



Comparison of effect of anger rumination on the relationship between anger dimensions and control and quality of life among students

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Abstract

Several studies have shown the destructive effects of anger as an emotion on quality of life. Meanwhile, the study and proper management of anger can have a significant positive impact on quality of life. The present study was conducted to examine the mediating effect of anger rumination on the relationship of the dimensions of anger and anger control with quality of life in male and female high school students in Damghan, Iran. This correlational study used stratified random sampling to examine 223 participants (136 girls and 87 boys) using the anger rumination scale, Spielberger's State-Trait anger expression inventory and the 36-item short form quality of life questionnaire developed by Ware and Sherbourne. A significant relationship was observed between anger rumination and the dimensions of anger, but not between anger rumination and anger control. The results showed a significant negative correlation between anger rumination and quality of life. Differences were also observed between the girls and boys in terms of the dimensions of anger (state anger and trait anger and anger control (control-in and control-out), but not in terms of anger rumination and quality of life. The results showed that anger rumination affects anger expression and also that girls and boys are different in terms of anger control and anger expression.

Keywords: Anger, Control, Rumination, Quality of Life

Introduction

Anger is one of the most common emotions experienced that is always focused on a specific subject (the self, others or fate [1]. Anger was defined as a subjective, negatively felt state associated with cognitive deficits and distortions and maladaptive behaviors [2]. The phenomenology of anger includes emotional experiences, varying from annoyance to rage, behavioral patterns, varying from social

withdrawal to physical aggression, and cognitive phenomena, such as attributions of blame and mental rumination [3]. Generally angry individuals are described by others as abrasive, confrontational, and opinionated. They report more verbal and physical antagonism toward others. Such behavior often leads to negative interpersonal consequences because people tend to react negatively to such

displays of [3]. Several models of anger were considered to provide a conceptual framework. Spielberger [3] proposed a factor-analytical model of anger that distinguished between anger experience and anger expression. Within this model, anger experience is viewed as a subjective experience varying in duration and intensity. Anger expression is viewed as an individual's tendency to act on anger by showing it outwardly, suppressing it, or actively coping with it. However, Spielberger [3] also suggested that there are unclear boundaries among the related concepts of anger, hostility, and aggression and that the three can be integrated into a collective "AHA syndrome." Within this syndrome, anger refers to emotional states, hostility refers to antagonistic beliefs, and aggression refers to overt harmful behavior [4].

Although anger can be adaptive if expressed in a constructive manner, lasting (chronic) anger associated with the break-up of relationships with others and the excessive activity of the sympathetic nervous system is often considered maladaptive [1]. Cognitive variables such as beliefs, attitudes, attributes, motivations and incomplete information processing mediate anger and aggression. These factors can include hostile attribution bias, making quick judgments, dismissing important signs and misjudging consequences [2]. Anger rumination is one such mediatory variable that appears during or after the experience of anger and refers to a cognitive process that begins or develops after the emotion of anger. Theoretically speaking, the construct of anger rumination includes three different components: Recalling memories of past experiences of anger, thinking about current experiences of anger and unrealistic thoughts about the experience of anger. Events related to previous experiences of anger can provoke a new experience of state anger and strengthen the intensity and duration of anger. Anger rumination is associated with the duration of the experience of anger, the tendency to think about the experience of anger and anger control and expression [2]. Psychologists distinguish between two types of anger: Trait anger and

state anger [1]. Spielberger [3] referred to the experience of anger as "state anger" in phenomenological terms. State anger is a transient psycho-biological state that varies in severity from sadness (mild anger) to wrath (intense anger). Trait anger is a type of anger based on which the person tends to experience state anger more frequently in response to a broader range of situations. Experiences of anger are also influenced by cognitive assessments, especially those related to prejudice, debasement and unfairness (dishonesty) [4].

