree, 2008) and to interfere with memory during social interactions (Robinson & Demaree, 2007). The effect of suppression on memory has been tested in a study using slides depicting injured men combined with orally presented information about each man (Richards & Gross, 2006). Participants were divided into three groups; a reappraisal, suppression and neutral group. Participants' memory for the information presented during the slides was then tested. As predicted, those in the suppression group performed worst (Richards & Gross, 2006).

The effect of the goal of emotion regulation on memory was also explored by Kennedy et al. (2004). They found both older and younger adults' memory for past health and habits can be manipulated by asking them to focus on a specific goal (Kennedy et al., 2004). In their study, several hundred nuns were asked to recall their behaviours and habits from 14 years previously. Kennedy et al. (2004) found that by reminding both younger and older adults to pay attention to their emotional state, both groups recalled their health and habits in a more positive light. When the nuns were asked to focus on memory accuracy, both older and younger nuns showed a negative bias in their memories. It was concluded that retrieval is influenced by the goal most salient at the time. Additionally, improved mood was reported by the older nuns and the 'emotion focussed' group but not by the younger nuns or the 'memory

accuracy' group. This seems to confirm that a bias towards remembering previous events and behaviours in a positive way is an effective emotion regulation strategy (Mather & Carstensen, 2005) and is present somewhat automatically in older persons.

These studies suggest that different emotion regulation strategies impact on memory, either improving it, as in the case of reappraisal, or having a detrimental effect, as with suppression. It appears that an emotion regulation goal is more likely to be present in older adults recall and has the consequence of improved mood.

### **6.3 Social consequences**

There may also be social consequences of the use of emotion regulation strategies. Positive emotional expression elicits social support from others (Uchino, Cacioppo, & Keicolt-Glaser, 1996), whilst suppression of emotional expression has a negative impact on both the person using suppression and the social contact (Butler, Egloff, Wilhelm, Smith, & Gross, 2001). Indeed, Butler and colleagues noted increased physiological responding in the partner of the person suppressing their emotions. This suggests that expressing positive emotions may have a calming effect on social partners (Gross, 2001) or the opposite, that not showing true feelings may be detectable by conversational partners and cause them to feel discomfort. This is supported by the finding that suppressors report feeling that they were not being true to their feelings and partners were able to detect this, reducing rapport and decreasing relationship formation (Robinson & Demaree, 2007; Gross & John, 2003). It could be that if an individual wanted to maintain good social relations in their close circle of friends, they may be motivated against suppressing their true feelings, as this will make both themselves and their social partner experience negative affect. This motivation will exist even if the feelings to be expressed are negative. Arguably, it may also be that by continuing to show positive

emotional expression, older adults are able to elicit social support from others, which arguably becomes increasingly important with age. This may explain the greater reliance on reappraisal over suppression in older adults.

#### ***6.4 Mental and physical health consequences***

Emotion regulation may also have health benefits for older adults. Research has shown that a relationship exists between emotional expression and well-being (Beutler, Engle, Oro-Beutler, Daldrup, & Meredith, 1986; Friedman & Booth-Kewley, 1987; Watson & Pennebaker, 1989), with suppression thought to lead to less positive health outcomes (Kim, Deci, & Zuckerman, 2002).

Suppression has also been associated with poorer coping and increased risk of depression (Higgins, Bond, Klien, & Strauman, 1986). Studies have found that those who suppress emotions compared with those who do not are more likely to develop cancer (Cox & Mackay, 1982) and spend less time in remission (Jensen, 1987). Other studies have found similar links between emotion inhibition and asthma, coronary heart disease and suppressed immune function (Goldstein, Edleberg, Meier, & Davies, 1988; Schwartz, 1990) and to lower rates of recovery after diagnosis (Dattore, Shantz, & Coyne, 1980). Arguably, it may be that by making use of antecedent emotion regulation strategies, older adults experience a positive effect on their health and well-being. This is supported by the fact that the occurrence of daily positive emotions results in reduced stress reactivity and mediates stress recovery (Ong, Bergeman, Bisconti, & Wallace, 2006). In addition, positive affect has a beneficial effect on cardiovascular functioning (Ong & Allaire, 2005). Finally, utilising suppression has a negative impact on social relationships and this may also explain the link between suppression and low emotional well-being (Gross & John, 2003).

Taken together, this evidence would suggest that older adults who use antecedent focussed emotion regulation strategies more and response-focused strategies, such as suppression, less might be better placed to experience health and well-being. Arguably, the health benefits may provide the motivation to engage in reappraisal rather than suppression.

Suppression has no impact on physiology, it causes memory ability to decline (a particularly important problem for older adults who already have cognitive loss to do with normal ageing) and it has a negative impact upon social interaction, again particularly important with age. In addition, suppressing emotions appears to result in less positive health outcomes.

## **7. Discussion**

It appears that age differences exist in emotional well-being, in the form of a 'U' shaped trend towards increasing emotional well-being in older adults, with wellbeing declining to its lowest point around age 40 and rising thereafter (Blanchflower & Oswald, 2008). This may be the result of age differences in the perception of and response to emotional stimuli. Socio-emotional selectivity theory helps to account for these changes in emotion processing (Carstensen et al., 2000; Charles et al., 2001; Labouvie-Vief & Medler, 2002; Mroczek & Almeida, 2004; Mroczek & Kolarz, 1998). Differences in emotion regulation between older and younger adults may explain how emotional selectivity operates to achieve improved well-being with age.

Whilst it is clear that older adults are effectively using emotion regulation strategies, the benefits to the individual go beyond reduced negative affect. As discussed previously, there are positive cognitive gains (Uchino et al., 1996), mental and physical health gains (Kim et al.,

2002) as well as social gains (Gross, 2001). These gains seem to support the argument that the better well-being found in older adults may well be the result of differences in emotion regulation style. Such reinforcing benefits of emotion regulation could be seen to offer an additional explanation for the differences between older and younger adults' emotion regulation strategies. In turn, such gains may serve to reinforce older adults' use of techniques such as reappraisal. Therefore, a shift in motivational goals may be the catalyst for changes in emotion regulation strategies that, with time, are strengthened as older adults experience the benefits of antecedent focused emotion regulation strategies, including benefits to social interactions and health. Older adults who use more of these strategies in combination may be more successful at keeping mentally well than those who use fewer strategies.

### ***7.1 Clinical implications***

There are a number of implications of the findings that older and younger adults utilise different emotion regulation styles to a lesser or greater extent. This section describes some of these implications with reference to the profession of Clinical Psychology.

Emotion regulation and dysregulation is a key area for clinical psychology. Emotion dysregulation is implicated in more than half of DSM-IV Axis 1 disorders and in all Axis 2 disorders (American Psychiatric Association, 1995; Gross & Levenson, 1997). Therapies that address emotion regulation have become increasingly popular in the past decade (e.g. Linehan, 1993). Reaching a better understanding of the role of emotion regulation in older adults, through studies such as those discussed in this paper, further adds to the literature informing such interventions (Koole, 2009).

During psychological interventions such as Cognitive Behavioural Therapy (CBT, Beck, Rush, Shaw, & Emery, 1979), patients are encouraged to use reappraisal techniques and reduce their reliance on suppression. For example, in the case of panic disorder, one element of a CBT intervention might be to encourage patients to challenge thoughts linked to their physiological symptoms. This illustrates reappraisal. During Mindfulness Based Cognitive Therapy (MBCT, Segal, Williams, & Teasdale, 2002), patients are encouraged to notice and accept psychological symptoms of panic rather than try to suppress them. The findings of the research presented here provide additional evidence that reappraisal is an effective emotion regulation strategy with positive gains including increased well being, thus supporting such approaches.

The finding that older adults show a positivity bias in their memories, in particular with autobiographical memories, and show a reduction in awareness of negative emotion material over time is also important. This may suggest that older adults will be less adept at conveying the negative affect they have experienced in the past or are currently experiencing. Indeed, research suggests that older depressed patients frequently display “masked” or “atypical” depression. That is, older adults more usually describe symptoms related to somatic problems and sleep disturbance and tend not to report sadness (Mulsant & Ganguli, 1999; Rosenberg, Wright, & Gershon, 1992). Ensuring that older adults receive treatment, despite this potential underreporting, is important. Older adults may also require support in accessing the true extent of their negative emotions in order fully to benefit from therapy.

The age bias reported in measures, such as anxiety questionnaires, would suggest that clinicians should be aware of their limitations. Clinicians should consider using scales specifically designed for and normed with older adults such as the Hospital Anxiety and



Depression Scale (HADS; Zigmond & Snaith, 1983). A thorough assessment that does not rely solely on assessment tools is essential. This is especially true given the consistent finding that only a modest correlation exists between self-report and examiner rated depression scales in older adults (Carroll, Felding & Blashki, 1973; Lyness et al., 1995; Prusoff, Klerman, & Paykel, 1972; Sayer et al., 1993; Schnurr, Hoaken, & Jarrett, 1976; Scogin, Beutler, Corbishley, & Hamblin, 1988). This suggests it is imperative to use other means of gathering assessment information including allowing adequate time to talk to the individual, interviewing additional informants and engaging in direct observation.

Emotional processing and regulation in ageing is an interesting area of study, which is important for clinicians as it helps to challenge the assumption that old age is associated with a time of reduced well-being (Banham, 1951; Buhler, 1935; Frenkel-Brunswik, 1968; Gaitz & Scott, 1972; Zung, 1967). The research presented here suggests that we should not assume low mood is a normal consequence of old age. Instead, the increase in emotion regulation with age and the subsequent declines in depression and anxiety suggest that older adults expressing and experiencing such disorders may require particular attention. This will be important for clinicians working with older adults who must fight negative stereotypes associated with old age. Such implications will be increasingly important given the growing older adult population and the consequent demand on services (Department of Health, 2008).

## ***7.2 Future Research***

The findings discussed previously are promising but there are number of areas that would benefit from further exploration.

An area for future research may involve investigating the impact of personality on the emotion regulation strategies observed in older adults. Research indicates that personality traits appear to have a lesser impact on emotion regulation activities in older compared to younger adults (Ready & Robinson, 2008). Personality traits such as neuroticism and extraversion can also affect responsiveness to emotionally valenced faces in younger adults (Canli, 2004). This research requires extending to older adults to test Kensinger and Leclerc's (2008) hypothesis that personality variables will affect older adults' responses to stimuli and affect the proposed shift towards selectively attending to positive information. Kensinger and Leclerc (2008) suggest that older adults high in neuroticism may require more cognitive resources to elicit the shift towards selectively attending to positive information or that this shift may be less likely to occur. The implications of this could be that such individuals are likely to experience poorer well-being throughout their lives.

Future research could also explore differences between older and younger adults' use of situation modification as this area has received little attention in the research literature. This could be done through a questionnaire, utilising a Likert scale (e.g. from 'not at all like me' to 'very much like me'). The measure could include scenarios which involve situation modification. For example, one scenario might be 'a friend talks about a subject you do not wish to discuss, so you ask them if they could change the subject'. Scenarios which illustrate lack of situation modification could also be included, for example 'at the dentist you are about to be seen by someone who in the past has caused you pain, rather than ask to see someone else you proceed with the appointment'. The measure would need to avoid bias towards age and would therefore avoid scenarios involving areas particularly salient to older or younger age groups. Emotion regulation goals could be manipulated by asking respondents either to focus on problem-solving goals or emotion regulation goals. This research would also need to

measure neuroticism as Gross (2007) predicts those individuals high in neuroticism will lack the confidence and self-esteem to take the steps necessary to modify situations. This may then need controlling in subsequent analysis.

