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The Relation Among Self-Reported

Constructive and Destructive Anger Verbal Behavior

and Resting Blood Pressure

Laura Chambers

Submitted in partial fulfilment of the requirements for the degree of Ph.D. in Clinical

Psychology at Dalhousie University July 26, 1999.

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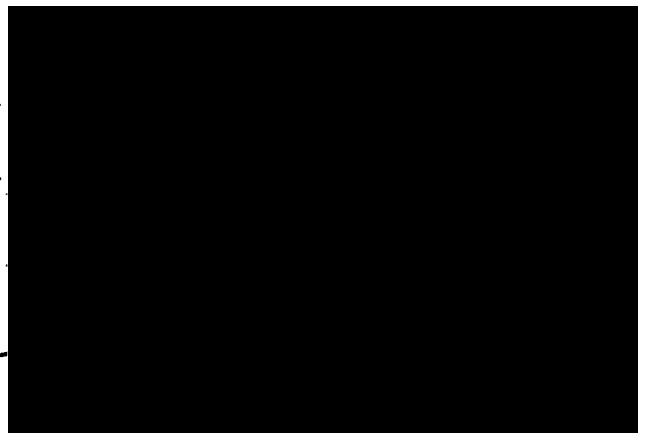
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Abstract

Past research has found that expressing anger outwardly in an antagonistic fashion and suppressing anger have detrimental effects on health, such as increased blood pressure. However, there may be more than these two dimensions of anger expression that have effects on health. One such anger expression dimension is anger discussion. Because of the dearth of information on anger discussion, a series of studies was conducted which sought to develop and validate a new measure of verbal anger behavior and test its ability to predict resting blood pressure.

Two studies were conducted to examine the psychometric properties including factor structure and convergent and discriminant validity, of a new measure of verbal anger behavior, the Anger Behavior-Verbal Scale (AB-V). A third study was then conducted to examine the relation between AB-V subscales and resting blood pressure. In both Study 1 (N= 487) and Study 2 (N=257), university undergraduate students completed a variety of anger expression and experience measures, scales assessing mood and personality scales, as well as the AB-V. Principal components analyses of the AB-V items revealed 3 factors that demonstrated good internal consistency estimates: Constructive Anger Behavior - Verbal scale (12 items; CAB-V; α= 0.90 and 0.89), Destructive Anger Behavior - Verbal Justification scale (6 items; DAB-VJ; α= 0.84 and 0.86) and Destructive Anger Behavior - Verbal Rumination scale (5 items; DAB-VR; α= 0.77 and 0.78). Results also indicated that DAB-VJ and DAB-VR were positively related to all anger expression and experience measures, whereas CAB-V was not. CAB-V was positively related to Agreeableness and Conscientiousness and DAB-VR was positively related to Trait anxiety, depression and Neuroticism. Implications for these anger behavior styles for health are discussed.

The third study hypothesized that destructive anger behavior (DAB-VJ and DAB-VR) should be related to increased resting blood pressure as age increases whereas CAB-V should be related to decreased resting blood pressure as age increases. A total of 108 persons (49 men and 59 women, aged 18 to 55 years) who were not currently taking medication for high blood pressure volunteered to complete a number of anger/hostility questionnaires, including the self-report DAB-VR before their blood pressure was obtained during 18 minutes of rest. Results indicated that high scores on the self-report DAB-VR significantly interacted with age to predict increased resting blood pressure after controlling for standard hypertension risk factors and other anger/hostility measures. A plot of the data revealed that for older participants, but not younger participants, higher DAB-VR scores predicted higher resting blood pressure. Self-reporting that one ruminates about anger was therefore shown to have deleterious effects on blood pressure levels. CAB-V and DAB-VJ did not significantly predict blood pressure.

Two other report types, i.e: friend-report and observer-report AB-V sclaes were also examined in the third study to provide further construct validity of the AB-V scale.

