Anger and major depressive disorder: The mediating role of emotion regulation and anger rumination

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A B S T R A C T

Many studies have documented the existence of a close relationship between anger and depression. Furthermore, recent literature has emphasized the role of impaired emotion regulation and anger rumination in depression. The aim of this study was to explore the mediating role of emotion regulation and anger rumination on the relation between anger and major depressive disorder. Eighty-eight patients with major depressive disorder (20 males, 68 females) completed the Beck Depression Inventory (BDI), the Multidimensional Anger Inventory (MAI), the Cognitive Emotion Regulation Questionnaire (CERQ), and the Anger Rumination Scale (ARS). Results illustrated that in clinically depressed people, there are positive relationships between anger, depression, emotion regulation, and anger rumination. Path analysis revealed that emotion regulation and anger rumination played a mediating role on the relation between anger and major depression. Anger was associated with depression via emotion regulation and anger rumination. Findings of the present study suggest that emotion regulation and anger rumination play an important role on the relation between anger and depression. The current study implicates the complicated nature of depression, and emphasizes the understanding and conceptualization of diverse variables that influence depression.

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1. Introduction

As one of the most common psychological disorders, major depression is associated with impaired regulation of emotion (Davidson et al., 2002; Joormann and Gotlib, 2010). Few studies have attempted to explain the relationship between anger and depression. Anger is defined as a negative feeling state associated with specific cognitive appraisals, physiological changes and action tendencies (Kassinove and Sukhodolsy, 1995). Although anger could be adaptive especially when it is expressed in a constructive manner (Taylor and Novaco, 2005), destructive anger, that causing interrupted interpersonal relationships and excessive activity of sympathetic nervous system, is generally accounted as maladaptive (Deffenbacher et al., 1996; Goleman, 2004; Howells, 2004). Apparently, variety in anger expression is associated with psychological and physiological pathology. Anger arousal, and at the same time its inhibition, is related to increased diastolic and systolic blood pressure (Bishop et al., 2008; Bongard and al’Absi, 2005; Goldstein et al., 1988) and heart disease (Depaulo and Horvitz, 2002; Tennant and McLean, 2001).

Evidence has demonstrated a close relationship between anger and depression both in normal (e.g., Kashdan and Roberts, 2007; Riley et al., 1989; Robbins and Tanck, 1997) and patient populations (e.g., Besharat et al., 2011; Brody et al., 1999; Fava and Rosenbaum, 1998; Novaco, 2010). Depressed people exhibit more anger suppression than normal people (Bridewell and Chang, 1997; Robbins and Tanck, 1997). Evolutionary theories of depression suggest that aroused but arrested defenses of flight (arrested anger) and fight (feelings of entrapment) may be among the important components of depression (Gilbert et al., 2004). However, it has been recognized that depressed people also experience more anger (Cheng et al., 2005). Again, in the case of treatment, having some residual symptoms such as anger is related to poor therapeutic outcomes and more relapses in depressed people (Fava and Rosenbaum, 1998). Depressed people also percept more hostility than the normal population (Moreno et al., 1993; Riley et al., 1989).

Psychodynamic theory states that anger is the cause of depression, but current conceptualizations propose a more complicated relationship. Finman and Berkowitz (1989) showed that a little increase in depressed mood led to activation of angry feelings. Indeed, interaction between different causal mechanisms disturbs definite conclusions (Garnefski et al., 2002). Despite various investigations on anger-depression relationship from clinical and theoretical views, there is insufficient evidence on
the nature and circumstances of this relationship. Depression is heterogeneous and therefore multiple variables may be operating.

Disturbances in emotional processing or negative bias in processing emotional information is a key feature of major depressive disorder (e.g., Gotlib et al., 2004; Koster et al., 2005; Siegle et al., 2002). Such dysfunctions of emotional information processing are presented by negative attention biases toward cues for sadness or dysphoria (Gotlib et al., 2004) and negative interpretation of neutral or positive information (Gollan et al., 2008) in patients with major depressive disorder.