Another possibility might be to conduct an experimental study in which spontaneous situation modification is observed in younger and older adults. A 'waiting room' scenario could be devised in which a stranger sits down next to a participant and strikes up a conversation with them, which becomes 'awkward' in content. Participants could be categorised based on their response in terms of engaging with the topic, changing the subject, telling them to stop, moving away or using their phone or other similar behaviours. Such a study would need carefully to follow ethical guidelines, as it would involve some deception. The content would need to be considered carefully to be relevant both to older and younger participants or could even vary along social and physical health threat dimensions.

Given the implications of emotion regulation strategies, such as reappraisal and suppression, for well-being, an area which also requires further exploration is the use of these strategies by older and younger adults. Few studies could be identified that investigate these strategies, (for example, John & Gross, 2004). A study which was able to compare older and younger adults' self-reported emotion regulation strategies, including but not restricted to reappraisal and suppression, would therefore add to the research in this area. A cross-sectional design with a questionnaire approach could be utilised to explore the impact of age on measures of emotional processing. Using measures such as the Emotion Regulation Questionnaire (ERQ; Gross & John 2003) and the Emotion Processing Scale (EPS; Baker, Thomas, Thomas, & Owens, 2007) would allow the researcher to explore the following aspects of emotional processing; emotional awareness and emotional expressivity, emotional processing style,

tendency towards unprocessed emotions, impoverished emotional experience, avoidance of emotions, and finally tendency towards unregulated emotions. Arguably, emotional awareness may be important in determining how well participants report their emotional processing styles. Thus, the study would need to explore the relationship between levels of emotional awareness and age. This could be achieved through a measure such as the Lane Emotional Awareness Scale (LEAS; Lane, Quinlan, Schwartz, Walker, & Zeitlin, 1990). Given the differences between male's and female's emotional processing, the study would also need to examine the relationship between gender, age and emotion processing. Additionally, investigating the direct impact of emotion regulation style on levels of anxiety and depression would also add to the literature. One way this could be achieved is by utilising the Depression Anxiety Stress Scale (DASS, Lovibond & Lovibond, 1995).

Any area of future research should be conceptualised in terms of the research limitations identified. The importance, for example, of cohort effects should be highlighted and where possible, controlled. This is not always possible but may involve, for example, matching older and younger samples in terms of education. Additionally, the types of materials used to elicit emotions from participants needs to be carefully considered given the finding that the salience of materials to different age groups also influences results.

### ***7.3 Overall summary***

The research reviewed here suggests that we should not assume that well-being reduces across the adult lifespan. Although some methodological problems are present in the research literature, well-being appears to be 'U' shaped, declining from the twenties to age 40 and increasing thereafter. Research seems to suggest that older and younger adults' emotional processing differs and that older adults make greater use of emotion regulation

strategies. In particular, older adults make greater use of those strategies classified as antecedent- focused strategies. This results in older adults experiencing less negative affect, and for less of the time. The types of emotion regulation strategies used by older adults appears to be beneficial to affect, cognition, social encounters and mental and physical wellbeing. Several theories have been put forward to explain these findings. Most promising is the socio-emotional selectivity theory, which suggests that, with age, a shift occurs in motivational goals. This shift means that emotion regulation goals become increasingly important with age.

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**Do emotion regulation and emotional awareness change with age?**

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## **Do emotion regulation and emotional awareness change with age?**

### **Abstract**

To date there is promising, yet limited, evidence to suggest that differences exist between older and younger adults' emotion processing styles. This study aimed to explore possible changes in emotional processing style across the adult lifespan by exploring whether the use of reappraisal and suppression change with age, and examining their relation to emotional awareness and psychological distress. Young, middle-aged and older adults' emotion regulation strategies, emotional awareness and levels of psychological distress were measured using self-report questionnaires and examined using a cross-sectional design. 102 males and 469 females were recruited, ranging in age from 18 to 91 years.

The findings suggest that differences exist between older and younger adults' emotion regulation strategies. Compared to younger adults, older adults make greater use of the emotion regulation strategy, suppression. This greater use of suppression by older adults was not related to greater reporting of psychological distress. By contrast, younger adults who reported high levels of suppression also reported higher levels of psychological distress. Older adults also reported less anxiety and stress than younger adults, with no age differences in depression. These findings suggest a decoupling of the use of emotional suppression and psychological distress with age. A time limited perspective, described in the socio-emotional selectivity theory, is postulated to increase older adults, focus on emotion regulation goals. Suppression may be a useful form of emotion regulation for the types of stressors experienced in later life stages, and arguably, therefore is not associated with the negative outcomes observed in younger adults.

Key words: emotion regulation, well-being, age, emotional awareness



## 1. Introduction

As people age, they display changes in the experience of emotion. Compared to younger adults, older adults appear to experience fewer negative emotions (Carstensen, Gottman, & Levenson, 1995) lower emotional intensity (Barrick, Hutchinson, & Deckers, 1989; Lawton, Kleban, Rajagopal, & Dean, 1992) less emotional expression (Lawton et al., 1992), more emotional understanding (Labouvie-Vief, DeVoe, & Bulka, 1989) and more emotional control (Lawton et al., 1992; Gross et al., 1997). One possible explanation for these changes could be that older adults use different emotion regulation strategies compared to younger and middle aged adults.

Emotion regulation includes both conscious and unconscious strategies that aim to increase, maintain, or decrease an emotional response (Gross, 1999). These strategies influence which emotions are experienced, and when and how they are experienced (Gross, 2001; 2002; Gross et al., 1997). Gross (2001) proposes a timeline of unfolding emotional responses, from situation selection and modification, through attentional deployment, to cognitive change, and finally response modulation. According to his model, specific strategies are activated at varying points along the timeline. Gross (2001) divides these strategies into two classes; *antecedent-focused* and *response-focused*. Gross identifies several *antecedent-focused* emotion regulation strategies that occur at the early stages of the emotion generating process, before the emotion has an impact on behaviour or physiology (Gross, 2001). The second set of strategies, *response-focused* strategies, occur when the experience of an emotion is already underway (Gross, 2001). Gross' model represents an important move forward in the emotion regulation literature as it provides a theoretically driven framework for systematizing the range of emotion regulation strategies.

The current study focuses on the relatively impoverished research areas of cognitive reappraisal (an antecedent-focused strategy) and suppression (a response-focused strategy). In contrast to other areas of research on emotion processing and regulation, very little published research has explored age differences in the use of these emotion regulation strategies. Therefore, after briefly reviewing the current literature, this study explores age related changes in these two emotion regulation strategies.

### ***1.1 Reappraisal***

Reappraisal is a cognitive change strategy that involves selecting one of a number of possible alternative and more positive explanations for a situation (Gross, 2001). There are well-documented benefits of using reappraisal. Garnefski, Kraaij, and Spinhoven (2001) identified that a self-reported tendency to reappraise in real-life experiences was negatively related to depression and anxiety. College students who used reappraisal techniques in response to traumatic events also benefitted with fewer GP visits compared to controls (King & Miner, 2000). Reappraisal benefits individuals with chronic pain (Affleck & Tennen, 1996), those who have lost a loved one (Davis, Nolen-Hoeksema, & Larson, 1998), and pre-operative patients (Callaghan & Li, 2002; Cheung, Callaghan, & Chang, 2003). Reappraisal has the advantage of effectively decreasing the emotional experience and negative expressive behaviour, leaving positive expressive behaviour intact (Richards & Gross, 2000).

There is some evidence that suggests older adults use cognitive reappraisal more than younger adults. In a retrospective study John and Gross (2004) asked 106 women in their early sixties to complete the Emotion Regulation Questionnaire (ERQ, Gross & John, 2003) in relation to how they respond to emotions now and how they used to responded to emotions in their twenties. As predicted, participants reported greater use of cognitive reappraisal now, than in their twenties. Although retrospective accounts are highly problematic, John and

Gross provide some converging evidence in another study where they demonstrated that 735 twenty-year-old women responded similarly on the ERQ to the older sample when they were reporting responding at a similar age.

Further evidence is provided by Brandtstädter and Renner (1990) who found that older adults were more likely than younger adults to agree with statements that indicate the use of reappraisal, such as “I usually find something positive even after giving up something I cherish”. In addition, in response to stressful situations, older adults make greater use of positive reappraisal than younger adults, who report more confrontational coping (Folkman, Lazarus, Pimley, & Novacek, 1987).

Taken together, there is some evidence to suggest that the emotion regulation strategy of reappraisal has positive gains and appears to be used by older adults to a greater extent than younger adults. A similar exploration of the emotion regulation strategy, suppression now follows.

### ***1.2 Suppression***

Suppression has attracted much less research than re-appraisal. Suppression describes the process of inhibiting responses to an emotion. The literature makes references to two types of suppression; expressive suppression and thought suppression. Expressive suppression describes the act of suppressing behavioural responses that may convey emotion, such as crying, whereas thought suppression refers to individuals' attempts to inhibit certain thoughts in order to avoid subsequent negative affect.

The majority of research has focused on expressive suppression, which has been associated with lower levels of social support, poorer coping and increased risk of depression (Higgins,

Bond, Klien, & Strauman, 1986). In younger adults, the use of expressive suppression does not have an impact on emotional experience, but decreases emotional expression (Gross & John, 2003). Its use also impairs memory, as the act of hiding one's feelings uses up cognitive resources (Richards & Gross, 2000).

The studies reviewed above have all been restricted to younger aged samples and their findings have been generalised to the whole population. However, investigations that include older adults offer a more complex picture of the role of expressive suppression. Magai, Consedine, Krivoshekova, Kudadjie-Gyamfi, & McPherson (2006) investigated the effect of age on suppression during a relived emotion task. Only older adult participants produced significantly reduced emotional expression (as measured by emotion words in subsequent narratives). Additionally, expressive suppression decreased sadness in the narratives of older, but not of middle aged or of younger adults (Magai, et al., 2006).

Evidence of an age shift in the use of expressive suppression is scarce, with just two published studies supporting this claim. John and Gross' (2004) study, described above, found that older adults reported less use of expressive suppression in their older age than in their twenties. One difficulty with this research is the claim that John and Gross (2004) are tapping into expressive suppression alone. As the research does not directly explore what participants are actually doing when they are asked to suppress their emotions, it is impossible to be sure whether participants are using expressive suppression exclusively. It is possible that participants are both suppressing the expression of emotions and trying to suppress the experience of emotions as well.

In parallel to the research literature on expressive suppression there is limited evidence available for an age shift in the use of thought suppression. Cheavens, Rosenthal, Banawan, & Lynch, (2008), have explored age differences in thought suppression. They evaluated emotion regulation in a sample of older and younger adults with and without psychiatric comorbidity. The authors found that younger adults reported significantly more thought suppression than older adults (Chevens et al., 2008).

The evidence presented here suggests that there may be benefits to using certain emotion regulation strategies above others. Compared to suppression, reappraisal appears to be associated with more positive outcomes. The evidence also appears to suggest that older adults may make greater use of reappraisal and less of suppression than younger adults. A number of theoretical explanations have been put forward, which attempt to explain why these differences might occur.