List of Abbreviations and Symbols Used

1) Self report Anger Behavior - Verbal scale (AB-V)

2) Self report Constructive Anger Behavior - Verbal scale (CAB-V)

3) Self report Destructive Anger Behavior - Verbal Justification (DAB-VJ)

4) Self report Destructive Anger Behavior - Verbal Rumination (DAB-VR)

5) Blood pressure (BP)

Acknowledgements

CHAPTER 1

Introduction

The Relationship between Anger and Health

Interest in the role that psychosocial conflict and emotional arousal play in the development of Coronary Heart Disease has been heightened by the observation that traditional risk factors, such as age, smoking, alcohol consumption and body mass index fail to account for half of the cases of CHD encountered on a worldwide basis (Eliot 1987). As a consequence, emotions and personality have been investigated for their role in the development of CHD. A meta-analysis of 83 studies found anger, aggression and hostility to significantly predict the development of CHD with effect sizes of .142, .059 and .171 respectively (Booth-Kewley & Friedman, 1987). Findings from subsequent research into the links between anger and health have left little doubt that anger is a pathogenic emotion. It has been associated with the development of hypertension (Costa, McCrae, & Dembroski, 1989; Harburg, Gleiberman, Rusell, & Cooper, 1991; Girdler, Turner, Sherwood, & Light, 1990), Coronary Heart Disease (Booth-Kewley & Friedman 1987; Miller, Smith, Turner, Guijarro, & Hallet, 1996; Suls, Wan, & Costa, 1995), and mortality from all causes (Barefoot, Dahlstrom, & Williams, 1983).

Traditionally, researchers have conceptualized anger along two fundamental dimensions: anger experience and anger expression (Bendig, 1962; Buss & Durkee, 1957; Edmunds & Kendrick, 1980; Musante, MacDougall, Dembroski, & Costa, 1989; Zelin, Alder, & Myerson, 1972). Anger experience is defined as the subjective emotion or internal reaction one has to anger provoking situations, sometimes reflecting a cognitive or attitudinal facet of anger (hostility; Musante et al., 1989).

Anger expression is the behavioral manifestation of this experience. Anger then, has affective, cognitive and behavioral components. Following this theoretical conceptualization of the construct of anger, the measurement of anger has also captured this higher-order dimensional framework.

The Measurement of Anger

Although existing measures of anger capture varying numbers of anger dimensions (eg: Barefoot, 1992; Hedlund & Lindquist, 1992; Siegel, 1986; Spielberger, Reheiser, & Sydeman, 1995), research suggests that it is the expression of anger rather than the experience of anger that may be more important to health.

Much research has been devoted to studying the effects of anger expression on health. Typically, measures of anger expression have focused on aggressive and/or antagonistic anger, directing of anger outwardly or on the inhibition of anger expression. For example, Barefoot (1992) found that aggressive responding predicted all cause mortality. The tendency to express anger outwardly towards other persons or objects in the environment (high Anger-Out scores on Spielberger's Anger Expression Inventory, 1985) has been linked with hypertension (Harburg et al., 1991), and has predicted myocardial infarction (Mendes de Leon, 1992) and coronary heart disease (CHD) (Costa, McCrae, & Dembroski, 1989). The tendency to inhibit or suppress anger related feelings or behaviors (high Anger-In scores from Spielberger's Anger Expression Inventory), has also been linked with elevated blood pressure (Gentry, Chesney, Gary, Hall, & Harburg, 1982; Suls, Wan, & Costa, 1995), and has been

found to predict all cause mortality in women (Julius, Harburg, Schork, &

Difrancieco, 1992). In sum, these anger/hostility measures address two independent

aspects of anger expression: Anger-Out and Anger-In. Both modes of expression have

been shown to be deleterious to health.

However, evidence is growing which suggests that there are other dimensions

of anger expression and that such dimensions may play an important role in

cardiovascular health. After reviewing biological, social, learning, social-cognitive

and drive theories, as they related to the development, maintenance, and control of

anger behavior, Stoney and Engbretson (1994) concluded that there may indeed be

such dimensions of anger behavior that are not typically assessed by existing

measures. One such dimension is communicative anger expression (Stoney &

Engbretson, 1994; Thomas 1993; Thomas & Williams, 1991).

Communicative anger expression reflects a style, whereby the anger-provoking

situation is discussed with the target of anger or with another person rather than being

merely an outward expression of anger directed at the target or others (Thomas 1995).

