Original Article

Age, anger regulation and well-being

L. H. Phillips1, J. D. Henry2, J. A. Hosie1, & A. B. Milne1

1School of Psychology, University of Aberdeen, Aberdeen, Scotland and 2School of Psychology, University of New South Wales, Australia

(Received 3 January 2005; accepted 16 May 2005)

Abstract

Emotion regulation has been argued to be an important factor in well-being. The current study investigated the effects of adult aging on emotional expression, emotional control and rumination about emotional events, focusing on an emotion which is particularly important in social interaction: anger. Measures of anger regulation and well-being were obtained in a sample of 286 adults aged between 18 and 88. Older adults expressed anger outwardly less often, and reported more inner control of anger using calming strategies compared to their younger counterparts. These age differences were not explained by variance in social desirability of responding. Age improvements in negative affect and anxiety were partly explained by age differences in anger regulation suggesting an important role for anger management in good mental health amongst older adults. Further, age improvements in quality of life were explained by variance in anger regulation indicating that improved management of emotions with age is an important factor in maintaining well-being in old age.

Introduction

Emotion regulation has been argued to be an important determinant of well-being (e.g., Gross & John, 2003). Unlike cognitive regulation such as inhibition of unwanted responses, which is typically associated with age-related decline (e.g., Phillips, MacPherson, & Della Sala, 2002), there is evidence that aging is associated with improvements in the capacity to regulate emotions (Gross et al., 1997; Lawton, Kleban, Rajagopal, & Dean, 1992; McConatha, Leone, & Armstrong, 1997). For example, older adulthood is associated with improved ability to manage emotionally tricky situations (Carstensen, Hanson, & Freund, 1995), and decreased rumination about negative emotional events (McConatha et al., 1997). Gross et al. (1997) argue that lifelong experience may result in improved emotion regulation, and suggest that this is likely to result in less frequent experience of negative affect amongst older adults. Suggested mechanisms for this age-related improvement in emotional regulation include: selective dampening of negative emotions such as anger, better matching of regulatory strategies to situations, or more frequent employment of positive reappraisal, such as finding positive aspects to a negative situation. Socio-emotional selectivity theory (e.g., Castensen, Fung, & Charles, 2003) proposes that older adults increasingly perceive time limitations as they approach the end of their lifespan, which in turn leads to motivational changes. These motivational changes include increased attention to emotional goals, resulting in better regulation of negative emotions.

Anger is one of the most frequently experienced negative emotions (Averill, 1983). It can be argued that in terms of social outcomes anger is the most important of all negative emotions in relation to the effects of anger expression on social relationships (Lazarus, 1996). Anger involves not only the experience of high-arousal negative feelings, but also often the attribution of blame to others. Expressing anger is specifically associated with social maladjustment, while other negative emotions such as fear and sadness are not (Deffenbacher, 1992; Kubany, Bauer, Muraoka, Richard, & Read, 1995). Research shows that either unrestrained expressions of anger, or chronic suppression of anger, may be detrimental to an individual’s physical health (Mittleman et al., 1995; Siegman & Smith, 1994; Tice & Baumeister, 1993). Minimising the subjective experience of anger through choice of situations or regulating the appraisal of the situation is likely to improve mental and physical well-being.

There are some indications that older adults report lower levels of experienced anger in their everyday lives than their younger counterparts (McConatha et al., 1997; Schieman, 1999). Gross et al. (1997, Study 3) found age-related decreases in the experienced intensity of anger, but not other emotions.
Birditt and Fingerman (2003) found that older adults were less likely to describe experiencing anger as a result of social conflict, but did not differ from younger adults in their level of other emotions experienced. They argue that these results support the socio-emotional selectivity theory (Carstensen, Isaacowitz, & Charles, 1999) in that older adults tend not to express so much anger in response to interpersonal tensions because angry responses are likely to damage important social relationships. However, not all studies indicate lower experience of anger with age: during interviews about experiences of anger, Malatesta-Magai and colleagues (1992) found that, relative to younger adults, older participants expressed more irritation and rage.