Current research has emphasized the importance of emotional functioning and deficits in emotion regulation for depression and related psychological disorders (Ehring et al., 2008; Gross and Munoz, 1995; Joormann and Gotlib, 2010). Although there is no consensus on the precise nature of these deficits, it is proposed that depression changes emotional reactivity in some ways (Rottenberg et al., 2005). Dysfunctions of emotion regulation are associated with changes in depressive symptoms (Ehring et al., 2008). Emotion regulation refers to methods that are used to change or modify the experience and expression of emotions, as well as times in which emotions occur (Rottenberg and Gross, 2003). Emotions can be regulated by a range of unconscious or conscious cognitive processes (Garnefski et al., 2001). This study is limited to self-regulatory, conscious, and cognitive components of emotion regulation.

Cognitive emotion regulation consists of two types of coping strategies: Less adaptive coping strategies such as self-blaming, blaming others, rumination, and catastrophizing are categorized; and more adaptive coping strategies including acceptance, refocus on planning, positive reframing, positive reappraisal, and putting into perspective (Garnefski et al., 2001). Garnefski et al. (2002) have accounted the use of less adaptive cognitive coping strategies as correlates of depression. Less adaptive coping strategies are associated with experience of and expression of anger as well (Martin and Dahlen, 2005). Several of the specific coping strategies proposed by Garnefski et al. (2001) are theoretically related to anger (Beck, 1999).

Anger rumination is defined as an unintentional and recurrent cognitive process that emerges during and continues after an episode of anger experience (Sukhdolosky et al., 2001). It is responsible for duration and intensification of anger (Segerstrom et al., 2003). Sukhdolosky et al. (2001) stated that, “Generally, if anger is viewed as an emotion, anger rumination can be defined as thinking about this emotion" (p. 689). Research has demonstrated a relation between anger rumination and depression (e.g., Gilbert et al., 2005). Anger rumination is also associated with aggression and anger (Maxwell, 2004; Maxwell et al., 2005; Peled and Moretti, 2010) and it can partially explain the intensity (Bushman, 2002; Rusting and Nolen-Hoeksema, 1998) and endurance (Bushman, 2002) of angry feelings.

Rumination is also associated with the tendency for anger suppression (Martin and Dahlen, 2005). In fact, there is a complicated relationship between rumination and anger that needs to be explained. People who use rumination as an emotion regulation strategy are more likely to experience anger repeatedly (Martin and Dahlen, 2005). The cognitive model of depression proposes that depression may intensify by a reciprocal cycle between negative thoughts and mood (Beck et al., 1979). Rumination may be a feature of emotion regulation that has unexpected effects on increasing distress during a long period of time (Campbell-Sills and Barlow, 2007).

The current study attempted to examine the relationship among anger, depression, emotion regulation, and anger rumination in people with major depressive disorder. It was hypothesized that the relationship between anger and depression in people with major depressive disorder is mediated by emotion regulation and anger rumination. The hypothetical model of the research is illustrated in Fig. 1.

2. Method

2.1. Participants and procedure

A total of 88 participants with major depressive disorder (68 women, 20 men; mean age: 33.61, age range: 18–58, SD: 9.28) participated in this study. Patients were selected if (i) they met the DSM-IV-TR (APA, 2000) diagnostic criteria for major depression; (ii) consulting for the first time in order to control therapeutic outcomes; and having good physical health. Patients were excluded from the study if (i) they did not agree to participate in the study; (ii) they had a current/past medical or psychiatric disorder in addition to depression (because of high comorbidity of major depression and anxiety disorders, this criteria was not fully applied and 16% of the present sample contemporaneously suffered from general anxiety disorder); (iii) they had a significant health problem; (iv) they had prior psychiatric treatment. Participants were asked to complete Beck Depression Inventory (BDI), Multidimensional Anger Inventory (MAI), Cognitive Emotion Regulation Questionnaire (CERQ), and Anger Ruminaton Scale (ARS). Upon completion, all participants were thanked for their participation. The protocol was approved by Department of Psychology, University of Tehran. All participants signed an informed consent document prior to performing the research procedure. Participants were primarily drawn from the middle socioeconomic classes. Participants’ demographic information is presented in Table 1.