Studies have shown that, after an emotionally arousing event, most persons (90% to

96.3%) spontaneously talk with others about that event (Rime, Philippot, Boca &

Mesquita, 1992) and that this tendency does not vary with age, gender or valence

(positive or negative aspect) of emotion. The higher the emotional arousal, the more

discussion with others is evident (Bouts, Luminet, Manstead, & Rime, 1994).

Moreover, this type of discussion appears to be important to health (Haynes &

Feinleib, 1980).

Although anger discussion has been shown to be correlated with general physical health (Thomas & Williams, 1991; Thomas 1993), not all forms of anger discussion may be beneficial. What seems to be very important is the manner in which anger is discussed. For example, Siegman (1994) asked persons to talk about anger-arousing events in three ways: 1) fast and loud, 2) slow and soft, and 3) normally. Results indicated that talking in a loud and fast manner was associated with the greatest increases in blood pressure. Thomas (1995) suggested that expressing anger in an attacking/blaming way is also unhealthy. In general however, very little is known about the discussion of anger because there is at present no valid measure of this type of anger expression.

A New Measure of Anger Behavior

Research aimed at describing how individuals behave have traditionally adopted either a typology approach or a dimensional approach. Inherent in a typology approach is the implication that individuals can be placed into distinct and separate categories. In other words, "types" have a defining core or essential characteristic that either qualifies or disqualifies an individual from the descriptor in question (Gunderson, Links, & Reich 1991). A dimensional approach on the other hand recognizes that individuals can vary considerably with regard to particular characteristics (Engler, 1995), or characteristic ways of behaving (Livesley, 1991). Thus, a dimensional approach lends itself to numerical representation and has a continuous distribution, offering measurement advantages (Gunderson et al., 1991). The present work adopts a

dimensional approach to anger expression, as it assumes that persons can express their anger adaptively or maladaptively to varying degrees.

Recent work has begun to examine the dimension of anger discussion and its implications for health (Davidson, Stuhr, & Chambers, 1998a). Based on empirical evidence, Davidson, Stuhr, and Chambers (1998a) have proposed that there are two verbal anger behavior (or discussion) constructs: constructive and destructive. Due to the dearth of information regarding a psychometrically valid measure of verbal anger behavior, a new measure of this dimension of anger expression (The Anger Behavior-Verbal scale (AB-V) was developed.

The items in the AB-V reflect motivations for discussing interpersonal conflict and anger, as well as the consequences of discussing conflict/anger, i.e., whether anger has been resolved or not. Past research has indicated that most anger usually arises within an interpersonal context. More specifically, one of the most prominent antecedents of anger is appraisals about the actions of people in social situations. Interactional injustice is a form of injustice occurring within a social context and is the most common form of injustice that people describe as provoking anger (Averill, 1982; Mikula, Petri, & Tanzer 1990; Quigley & Tedeschi 1996). Interactional injustices include such behaviors as breaking of politeness norms, breaking agreements, impolite treatment or making accusations. Attributions of causality and intentionality towards the perpetrators of such social transgressions are necessary conditions for the experience of anger to occur (Quigley & Tedeschi, 1996). Items on the AB-V concern the expression of anger to others or to the target of anger when

such transgressions have occurred. Items also measure the success of such anger expression, (i.e., whether anger discussion has made the person feel better or not, or whether anger/conflict has been resolved or not.)

Research has suggested that once anger is experienced, anger expressions can vary in intention, actual responses to the anger-eliciting situation, and vary on the consequences of the entire anger episode (Tangney et al., 1996a). Therefore, anger expression could be considered to result from one of two motivations: positive and constructive or negative and destructive. Constructive intentions are problem-solving intentions and could include gaining greater perspective of another's point of view, gaining a greater understanding of the anger-eliciting event and working towards resolving the problem that created the anger in the first place. Destructive intentions are 'other' blaming or defensive intentions and thus by their nature are not oriented towards solving the anger-eliciting event or conflict or resolving angry thoughts and feelings. Such intentions could include assigning blame to the other person and not taking responsibility for one's role in an anger-eliciting event, becoming defensive and justifying one's own behavior without understanding the other person's perspective, or holding grudges and continued rumination over anger. Following the underlying intentions of discussing anger, actual responses can also be constructive or destructive in nature. Constructive responses could include coming up with constructive solutions to the problem, where roles of self and other in the event are recognized and discussed, so as to prevent further conflict. Destructive responses could include discussing anger to show how wrong the other person is and to get