Two constructs, anger-in and anger-out, have been particularly influential in research on anger. As measured by Spielberger [3] State-Trait Anger Expression Inventory-2 (STAXI-2), anger-in refers to the tendency to suppress one's anger, and anger-out involves the outward expression of anger in a physically or verbally aggressive manner. Both forms of anger expression have been implicated in negative health outcomes. In addition, both predict adverse anger-related consequences. Specifically, Dahlen and colleagues found that anger-in predicted negative feelings about oneself, tension, and reckless driving, while anger-out predicted verbal fights [2].

Anger is the reflection of a multi-dimensional phenomenon and a combination of internal anger, external anger and anger control. Internal anger reflects the tendency to suppress thoughts and feelings of anger. In contrast, external anger reflects the desire to engage in aggressive behaviors toward objects or people in the environment. Ultimately, anger control refers to the individual's ability to control and avoid the experience or expression of anger. Controlling anger involves the person's constructive use of calmness [5]. Deffenbacher [6] distinguishes between the initiators of internal anger and external anger. The events provoking external anger include identifiable conditions, such as being stuck in a traffic jam or facing others' undesirable behaviors. The internal factors initiating anger include reflection about an unpleasant event. Emotional impulses, particularly

destructive emotions such as anger, face us with the question of 'What can be construed as an effective way to deal with these emotions? Should we express them freely or should we try to control them?' The repeated expression of anger and refraining from its control threaten one's mental health, social functioning, physical health and quality of life in general [1]. Quality of life is one of the variables that can be negatively affected by the expression of anger and the inability to properly control it. Quality of life refers to people's level of satisfaction with their conditions and is affected by many factors, including health-related factors such as affliction, illness and pain, disability, etc. [7]. The main components of a good quality of life include a good family (children), good social relationships, health, adequate physical activity, good financial conditions, being engaged in different activities, joy, youth and a good living environment [8].

Anger negatively affects people's quality of life on physical, emotional, mental and spiritual levels. Studies suggest that anger and quality of life are related. A study conducted to investigate the mediating effect of anger rumination on the relationship of physical health with the dimensions of anger and anger control, including trait anger, state anger, internal anger, external anger, anger control-in and anger control-out, found that higher levels of anger are correlated with lower levels of physical health and higher levels of physical illness while higher levels of anger control are associated with higher levels of physical health and lower levels of physical illness [9]. The analysis carried out in the study also showed that, through anger rumination, the dimensions of anger and anger control affect physical health indicators as one of the indicators of quality of life in opposite directions. Through anger rumination, increased anger was associated with reduced physical health and increased physical illness while increased anger control was associated with increased physical health and reduced physical illness. According to this study, anger rumination had a full mediation effect on the relationship of trait anger, state anger and anger

control-in and control-out with physical health, and only a partial mediation effect on the relationship the dimensions of internal and external anger with physical health.

[9]. Studies [10-11] show that emotions and the way of coping with them affect people's health and quality of life. As a negative emotion, anger is also considered a risk factor for cardiovascular diseases. One study [12] showed that, not only the expression of anger, but suppressed anger, too, is associated with the severity of atherosclerosis progress and its prevalence. Life skills training programs designed to improve quality of life have helped people manage their negative emotions, such as anger, and express them in a more appropriate way. Anger is an emotion that is provoked by discordant and contradictory interactions and delays the healing of wounds and injuries. Trait anger indicates a tendency to experience anger more frequently [3]. There is substantial empirical evidence on the strong relationship between anger and different diseases. One study [13] revealed a close relationship between anger and the risk of cardiovascular diseases. Rumination and chronic psychological stress increase autonomic activity and reduce sympathetic activity—factors that are both associated with cardiovascular risks [14]. The results of one study also revealed a relationship between rumination, especially anger rumination, and serious health indicators and health problems, including tachycardia and hypertension [15]. According to the results of these studies, anger rumination can be said to affect quality of life and its indicators, including physical, mental, emotional and social health, by reducing anger control. The present study was therefore conducted to evaluate the mediating effects of anger rumination on the relationship of the dimensions of anger and anger control with quality of life in pre-collegiate students.