2.2. Measures

2.2.1. Beck Depression Inventory (BDI)

The BDI (Beck et al., 1988) is a 13-item measure of depressive symptomatology. Each item is rated on a four-point Likert scale ranging from 0 to 3. The BDI is a widely used measure with considerable support for its reliability and validity across a variety of samples (Besharat, 2004; Beck et al., 1979, 1988). Cronbach’s alpha coefficient was .78 for the present study.

![Fig. 1. The hypothetical model of the mediating role of emotion regulation and anger rumination on the relation between anger and depression.](image-url)
Table 1
Demographic information (N=88).

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean (S.D.)</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (year)</td>
<td>33.61 (9.28)</td>
<td>68</td>
<td>77.3</td>
</tr>
<tr>
<td>Duration of illness (month)</td>
<td>42.14 (37.60)</td>
<td>20</td>
<td>23.7</td>
</tr>
<tr>
<td>Sex</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>54</td>
<td>64</td>
<td>36.4</td>
</tr>
<tr>
<td>Male</td>
<td>54</td>
<td>64</td>
<td>36.4</td>
</tr>
<tr>
<td>Marital status</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Married</td>
<td>54</td>
<td>64</td>
<td>36.4</td>
</tr>
<tr>
<td>Single</td>
<td>54</td>
<td>64</td>
<td>36.4</td>
</tr>
<tr>
<td>Divorced</td>
<td>2</td>
<td>25</td>
<td>2.7</td>
</tr>
<tr>
<td>Highest education level</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>9th to 12th grade</td>
<td>48</td>
<td>64</td>
<td>36.4</td>
</tr>
<tr>
<td>Bachelor level</td>
<td>34</td>
<td>64</td>
<td>36.4</td>
</tr>
<tr>
<td>Master level</td>
<td>6</td>
<td>25</td>
<td>2.7</td>
</tr>
</tbody>
</table>

2.2.2. The Farsi version of the Multidimensional Anger Inventory (MAI)

The MAI is a 30-item scale rated on a five-point Likert scale ranging from 1 (completely undistruptive) to 5 (completely descriptive). Items measure five dimensions of anger including anger arousal, anger-eliciting situations, hostile outlook, anger-out, and anger-in. Psychometric properties of the MAI have been confirmed across several studies (e.g., Siegel, 1986). Psychometric properties of the Farsi version of the scale indicated sufficient internal consistency and test-retest reliability (Besharat, 2007). Cronbach’s alpha coefficient was .80 for the present study.

2.2.3. Cognitive Emotion Regulation Questionnaire (CERQ)

The CERQ is a 18-item questionnaire validated for measuring individual differences in coping across nine subscales: Self-blame, blaming others, acceptance, refocusing on planning, positive refocusing, rumination, positive reappraisal, putting into perspective, and catastrophizing (Garnefski and Kraaij, 2006). Items are rated on a five-point Likert scale ranging from 1 (almost never) to 5 (almost always) so that higher scores represent greater use of the coping strategy. Adequate psychometric properties of the scale have been reported for the English version (Garnefski and Kraaij, 2006; Garnefski et al., 2001). Preliminary findings on the Farsi version of the CERQ have confirmed the internal consistency and the test-retest reliability of the scale (Besharat, 2010).

2.2.4. The Farsi version of the Anger Rumination Scale (ARS)

This is a 19-item self-report measure of the tendency to think about current anger-provoking situations and to recall anger episodes from the past (Sukhodolsky et al., 2001). Each item is rated on a four-point Likert scale ranging from 1 (almost never) to 4 (almost always). The scale also provides a total anger rumination score. It includes four subscales: anger afterthoughts, thoughts of revenge, angry memories, and understanding of causes. Adequate psychometric properties of the scale have been reported for the English (Sukhodolsky et al., 2001) and the Farsi (Besharat, 2011; Besharat and Mohammad Mehr, 2009) versions.