others to believe that one had no fault in the conflict. There is no attempt at problem solving. Finally, the consequences of discussing anger can be either constructive or destructive. A positive or constructive consequence is anger resolution and a negative or destructive consequence is continued or even heightened anger, accompanied with rumination over the eliciting event. The AB-V is based on this theoretical model of positive and negative antecedents, behaviors and consequences of anger discussion.

A constructive verbal anger behavior style is a goal-oriented, problem-solving method of responding to the experience of anger. It consists of the intent or motivation to resolve interpersonal conflict and anger by understanding the other person's point of view as well as by clarification of one's own role in the conflict. Anger is dealt with directly with the target of anger in a reflective, assertive and constructive manner. This style of anger expression has already been shown to have a beneficial or protective impact on health (Davidson, Stuhr, & Chambers, 1998a; Davidson et al., 1998b).

A destructive verbal anger behavior style focuses on the intent or motivation of self justification/vindication and attribution of blame elsewhere in an anger-eliciting situation. Grudges are held, and anger is ruminated over, both outwardly and internally, with the person feeling even angrier than before discussion, reinforcing dislike for the target of anger. Research has demonstrated that as people brood on the person who has harmed them, their unfavorable evaluation of the person becomes reinforced (Tesser, 1978). Research has also shown that self-focused rumination of a provoking event maintains and intensifies anger (Rusting & Nolen-Hoeksema, 1998).

As a consequence of destructive verbal anger behavior then, anger is not resolved.

The Present Work

After the development of the AB-V scale, two studies were conducted which sought to psychometrically validate it with other measures of anger/hostility, as well as measures of mood and personality. The further development and validation of the AB-V scale will be discussed in Chapters 2 and 3. An examination of how each AB-V subscale predicts resting blood pressure, the mechanisms by which it may do so and their role as new assessment tools in the measurement of health behavior is presented in Chapters 4 and 5.

CHAPTER 2

Study 1 : The Development and Validation of a new Measure of Verbal

Anger Behavior

The Development and Validation of a New Measure of Verbal Anger Behavior

Based on the proposed new anger expression dimension (anger discussion), a new self-report instrument called The Anger Behavior- Verbal scale (AB-V) was developed. Based on empirical evidence, two verbal anger behavior constructs were proposed: constructive (CAB-V) and destructive (DAB-V). These two styles of anger expression does not describe "types" of styles where persons either adopt constructive or destructive anger expression or not. Rather, persons may adopt these styles of anger expression to varying degrees. Therefore persons can range from using these styles never to using them always. CAB-V and DAB-V are therefore thought to reflect dimensions rather than typologies.

The main purpose of the present study was to demonstrate construct validity of the CAB-V and DAB-V scales. Construct validity was first proposed by Cronbach and Meehl (1955) and refers to whether or not a test of a particular construct actually measures that construct. A construct is defined as, " some postulated attribute of people, assumed to be reflected in test performance" (Cronbach & Meehl 1955, p 283). Construct validity is not expressed in the form a single coefficient. Rather, it may be demonstrated in a number of different ways including correlations with other tests or questionnaires measuring similar attributes, factor analysis of test items and internal consistency of test items.

Construct validity may be demonstrated by examining the convergent and discriminant validity of a particular questionnaire with other questionnaires measuring similar person characteristics. Positive correlations with such similar tests

demonstrates convergent validity and negative, low positive or no correlations demonstrate discriminant validity. For example, Smith and Frohm (1985) established construct validity of the Cook and Medley Hostility Scale (Cook and Medley, 1954) by demonstrating convergent and discriminant validity by correlating it with other measures of anger and hostility such as the Trait Anger Scale (Spielberger et al., 1983), the Buss-Durkee Hostility Inventory (Buss & Durkee, 1957) and measures of mood such as the Trait Anxiety Scale (Spielberger, Gorsuch & Lushene, 1970), and the Beck Depression Inventory (Beck, 1967). Results indicated that the Cook and Medley Hostility Scale correlated highly with trait anger and less so with anxiety and depression.