Method

This descriptive-correlational study was conducted on a statistical population of all the pre-collegiate students in the academic year

2012-2013 in Damghan, Iran, including 200 male and 317 female students. A total of 223 students (136 girls and 87 boys) were selected using Cochran's formula through stratified random sampling. First, all the pre-collegiate schools of Damghan, which are gender-segregated by law, were identified; next, one boys' pre-collegiate school and another girls' school were randomly selected. The girls' school had nine classrooms and five of them were randomly selected by drawing lots (n=136). The boys' school had seven classrooms and three of them were randomly selected (n=87). After determining the sample size and selecting the participants, the respondents were asked to complete the 36-Item Short Form (SF-36) Quality of Life Questionnaire, the Anger Rumination Scale (ARS) and the Spiel Berger State-Trait Anger Expression Inventory (STAXI-2), but they were told that they did not have to fill out their personal information, and that only clarity and precision in answering the items were important. The questionnaires were then collected. The next section discusses the data collection tools used.

The Spiel Berger State-Trait Anger Expression Inventory (STAXI-2): is a 57-item inventory developed by Spiel Berger in 1988 that consists of six scales: 1) State anger (15 items), which itself comprises of three subscales, including angry feelings (five items), tendency to express anger verbally (five items) and tendency to express anger physically (five items); 2) Trait anger (ten items), comprising of the subscales of angry temperament and angry reaction; 3) Anger Expression-Out (eight items); 4) Anger Expression-In (eight items); 5) Anger Control-Out (eight items); 6) Anger Control-In (eight items). The respondents rated these items on a 4-point scale from 'not at all' (1) to 'very much so' (4). The Cronbach's alpha coefficients calculated for the scales and subscales of state anger, trait anger, angry feelings, tendency to express anger verbally, tendency to express anger physically, anger expression-out, anger expression-in, anger control-out and anger control-in were 0.93, 0.87, 0.85, 0.87, 0.88, 0.83, 0.70, 0.67, 0.80 and

0.69, in respective order.

The high internal consistency between the scales and subscales of anger and its positive correlation with the other scales of anger suggest a good validity [3].

The Anger Expression (AX) scales were subsequently developed to assess differences in the manner in which participants typically respond to anger. Spiel Berger et al reported reliability and validity of the test:

Internal Reliability and Factor Analysis: Preliminary analyses suggested that two orthogonal factors could be used to describe responses to the item pool, involving measures of anger-in (8 items, e.g., "pout or sulk") and anger-out (8 items, e.g., "say nasty things"), respectively. Internal consistency was reasonably high for each of the two subscales (0.73-0.84).

The SF-36 Quality of Life Questionnaire: has proven its effectiveness in clinical practice, health policy evaluations and general population research and surveys. This short-form 36-item was designed in 1992 in the US by Ware and Sherburne and evaluates eight domains of health, including general health perceptions, physical functioning, role limitations due to physical health problems, role limitations due to emotional problems, bodily pain, social functioning, fatigue/vitality and mental health. The internal consistency of the questionnaire was assessed to confirm its reliability, and known-group comparison and convergent validity methods were used to confirm its validity. The analysis of the internal consistency showed that, except for the vitality scale (=0.65), all the other scales of the SF-36 have the minimum standard reliability coefficients (0.77 to 0.9). The internal consistency reliability of the scales was confirmed with Cronbach's alpha coefficients of 0.7 or higher for all the items, although the coefficient was less than the recommended value for the vitality scale (=0.65). This study measured the reliability of this questionnaire with a Cronbach's alpha coefficient of 0.8. [3]

Reliability and validity of the SF-36 in Chinese

migrants was checked out, as described below: Internal reliability of the SF-36 questionnaire was measured by determining the internal uniformity, which is expressed by Cronbach's α coefficient. The Cronbach's α coefficient was calculated for the eight domains of the SF-36 questionnaire and the reliability was considered to be good if the α value was not <0.7 . Split-half reliability, a measure of consistency where a test is split in two and the scores for each half of the test are compared with one another, was used to check the internal stability of the questionnaire, and test-retest reliability was used to assess the consistency of the questionnaire from one time to another.