3. Results

A multivariate analysis of variance (MANOVA) was performed between measures of anger, anger rumination, and emotion regulation and the categorical variable of gender in order to examine gender differences. The use of Wilks’ criterion analysis revealed that there was no multivariate main effect for gender F(3,84) = 0.84, P > 0.05. So subsequent analyses were collapsed across gender.

Descriptive statistics and Pearson’s correlation coefficients between variables are shown in Table 2. Correlation coefficients between variables showed that depression was positively correlated with four dimensions of anger as well as anger rumination and less adaptive emotion regulation strategies. Less adaptive emotion regulation strategies were positively associated with anger arousal and anger-eliciting situations. It was also shown that anger rumination was positively correlated with four dimensions of anger including anger arousal, anger-eliciting situations, hostile outlook, and anger-in.

Variance–covariance matrices were used as input data in order to examine the hypothesized model of the study (Fig. 1). Since distribution of the data was normal, the maximum likelihood (ML) method was conducted. The results showed that the model is significant for anger arousal, anger-eliciting situations, and hostile outlook; and insignificant for anger-in and anger-out.

Fig. 2 displays standardized path coefficients on the mediating role of emotion regulation and anger rumination on the relation of anger arousal to depression. Direct effects of variables are shown on the arrows pointing to relationships of variables in the model. As can be seen from Fig. 2, anger arousal explained 35% of

Table 2
Mean scores, standard deviations, and correlations between depression and measures of anger, anger rumination and emotion regulation.

<table>
<thead>
<tr>
<th>Variable</th>
<th>M</th>
<th>S.D.</th>
<th>Anger arousal</th>
<th>Less adaptive emotion regulation</th>
<th>Depression</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anger arousal</td>
<td>40.69</td>
<td>12.08</td>
<td>.25</td>
<td>.28</td>
<td>.67</td>
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<tr>
<td>Anger-eliciting situations</td>
<td>33.72</td>
<td>7.89</td>
<td>.22</td>
<td>.23</td>
<td>.53</td>
</tr>
<tr>
<td>Hostile outlook</td>
<td>41.67</td>
<td>7.44</td>
<td>.31</td>
<td>.16</td>
<td>.44</td>
</tr>
<tr>
<td>Anger-out</td>
<td>13.16</td>
<td>2.43</td>
<td>.03</td>
<td>-.14</td>
<td>.11</td>
</tr>
<tr>
<td>Anger-in</td>
<td>21.68</td>
<td>4.32</td>
<td>.32</td>
<td>.19</td>
<td>.38</td>
</tr>
<tr>
<td>Depression</td>
<td>21.70</td>
<td>6.90</td>
<td>.31</td>
<td>.44</td>
<td>.57</td>
</tr>
<tr>
<td>Less adaptive emotion regulation</td>
<td>26.48</td>
<td>12.72</td>
<td>.37</td>
<td>.59</td>
<td>.76</td>
</tr>
<tr>
<td>Anger rumination</td>
<td>55.05</td>
<td>12.72</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*p < .05.

**p < .01.

Fig. 2. Standardized path coefficients on the mediating role of emotion regulation and anger rumination on the relation of anger arousal to depression.
depression variance by the path coefficient of .59. On the other paths, anger arousal explained 6% of less adaptive emotion regulation variance by the path coefficient of .25, and 8% of anger rumination by the path coefficient of .29. Less adaptive emotion regulation explained 8% of depression variance by the path coefficient of .28, and anger rumination explained 6% of depression variance by the path coefficient of .25. All of these direct coefficients were significant at $p < .05$.

Fig. 3 displays standardized path coefficients on the mediating role of emotion regulation and anger rumination on the relation of anger-eliciting situations to depression. All of these direct coefficients were significant at $p < .05$.

Fig. 4 displays standardized path coefficients on the mediating role of emotion regulation and anger rumination on the relation of hostile outlook to depression. All of these direct coefficients were significant ($p < .05$).

**Table 3** shows standardized and non standardized coefficients of direct paths for anger arousal, anger-eliciting situations, and hostile outlook.