Construct validity can also be demonstrated by factor analysis and internal consistency coefficients of questionnaire items. For example, Siegel (1986) showed that the Multidimensional Anger Inventory to consist of 5 factors describing dimensions of anger via factor analysis. Construct validity was further demonstrated by high internal consistencies of 4 of 5 scales. The last scale labelled 'Anger-Out" had an alpha of 0.51 was is unacceptably low. Buss and Perry (1992) also demonstrated construct validity of the Buss and Perry Aggression Questionnaire via factor analysis and internal consistency. Results indicated that this questionnaire is composed of 4 dimensions of anger and hostility. The internal consistency of the 4 scales ranged from 0.72 to 0.89.

The present study used correlations with other anger/hostility measures and mood measures, factor analysis and internal consistency in order to examine the

construct validity of the CAB-V and DAB-V scales. It was hypothesized that these two constructs would be differentially related to other established measures of anger/hostility and mood, that AB-V items would separate into CAB-V and DAB-V scales via principal components analysis and finally, that these two factors would show high internal consistency coefficients. Three measures of anger/hostility and two measures of mood were included for comparison.

Anger Measures

Three measures of anger/hostility were included in all analyses: The Multidimensional Anger Inventory (MAI; Seigel, 1986), The Buss-Perry Aggression Questionnaire (BPAQ; Buss & Perry, 1992), and the Trait Anger Scale (TAS; Spielberger, Jacobs, Russell, & Crane, 1983; Spielberger, 1988)). The MAI was chosen as a measure because of its ability to capture unique dimensions of anger experience and expression such as the magnitude, duration, frequency of anger, and the range of situations over which anger is experienced. Other scales assess hostile cognitions, hostile displays of anger and tendencies to suppress anger and hold grudges. The BPAQ was chosen because it assesses both physical and verbal aggressive expression tendencies, as well as cognitive and emotional anger. The TAS was chosen as a measure because it measures anger temperament, or the disposition to become angry, and assumes this disposition is stable across time and situation. Although some of these individual instruments subscales may seem redundant, each subscale actually captures slightly different aspects of anger experience and expression.

Theoretically, constructive anger expression should be negatively related or not related at all, to all these scales because by its very nature, anger will not be suppressed, but will be resolved quickly, directly, and without the use of physical aggression. Through perspective taking, others' points of view will be understood and responsibility for the anger-eliciting event will be accepted. As such, individuals who use this style of anger expression will be less likely to harbor or maintain negative (or hostile) views of others and hence anger itself.

On the other hand, a destructive anger expression style should be positively related to these other anger measures. Theoretically, a destructive anger expression style is characterized by a tendency to blame others, feel ill will towards others and hold grudges (implying continued hostile cognitions, or resentments and continued emotional anger). Thus anger can be expressed aggressively outward, as others are blamed, and can be suppressed, as grudges are maintained.

Mood Measures

Two measure of mood were included in all analyses: The Beck Depression Inventory (BDI; Beck, Rush, Shaw, & Emery, 1979), and the Trait Anxiety Scale (TAI; Spielberger, 1983, 1984). These two measures were chosen because they are reliable and commonly used measures of negative affect. Theoretically, a constructive anger expression style should be negatively related to the predisposition to become anxious and to feel depressed. By its very nature anger is resolved and feelings of satisfaction and well being are achieved. On the other hand, a destructive anger expression style

is characterized by concern or worry over how others view personal responsibility and culpability as well as increased agitation after expression. It is hypothesized that this style will be positively associated with an anxious temperament and depression symptoms.