Anger is not a unitary construct, and Spielberger (1988) distinguishes between various dissociable sub components such as anger expression, anger control, and trait and state anger. Moreover, anger rumination—defined as the tendency to engage in unintentional recurring thoughts about anger episodes—has been conceptualised as a cognitive trait relatively independent from the actual emotional experience of anger (Sukhodolsky, Golub, & Cromwell, 2001). In the current study, we investigate whether the various aspects of anger expression, control and rumination are differentially affected by aging.

In order to assess whether age differences in anger regulation have any impact on the emotional and more general well-being of older adults, we explore whether any age differences in current emotional state and rated quality of life are predicted by variance in anger regulation. Previous studies have indicated that aspects of emotional regulation predict general negative affect and life satisfaction (Gross & John, 2003; Larsen, 2000; Sukhodolsky et al., 2001) and it may be the case that age changes in anger control influence these important outcome variables. Gross et al. (1997) specifically predict that improved emotional control with age is likely to result in a reduction in the experience of negative affect, while Carstensen Fung, & Charles (2003) predict that age improvements in emotional control may underlie age-related increases in life satisfaction and age-related decreases in mental health problems. These hypotheses have not previously been tested in a mixed age sample, and in the current study it will be investigated whether age differences in negative affect, anxiety, depression and self-rated quality of life can be explained by variance in anger regulation measures.

The aims of this study are therefore: (1) to assess whether there are any age differences in aspects of anger regulation; and (2) if so, to assess whether these differences could be explained by social desirability effects. As Birditt and Fingerman (2003) point out, older adults may be specifically less likely to report anger because of generational differences in the acceptability of expressing strong negative emotions. It is therefore important to investigate whether any age differences in reported anger regulation can be explained by a tendency to socially desirable responding. If age differences in the expression and control of anger are found, one important factor might be the day-to-day levels of anger that an individual experiences. This will be investigated by (3) assessing whether any age differences in anger expression and control can be explained by trait anger. A final aim (4) was to investigate whether age differences in anger regulation predict changes in current emotional state and self-rated quality of life.

Method
Participants

Two hundred and eighty-six healthy participants contributed to these analyses. Most were recruited via advertisements in community newsletters, approaching various organizations (e.g., bowling clubs, rural women’s institute, local charitable organisations), or from the public participation panel at the University of Aberdeen. These participants were each given £10 remuneration. The remaining participants were undergraduate students who completed the study in return for course credits. The mean age of the participants was 43.5 (SD = 23.07; range 18-88); 57.3% of the participants were female, 42.7% male. There was little evidence of gender effects on the anger regulation measures, and no evidence of age × gender interactions, and so gender effects are not reported here. On average, participants had completed 13.4 years of education (SD = 2.90). Age and education were significantly correlated (\(r = -0.28, p < 0.001\)), indicating that younger participants had received more education than their older counterparts. Participants were asked to self rate their health on a seven point scale from 1 (very poor) to 7 (excellent); on average participants rated their health as 5.2 (SD = 1.16); self ratings of health were not significantly correlated with age (\(r = 0.06, p = 0.335\)).

Measures

State-Trait Anger Expression Inventory-2 (STAXI-2). The STAXI-2 is a 57-item self report scale that was developed by Spielberger (1988) to quantify the experience, expression and control of anger. The STAXI 2 can be subdivided into subscales that measure:

- State Anger: the level of anger experienced at the time of testing, for example, ‘I am furious’.
- Trait Anger: the more general predisposition to experience anger, for example, ‘I have a fiery temper’.
- Anger Expression Out: the tendency to express angry feelings verbally or via physically aggressive
behaviour, for example, 'I'll strike out at whatever infuriates me'.

- Anger Expression In: the tendency to experience anger but only express it inwardly, for example, 'I boil inside but don’t show it'.
- Anger Control Out: how often the outward expression of angry feelings is controlled, for example, 'I control my urge to express my angry feelings'.
- Anger Control In: how often angry feelings are controlled by inward calming strategies, for example, 'I take a deep breath and relax'.