### ***1.3 Theoretical explanations for age related differences in the response to emotional stimuli***

Two competing theories stand out in the literature that try to explain age differences in emotion regulation. The first suggests that neurological changes in the brain (McDowell, Harrison, & Demaree 1994; Dolcos, Rice & Cabeza, 2002), lead to a decline in the ability to identify or recognize emotions in both oneself and in others (Macpherson, Phillips & Della Sala, 2002; Malatesta, Izard, Culver, & Nicolich, 1987; McDowell et al., 1994).

Evidence suggests however, that a decline in certain brain regions does not explain differences in emotion recognition between older and younger adults. Firstly, older adults are equally adept at detecting and orientating to threatening information (Mather & Knight, 2006; Rosler, Mapstone, Hays-Wicklund, Gitelman, & Weintraub, 2005). Secondly, older adults gain

as much benefit as younger adults from emotionally arousing information relative to non-emotionally arousing information when it comes to recall (Comblain, D'Argembeau, Van der Linden, & Aldenhoff, 2004; Denburg, Buchanan, Tranel, & Adolphs, 2003; Kensinger, Brierley, Medford, Growdon, & Corkin, 2002). Taken together, this evidence suggests that older adults' ability to process emotional information remains relatively intact (Mather & Carstensen, 2005).

An alternative theory put forward to explain changes in emotional processing is that of socio-emotional selectivity theory (Carstensen, Issacowitz, & Charles, 1999). According to this theory, as adults' age they increasingly experience an awareness of time being limited and therefore shift their motivational goals. Goals that focus on the future, such as knowledge acquisition, become less important with age. Instead, the focus changes to emotional well-being and meaningful emotional aspects of life. A time limited perspective may also lead to greater use of strategies to cope with stresses in the present, over problem solving barriers to future outcomes (see for example Heckhausen & Schutz, 1995; John & Gross, 2004). Studies with younger people with terminal illness show that they utilise more emotion focused coping strategies than their healthy peers (Carstensen & Fredrickson, 1998). This suggests that a limited time perspective alters an individual's goals towards becoming more focused on and coping with the present rather than concentrating on future goals. Support for this idea comes from a study of mental representations of social partners in older and younger adults (Fredrickson & Carstensen, 1990).

Emotion regulation describes the set of strategies that individuals use to control their emotions. These strategies are affected by a number of factors, including gender and emotional awareness, which are reviewed in the next section.

### ***1.4 Influences upon emotion regulation***

Emotional awareness refers to the ability to recognise the signs and symptoms associated with an emotion, both in oneself and in others. There is some evidence to suggest that emotional awareness may increase as a function of age, with the greater life experience of older adults leading to the development of the ability to acknowledge, understand and communicate emotions (Lane et al., 1997; Lane & Schwartz, 1987). However much of the research in the area of emotional awareness is restricted to younger adults (for example, Ciarrochi, Caputi & Mayer, 2003; Lane, Kivley, Du Bois, Schamasundara, & Schwartz, 1995; Lane, Quinlan, Schwartz, Walker, & Zeitlin, 1990). Arguably, emotional awareness may be associated with the type of emotional regulation employed, as suppressing emotions may affect an individual's awareness of their emotions (Gross & John, 2003).

Gender may also influence emotion regulation. Young males tend to use expressive suppression more than young females, whereas no differences have been found in the use of reappraisal (Gross & John, 2003). Jorm (2000) reviewed research which showed that trends in well-being were different when males and females were analysed separately, with males and females differing in the peak age of prevalence of disorders across the studies. Overall, women reported more negative affect than men, especially sadness and anxiety (Costa et al., 1987; Fujita, Diener, & Sandvik, 1991). Additionally, women were almost twice as likely as men to suffer from depression or from anxiety disorders (Nolen-Hoeksema, 1990; Reich, 1986).

### ***1.5 Aims of the current study***

To date there is promising, yet limited, evidence to suggest that differences exist between older and younger adults' emotion regulation styles. Theorists, such as John and Gross (2004) have postulated that suppression is more likely to be used by younger adults and that

reappraisal is more likely to be used by older adults. This study aims to explore this proposed shift in emotion regulation style across the adult lifespan by assessing whether the use of self-reported reappraisal, or suppression varies with age, and how these emotion regulation strategies may impact upon psychological distress. The study also explores the relationship between emotion regulation and emotional awareness. Specifically, the study aimed to explore three areas as follows:

The study first aimed to explore the pattern of emotion regulation strategies across different age groups. Specifically the study tests the hypothesis that older adults would report using reappraisal more than younger adults, whereas younger adults would report more use of suppression. Given that gender differences have been reported in the use of reappraisal and suppression in younger adults (Gross & John, 2003), the study also explored gender differences in patterns of emotion regulation.

The second objective was to explore the pattern of emotional awareness across age. Thus, this study explored the relationship between levels of emotional awareness and age. In line with the literature (Feldman Barrett, Lane, Sechrest, & Schwartz, 2000), the impact of gender on this relationship was investigated. Additionally, the relationship between emotional awareness and suppression was investigated, as suppressing emotions may affect an individual's awareness of their emotions (Gross & John, 2003). Specifically the study aimed to test the following two hypotheses. Firstly, that older adults would have greater emotional awareness than younger adults, and secondly that greater emotional awareness would be significantly associated with lower levels of expressive suppression.



The final objective was to explore the pattern of stress, anxiety and depression across the adult life span and to investigate the relationship between negative affect and self-reported emotion regulation use. The study tested a final hypothesis, that greater suppression would be associated with higher levels of psychological distress (anxiety, depression and stress). Again, gender differences were explored, in line with the findings in the literature reported above (Jorm, 2000).

## **2. Method**

### ***2.1 Design***

A cross-sectional design was utilised in order to explore the impact of age on measures of emotional regulation, emotional awareness and psychological distress using a questionnaire approach. Gender and age data were gathered and entered as categorical variables.

To test hypothesis 1, a MANOVA was utilised to compare the multivariate effect of the independent variable age group (with 3 levels, younger, middle aged and older) on two dependent variables (suppression and reappraisal) as measured by the Emotion Regulation Questionnaire (ERQ, Gross & John, 2003) and the Emotion Processing Scale (EPS, Baker, Thomas, Thomas, & Owens, 2007)

To test hypothesis 2, an ANOVA was utilised to compare the effect of the independent variables gender (with two levels, male, female) and age group (with 3 levels, younger, middle aged, older) on the dependent variable emotional awareness, measured using the Levels of Emotional Awareness Scale (LEAS, Lane et al., 1990). Correlation analysis was used to explore the relationship between emotional awareness and suppression.

To test hypothesis 3, a MANOVA was utilised to compare the multivariate effect of the independent variables gender (with 2 levels, male, female) and age group (with 3 levels, younger, middle aged, older) on the dependent variables depression, anxiety and stress measured using the Depression Anxiety and Stress Scale – short form (DASS-21, Lovibond & Lovibond, 1995). Correlation analysis was used to explore the relationship between suppression and depression, anxiety and stress.

A measure of social desirability response bias was included as questions about emotions and emotion processing are highly social and, therefore, may elicit a stronger than average desire to report in a biased manner.

## **2.2 Ethics**

Ethics committee approval was obtained from the University of Southampton, School of Psychology Ethics Committee (Appendix A, B<sup>2</sup>) and steps were taken to ensure the study adhered to ethical guidelines.

## **2.3 Participants**

Participants consisted of non-clinical community dwelling adults aged between 18 and 91 recruited online through a university questionnaire site and a volunteer list created by university research staff. Voluntary organisations (including the Royal British Legion), interested associations (such as the Women's Institute) and an opportunist sample of personal contacts were also approached. Students were recruited from a participant pool and were awarded credits for consenting to take part in the study. Power calculations

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<sup>2</sup> A request to ethics was made for an amendment in the form of the addition of the Depression Anxiety Stress Scale 21 (DASS\_21).

using 'G-Power' (Faul, Erdfelder, Lang & Bauchner, 2007) suggest that a MANOVA design with 3 groups and an  $\alpha$  at .05 and power of .8 would require a sample size of 129 whilst for an ANOVA a sample size of 159 would be required.

## **2.4 Materials**

The following measures were used:

*The Levels of Emotional Awareness Scale (LEAS, Lane, Quinlan, Schwartz, Walker, & Zeitlin, 1990).*

The Levels of Emotional Awareness Scale measures aspects of emotional awareness (see Appendix C). The scale contains 20 evocative interpersonal situations followed by two questions, "How would you feel?" and "How would the other person feel?" Two scores are derived, one for 'self' and one for 'other', plus a total score. A shortened version of the LEAS was constructed for this study by selecting 10 items most relevant to older adults. Specific criteria are used to score responses, with each situation or vignette receiving a score between 0 and 5. Higher scores correspond to greater differentiation in emotion and greater emotional awareness of self and other. A maximum score of 50 is achievable across the ten vignettes. A score of 0 is assigned to responses limited to non-emotion words including thoughts. A score of 1 is assigned when a response is limited to physiological cues, a score of 2 for responses limited to undifferentiated emotions such as "good" or "bad" or for actions that demonstrate an emotional response. A 3 is assigned when the response includes one emotion word (such as happy), and a 4 when there are at least two clearly differentiated emotion words present. A score of 5 is given when the responses to self and other are both given a score of 4 and are distinct from each other.

The LEAS has good convergent validity, it positively correlates with several other relevant measures including an emotional range measure, perception of emotion measure, and

openness to experience measure (Lane, Sechrest, & Riedel, 1998, Lane et al., 1990, Lane et al., 1995, Lane et al., 1996; Lane, Sechrest, Riedel, Shapiro, & Kaszniak, 2000). Inter-rater reliability for the measure is high and ranges from  $r_s(20) = .84$  (Lane et al., 1990) to  $r_s(118) = .98$  (Lane, Reiman, et al., 1998). The measure has good internal consistency, with alphas from .83 to .88 (Barrett, Lane, Sechrest, & Schwartz, 2000; Lane et al., 1990, Lane et al., 1995; Lane et al., 1996).

*The Emotion Processing Scale (EPS, Baker, Thomas, Thomas, & Owens, 2007)*

The EPS is a 25-item self-report scale measuring five subscales (see Appendix D). Although the EPS was administered in a complete form, only the suppression subscale was used for the purposes of this study. The questionnaire lists different descriptions of potential feelings or actions. Participants use a sliding scale to report how much each of the descriptions applied to them in the past week. The nine point scale ranges from 'completely disagree' (0) to 'completely agree' (9).

The scale produces individual scores on each of the subscales as well as a total score (calculated by dividing the sum of the scores by the number of items completed, giving a maximum total score of 9). The five subscales of the Emotion Processing Scale were generated following factor analysis of a larger set of items (Baker et al., 2007). As a result, they have been shown to measure separate constructs (Baker et al., 2007). The coefficient alpha value for the entire scale is .92 (Baker et al., 2007) and internal consistency is high for the suppression subscale (.82) (Baker et al., 2007). Baker et al., (2007), assessed convergent validity by calculating Pearson Product-Moment Correlation Coefficients between EPS subscales and measures with theoretically related constructs. These measures included the Courtauld Emotional Control Scale (CECS; Watson & Greer, 1983), the Toronto Alexithymia Scale (TAS-20; Bagby, Taylor, & Parker, 1994) and the Personal Disturbance Scale (sAD;

Henry, Crawford, Bedford, Crombie, & Taylor, 2002). The suppression subscale appeared to be most strongly correlated with the TAS-20 and the CECS with correlations ranging from  $r_s = .65$  to  $r_s = .41$  (Baker et al., 2007).