One of the structural equations modeling aims is to detect indirect effects of independent variables (exogenous variables) on dependant variables (endogenous variables); so indirect effects of independent variables are displayed in **Table 4**. These indirect coefficients were significant at $p < .05$.

The Fit indices related to models of anger arousal, anger-eliciting situations, and hostile outlook are presented in **Table 5**. Absolute fit of each model was adequate. Comparative indices of the models were superior to independent models. Expected cross-validation index (ECV) indicated the validity of the models.

The results showed that three dimensions of anger including anger arousal, anger eliciting-situations, and hostile outlook were related to depression through the mediating role of emotion

---

**Table 3**

<table>
<thead>
<tr>
<th>Paths</th>
<th>$B$</th>
<th>$\beta$</th>
<th>$t$</th>
<th>$p$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anger arousal</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The effect of anger arousal on depression</td>
<td>.34</td>
<td>.59</td>
<td>7.36</td>
<td>.001</td>
</tr>
<tr>
<td>The effect of anger arousal on less adaptive emotion regulation</td>
<td>.14</td>
<td>.28</td>
<td>2.55</td>
<td>.03</td>
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<tr>
<td>The effect of anger arousal on anger rumination</td>
<td>.26</td>
<td>.25</td>
<td>2.39</td>
<td>.04</td>
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<tr>
<td>The effect of less adaptive emotion regulation on depression</td>
<td>.28</td>
<td>.25</td>
<td>3.25</td>
<td>.01</td>
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<tr>
<td>The effect of anger rumination on depression</td>
<td>.44</td>
<td>.29</td>
<td>6.25</td>
<td>.001</td>
</tr>
<tr>
<td>Anger-eliciting situations</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The effect of anger-eliciting situations on depression</td>
<td>.36</td>
<td>.44</td>
<td>4.91</td>
<td>.001</td>
</tr>
<tr>
<td>The effect of anger-eliciting situations on less adaptive emotion regulation</td>
<td>.18</td>
<td>.23</td>
<td>2.23</td>
<td>.03</td>
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<tr>
<td>The effect of anger-eliciting situations on anger rumination</td>
<td>.35</td>
<td>.22</td>
<td>2.09</td>
<td>.03</td>
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<tr>
<td>The effect of less adaptive emotion regulation on depression</td>
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<td>.01</td>
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<tr>
<td>The effect of anger rumination on depression</td>
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<td>.12</td>
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<td>.03</td>
</tr>
<tr>
<td>Hostile outlook</td>
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<td></td>
</tr>
<tr>
<td>The effect of hostile outlook on depression</td>
<td>.34</td>
<td>.44</td>
<td>3.93</td>
<td>.01</td>
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<tr>
<td>The effect of hostile outlook on less adaptive emotion regulation</td>
<td>.33</td>
<td>.23</td>
<td>4.11</td>
<td>.001</td>
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<tr>
<td>The effect of hostile outlook on anger rumination</td>
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<td>3.09</td>
<td>.001</td>
</tr>
<tr>
<td>The effect of less adaptive emotion regulation on depression</td>
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<td>.30</td>
<td>4.01</td>
<td>.001</td>
</tr>
<tr>
<td>The effect of anger rumination on depression</td>
<td>.23</td>
<td>.12</td>
<td>4.91</td>
<td>.001</td>
</tr>
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**Table 4**

<table>
<thead>
<tr>
<th>Paths</th>
<th>$\beta$</th>
<th>$Z_{sobel}$</th>
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<tbody>
<tr>
<td>Anger arousal</td>
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</tr>
<tr>
<td>The effect of anger arousal on depression mediated by less adaptive emotion regulation</td>
<td>.07</td>
<td>2.01*</td>
</tr>
<tr>
<td>The effect of anger arousal on depression mediated by anger rumination</td>
<td>.07</td>
<td>2.11*</td>
</tr>
<tr>
<td>Anger-eliciting situations</td>
<td></td>
<td></td>
</tr>
<tr>
<td>The effect of Anger-eliciting situations on depression mediated by less adaptive emotion regulation</td>
<td>.07</td>
<td>2.11*</td>
</tr>
<tr>
<td>The effect of Anger-eliciting situations on depression mediated by anger rumination</td>
<td>.03</td>
<td>2.03*</td>
</tr>
<tr>
<td>Hostile outlook</td>
<td></td>
<td></td>
</tr>
<tr>
<td>The effect of hostile outlook on depression mediated by less adaptive emotion regulation</td>
<td>.09</td>
<td>2.07*</td>
</tr>
<tr>
<td>The effect of hostile outlook on depression mediated by anger rumination</td>
<td>.08</td>
<td>2.21*</td>
</tr>
</tbody>
</table>