Higher scores on the first four subscales indicate a greater propensity to experience and express anger, higher scores on the final two subscales a tendency to control the experience of anger. Before completing the anger expression and control subscales participants are told to think about how they generally react or behave when feeling angry. The Anger Expression Index is calculated as the scores on the two expression scales minus scores on the two control scales, with higher scores indicative of higher overall levels of anger expression. In the present study all scales were administered with the exception of the State Anger scale; pilot work indicated that this scale only revealed floor effects. The STAXI-2 has been found to be a valid, reliable measure of the constructs it was intended to represent (Spielberger, 1988).

Anger Ruminati on Scale (ARS). The Anger Ruminati on Scale (ARS; Sukhodolsky et al., 2001) is a 17-item self report scale that was developed to assess the propensity to focus attention upon anger, recollect past anger experiences, and ruminate about the causes and consequences of anger experiences. Sukhodolsky et al. (2001) argue that whilst anger should be regarded as an emotion, anger rumination refers to the cognitive process of thinking about this emotion. Exploratory factor analysis revealed that the ARS consists of four distinct factors, labelled as 'angry afterthoughts', 'thoughts of revenge', 'angry memories', and 'understanding of the causes of anger' (Sukhodolsky et al., 2001).

Crowne-Marlowe Social Desirability Scale (CMSD). A shortened version of the Crowne and Marlowe (1960) Social Desirability Scale was employed, consisting of the seven items which Crawford and Heather (1987) found to have the highest correlations with respondents’ total score on the full version. The measure was designed to provide an assessment of the extent to which individuals need social approval and acceptance.

The Hospital Anxiety and Depression Scales (HADS). The HADS was developed by Zigmond and Snaith (1983) to provide a brief means of identifying and measuring severity of depression and anxiety in non-psychiatric clinical environments. It consists of 14 items, seven of which measure depression, the other seven anxiety. The respondent is asked to underline the reply that most closely matches how they have felt during the past week.

The Positive and Negative Affect Schedule. The Positive and Negative Affect Schedule (PANAS) is a brief (20-item) self report measure of positive affect and negative affect developed by Watson, Clark and Tellegen (1988). It is claimed that the PANAS provides independent (i.e., orthogonal) measures of these constructs. The PANAS has been shown to be relatively reliable and valid with positive affect and negative affect modestly but significantly correlated (Crawford & Henry, 2004).

The LEIPAD. The LEIPAD is a 27-item self report quality of life questionnaire developed by de Leo et al. (1998). In addition to providing an overall index of quality of life, the measure provides scores for specific subscales that tap physical functioning, cognitive functioning, depression, anxiety, social functioning, life satisfaction, self-esteem and social desirability. The measure has been validated cross-culturally, and has been found to be psychometrically sound (de Leo et al., 1998).

Results

Pearson product moment correlations were calculated to investigate the relationship between each of the STAXI and ARS subscales and total scales with age. These correlations are presented in Table I. It can be seen that all of the subscales are significantly negatively correlated with age, with the exception of the Anger Control Out and Anger Control In subscales of the STAXI, each of which are significantly positively correlated with age. In relation to the STAXI, this data shows that aging is associated with a decrease in self reported trait anger, a decrease in outward expression of anger, and a weaker relationship with a tendency to suppress the outward expression of anger (Anger Expression In). Further, aging is associated with a substantial increase in the control of anger using inward calming strategies (Anger Control In), and a weaker increase in the frequency with which outward expressions of anger are controlled (Anger Control Out). Aging effects were found on all subscales of the ARS, indicating that older adults tend to have fewer post-anger afterthoughts, fewer thoughts of revenge, fewer memories of an angering experience, and spend less time trying to understand the cause of their anger. Since a relatively large number of participants contribute to these analyses, it is important to consider the absolute magnitude of the effects when inferring the practical importance of the results. Following Cohen (1977), in the
present study, the correlations between age and the ARS and STAXI subscales range in absolute magnitude of effect from –0.17 to –0.38, and thus may be regarded as ranging from small to moderate in magnitude. There was no evidence of non linear effects of age in any of the relationships with the STAXI or ARS subscales.

The correlation between age and social desirability (as assessed by the CMSD) was 0.23. In order to determine whether age differences in reported anger regulation might be due to increased concern about social desirability of responding, age-anger correlations were recalculated partialling-out social desirability. These results are also presented in Table I. Slight reductions in age correlations with anger regulation measures were seen, but most of the relationships between age and anger control indices remained significant. Partialling-out social desirability reduced the age correlation to below significance only on the STAXI expression in, and ARS afterthoughts measures. These results indicate that age improvements in reported anger regulation are not generally attributable to more socially desirable responding in older adults.