*The Emotion Regulation Questionnaire (ERQ, Gross & John, 2003)*

The ERQ is a 10-item measure that assesses the degree to which the participant uses the emotion regulation strategies of cognitive reappraisal and expressive suppression (see Appendix E). Participants respond to questions about emotional experience and expression using a 7-point Likert scale ranging from strongly disagree (1) to strongly agree (7). A maximum score of 42 and a minimum score of 6 can be achieved for the reappraisal subscale and a maximum of 28 and minimum of 4 for the suppression subscale. Higher scores indicate greater levels of reappraisal or expressive suppression. Reported alpha reliabilities are .79 for the reappraisal and .73 for the suppression subscale (Gross & John, 2003).

*Depression Anxiety Stress Scale (DASS, Lovibond & Lovibond 1995) shortened version.*

The DASS\_21 is a brief 21 item self-report scale that is able to distinguish between the negative emotional states of depression, anxiety and stress (see Appendix F). The measure takes approximately 5 to 10 minutes to complete. Participants rate on a scale of 0 (did not apply to me at all) to 3 (applied to me very much or all of the time) how much a statement, relating to one of the three states, has applied to them over the past week. High scores suggest greater levels of depression, anxiety or stress.

The design of the measure was based on non-clinical samples but is widely used and suitable for both nonclinical (Lovibond & Lovibond, 1995) and clinical samples (Brown, Chorpita, Korotitsch, & Barlow, 1997). It is a well-validated scale with adequate convergent and

discriminant validity (Lovibond & Lovibond, 1995) and good internal reliability for the depression, anxiety and stress scales, (Cronbach's alpha coefficients; .91, .84 and .90, respectively; Crawford & Henry, 2003). These values are similar to those obtained from clinical populations (Antony, Beiling, Cox, Enns, & Swinson, 1998; Brown, et al., 1997).

*The Marlowe-Crown Social Desirability Scale- Short-form (MCSDS, Fischer & Fick, 1993).*

This is a standardised measure allowing for the measurement of the extent of social desirability response bias (see Appendix G). The measure contains 10 statements concerning personal attitudes and traits centred upon universal truths. Participants respond whether each statement is true or false. Several reverse items are included and higher scores suggest greater levels of response bias. Reliability of the measure has been reported to be better than the original full-scale version with the alpha coefficients of the short version ranging from .50 to .75 (Reynolds, 1982; Strahan & Gerbasi, 1972).

## **2.5 Procedure**

Participants were invited to complete the questionnaires online or were sent or given the questionnaires. An information sheet (Appendix H) provided the participants with details of how to complete the measures and their rights of withdrawal, whilst a de-briefing statement (Appendix I) gave further information about the study and contact details for information or support. The questionnaires were completed in the order presented above and took between 30 and 45 minutes to complete. Freepost envelopes were provided to those filling in the questionnaires by hand. <sup>3</sup>

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<sup>3</sup> A pilot study was conducted to examine the equivalence of online and paper and pencil versions of the measures (see Appendix J).

### 3. Results

#### ***3.1 Data exploration***

The initial steps in data analysis included examining the distribution of the data to explore the existence of skewness. This was conducted separately for all variables and those variables that were discovered to have a skewed distribution were transformed. Given that in each case, this was unsuccessful at generating a normal distribution the original data was utilised in subsequent analysis. ANOVA and MANOVA was used despite some of the data deviating from normality as it is argued that the F Test is robust to such deviations (Glass, Peckham, & Sanders, 1972; Field, 2009).<sup>4</sup>

#### ***3.2 Participant characteristics***

In total, 580 participants were recruited aged between 18 and 91 years with a mean age of 37 years; 472 females and 102 males responded to the questionnaires<sup>5</sup>. In order to compare differences in emotion processing, we constructed three groups that were roughly matched from the sample. This was achieved by first dividing the participants into age groups as follows; younger (participants aged between 18-29 years) middle aged (30-64 years) and older participants (65 years+). The selection of these age groups represents an informed decision based upon groupings made by similar studies in the literature and in addition consideration of life stages. For example, 65 years and over being retirement age. Table 1 contains demographic information about the sample.

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<sup>4</sup> The original plan for the analysis was to use regression to explore the relationship between age and emotional processing. Unfortunately, the distribution of the data precluded this approach because it was heavily skewed towards the younger age group and also followed a roughly bimodal distribution due to small number of adults of and around the age of 40 participating in the study.

<sup>5</sup> 6 participants did not give information on their gender.

Table 1.

*Participant demographic information*

	Younger adults (18-29 years) M = 22.15	Middle aged adults (30-64 years) M= 49.42,	Older adults (65-91 years) M= 74.28,
	N		
Gender			
Females	292	116	61
Males	43	36	23
Ethnicity			
White / white British / white Irish	305	150	82
Irish Traveller	8	0	0
Asian Indian	4	4	1
Asian Bangladeshi	2	0	0
Black Caribbean	2	0	0
other Black	4	0	0
Mixed white/Black Caribbean	3	0	0
Mixed White/Black African	2	0	0
Mixed White/Asian	2	0	0
Mixed any other	3	0	1
No comment	1	0	1
Total	336	154	85

For the analysis the disproportionately large number of females in the sample were reduced in each of the age groups to match the number of males in each group. As far as possible an even age distribution was created. This was achieved by selecting an age equivalent female for each male. An attempt to match the participants for years of education was made. However, this was not possible as the older age group had on average fewer years of education than the younger group and therefore matching the two groups in this way further skewed the age distribution.

295 of the younger adult participants completed the questionnaires online and 21 on paper.

104 of the middle-aged adults completed their questionnaire online and 73 on paper whilst 9



older adults completed the questionnaire online and 75 completed the questionnaires on paper.

### **3.3 Reliability of coding and measures**

In order to check the reliability of the coding for the LEAS measure, 10 per cent of the data (50 participants) were re-coded by a second coder. This is equivalent to other authors who have reported excellent inter-rater reliability  $r_s(73) = .95$  after rescoring 25 per cent of their data (Novick-Kline, Turk, Mennin, Hoyt, & Gallagher, 2005). Inter-rater reliability was checked for the LEAS data using Intra-class Correlation Coefficient (ICC), and Spearman's Rank correlations. The results were as follows LEAS-Self,  $r_s(49) = .88$ , (95% CI .84 - .94),  $p < .001$ ; LEAS-Other  $r_s(49) = .94$ , (95% CI .95-.98),  $p < .001$  and LEAS-Total,  $r_s(49) = .92$  (95% CI .86 - .95),  $p < .001$ . These results suggest excellent agreement between raters. For the purposes of analysis the LEAS total score was utilised.

Test-retest reliability for the ERQ measures was .69 for both subscales. Internal reliability for the DASS was good, with alpha coefficients of .90 for the depression subscale, .85 for anxiety and .87 for stress. The alpha coefficient for the MCSDS was .62. The removal of items did not improve the reliability of the measure. Implications of this finding are discussed later.

A combined suppression variable was created using the ERQ suppression subscale and the EPS suppression subscale by first calculating Z scores. These two measures claim to tap different forms of suppression. The ERQ claims to record only expressive suppression whilst the EPS claims to relate to the control of the experience of and output of emotions i.e. both the experience and expression of emotion. A Spearman's rho correlation was conducted and showed that the two measure are significantly correlated ( $r = .596$ ,  $p < .001$ ), suggesting the

measures have good concurrent validity. It was decided to combine the subscales due to the ambiguity, mentioned previously, as to whether the ERQ is actually able to measure just one form of suppression. Additionally, combining the two subscales reduced the risk of multiple comparisons and increased the reliability of the individual measures of suppression ( $\alpha = .88$ ), which were found to be low when analysed separately.

### **3.4 Social desirability response bias**

A significant positive correlation between social desirability response bias and age was found in this sample,  $r_s(551) = .20, p < .001$ . Further correlation analysis revealed that response bias was correlated with the psychological distress sub-scales; depression  $r_s(504) = .38, p < .001$ , anxiety  $r_s(502) = .29, p < .001$  and stress  $r_s(506) = .30, p < .001$ . It was necessary, therefore, to add response bias as a covariate to analysis involving these variables.

### **3.5 The relationship between age and emotion regulation strategies**

Age differences in emotion regulation strategies were explored. Descriptive statistics for each of the age groups are reported below.

Table 2

*Descriptive statistics of younger, middle aged and older adults' use of the emotion regulation strategies; reappraisal and suppression.*

	Younger adults ( $n=84$ )		Middle aged adults ( $n=84$ )		Older adults ( $n=84$ )	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Reappraisal	30	5.4	30.5	6.0	28.5	6.7
Suppression	-0.4	6.3	-1.1	5.9	2.2	6.5

Note: Z scores based on combining ERQ suppression subscale and EPS suppression subscale. Range -12.2 - 20.1.

Figure 1 illustrates the use of both strategies suppression and reappraisal is greater in the middle aged group compared to the younger aged groups however whilst the use of reappraisal is lowest in the older aged group suppression is greatest.

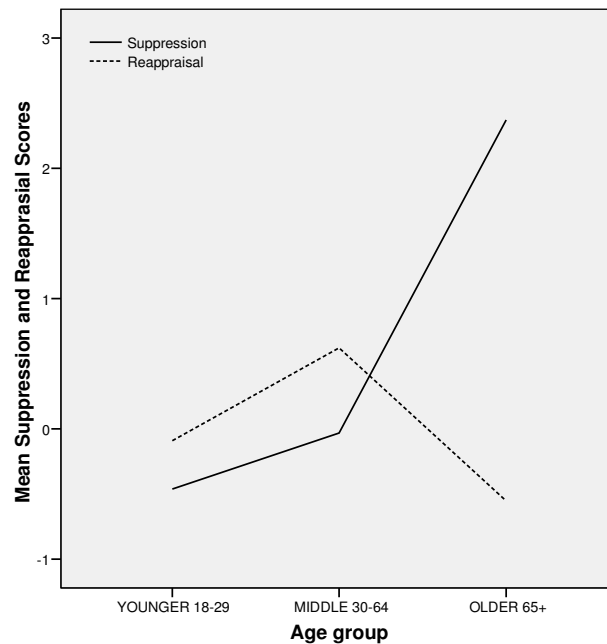


Figure 1. Interaction between suppression and reappraisal scores across the age groups.

Note: values represent Z scores.

A 2 (gender) X 2 (emotion regulation) X 3 (age group) MANOVA was conducted on the subsample of younger ( $n=84$ ), middle aged ( $n=84$ ) and older aged ( $n=84$ ) adults. The MANOVA indicated no main effects of gender ( $F < 1$ ). Therefore, gender was removed as a factor from the MANOVA. This showed significant age differences in suppression,  $F(2, 218) = 4.16$ ,  $p = .003$ , partial  $\eta^2 = .037$ . No significant age differences were found in reappraisal. Older adults had significantly higher suppression scores than younger ( $p = .041$ ) and middle aged adults ( $p = .004$ ), who did not differ from each other ( $p > .05$ )<sup>6</sup>.

<sup>6</sup> This analysis was re-run with a matched sample of females resulting in the same patterns of results. The analysis was also run with the two original suppression measures and again the same pattern of results was shown.

This analysis suggests that older adults make greater use of suppression than younger and middle aged adults, but that there is no significant difference between older, middle aged and younger adults' use of reappraisal.