The validity was analyzed through collective validity, divisional validity and structural validity. After deducting the overlap between each of the 36 items and its related domain, the collective validity was considered to be good if the correlation coefficient was still > 0.4 . If the correlation between any particular item and its related domain was considerably higher than the correlation between the item and any other domain, the divisional validity was considered to be good.

Factor analysis is a statistical method used to test the structural validity of a scale and describes variability among observed variables in terms of fewer unobserved variables called factors. In the present study, factor analysis for the eight domains was used to evaluate the structural validity of the SF-36 questionnaire, by testing whether the observed data for the eight domains collected during the study correlated with the hypothetical structure of the two overall component scores, PCS and MCS. The Kaiser-Meyer-Olkin (KMO) statistic and Bartlett's spherical check were carried out to check for sample suitability for the factor analysis [21].

According to the convergent validity for hypothesis testing, the correlation between each item and the hypothesized scale was examined and all the correlation coefficients obtained were found to be greater than the recommended value of 0.4 (the coefficients ranged from 0.58 to 0.95). The factor analysis also yielded two

principal components that explained 65.9% of the variance in the SF-36 scales. Overall, the results showed that the Persian version of the standard SF-36 questionnaire has the required validity and reliability to assess the health-related quality of life [16].

The Anger Rumination Scale (ARS) is a 19-item scale developed by Sukhodolsky et al. [4] to assess and analyze the tendency to think about current anger-provoking situations and recall past experiences of anger. The items assess four subscales of anger rumination, including angry afterthoughts, thoughts of revenge, angry memories and understanding of causes, and are scored based on a 4-point Likert scale from 1 (very slightly) to 4 (very much). Higher scores indicate greater levels of anger rumination. The total anger rumination score is obtained by adding the scores of the items of the four subscales. The psychometric properties of the ARS have been confirmed in foreign studies [4]. The psychometric properties of the Persian version of the ARS have also been examined and confirmed in several studies [9]. The preliminary findings reported Cronbach's alpha coefficients of 0.95, 0.89, 0.83, 0.87 and 0.78, respectively, for the entire ARS (the total score) and its subscales, i.e. angry afterthoughts, thoughts of revenge, angry memories and understanding of causes, in a sample of 833 students; these figures indicate the good internal consistency of the scale. The present study examined the reliability of this scale and obtained a Cronbach's alpha coefficient of 0.6. The correlation coefficients between the scores were reported as $r=0.77$ for the total anger rumination, $r=0.79$ for angry afterthoughts, $r=0.83$ for thoughts of revenge, $r=0.81$ for angry memories and $r=0.74$ for understanding of causes in a sample of 214 of the students as obtained over two sessions with an interval of four to six weeks. These coefficients indicate the satisfactory test-retest reliability of the ARS. The content validity of the ARS was examined by surveying ten psychologists, and Kendall's coefficients of concordance were calculated

as 0.70, 0.82, 0.79, 0.70 and 0.78 for the entire ARS (the total score) and its subscales, i.e. Angry afterthoughts, thoughts of revenge, angry memories, and understanding of causes. The convergent and discriminant validity of the ARS were calculated and confirmed through the simultaneous implementation of Tehran multidimensional anger scale and the Mental Health Inventory for the participants [17]. The data obtained in the study were analyzed in SPSS-16 using the mean and standard deviation to describe the data, Pearson’s correlation coefficient to analyze the data, and the one-way ANOVA to compare the groups.