To investigate whether any age differences in the frequency of expressing and controlling anger as assessed by the STAXI might be attributable to differences in trait anger, partial correlations between age and the four anger expression/control variables were calculated, partialling-out the trait anger scale scores. These revealed that some of the age variance in anger expression and control could be explained by differences in the level of trait anger, but that significant age variance in outward expression of anger, and inward control of anger remained when trait anger was controlled (partial correlations between age and anger indices after controlling for trait anger: Anger Expression Out, r = –0.19, Anger Expression In, r = –0.08, Anger Control Out, r = 0.04, Anger Control In, r = 0.25).

A final set of analyses investigated whether age differences in anger regulation predict age-related change in well-being measures such as mood and self-reported quality of life using a series of partial correlations. In Table II, the correlations of age with mood measures (PANAS positive and negative affect, HADS anxiety and depression scores), and quality of life measures (LEIPAD) are reported. Older adults report significantly higher positive affect, and lower negative affect, and lower levels of anxiety, but there was no age difference in depression. In terms of quality of life indices, overall older adults reported higher total LEIPAD scores, and better cognitive functioning, life satisfaction and self-esteem compared to younger adults. There were no age differences in physical and social functioning. Correlations are also reported between well being measures and anger regulation; as can be seen, the majority of these correlations were significant.

Next, analyses were carried out to investigate whether age differences in anger regulation indices (partialling-out both STAXI index and ARS total scores) could explain significant amounts of age variance in well-being measures. A method developed by Steiger (1980) was adapted to test whether the partial correlations between age and the well being measures were significantly lower than the raw correlations between these variables; see Crawford, Deary, Starr and Whalley (2001) for details of this method. Age variance in negative affect and anxiety scores were significantly reduced when anger regulation was partialled-out. Age variance in total quality of life as assessed by the LEIPAD was also reduced, and looking at the individual subscales of the LEIPAD, positive age correlations with cognitive well-being, life satisfaction and self-esteem were reduced when anger regulation variance was partialled-out. Social well-being was not initially correlated significantly with age, but partialling-out

---

Table I. Simple and partial correlations of age with the STAXI and the ARS, and means and SDs for these measures.

<table>
<thead>
<tr>
<th>Measure</th>
<th>r with age (n = 286)</th>
<th>Partial r with age (CMSD controlled) (n = 283)</th>
<th>Total group (n = 286)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>STAXI</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Trait Anger</td>
<td>–0.32*</td>
<td>–0.24*</td>
<td>18.2</td>
</tr>
<tr>
<td>Anger Expression Out</td>
<td>–0.36*</td>
<td>–0.29*</td>
<td>14.3</td>
</tr>
<tr>
<td>Anger Expression In</td>
<td>–0.18*</td>
<td>–0.09</td>
<td>17.1</td>
</tr>
<tr>
<td>Anger Control Out</td>
<td>0.20*</td>
<td>0.14*</td>
<td>24.2</td>
</tr>
<tr>
<td>Anger Control In</td>
<td>0.37*</td>
<td>0.31*</td>
<td>23.2</td>
</tr>
<tr>
<td>Index</td>
<td>–0.38*</td>
<td>–0.31*</td>
<td>32.0</td>
</tr>
<tr>
<td><strong>ARS</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>–0.28*</td>
<td>–0.21*</td>
<td>36.2</td>
</tr>
<tr>
<td>Angry afterthoughts</td>
<td>–0.17*</td>
<td>–0.09</td>
<td>11.5</td>
</tr>
<tr>
<td>Thoughts of revenge</td>
<td>–0.25*</td>
<td>–0.18*</td>
<td>6.2</td>
</tr>
<tr>
<td>Angry memories</td>
<td>–0.32*</td>
<td>–0.25*</td>
<td>9.8</td>
</tr>
<tr>
<td>Understanding causes</td>
<td>–0.28*</td>
<td>–0.21*</td>
<td>8.8</td>
</tr>
</tbody>
</table>

*p < 0.01; CMSD, Crowne-Marlowe Social Desirability Test; STAXI, State-Trait Anger Expression Inventory; ARS, Anger Rumination Scale.