### **3.6 Investigating age differences in Emotional awareness.**

In order to investigate age difference in emotional awareness a 2 (gender) X 3(age group) ANOVA on emotional awareness was conducted. Gender was added as a factor to the ANOVA as the literature suggested that males and females differ in emotional awareness (Feldman Barrett et al., 2000).

Table 3.

*Descriptive statistics for younger, middle aged and older adults' emotional awareness*

<i>Age group</i>	Male			Female		
	<i>n</i>	<i>M</i>	<i>SD</i>	<i>n</i>	<i>M</i>	<i>SD</i>
Younger adults	23	29.5	4.2	61	31.5	4.0
Middle aged adults	23	28.0	7.7	60	30.6	5.5
Older adults	22	26.9	5.7	53	29.5	4.2

The ANOVA indicated a main effect of gender,  $F(1,236) = 10.82, p = .001$ , partial  $\eta^2 = .044$ , and a main effect of age  $F(2,236) = 3.47, p = .033$  partial  $\eta^2 = .029$ , interactions between age and gender did not reach significance ( $F < 1$ ). The main effects indicated that women had higher levels of emotional awareness than men and that emotional awareness declined with age<sup>7</sup>. Pairwise comparisons showed that these differences were between older and younger adults only.

<sup>7</sup> This analysis was re-run with a matched sample of females resulting in the same patterns of results.

The relationship between emotional awareness and suppression was investigated using Spearman's rho using all participants in the three age groups. There was no relationship between suppression and emotional awareness,  $r_s(215) = -.05, p = .438$ . This was true when the age groups were analysed separately (younger adults  $r_s(79) = .04, p = .971$ , middle aged  $r_s(75) = -.04, p = .748$ , older adults  $r_s(67) = -.02, p = .892$ ).<sup>8</sup>

### **3.7 The relationship between age, emotion regulation and psychological**

#### **distress**

In order to investigate the relationship between age and psychological distress a 3 (age group) X 2 (gender) X 3 (psychological distress) MANCOVA was run using response bias as a covariate to the analysis. The means illustrated in Table 4 below, suggest that anxiety, depression and stress, appears to decline with age for both males and females.

Table 4.

*Descriptive statistics for younger, middle aged and older adults psychological distress measures*

	Younger adults ( $n=78$ )		Middle aged adults ( $n=73$ )		Older adults ( $n=65$ )	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Depression	8.5	9.0	7.4	7.8	6.8	7.3
Anxiety	7.0	7.5	4.9	5.8	3.9	5.4
Stress	14.5	8.8	12.5	8.3	8.8	7.6

MANCOVA revealed no effects of gender and therefore gender was removed from the analysis. There was a significant main effect of age on psychological distress,  $F(6,422) =$

<sup>8</sup> A correlation analysis was conducted to investigate the relationship between emotional awareness and psychological distress. The analysis suggested that there were no significant correlations between emotional awareness and the three measures of psychological distress, depression, anxiety and stress ( $p > .05$ ).

2.39,  $p = .027$ , partial  $\eta^2 = .033$ . There were significant age differences in anxiety  $F(2,212) = 3.787$ ,  $p = .024$ , partial  $\eta^2 = .034$ , and stress  $F(2,212) = 5.243$ ,  $p = .006$ , partial  $\eta^2 = .047$ .

Pairwise comparisons showed that these differences were between older and younger adults only, and that older adults reported lower levels of stress and anxiety compared to younger adults. There were no differences in depression suggesting that levels of depression do not vary with age.

In order to investigate the relationship between psychological distress and suppression Spearman's correlation coefficients were conducted on the three indices of psychological distress using a Bonferroni corrected  $p$  value of  $.005$ . For younger and middle aged adults there was a significant positive correlation of moderate magnitude for anxiety, depression and stress. By comparison, for the older adults the correlations were extremely small and not significant, indicating no relationship between suppression, anxiety, depression and stress for this age group.

Table 5.

*Correlations between Suppression and measures of psychological distress*

	Younger adults ( $n=314$ )	Middle aged adults ( $n=137$ )	Older adults ( $n=76$ )
	Suppression		
Depression	.43‡	.41‡	.17
Anxiety	.38‡	.25†	.08
Stress	.32†	.46‡	.15

*Note.* ‡  $p < .001$ ; †  $p < .005$ .

Post hoc power calculations indicate that all analysis were sufficiently powered ( $1-\beta$  range = .76 to .99).

## **4. Discussion**

The primary goal of this study was to examine whether emotion regulation and emotional awareness differed across the lifespan. A subsidiary goal was to explore the impact of emotion regulation styles on subsequent psychological distress and on emotional awareness. The findings suggest that differences exist between older and younger adults in their use of emotion regulation strategies, with older adults making greater use of suppression than middle aged and younger adults. Surprisingly, suppression was not associated with psychological distress in the older adult age group, which was lower in older than in younger adults. The discussion below explores these findings and considers how they might be explained in the light of conflicting results in the existing literature.

### ***4.1 Age differences in emotion regulation***

We predicted that the emotion regulation strategy, reappraisal, would be used more by older adults than by younger adults and that suppression would be used more by younger adults, and in particular by males. Instead, this study found that older adults utilise the emotion regulation strategy of suppression to a greater extent than younger or middle aged adults. This is contrary to other findings reported in the literature (Cheavens et al., 2008; Gross & John, 2003), which suggest that older adults make less use of suppression. It also appears that in this study, younger and middle-aged adults' emotion regulation strategies appear more similar to one another than they do to the older adult age group. Possible explanations for these findings are discussed below.

In terms of gender, the study found no difference between males and females use of the emotion regulation strategy, reappraisal, a finding that is consistent with the literature (Gross & John, 2003). In addition, this study did not find any gender differences in the use of suppression. This conflicts with other findings in the literature, which suggest that suppression

is utilised significantly more by younger males' than by females' or by older adults (Gross & John, 2003).

#### ***4.2 Age differences in emotional awareness***

We predicted that emotional awareness would improve with age due to cognitive developmental processes (Lane et al., 1997; Lane & Schwartz, 1987). However, the study found that younger and middle aged adults reported greater emotional awareness than older adults. Limited literature exists which explores emotional awareness across the life span with the majority of studies confined to university students and young adults. However, the one published piece of research that does include an older adult sample is consistent with the findings reported here. Lane, Reiman et al. (1998) reported a significant negative correlation between emotional awareness (measured by the LEAS) and age in a sample of 18 to 80 year old participants (Lane et al., 1996; Lane, Sechrest, & Riedel, 1998). An unpublished thesis also discovered this pattern (Drysdale, 2008). The lower levels of emotional awareness in older adults observed in this study were not accounted for by an increase in the use of suppression.

Turning to gender, we predicted that females would be significantly more emotionally aware than males. This pattern was confirmed, and has been replicated in both clinical (Levine, Marziali, & Hood, 1997) and non-clinical samples (Feldman Barrett et al., 2000).

#### ***4.3 Psychological distress***

In line with the findings reported in the literature (Folkman et al., 1987; Henderson et al., 1998; Lawton, Kleban & Dean, 1993), this study found that levels of psychological distress appear to decline with age. However, in this sample, only anxiety and stress were significantly lower in older adults compared to younger adults; whereas there were no significant



differences in levels of depression across the age groups. The finding that depression does not decline with age is contrary to a number of studies (see for example, Blanchflower & Oswald, 2008) and may be due to participant bias in this sample. The sample of older adults were likely to be high functioning as they were largely drawn from a university volunteer list. This is discussed further in section 4.5.

In terms of gender, women reported more psychological distress than men, a finding consistent with the literature (Thomsen, Mehlsen, Viidik, Sommerlund, & Zachariae, 2005). Younger women reported lower levels of stress than middle-aged women, who reported higher stress levels than older aged women. In contrast, younger males reported higher levels of stress than middle aged or older aged males. Folkman et al.'s (1987) study suggests that these differences may reflect gender differences in types of stressors, which vary at different life stages.

As predicted, suppression was positively associated with psychological distress but only in younger, and not in older adults. Although there is a substantial body of literature, which suggests that suppression, is associated with distress, this literature has failed to take age differences into account. One study was identified that showed no relationship between suppression and psychological distress in older adults (Magai et al., 2006). The results of this study and those of Magai et al. (2006) suggest that, contrary to Gross and Levenson (1993), suppression is not associated with negative outcomes, for older adults. In younger adults, both this study and the literature suggest that suppression is linked to psychological distress (John & Gross, 2004). This suggests that the relationship between suppression and psychological distress is not a simple and straightforward one and that there may be a decoupling of suppression and psychological distress with age.

#### ***4.4 Emotion regulation goals as an explanation for age differences.***

The current study found that, contrary to previous suggestions by Gross and John (2003), older adults used more suppression than younger adults. This study also suggests the occurrence of a decoupling between the use of emotional suppression and psychological distress with age. It appears that whilst the use of the emotion regulation strategy, suppression, has negative consequences for younger adults it does not have the same deleterious consequences in older adults. This leads us to the question of why suppression might function differently in older adults. One possibility is that suppression has some functional benefits for older adults because of the types of difficulties faced at a later stage of life.

Older adults experience more loss events such as declining health, terminal illness, loss of a work role, loss of friends and loved ones (Chiriboga & Cutler, 1980; Dekker & Webb, 1974; Lazarus & DeLongis, 1983; Lowenthal, Thurnher, & Chiriboga, 1975; Uhlenhuth, Lipman, Balter, & Stern, 1974), whereas younger adults report more day-to-day hassles (Holahan, Holahan, & Belk, 1984). The types of stressors experienced more frequently by older adults therefore are not controllable, whilst stressors experienced by younger adults, tend to be changeable and within individual control (Mirowsky & Ross, 1992, 1999; Schieman, Van Gundy, & Taylor, 2001). The differences in the types of stressful events faced by the two groups might mean that different types of emotion regulation strategies are required at different phases of the life span.

Suppression, in younger adults is generally associated with poorer psychological health outcomes and this finding was corroborated in the current sample. However there is a small body of literature which shows that suppression can be useful when stressors are not

controllable (Lazarus, 1990). For example, the use of emotion regulation strategies such as suppression were associated with fewer psychological symptoms in victims of a nuclear disaster (Collins, Baum, & Singer, 1983). The authors suggest that where there is little scope to change or control the damaging effects of the accident, then strategies such as distancing or avoiding are associated with better adaption when compared to strategies such as attempted problem solving. Similar conclusions were drawn in a later study with hostages (Strentz & Auerbach, 1988).

These findings might help to explain why suppression could be useful at a life stage when there is limited scope for changing or controlling the types of stressors that are frequently experienced. The focus at this stage of life might be on remaining as emotionally satisfied as possible in the present. This is described by the socio-emotional selectivity theory as a shift in emotion regulation goals (Carstensen et al., 1999). As discussed previously, the socio-emotional selectivity theory (Carstensen et al., 1999), suggests that as people age they increasingly experience an awareness of time being limited and therefore shift their motivational goals towards a focus on emotional well-being. Preparing for the future is replaced by striving to feel emotionally satisfied in the present. Research investigating age differences in styles of coping provides support for this theory. Younger adults use proportionally more active, interpersonal problem-focused coping strategies (including confrontative coping and problem solving) than older adults (Folkman et al., 1987); whereas older adults use more emotion-focused forms of coping (Folkman et al., 1987). Suppression could be conceptualised as just such a form of coping, in that suppression is useful as a means of suppressing the expression and experience of emotions in older adults.