Results

Pearson’s correlation coefficient was used to examine the effect of anger rumination on the relationship of the dimensions of anger and anger control with quality of life. As shown in Table 1, there is a significant positive correlation between state anger and anger rumination at a significance level of less than 0.01 ($p < 0.01$, $r = 0.378$), indicating that the higher is state anger, the greater is anger rumination. There is also a significant positive correlation between

trait anger and anger rumination ($p < 0.01$, $r = 0.513$), indicating that an increase in trait anger is associated with an increased anger rumination. There is a significant negative correlation between anger rumination and quality of life ($p < 0.01$, $r = 0.175$), indicating that increased anger rumination reduces quality of life. There is a significant negative correlation between state anger and quality of life ($p < 0.01$, $r = 0.378$), indicating that as state anger increases, quality of life decreases. Nevertheless, no significant correlations were observed between trait anger and quality of life ($r = -0.041$); it can therefore be argued that no significant correlations exist between trait anger and quality of life. There are no significant correlations between anger control-out and anger rumination ($r = 0.121$). Moreover, no correlations were observed between anger control-in and anger rumination at a significance level of less than 0.01 ($r = 0.049$). There are also no correlations between anger control-out and quality of life ($r = 0.036$). No significant correlations were observed between anger control-in and quality of life ($r = 0.102$).

Table 1 The results of Pearson’s correlation coefficient analysis of anger rumination and anger management, anger control, and quality of life

Variable	1	2	3	4	5	6
1. State anger	1					
2. Trait anger	0.520	1				
3. Anger Control-Out	-0.215*	-0.40	1			
4. Anger Control-In	-0.239	0.028	0.856	1		
5. Anger Rumination	0.378**	0.513**	0.121	0.049	1	
6. Quality of Life	-0.174**	0.041	0.036	0.102	-0.175**	1

* $p < 0.05$ ** $p < 0.01$

The one-way ANOVA was used to evaluate the differences between the female and male students in terms of anger expression, anger control, quality of life and anger rumination. As shown in Table 2, the mean score of state anger was significantly higher in the male students (28.81) than in the female students (25.66); ($p < 0.01$,

$F = 9.78$). The mean score of trait anger was significantly less in the female students (19.17) than in the male students (21.55); ($p < 0.01$, $F = 11.11$). In terms of anger control, the mean score of anger control-out was significantly higher in the female students (21.34) than in the male students (17.64); ($p < 0.01$, $F = 36.23$).

Table 2 The one-way ANOVA for the dimensions of anger, anger control, anger rumination and quality of life between the female and male students

	Impact	SS	df	MS	F	Sig
State anger	Inter-group	527.91	1	527.91	9.78	0.002
	Intra-group	1192.49	221	53.94		
	Total	12449.41	222			
Trait anger	Inter-group	302.16	1	302.16	11.11	0.001
	Intra-group	94.6007	221	27.185		
	Total	6310.10	222			
Anger Control-Out	Inter-group	727.11	1	727.11	36.23	0.001
	Intra-group	4434.71	221	20.06		
	Total	5161.83	222			
Anger Control-In	Inter-group	1006.48	1	1006.16	50.55	0.001
	Intra-group	26.44007	221	19.91		
	Total	5406.75	222			
Anger Rumination	Inter-group	368.48	1	368.48	3.96	0.067
	Intra-group	108.51	221	108.51		
	Total		222			
Quality of Life	Inter-group	368.48	1	368.48	3.091	0.080
	Intra-group	23981.04	221	108.51		
	Total	24349.52	222			

The mean score of anger control-in was significantly higher in the female students (22.02) than in the male students (17.66); ($p < 0.01$, $F = 50.55$). The mean score of anger rumination in the female students (42.19) was slightly higher than the mean score of anger rumination in the male students (39.56), but this difference was not significant at the 0.01 level ($p > 0.01$, $F = 3.96$). The mean score of quality of life was slightly higher in the female students (96.24) than in the male students (94.43), but this difference was not significant at the 0.01 level ($p > 0.01$, $F = 3.091$).