The goals of this study therefore included 1) establishing the factor structure of the AB-V scale, 2) obtaining good internal consistency estimates for subscales, and 3) obtaining convergent and discriminant validity with other anger/hostility measures and mood scales. It was hypothesized that CAB-V and DAB-V would be independent constructs and be differentially related to other anger and mood measures. Whereas CAB-V should be negatively related to, or show no relation at all to other destructive dimensions of anger, DAB-V should be positively related to other destructive dimensions of anger. Both should capture aspects of anger expression not addressed or measured by these existing measures.

<u>Method</u>

<u>Participants.</u> The data from a total of 487 undergraduate students recruited from various first year Psychology classes who elected to participate in an ongoing study of personality and mood were used in the present study. Two hundred and twelve of these students were recruited from Dalhousie University, Halifax, Canada, and 275 of these students were recruited from the University of Alabama, Tuscaloosa, USA. Students were recruited from these two sites as a matter of convenience. The author attended Dalhousie University, and her thesis supervisor worked at the University of Alabama. No differences in age were noted (refer to results section) between the two

samples and they were thus combined to have sufficient power to conduct subsequent analyses. All students voluntarily participated for credit towards their Psychology course. Questionnaire packages were filled out during class time with confidentiality ensured by use of identification numbers instead of names on all materials.

The mean age of all Dalhousie students was 20.1 (1.9) and the mean age of all of the University of Alabama students was 20.3 (4.6). Ages of participants in this overall sample ranged from 18 years to 66 years, with a mean age of 20.0 (3.5).

Measures.

Anger- Behavior Scale (AB-V). A focus group of six women and two men (Psychology Honour or graduate students) was first gathered to discuss potential, theoretically-based, constructive and destructive anger verbal behaviors. Individuals were first asked to imagine someone who handles anger well, i.e., someone who discusses anger in a way that reduces or eliminates anger. This same process occured for destructive verbal anger items, i.e., members imagined someone who does not handle anger well, and discusses anger in such a fashion as to maintain or increase anger. Group members were then asked to write down what behaviors these two people would engage in to reduce or maintain anger. Each behavior was then discussed by the group for its potential inclusion as a constructive or destructive verbal anger scale item. Items were included only if all members agreed upon their suitability and ability to differentiate between the two proposed styles of anger discussion. This effort resulted in 36 items (18 constructive and 18 destructive).

These items then went through a series of revisions based on their readability and theoretical coherence. These revisions led to two scales: a 12-item constructive verbal anger behavior scale (CAB-V) and an 11-item destructive verbal anger scale (DAB-V). See Appendix A for the AB-V scale.

Each scale has two different prompts. The first, " I discuss my anger....." assesses motivations for anger behavior. For constructive anger, this implies problem-solving/conflict resolution and for destructive anger it implies self-justification and attribution of blame elsewhere. The second prompt, " I find that after discussing my anger....", assesses consequences of anger discussion. For constructive anger this implies conflict and anger resolution and for destructive anger it implies rumination and continued anger. These two prompts were included to assess both the motivations behind different styles of anger expression as well as the consequences these styles have for anger resolution. Persons rate themselves on a 4-point Likert scale where 1 is "almost never" and 4 is "almost always", according to how frequently each item applies to them in general.

The Multidimensional Anger Inventory (MAI). The MAI (Siegel, 1986) is a 26-item, self- report measure designed to assess five different anger dimensions. Anger-Arousal (8 items) measures the frequency, duration and magnitude of the experience of anger. Range of Anger Eliciting Situations (7 items) measures the range of situations in which anger is experienced. Hostile Outlook (4 items) measures hostile cognitions (negativism, resentment and suspicion). Anger-In/Brood (5 items) measures anger suppression along with feelings of brooding and guilt. Anger-Out (2 items)

measures overt expression of anger. Persons rate items on a 5-point Likert scale according to how descriptive each item is of them, where 1 represents "completely undescriptive of you", and 5 represents "completely descriptive of you". The internal consistency of these different scales varies from good to poor: Anger-Arousal (0.83), Range of Anger Eliciting Situations (0.80), Hostile Outlook (0.70), Anger-in (0.72) and Anger-Out (0.51) (Siegel, 1986).