Age, anger and well-being

---

Age, anger and well-being

---
but that other factors must also be important.

expression is less frequent experience of emotion, one reason for age reductions in outward anger significant age variance remained. This suggests that of anger did reduce age variance in anger expression, group. However, although partialling-out trait levels being experienced less frequently in the older age reduction in angry behaviours may be due to anger such behaviour is considered less socially acceptable among older adults, however, the current data indicate that the majority of the age effects observed were not attributable to variance in social desirability of responding. Another possibility is that the age reduction in angry behaviours may be due to anger being experienced less frequently in the older age group. However, although partialling-out trait levels of anger did reduce age variance in anger expression, significant age variance remained. This suggests that one reason for age reductions in outward anger expression is less frequent experience of emotion, but that other factors must also be important.

There were weak age correlations with Anger Expression In, which assesses the tendency to only express anger inwardly, and Anger Control Out, which assesses how often an individual suppresses the outward expression of emotion. Both of these relationships were reduced to non-significance once trait anger was controlled. Suppression of negative emotions is often viewed as a maladaptive regulation strategy (e.g., Gross & John, 2003; Gatz & Roemer, 2004; Wegner & Bargh, 1997) because chronic suppression of emotions is likely to have negative consequences for health and well-being. The current results suggest negligible effects of age on the use of suppression strategies to regulate emotions. This also indicates that it is unlikely that the age decrease in outwardly expressed anger behaviour described above is due to greater use of suppression strategies to control anger.

A more substantial relationship was found between age and the control of inner experiences of anger (Anger Control In). Older adults report more frequent use of inward-focussed strategies to soothe or calm anger. Most of the items on this subscale deal with the tendency to reduce anger, however it is not made explicit in this questionnaire how these reductions in emotional arousal are carried out. For example, this modulation of angry experience might be carried out by cognitively re-appraising the situation to alter its emotional impact, by substituting a positive for the on-going negative emotion, by attempting to suppress the inner experience of an emotion, or by the use of a distraction strategy such as counting to ten. These different types of emotion regulation strategy might have very different implications for the effectiveness of emotion regulation (Gross & John, 2003). A more detailed approach to individual anger experiences is needed to distinguish between these different types of anger control strategy, while bearing in mind that the inner experience of emotion regulation may not always be subject to conscious awareness or control.

<table>
<thead>
<tr>
<th>Measure</th>
<th>r with age</th>
<th>Partial r with age</th>
<th>r with STAXI index</th>
<th>r with ARS total</th>
</tr>
</thead>
<tbody>
<tr>
<td>PANAS (n = 286)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Positive affect</td>
<td>0.38**</td>
<td>0.34**</td>
<td>-0.22**</td>
<td>-0.08</td>
</tr>
<tr>
<td>Negative affect</td>
<td>-0.23**</td>
<td>-0.14*</td>
<td>0.23**</td>
<td>0.25**</td>
</tr>
<tr>
<td>HADS (n = 286)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Anxiety</td>
<td>-0.37**</td>
<td>-0.22**</td>
<td>0.45**</td>
<td>0.46**</td>
</tr>
<tr>
<td>Depression</td>
<td>-0.06</td>
<td>0.05</td>
<td>0.21**</td>
<td>0.28**</td>
</tr>
<tr>
<td>LEIPAD (n = 250)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>0.26**</td>
<td>0.09</td>
<td>-0.37**</td>
<td>-0.45**</td>
</tr>
<tr>
<td>Physical functioning</td>
<td>0.03</td>
<td>-0.06</td>
<td>-0.18**</td>
<td>-0.21**</td>
</tr>
<tr>
<td>Cognitive functioning</td>
<td>0.20**</td>
<td>0.09</td>
<td>-0.27**</td>
<td>-0.27**</td>
</tr>
<tr>
<td>Social functioning</td>
<td>-0.03</td>
<td>-0.14*</td>
<td>-0.14*</td>
<td>-0.29**</td>
</tr>
<tr>
<td>Life satisfaction</td>
<td>0.27**</td>
<td>0.18**</td>
<td>-0.21**</td>
<td>-0.28**</td>
</tr>
<tr>
<td>Self-esteem</td>
<td>0.29**</td>
<td>0.14*</td>
<td>-0.37**</td>
<td>-0.40**</td>
</tr>
</tbody>
</table>