Discussion

This study was conducted to investigate the mediating effect of anger rumination on the relationship of the dimensions of anger and anger control with quality of life in male and female high school students in Damghan. The results showed a positive correlation between the dimensions of anger (state anger and trait anger) and anger rumination, which is consistent with the results obtained by Besharat [4,9,14]. As a fundamental emotion [18], anger is associated with threat and negative assessment,

activates physiological responses, and affects behavioral tendencies [4]. Ruminating thoughts are triggered by emotional responses. Anger is an emotion and anger rumination is defined as thinking about this emotion; as such, anger rumination is an inevitable and recurrent cognitive process that emerges in the course of anger and persists to then become responsible for the continuation and escalation of anger it self [4]. Anger rumination is considered a relatively independent component extending from a broader concept called anger. Rumination is defined as a recurrent and often inevitable process of thinking about past experiences. This phenomenon exacerbates the negative consequences of anger by increasing the intensity and duration of its experience. The construct of anger rumination consists of three different components, including recalling memories of past experiences of anger, focusing attention on the immediate experiences of anger and unrealistic thoughts about the experience of anger. There is therefore a close relationship between the experience of anger and anger rumination. The process of trait anger and state anger is intertwined with the

process of anger rumination. Anger rumination can be responsible for maintaining, increasing and intensifying state anger [4]. Focusing attention on the past experience of anger can strengthen the intensity and increase the duration of anger, and unrealistic thoughts may also lead to certain reactions (revenge). Anger rumination is associated with the duration of anger and the tendency to think about the experiences of anger [4].

Table 1 shows the lack of a significant correlation between anger control and anger rumination. Anger control-out and control-in have no effect on reducing ruminating thoughts related to anger. Anger control-out refers to the control of angry feelings and inhibiting the expression of anger toward external people and objects; anger control-in refers to the control of suppressed angry feelings. It appears that anger control-in and control-out have no effect on reducing anger rumination; in other words, anger control does not cause the angry person to stop thinking about the anger-provoking situation.

Table 1 shows a negative correlation between anger rumination and quality of life. An increased anger rumination therefore decreases quality of life. Rumination increases the parasympathetic activity and decreases the sympathetic activity—which are both cardiovascular risk factors. The results of one study suggest a significant correlation between rumination, especially anger rumination, and health indicators and serious health problems such as tachycardia and hypertension [15]. Public health is one of the indicators used for assessing quality of life in people. It can therefore be argued that, increased recurrent anger-related thoughts decrease health and quality of life [9].

Table 2 shows significantly higher means of anger control-in and control-out in girls than in boys. Due to their feminine personality traits, women are more inclined to control their anger than men. Another reason for which women obtained a higher score in anger control is that women are more inclined to control their anger and at the same time express this control, while men are less inclined to express their anger control due to dismissing the matter as

unimportant and owing to their modest or dismissive behaviors [18-19].

Table 2 shows the lack of differences between the female and male students in terms of quality of life. Although there are no significant differences between the girls and boys in terms of the overall quality of life, there is a significant difference between them in terms of the fatigue component of quality of life, as the mean score of fatigue was significantly higher in girls than in boys. Women have less physical strength due to their particular physiological, biological and hormonal structure and get tired more quickly, and this distinction is even more noticeable among Iranian women. Studies have shown that there are no significant differences between men and women in terms of quality of life; however, some studies have reported differences between the genders in terms of the physical health dimension of quality of life and argue that women have lower physical health compared to men; this difference was observed in a study with a statistical population above 2000 and with controlled demographic and confounding variables [20].

Table 2 also shows that the amount of anger rumination is not different between boys and girls. On the one hand, adolescence is an age at which girls and boys have many similarities in terms of personality, emotional, and intellectual traits, and these similarities also exist in dealing with events that lead to anger and anger rumination. On the other hand, although the difference between the genders was not statistically significant in terms of anger rumination, it was close to the level of significance (0.067), and the mean anger rumination score is higher in girls than in boys. In the face of anger-provoking situations, women are more inclined to suppress their anger by crying, and this tendency to suppress anger facilitates future thinking about the experience of anger and the cause of anger and thus increases anger rumination [9].

Conclusion

The results show that anger rumination affects anger expression and agender difference

exists in anger control and expression. Anger rumination also affects quality of life and its indicators, such as physical, mental, emotional and social health.

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Contribution

Study design: MGB

Data collection and analysis: MGB

Manuscript preparation: MGB

Conflict of Interest

"The authors declare that they have no competing interests."

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