* $p < .05$. 

---

**Fig. 3** Standardized path coefficients on the mediating role of emotion regulation and anger rumination on the relation of anger-eliciting situations to depression.

**Fig. 4** Standardized path coefficients on the mediating role of emotion regulation and anger rumination on the relation of hostile outlook to depression.
regulation and anger rumination. Thus, proposed model of the research is presented in Fig. 5.

4. Discussion

This study presented a hypothetical model to examine the relationships between anger, depression, emotion regulation, and anger rumination in a sample of patients with major depressive disorder. Results of the present study revealed positive relationships between anger, depression, emotion regulation, and anger rumination. As predicted, emotion regulation and anger rumination played a mediating role on the relation between anger and major depression. Results of the present study confirmed the hypothetical model about three dimensions of anger including anger arousal, anger-eliciting situations, and hostile outlook. These findings are consistent with existing evidence of a robust relationship between anger, depression, emotion regulation, and anger rumination (e.g., Besharat et al., 2011; Campbell-Sills and Barlow, 2007; Cheng et al., 2005; Davidson et al., 2002; Ehring et al., 2008; Gilbert et al., 2005; Gollan et al., 2008; Gotlib et al., 2004; Joormann and Gotlib, 2010; Koster et al., 2005; Novaco, 2010; Rottenberg et al., 2005; Siegle et al., 2002).

Through information processing, people lead their attention to positive or negative events in order to adapt the events with their previous experiences. Because of the negative bias in information processing, depressed people tend to perceive cues for sadness or dysphoria (Gotlib et al., 2004) and interpret neutral or positive information negatively (Gollan et al., 2008). In fact, negative bias in information processing is a feature of major depression (Gotlib et al., 2004; Koster et al., 2005; Siegle et al., 2002). Dysfunctional schemas and consequently dysfunctional attitudes lead people with major depression to have failures in evaluating life events (Scher et al., 2005). On the whole, these people experience more negative and destructive emotions such as anger than nondepressed individuals. Obviously, simple and usual experiences of anger cannot explain quality and quantity of this emotion in depressed people. This study showed that emotion regulation mechanisms are effective in this relationship. Confronting negative events, people use different coping strategies. These cognitive strategies have a crucial role in the relationship between experiencing negative life events and reporting depression and anxiety symptoms.

According to a self-regulatory executive functional model (Wells and Matthews, 1994), failure in cognitive mechanisms of emotional self-regulation (a type of emotion regulation) leads to emotional maladjustment and persistence in depression symptoms. In the present study, we investigated conscious and cognitive processes such as self-blame, blaming others, and rumination. Depressive symptoms may indicate the existence of less adaptive cognitive coping strategies. On the other hand, the existence of multiple causal mechanisms in depression makes the final conclusion impossible. Indeed, anger initiates depression through these less adaptive regulation strategies. On the other side, depressive mood elicits negative feelings such as anger, and consequently the feelings accompanied with failures in regulation worsen the depressed mood. Anger rumination as a coping strategy in the presence of anger is effective in depression. When anger feelings are elicited, depressive mood makes a connection between the feelings and past memories and activates automatic thoughts. These thoughts have a close relationship with central self-concept. These thoughts include anger rumination as well. In this situation, individuals may have hostile feelings toward others, and a tendency for revenge or other components of rumination might be started off.