Suppression might be a useful emotion regulation strategy in situations that cannot be changed and when the primary goal is emotion regulation, which means that the optimal response is to suppress negative emotions. This may help to explain why older adults use this strategy more, and critically, why it might be an effective strategy for older adults and not associated with negative outcomes. In younger adults, there is a need to problem-solve and change situations in order to move forward and suppression of emotions could lead to longer term negative outcomes because it prevents necessary change. For example, work situations or relationships might be sources of stress and the psychological discomfort caused by this stress can be used as a motivator to evaluate the difficulties and then to problem-solve and change, in order to achieve desired goals. Suppression, in this situation would block action and be unhelpful and the long-term benefits of action would probably outweigh the short-term increase in distress that tackling the problem might cause. However, for older adults the stressors are often different and may be unchangeable; therefore suppressing emotions rather than choosing problem solving could result in better psychological well-being.

The suggestion that suppression may be beneficial in a life stage characterised by uncontrollable events receives further support from the data on social desirability in this study. The Marlowe Crown social desirability scale, which was used here, was originally designed to measure an individual's tendency to consciously respond in an overly positive way in order to create a good impression (Crowne & Marlowe, 1964). However, the scale may also measure defensiveness (Thomsen et al., 2005). Defensiveness represents an individual's attempt to avoid or down-regulate negative affect (Gross, 1999). This emotion regulation strategy has an inverse correlation with anxiety, sadness, depression and anger (Barrett, 1996; Clark, Crewdson, & Purdon, 1988; Crowne & Marlowe, 1960). Consistent with this suggestion, older

adults score higher on defensiveness than younger adults (Dijkstra, Smit, & Comijs, 2001; Ray, 1988). Defensive or socially desirable responding could be another strategy by which older adults try to regulate emotions, and arguably could be similar in form to expressive suppression. This suggests that by using emotion regulation strategies such as suppression or defensiveness older adults may be meeting the goal of emotion regulation, identified as important by the socio-emotional selectivity theory.

The goal of emotion regulation may also explain why older adults reported lower levels of emotional awareness. There may be an optimum level of emotional awareness, so that too much or too little emotional awareness can have negative consequences. We know that reduced emotional awareness is associated with a decline in the ability to recognize emotions in oneself and in others (Macpherson et al., 2002; Malatesta et al., 1987; McDowell et al., 1994). However, becoming too emotionally aware may also lead to negative outcomes such as anxiety-related symptoms. There is some support for this suggestion; for example, higher levels of emotional awareness are associated with anxiety disorders such as Generalised Anxiety Disorder (GAD, Novick-Kline et al., 2005). Older adults might want to avoid becoming too emotionally aware because this may lead to increased levels of negative affect. However, in this study, suppression was not directly related to decreased emotional awareness in older adults, and therefore cannot be the mechanism that explains why older adults had lower levels of emotional awareness compared to younger adults in this sample. This finding is contrary to Gross and John (2003) who suggest that suppression involves “shutting down” emotions in a way that interferes with attention to the emotion, leading to less awareness of emotions.

The findings reported here suggest that self-reported emotion regulation strategies do not appear to account for older adults' reduced vulnerability to anxiety or stress. Indeed, older adults appeared to use suppression more, but this did not increase their risk of anxiety or stress, whereas suppression was positively associated with psychological distress in younger adults. These data suggest a decoupling of the use of emotional suppression and psychological distress with age, which may be due to different emotion regulation needs at different life stages.

#### ***4.5 Conclusions and future directions***

This study has several strengths. The inclusion of both adaptive and maladaptive emotion regulation strategies gave a more complete picture than previous research (for example Cheavens et al., 2008), which has tended to focus on a limited number of emotion regulation strategies. The large sample size and the wide range of ages from 18 to 91 years allowed the study to capture an, often omitted, older age group.

There were of course, a number of limitations. One limitation was the uneven distribution of age due to the difficulty in recruiting men in the older age category, and problems in recruiting participants of both genders around the age of 40 years. This produced an uneven sample and meant that the original analytic strategy, based on regression, was impossible. As a result, a number of participants had to be eliminated from the study in certain analyses to ensure evenly matched sample sizes. A further limitation of the study was the cross-sectional design. Cross-sectional studies that look at age differences are vulnerable to cohort effects that can impact on the results because there are established age-group differences in psychological well-being (Sacker & Wiggins, 2002; Twenge, 2000). However, we took steps to control for some cohort effects such as the tendency for older adults to respond in a more socially desirable way by using a measure of social desirability (MCSDS, Fischer & Fick,

1993) as a covariate. Whilst, some argue that cohort factors have limited impact on cross sectional studies (Blanchflower & Oswald, 2008) longitudinal studies could shed more light on how emotion regulation strategies develop. Such longitudinal studies may also overcome a further limitation of this study, which was the potential of a sampling bias. This sampling bias may have been present due to the older adult sample being largely drawn from a population involved in university research who were well-educated and active. This may account in part to the lower levels of anxiety and stress found in the older adult sample. Indeed, there is some research, which suggests that contrary to the findings reported here old age is associated with an increased vulnerability to psychological difficulties such as Post Traumatic Stress Disorder (PTSD; Foa, Keane, Freidman & Cohen, 2008). This remains a controversial area which would benefit from further exploration.

A final limitation was the low reliability of several of the measures used. Low test-retest reliability was found between the online and paper and pencil version of the Emotion Processing Scale (EPS, Baker, Thomas, Thomas, & Owens, 2007) and Depression Anxiety Stress Scale (DASS, Lovibond & Lovibond 1995) suggesting that these measures may be limited in their reliability. The Marlowe-Crowne scale Short-form (Fischer & Fick, 1993) also has relatively poor reliability (see Beretvas, Meyers, & Leite, 2002); however, there was no satisfactory alternative. For example, a similar widely used measure, the Balanced Inventory of Desirable Responding (BIDR; Paulhus, 1991), also has low reliability (Li & Bagger, 2007). Further development of these scales is required and the continued analysis and reporting of reliability will ensure that researchers make adequate allowances for the measures already in place (Thomsen et al., 2005).

In terms of future research, studies could focus on further exploration of the relationship between age and use of suppression and subsequent negative affect. This study has identified the occurrence of a possible decoupling between the use of emotional suppression and psychological distress with age and if this is a robust finding, we need to directly explore how and why suppression is a beneficial strategy for older adults. This analysis would also benefit by including a measure of positive affect.

Personality also influences emotional responding and another fruitful area of enquiry is an investigation of the impact of personality on the emotion regulation strategies observed in older adults. Personality traits such as neuroticism and extraversion affect emotional processing (Canli, 2004; Noguchi, Gohm, & Dalsky, 2006) and could therefore influence the selection of emotion regulation strategies. Kensinger & Leclerc (2008), for example, suggest that older adults high in neuroticism may require more cognitive resources to utilise positive emotion processing strategies and it could be that such individuals may experience poorer well-being throughout their lives. If this is the case, then depletion of cognitive resources in older adulthood may pose particular difficulties in emotion regulation for individuals with these personality traits.

This study provides new insight into the relationships between self-reported emotion regulation and emotional awareness across the adult lifespan. The study confirms previous data that demonstrate a decline in psychological distress with increased age, and provides further evidence that we should not assume that psychological distress is a necessary consequence of old age. Instead, the reductions in psychological distress found in this study, and supported by the literature, suggest that mood and psychological functioning should be carefully assessed and that older adults suffering from anxiety and mood disorders require



treatment. In addition, research on emotion regulation in older adults requires further expansion. Emotion dysregulation is implicated in more than half of DSM-IV Axis 1 disorders and in all Axis 2 disorders (American Psychiatric Association, 1995; Gross & Levenson, 1997; Thoits, 1985). Therapies that address emotion regulation have become increasingly popular in the past decade (e.g. Linehan, 1993). Reaching a better understanding of the role of emotion regulation in older adults, through studies such as this, further adds to the literature informing such interventions.

This study represents an important advance in the understanding of age differences in emotion regulation, emotional awareness and emotional well-being. The study provides evidence for the greater use of suppression in older adults, a research area with previous scant evidence. It suggests that in older adults suppression is not associated with the negative affect that is reported in studies with younger adults. Instead, a time limited perspective, described in the socio-emotional selectivity theory, is postulated to increase older adults focus on emotion regulation goals. Suppression is a useful form of emotion regulation for the types of stressors experienced in later life stages, and arguably, therefore is not associated with the negative outcomes observed in younger adults. This could account for the decoupling between suppression and psychological distress observed in this study.

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## Appendix A: Ethical Approval letter

**University  
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5 February 2007

Lusia Stopa  
School of Psychology  
University of  
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Highfield  
Southampton 5017 1BJ

Dear Lusia,

**Re: Emotion processing in ageing: a cross-sectional study**

I am writing to confirm that the above titled ethics application was approved by the School of Psychology Ethics Committee on 24 November 2006.

Should you require any further information, please do not hesitate in contacting me on 023 8059 3995.

**Please quote** approval reference number ST/03/90.

Yours sincerely,



Kathryn Smith Secretary to the Ethics Committee

## Appendix B: Ethical approval for amendments

brummer I. (1b1006)

**From:** Seiter B. **Sent:** Mon 10/1/2007 10:37 AM  
**To:** brummer I. (1b1006)  
**Cc:**  
**Subject:** Ethics approval for amendment  
**Attachments:**

Dear Laura,  
This email is to confirm that the Ethics Committee has approved your amendment request (send by letter to Roger Ingham on 19<sup>th</sup> September 2007) to your study Emotion Processing in ageing, ST/03/90.

With kind regards,  
Barbara

*Barbara Seiter*

*Academic Administrator*

*School of Psychology / Institute for Disorder of Impulse and Attention*

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## Appendix C: Level of Emotional Awareness Scale

**LEAS****INSTRUCTIONS**

Please describe what you would feel in the following situations.

The only requirement is that you use the word **“feel”** in your answers.

You may make your answers as brief or as long as necessary to express how you would feel.

In each situation there is another person mentioned. Please indicate how you think that other person would feel as well.

1. You are traveling in a foreign country. An acquaintance makes derogatory remarks about your native country.

How would you feel?

How would your acquaintance feel?

2. As you drive over a suspension bridge you see a person standing on the other side of the guardrail, looking down at the water.

How would you feel?

How would the person feel?

3. Your sweetheart has been gone for several weeks but finally comes home. As your sweetheart opens the door....

How would you feel?

How would your sweetheart feel?

4. You are standing in line at the bank. The person in front of you steps up to the window and begins a very complicated transaction.

How would you feel?

How would the person in front of you feel?

5. You and your spouse are driving home from an evening out with friends. As you turn onto your road you see fire engines parked near your home.

How would you feel?

How would your spouse feel?

6. You receive an unexpected long-distance phone call from a doctor informing you that your mother has died.

How would you feel?

How would the doctor feel?

7. You tell a friend who is feeling lonely that she/he can call you whenever she/he needs to talk. One night she/he calls at 4:00 a.m.

How would you feel?

How would your friend feel?

8. Your dentist has told you that you have several cavities and schedules you for a return visit.

How would you feel?

How would the dentist feel?

9. Someone who has been critical of you in the past pays you a compliment.

How would you feel?

How would the other person feel?

10. Your doctor told you to avoid fatty foods. A new colleague at work calls to say that she/he is going out for pizza and invites you to go along.

How would you feel?

How would your colleague feel?