The Beck Depression Inventory (BDI). Depression was assessed using the BDI (Beck, Rush, Shaw, & Emery, 1979). The BDI is a self-report, 21-item instrument that corresponds to symptoms and attitudes such as depressed mood, pessimism, suicidal thoughts, and somatic preoccupation. Participants indicate how they generally feel by responding to one of four possible response choices for each item. In each case the first response choice indicates the absence of symptoms, while the fourth indicates severe symptoms. Items are added to form a total depression score. The BDI has demonstrated high stability across short and long term follow-up studies (Beck et al., 1979).

The State-Trait Anxiety Inventory --Trait Scale (TAI). The TAI (Spielberger, 1983, 1984) is a 10-item, self-report of trait-levels of symptoms of anxiety. Respondents rate how they generally feel by indicating on a 4-point Likert scale the frequency with which they have experienced specific anxiety symptoms, where 1 represents "never", and 4 represents "always". The TAI has shown adequate reliability, with test-retest estimates ranging from 0.65 to 0.86 for periods of between 1 hour to 104 days. Internal consistency estimates for the TAI are good and range from 0.89 to 0.91

(Spielberger, 1983).

The Buss-Perry Aggression Questionnaire (BPAQ). The BPAQ (Buss & Perry, 1992) is a 29- item, self-report measure designed to assess four different dimensions of anger: Physical Aggression (9 items), Verbal Aggression (5 items), Anger (7 items) and Hostility (8 items). The Physical and Verbal Aggression scales measure anger expression, and the Anger and Hostility scales measure anger experience. The Physical Aggression scale contains items describing the tendency to engage in physically hurtful or harmful behaviors towards others, threat to cause harm, and destruction of objects. The Verbal Aggression scale measures the tendency to disagree with others and become argumentative. The Anger scale measures the tendency to experience the affective component of anger, and the Hostility scale measures three aspects of the cognitive component of anger: bitterness or ill will, suspiciousness, and paranoia. Respondents are asked to rate themselves on a 5-point Likert scale according to how characteristic each item is of them, ranging from 1 (extremely uncharacteristic of me) to 5 (extremely characteristic of me).

The BPAQ has shown good internal consistency and test-retest reliability. The Alpha coefficient for the total scale was found to be 0.89. Coefficients for its subscales were found to be 0.85 for Physical Aggression, 0.72 for Verbal Aggression, 0.83 for Anger and 0.77 for Hostility. Test-retest reliability over nine weeks was 0.80 for the entire scale, 0.80 for Physical Aggression, 0.76 for Verbal Aggression, 0.72 for Anger and 0.72 for Hostility (Buss & Perry 1992).

The State-Trait Anger Scale—Trait Scale (TAS). The TAS (Spielberger, Jacobs,

Russell, & Crane, 1983; Spielberger, 1988) is a 15-item, self-report measure of individual differences in the disposition to experience anger (Trait anger). Persons rate themselves on a 4-point Likert scale according to how they generally feel, with 1 representing "almost never", to 4 representing "almost always". Item scores are added into one scale score. Internal consistency has been shown to be good and ranges from 0.82 to 0.84 (Spielberger, 1988). Table 1 describes each anger/hostility measure.

Procedure. All participants completed the five questionnaires in the following order: the Multidimensional Anger Inventory (MAI; (Siegel, 1986), the Anger Behavior-Verbal Scale (AB-V), the Trait scale of the State-Trait Anxiety Inventory (TAI; (Spielberger, 1983), the Buss-Perry Aggression Questionnaire (BPAQ; (Buss & Perry, 1992) and the Trait scale of the State-Trait Anger Scale (TAS; (Spielberger, 1988). Table 1 shows all measures by measure type, along with descriptions of items from each measure's sub-scales. Participants completed the questionnaire package in about one hour. The means and standard deviations of all measures are shown in Table 2.

Results

Participants

The mean ages of the Dalhousie University students and University of Alabama students did not differ significantly (t(349)= -0.59, ns.) from each other. These two samples were combined into one overall sample in order to have sufficient power to conduct factor analyses.