*p < 0.05; ** p < 0.01, STAXI, State-Trait Anger Expression Inventory; ARS, Anger Rumination Scale; PANAS, Positive and Negative Affect Schedule; HADS, Hospital Anxiety and Depression Scales, LEIPAD = quality of life questionnaire. Bold figures indicate a significant reduction in age correlations after partialling-out anger control measures.
After controlling for social desirability there was no age difference in the tendency to have recurring thoughts about anger experiences, but older adults were found to ruminate less on their angering experiences: in particular to have fewer thoughts of revenge, to dwell less on angry memories, and spend less time trying to understand the causes of anger. The finding that older people report less anger rumination may have important emotional consequences since ruminating increases the level of anger experienced over time (Rusting & Nolen-Hoeksema, 1998) delays cardiovascular recovery after an angering experience (Suchday, Carter, Ewart, Larkin, & Desiderato, 2004) and sustains depression in older adults (Kraaij, Pruynboom, & Garnefski, 2002).

These age changes in anger regulation may have implications for important outcomes such as mood disorder and life satisfaction. In the present sample age was associated with lower levels of negative affect, higher levels of positive affect, lower levels of depression and better quality of life. Statistically partialling-out measures of anger control influenced the size of correlations between age and well-being. The relationship between age and negative affect was significantly reduced when anger regulation measures were partialled-out, indicating that at least one cause of the lower levels of negative affect amongst older people might be effective regulation of anger. This supports the hypothesis of Gross et al. (1997) that better regulation of emotion with age may result in less experience of negative affect. A similar result was obtained for anxiety, with a significant portion of age-related decrease in anxiety levels being statistically explained by better anger regulation. Anxiety and negative affect are strongly related constructs (Crawford & Henry, 2004), and it is plausible that both may decrease with age as a result of better emotional regulation.

In the current sample there were no age differences in depression scores, and also, the significant age increase in positive affect was not statistically explained by variance in anger regulation measures. There is evidence that absence of positive affect contributes more to the explanation of unique depression variance than does presence of negative affect (Henry & Crawford, 2004) and the current results suggest that better anger regulation amongst older adults does not influence the experience of positive affect or depression.

Older adults in the current sample tended to have better self-reported quality of life. The age variance in total quality of life was substantially reduced from 0.26 to 0.09 when anger regulation measures were partialled-out, indicating that one factor influencing older adults’ high levels of well-being is good regulation of emotions, as hypothesized by Carstensen et al. (2003). In terms of specific subscales on the LEIPAD quality of life measure, higher self-rated cognitive functioning and self-esteem amongst older adults was also related to good anger regulation. In contrast, the raw age correlation with social functioning was not significant. Controlling for anger regulation resulted in a negative relationship between age and quality of social interactions, suggesting that better anger regulation in older adults counteracts declines in the quality of social life.

The present results indicate that older adults utilise more effective anger regulation strategies. It has been suggested that age is associated with an improved ability to control emotions, resulting in negative emotions such as anger being experienced less frequently (Carstensen et al., 2003; Gross et al., 1997). It may be that older adults report better control of anger because they tailor their environment to avoid anger inducing situations. However, another possible explanation is that there may be age related changes in the cognitive appraisals of emotional situations, resulting in improved emotion management (Gross et al., 1997). The reported age improvements in regulation of anger contrast starkly with the reliable findings of age declines in regulation in the cognitive domain (e.g., MacPherson, Phillips, & Della Sala, 2002). It will be of interest in future studies to investigate the pattern of age changes in cognitive and emotional regulation within the same sample.

To conclude, older adults experience and express anger less often, report better inner control of anger, and ruminate less on angry experiences; even when differences in social desirability of responding, and trait levels of anger are taken into consideration. These age improvements in anger regulation explain much of the age-related increases in self-reported quality of life; and a significant proportion of age decreases in anxiety and negative affect.

References