Appendix D Emotion Processing Scale

The idea of this questionnaire is to try to understand something about your emotions and feelings. In order to fill it in, you will need to fix the last week firmly in your mind.

Could you first of all spend a few minutes thinking back over what you have been doing in the last week. Starting from one week ago today, try to think about where you were, what you were doing, who you met, anything you may remember. If you have a diary, check for any appointments or reminders of each day.

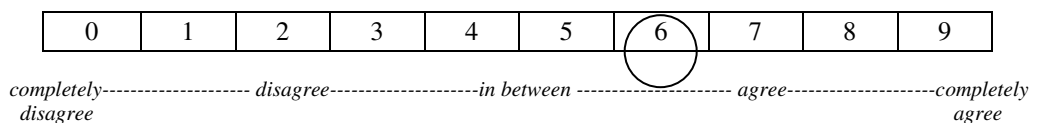
**With the last week in mind what would you say was the *strongest* positive or pleasant emotion that you felt?**

**With the last week in mind what would you say was the *strongest* negative or unpleasant emotion that you felt?**

This questionnaire lists different descriptions of how you may have felt or acted last week. Each description has got a sliding scale under it. The scale moves from ‘completely disagree’ (0) to ‘completely agree’ (9). After reading each description, show how much it applies to you last week by putting a circle around one of the numbers on the sliding scale.

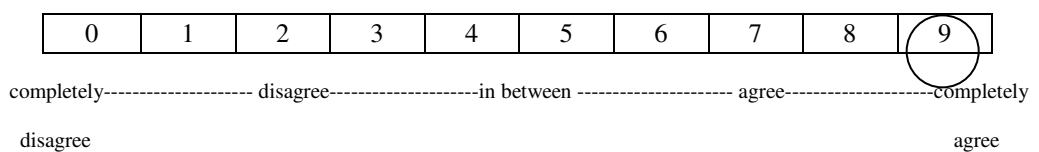
**EXAMPLES**

**I kept my feelings to myself.**



If you circled 6, this would mean that you mildly agree that you ‘**kept your feelings to yourself**’ last week. If this had fully described the way you were last week then you would circle 9.

**I felt bitter about things.**





**1. I smothered my feelings.**

0	1	2	3	4	5	6	7	8	9
---	---	---	---	---	---	---	---	---	---

*completely disagree*----- *disagree*-----*in between* ----- *agree*----- *Completely agree*

**2. Unwanted feelings kept intruding.**

0	1	2	3	4	5	6	7	8	9
---	---	---	---	---	---	---	---	---	---

*completely disagree*----- *disagree*-----*in between* ----- *agree*----- *completely agree*

**3. When upset or angry it was difficult to control what I said.**

0	1	2	3	4	5	6	7	8	9
---	---	---	---	---	---	---	---	---	---

*completely disagree*----- *disagree*-----*in between* ----- *agree*----- *completely agree*

**4. I avoided looking at unpleasant things (eg on TV/in magazines).**

0	1	2	3	4	5	6	7	8	9
---	---	---	---	---	---	---	---	---	---

*completely disagree*----- *disagree*-----*in between* ----- *agree*----- *completely agree*

**5. My emotions felt blunt/dull.**

0	1	2	3	4	5	6	7	8	9
---	---	---	---	---	---	---	---	---	---

*completely disagree*----- *disagree*-----*in between* ----- *agree*----- *completely agree*

**6. I could not express my feelings.**

0	1	2	3	4	5	6	7	8	9
---	---	---	---	---	---	---	---	---	---

*completely disagree*----- *disagree*-----*in between* ----- *agree*----- *completely agree*

**7. My emotional reactions lasted for more than a day.**

0	1	2	3	4	5	6	7	8	9
---	---	---	---	---	---	---	---	---	---

*completely disagree*----- *disagree*-----*in between* ----- *agree*----- *completely agree*

**8. I reacted too much to what people said or did.**

0	1	2	3	4	5	6	7	8	9
---	---	---	---	---	---	---	---	---	---

*completely disagree*----- *disagree*-----*in between* ----- *agree*----- *completely agree*

**9. Talking about negative feelings seemed to make them worse.**

0	1	2	3	4	5	6	7	8	9
---	---	---	---	---	---	---	---	---	---

*completely*----- *disagree*-----*in between* ----- *agree*----- *completely*  
*disagree* *agree*

**10. My feelings did not seem to belong to me.**

0	1	2	3	4	5	6	7	8	9
---	---	---	---	---	---	---	---	---	---

*completely*----- *disagree*-----*in between* ----- *agree*----- *completely*  
*disagree* *agree*

**11. I kept quiet about my feelings.**

0	1	2	3	4	5	6	7	8	9
---	---	---	---	---	---	---	---	---	---

*completely*----- *disagree*-----*in between* ----- *agree*----- *completely*  
*disagree* *agree*

**12. I tended to repeatedly experience the same emotion.**

0	1	2	3	4	5	6	7	8	9
---	---	---	---	---	---	---	---	---	---

*completely*----- *disagree*-----*in between* ----- *agree*----- *completely*  
*disagree* *agree*

**13. I wanted to get my own back on someone.**

0	1	2	3	4	5	6	7	8	9
---	---	---	---	---	---	---	---	---	---

*completely*----- *disagree*-----*in between* ----- *agree*----- *completely*  
*disagree* *agree*

**14. I tried to talk only about pleasant things.**

0	1	2	3	4	5	6	7	8	9
---	---	---	---	---	---	---	---	---	---

*completely*----- *disagree*-----*in between* ----- *agree*----- *completely*  
*disagree* *agree*

**15. It was hard to work out if I felt ill or emotional.**

0	1	2	3	4	5	6	7	8	9
---	---	---	---	---	---	---	---	---	---

*completely*----- *disagree*-----*in between* ----- *agree*----- *completely*  
*disagree* *agree*

**16. I bottled up my emotions.**

0	1	2	3	4	5	6	7	8	9
---	---	---	---	---	---	---	---	---	---

*completely*----- *disagree*-----*in between* ----- *agree*----- *completely*  
*disagree* *agree*

**17. I felt overwhelmed by my emotions.**

0	1	2	3	4	5	6	7	8	9
---	---	---	---	---	---	---	---	---	---

*completely*----- *disagree*-----*in between* ----- *agree*----- *completely*  
*disagree* *agree*

**18. I felt the urge the smash something.**

0	1	2	3	4	5	6	7	8	9
---	---	---	---	---	---	---	---	---	---

*completely*----- *disagree*-----*in between* ----- *agree*----- *completely*  
*disagree* *agree*

**19. I could not tolerate unpleasant feelings.**

0	1	2	3	4	5	6	7	8	9
---	---	---	---	---	---	---	---	---	---

*completely*----- *disagree*-----*in between* ----- *agree*----- *completely*  
*disagree* *agree*

**20. There seemed to be a big blank in my feelings.**

0	1	2	3	4	5	6	7	8	9
---	---	---	---	---	---	---	---	---	---

*completely*----- *disagree*-----*in between* ----- *agree*----- *completely*  
*disagree* *agree*

**21. I tried not to show my feelings to others.**

0	1	2	3	4	5	6	7	8	9
---	---	---	---	---	---	---	---	---	---

*completely*----- *disagree*-----*in between* ----- *agree*----- *completely*  
*disagree* *agree*

**22. I kept thinking about the same emotional situation again and again.**

0	1	2	3	4	5	6	7	8	9
---	---	---	---	---	---	---	---	---	---

*completely*----- *disagree*-----*in between* ----- *agree*----- *completely*  
*disagree* *agree*

**23. It was hard for me to wind down.**

0	1	2	3	4	5	6	7	8	9
---	---	---	---	---	---	---	---	---	---

*completely*----- *disagree*-----*in between* ----- *agree*----- *completely*  
*disagree* *agree*

**24. I tried very hard to avoid things that might make me upset.**

0	1	2	3	4	5	6	7	8	9
---	---	---	---	---	---	---	---	---	---

*completely*----- *disagree*-----*in between* ----- *agree*----- *completely*  
*disagree* *agree*

25. Sometimes I got strong feelings but I'm not sure if they were emotions.

0	1	2	3	4	5	6	7	8	9
---	---	---	---	---	---	---	---	---	---

*completely*-----*disagree*-----*in between* -----*agree*-----*completely*  
*disagree* *agree*

Are there any other important things that you would like to add?

THANK YOU FOR YOUR HELP AND TIME IN FILLING IN THIS  
QUESTIONNAIRE



## Appendix F Depression Anxiety and Stress Scale

**DASS21**

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

*The rating scale is as follows:*

- 0 Did not apply to me at all
- 1 Applied to me to some degree, or some of the time
- 2 Applied to me to a considerable degree, or a good part of time
- 3 Applied to me very much, or most of the time

1	I found it hard to wind down	0	1	2	3
2	I was aware of dryness of my mouth	0	1	2	3
3	I couldn't seem to experience any positive feeling at all	0	1	2	3
4	I experienced breathing difficulty (eg, excessively rapid breathing, breathlessness in the absence of physical exertion)	0	1	2	3
5	I found it difficult to work up the initiative to do things	0	1	2	3
6	I tended to over-react to situations	0	1	2	3
7	I experienced trembling (eg, in the hands)	0	1	2	3
8	I felt that I was using a lot of nervous energy	0	1	2	3
9	I was worried about situations in which I might panic and make a fool of myself	0	1	2	3
10	I felt that I had nothing to look forward to	0	1	2	3
11	I found myself getting agitated	0	1	2	3
12	I found it difficult to relax	0	1	2	3
13	I felt down-hearted and blue	0	1	2	3
14	I was intolerant of anything that kept me from getting on with what I was doing	0	1	2	3
15	I felt I was close to panic	0	1	2	3
16	I was unable to become enthusiastic about anything	0	1	2	3
17	I felt I wasn't worth much as a person	0	1	2	3
18	I felt that I was rather touchy	0	1	2	3
19	I was aware of the action of my heart in the absence of physical exertion (eg, sense of heart rate increase, heart missing a beat)	0	1	2	3
20	I felt scared without any good reason	0	1	2	3
21	I felt that life was meaningless	0	1	2	3

## Appendix G The Marlowe Crown Social Desirability Scale Short-Form

**PERSONAL REACTIONS INVENTORY**

Listed below are a number of statements concerning personal attitudes and traits.

Read each item and decide whether the statement is True or False as it **pertains to you personally**, then circle that answer.

- |      |  |      |       |
|------|--|------|-------|
| (1)  | I like to gossip at times  | TRUE | FALSE |
| (2)  | There have been occasions when I took advantage of someone                         | TRUE | FALSE |
| (3)  | I am always willing to admit when I make a mistake                                 | TRUE | FALSE |
| (4)  | I always try to practice what I preach   | TRUE | FALSE |
| (5)  | I sometimes try to get even with people rather than forgive and forget.            | TRUE | FALSE |
| (6)  | At times, I have really insisted on having things my own way                       | TRUE | FALSE |
| (7)  | There have been occasions when I felt like smashing things                         | TRUE | FALSE |
| (8)  | I never resent being asked to return a favour                                      | TRUE | FALSE |
| (9)  | I have never been irritated when people expressed ideas very different from my own | TRUE | FALSE |
| (10) | I have never deliberately said something that hurt someone's feelings              | TRUE | FALSE |

## Information Sheet: Emotions and Ageing

You are being invited to take part in a research study. Before you decide whether or not to take part, it is important for you to understand why the research is being done and what it will involve. Please take time to read the following information carefully and discuss it with others if you wish. Do not hesitate to ask us if there is anything that is not clear, or if you would like more information. Take time to decide whether or not you wish to take part. Thank you for reading this.