From the metacognitive perspective (Papageorgiou and Wells, 2004), positive beliefs about the rumination benefits and advantages could make them last. When ruminate thoughts are activated, people perceive them as uncontrollable and harmful phenomena that could produce detrimental interpersonal and social consequences. Arousal of negative thoughts and subsequently appraisal on rumination participate in depression. So, through a number of vicious cycles, depression and metacognitive beliefs may be involved in depression persistency. Mood disorders are characterized by another figure of negative cognition, known as rumination. Therefore, rumination includes negative events of past and present, and tries to regulate negative emotions; so it elicits negative emotions.

Campbell-Sills and Barlow (2007) suggested that people who ruminate deliberately seek negative outcomes. In contrary, active mechanisms such as negative reinforcement or belief in the usefulness of rumination probably reinforce this cognitive model. Accordingly, rumination may be a kind of emotion regulation that has an unpredictable effect on increasing distress over long periods of time.

On the basis of the results of the present study, it can be concluded that anger and depression are related through the mediating role of emotion regulation and anger rumination. Accordingly, this knowledge would provide benefits for the understanding of the relations between anger and depression, for both theoretical and clinical applications. Therefore, the proper assessment of anger, dysfunctions of emotion regulation, and anger rumination in patients with major depressive disorder may

Table 5
Fit indices related to models of anger arousal, anger-eliciting situations, and hostile outlook.

<table>
<thead>
<tr>
<th>Model</th>
<th>$\chi^2$</th>
<th>df</th>
<th>$p$</th>
<th>$\chi^2$/df</th>
<th>RMSEA</th>
<th>GFI</th>
<th>AGFI</th>
<th>CFI</th>
<th>ECV</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anger arousal</td>
<td>3.34</td>
<td>1</td>
<td>.224</td>
<td>3.34</td>
<td>.011</td>
<td>.95</td>
<td>.93</td>
<td>.89</td>
<td>.02</td>
</tr>
<tr>
<td>Anger-eliciting situations</td>
<td>3.06</td>
<td>1</td>
<td>.152</td>
<td>3.06</td>
<td>.032</td>
<td>.95</td>
<td>.92</td>
<td>.93</td>
<td>.02</td>
</tr>
<tr>
<td>Hostile outlook</td>
<td>4.35</td>
<td>1</td>
<td>.130</td>
<td>4.35</td>
<td>.030</td>
<td>.96</td>
<td>.94</td>
<td>.89</td>
<td>.07</td>
</tr>
</tbody>
</table>

![Fig. 5. Proposed model of the study on the mediating role of emotion regulation and anger rumination on the relation between anger dimensions and depression.](image-url)
provide useful information for intervention and management programs. It has been shown that rumination in response to depressive symptoms predicts new onsets of major depressive episodes (Nolen-Hoeksema, 2000; Spasojevic and Alloy, 2001). Hence it may be argued that reductions in rumination would reduce the risk of new onsets of major depressive episodes. There is evidence to suggest that mindfulness-based cognitive therapy may be effective in reducing rumination (Segal et al., 2002; Teasdale et al., 2000). The results of the present study support using mindfulness-based cognitive therapy in order to help reduce rumination and the risk of new onsets of major depressive episodes.

There are several limitations to the current study. First, the present study was cross-sectional and utilized self-report measures. Although this study provides evidence for the mediating role of emotion regulation and anger rumination on the relation between anger and major depressive disorder, the cross-sectional design prevents an understanding of the exact nature of the relationships, particularly with respect to directionality. Second, this study did not include a normal control group. It would be of value to compare the scores of anger, depression, emotion regulation, and anger rumination between normal controls and depressive patients. Such a study may lead to a better understanding of the role of dysfunctions of emotion regulation in the development and/or perpetuation of the condition. Third, differences of personality characteristics were not investigated in this study. It is possible that personality factors may interact with emotion regulation to produce positive or negative consequences. Future studies need to be pursued to address this issue. Finally, the present study focuses on two mediating factors, emotion regulation and anger rumination. Consequently, it is important that future studies employ different variables which may have potential to play a mediating role, in order to lead to a better understanding of the role of emotional and cognitive factors in the development and perpetuation of depression.

References