### **What is the purpose of this study?**

Research suggests that with age and experience the way we handle emotions may change. This study is designed to explore the way in which growing older impacts on our responses to emotions and emotional situations.

### **Why have I been chosen?**

Any person aged 18 years and over is eligible to take part in the study. You have been asked if you would like to take part as you are aged 18 or over. We hope to recruit around 500 people for the study.

### **Do I have to take part?**

It is entirely up to you to decide whether or not to take part. Your consent to participate in the study will be assumed by the return of a completed set of questionnaires/by your completion of these questionnaires on line.

### **What will happen to me if I decide to take part?**

If you decide to take part you will be asked to complete a brief sheet that describes you (e.g. your age and gender) and four further questionnaires. You are free to withdraw your consent to participate in the study at any time, without penalty.

### **Will my taking part in this study be kept confidential?**

Yes, any information that you give will be kept strictly confidential. All data will be stored in an anonymous format.

### **What will happen to the results of the research?**

The results of the study will be written up for publication in a psychological journal. It is also hoped that what we learn will be of benefit to our clinical colleagues when they are treating people, both older and younger, who are suffering from a psychological disorder such as anxiety or depression. A brief summary of the findings will be made available on request.

### **Who has reviewed the study?**

This study has been reviewed by the School of Psychology Research Ethics Committee, University of Southampton.

### **Contact for further information**

If you would like more information about any aspect of the study, or if you have any questions or concerns at any time, please do not hesitate to contact Dr Lusia Stopa, Programme Director, Dip/MSc in Cognitive Therapy, on 023 8059 6897, email: L.Stopa@soton.ac.uk, at: School of Psychology, University of Southampton, Building 44 (Shackleton), Highfield, Southampton SO17 1BJ.

**Laura Brummer**  
Trainee Clinical Psychologist

**Dr. Lusia Stopa**  
Programme Director



## **An investigation of ageing and emotions Debriefing statement**

### **Background**

Research suggests that with age and experience the way we handle emotions may change. This study was designed to explore the way in which growing older impacts on our responses to emotions and emotional situations.

### **Methodology**

Participants completed four questionnaires, which aim to explore how people tend to respond when they are faced with difficult, stressful or emotional events in their everyday lives. Descriptive information relating to variables such as age, gender and length of time in education was also collected in order to describe the participants.

### **Results**

The results will be written up and submitted for publication in a peer reviewed journal. This article will summarise the findings but will not identify any individual. A brief summary of the findings will be made available on request.

### **Your response to testing**

If anything that you have been asked to complete has caused you to experience strong, negative emotions, with which you are having difficulty coping, there are a number of sources of support to which you can turn:

1. You can contact your general practitioner
2. You can contact Solent Mind, at  
54 Henstead Road  
Southampton  
SO15 2DD  
Tel. 023 8033 4977  
Email: [info@sotonmind.org.uk](mailto:info@sotonmind.org.uk)  
Web: [www.solentmind.org.uk](http://www.solentmind.org.uk)
3. If you are a student, you can contact the University of Southampton Counselling Service, at:  
28 University Road  
Highfield  
Southampton SO17 1BJ  
Tel: 023 8059 3719 (internal 23719)  
Fax: 023 8059 4589  
Email: [counser@soton.ac.uk](mailto:counser@soton.ac.uk)

Finally, if you have any questions about your rights as a participant in this research, or you feel that you have been placed at risk, please contact the Chair of the Ethics Committee, School of Psychology, University of Southampton, Southampton, SO17 1BJ, Tel: 023 8059 3995.

## **Pilot Study**

### **1. Introduction**

There are several advantages to utilising web accessible computerised surveys; including reaching a wider audience and reduced potential for input errors (see Fouladi, McCarthy & Moller, 2002). However Cronbach (1990) and others (e.g. Kline, 1993) urge caution in assuming the equivalence of computerised and paper and pencil tests. Salgado and Moscoso (2003) suggest that studies often ignore the importance of examining the equivalence of online and traditional measures. Salgado and Moscoso (2003) have suggested guidelines to allow a thorough analysis of this. Using these guidelines, a pilot study examined the equivalence of the method of response used in this study.

### **2. Design**

In order to conduct this pilot study a repeated measures design was used.

### **3. Participants**

20 participants were recruited from the Doctoral Course in Clinical Psychology at the University of Southampton and partners of those on the course. The sample was comprised of trainees and partners of trainees, 13 of whom were female and 7 were male. The age range was 24 to 38 years with a mean age of 28.

### **4. Measures**

The measures used in the pilot study were the same as those used in the main study (see pages 88 to 92).

## **5. Procedure**

Trainee Clinical Psychologists enrolled on the Doctoral course at the University of Southampton were contacted by e-mail with a description of the pilot study. The email asked that they respond via e-mail if they were interested in participating and to forward the email on to interested partners. Those who were interested in participating were then either e-mailed a link to the online survey or sent a questionnaire pack. Half completed the pencil-and-paper measures first, the other half completed the online survey first. Approximately 2 weeks later, they were asked to complete the alternative version.

## **6. Results**

The data set was screened for normality using Shapiro-wilk tests, conducted on the individual subscales for both versions of the measures. Significant results ( $P < 0.05$ ) were returned for the following scales; EPS unprocessed online, DASS depression online, DASS anxiety online, DASS anxiety paper, LEAS total paper. These variables were therefore transformed using the Log10 function and Shapiro-Wilk tests conducted again. All variables except the DASS anxiety and DASS depression subscales were normally distributed and therefore Pearson's correlation coefficients and Spearman's Rho were conducted accordingly to examine correlations between the subscales of the online questionnaires and their pencil-and-paper counterparts. All the subscales were found to correlate with one another ( $p < 0.05$ ). However, only one of the subscales approached the 0.9 level of correlation advocated by Kline (1993).

Table 1:

Table of correlations for EPS

	Paper and Pencil EPS Sub-Scales				
	Suppression	Unregulated	Impoverished	Avoidance	Unprocessed
Online EPS sub-scales					
Suppression	.426*				
Unregulated		.558*			
Impoverished			.711*		
Avoidance				.623*	
Unprocessed					.558*

\*correlation is significant at the 0.01 % level (one-tailed)

Table 2:

Table of correlations for LEAS

	Paper and pencil LEAS sub-scales		
	Self	Other	Total
Online LEAS sub-scales			
Self	.531*		
Other		.816*	
Total			.800*

\*correlation is significant at the 0.01 % level (one-tailed)

Table 3:

Table of correlations for DASS

	Paper and Pencil DASS sub-scales		
	Anxiety	Depression	Stress
Online DASS sub-scales			
Anxiety	.613*		
Depression		.514*	
Stress			.501*

\*correlation is significant at the 0.01 % level (one-tailed)

Table 4:

Table of correlations for ERQ

	Paper and Pencil ERQ sub-scales	
	Reappraisal	Suppression
Online ERQ subscales		
Reappraisal	.537*	
Suppression		.379*

\*correlation is significant at the 0.01 % level (one-tailed)

Table 5:

Table of correlations for Marlowe Crown

	Paper and Pencil Marlowe Crown
Online Marlowe Crown	.872*

\*correlation is significant at the 0.01 % level (one-tailed)

Salgado and Moscoso (2003) also suggest reporting the means, standard deviations and internal consistency coefficients of the response methods in order to demonstrate equivalence, these are illustrated in Table 6. Alphas for both versions indicated acceptable internal reliability although were low for LEAS self and ERQ Suppression and were unacceptable for the Marlowe Crown measure. The Alphas were generally comparable between each version with neither version demonstrating consistently higher or lower alphas than the other.

Table 6:

Mean, standard deviation and alpha coefficients for online and paper and pencil versions.

Dimension	Paper and Pencil (N=10)			Online (N=10)		
	<i>M</i>	<i>SD</i>	<i>Alpha</i>	<i>M</i>	<i>SD</i>	<i>Alpha</i>
<b>EPS</b>						
Suppression	15.83	6.44	.77	12.6	6.15	.85
Unregulated	16.16	7.59	.66	15.4	7.81	.66
Unprocessed	19.95	10.22	.89	15.9	9.38	.84
<b>LEAS</b>						
Emotional Awareness of Self	29.6	4.07	.73	28.55	3.86	.63
Emotional Awareness of others	27.8	4.83	.68	26.3	5.04	.72
Emotional Awareness Total	32.75	4.51	.85	30.85	3.98	.76
<b>DASS</b>						
Anxiety	2.3	2.41	.70	2.3	2.06	.70
Depression	3.35	3.05	.85	2.4	2.76	.84
Stress	7.35	3.66	.76	6.55	4.61	.89
<b>ERQ</b>						
Reappraisal	32.2	4.97	.81	32.1	4.15	.76
Suppression	10.85	4.07	.76	11.40	3.69	.64
<b>Marlowe Crown</b>						
Response bias	5.9	1.45	.078	6.4	1.39	.063

Paired samples t-tests were used to compare subscale pairs meeting parametric assumptions, and Wilcoxon Signed Ranks tests were used where these assumptions were violated. The results of the t-tests and Wilcoxon signed ranks tests (Tables 6 and 7) showed non-significant differences between all the subscale pairs except the LEAS other subscale ( $P > 0.05$ ).

Table 7:

Results of t-test

Online and paper and pencil pairing	t	Significance (two tailed)
EPS		
Suppression	-1.752	.096
Unregulated emotions	-.213	.833
ERQ		
Reappraisal	-.101	.921
Suppression	.567	.577
DASS		
Stress	-.801	.433
LEAS		
Self	-.735	.442
Other	-2.131	.046*

Table 8:

Results of Wilcoxon tests

Online and paper and pencil pairing	Z	Significance (two-tailed)
DASS		
Depression	-1.235	.217
Anxiety	-.201	.841
EPS		
Unprocessed	-1.705	.088

## 7. Discussion

Analysis was conducted to measure the equivalence of the online and paper and pencil input versions of responses to the questionnaires. Guidelines were followed (Salgado & Moscoso, 2003) and suggest that there is good, but not perfect, equivalence between the

majority of the measures. The EPS and DASS measures showed some problems. This may be due to the fact that participants were asked to complete the online and paper versions in different weeks and measures including the DASS and EPS asks participants to respond based on the past week. It is likely that participants had different experiences to draw upon for each of their responses. The two suppression variables; EPS suppression and ERQ suppression also returned the lowest correlation. However, this was overcome by creating a single suppression variable which incorporated both measures. Of concern is the LEAS-other subscale as this should be a relatively stable measure and therefore the reasons stated above should not apply. However, this will not affect the analysis of this study due to the LEAS-Total subscale being used instead.

## **8. References** (additional to those in main reference section)

Cronbach, L.J. (1990). *Essentials of Psychological Testing 5<sup>th</sup> Edition*. New York:

Harper Collins.

Fouladi, R.T., McCarthy, C.J., & Moller, N.P. (2002). Paper-and-pencil or online? Evaluating mode effects on measures of emotional functioning and attachment. *Assessment*, 9(2), 204-215.

Kline, P. (1993). *Handbook of Psychological Testing*. London: Routledge.

Salgado, J.F., & Moscoso, S. (2003). Internet based personality testing: equivalence of measures and assesses' perceptions and reactions. *International Journal of Selection and Assessment*, 14, 194-205.