Table 1. Description of anger expression and experience scales

Scale Type	Item description
ANGER EXPERIENCE	
A) Cognitive Anger	
1) Hostile Outlook (MAI)	irritation and impatience with others
2) Cognitive Anger (BPAQ)	suspiciousness, bitterness, resentment
3) Cynicism (CMHS)	view others as unworthy, deceitful/ selfish
4) Hostile Attributions (CMHS)	interpret others' behaviors as harmful; suspicion, paranoia
5) Hostile Other (CMHS)	suspiciousness, jealousy
B) Affective Anger	
1) Anger-Arousal (MAI)	duration, frequency and magnitude of angry affect
2) Range of Anger Eliciting Situations (MAI)	range of different situations where anger felt
3) Emotional Anger (BPAQ)	tendency to become angry easily
4) Hostile Affect (CMHS)	impatience and loathing when dealing with others
5) Trait Anger (TAS)	predisposition to feel angry
ANGER EXPRESSION	
A) Avoidant	
1) Anger In (MAI)	hiding anger, harbouring grudges, brooding
2) Anger-In (AEI)	suppression of anger, grudges, withdrawal, critical of others
3) Social Avoidance (CMHS)	avoid others, withdraw from interpersonal involvement
4) Passivity (PAA)	not expressing desires/opinions to avoid conflict

Table 1. Cont'd

Scale Type	Item description
B) Outward/Antagonistic	
1) Anger Out (MAI)	outward verbalization of anger
2) Anger-Out (AEI)	verbal or physical antagonistic expression of anger
3) Verbal Aggression (BPAQ)	disagree and become argumentative
4) Physical Aggression (BPAQ)	physical violence towards others/objects
5) Aggressive Responding (CMHS)	use/endorse/justify anger/aggression in response to problems
6) Aggression (PAA)	respond with verbal/physical aggression when angry
C) Controlled	
1) Anger-Control (AEI)	control and nonexpression of anger and quick resolution of anger
2) Assertiveness (PAA)	controlled expression, respecting others' feelings
D) Verbal Behavior	
1) CAB-V	discussing anger to resolve conflict, anger resolution
2) DAB-VJ	discussing anger to self justify/attribute blame elsewhere
3) DAB-VR	discussing anger ruminatively/increased anger/resentment

CAB-V = Constructive Anger Behavior-Verbal; DAB-VJ =Destructive Anger Behavior - Verbal Justification; DAB-VR = Destructive Anger Behavior - Verbal Rumination; CMHS = Cook-Medley Hostility Scale; AEI= Anger Expression Inventory; PAA = Personal Assertion Analysis
BPAQ = Buss-Perry Aggression Questionnaire; MAI = Multidimensional Anger Inventory; TAS = Trait Anger Scale

Table 2. Means and standard deviations for measures in Study 1.

Scale	Subscale	N	Mean	SD
AB-V Scale	CAB-V	486	29.6	(7.6)
	DAB-VJ	487	12.3	(4.1)
	DAB-VR	482	9.2	(3.0)
MAI	Anger-Arousal	484	18.0	(6.1)
	Hostile Outlook	487	12.1	(3.4)
	Anger In	486	13.4	(3.7)
	Anger Out	482	6.1	(1.3)
	Range of Anger Eliciting Situations	486	22.6	(5.1)
BDI	Total depression	478	9.2	(7.9)
TAS	Trait Anger	483	30.9	(7.9)
TAI	Trait Anxiety	483	43.8	(9.1)
BPAQ	Verbal Aggression	485	13.6	(4.1)
	Physical Aggression	486	19.3	(7.7)
	Emotional Anger	485	15.8	(5.4)
	Cognitive Anger	484	19.4	(6.2)

AB-V = Anger Behavior -Verbal scale CAB-V = Constructive Anger Behavior-Verbal; DAB-VJ =Destructive Anger Behavior - Verbal Justification; DAB-VR = Destructive Anger Behavior - Verbal Rumination; MAI = Multidimensional Anger Inventory; BDI = Beck Depression Inventory; TAS = Trait Anger Scale; TAI = Trait Anxiety Inventory; BPAQ=Buss-Perry Aggression Questionnaire.

Principal Components Analysis of AB-V Items: A Principal Components analysis using oblique rotation, which assumes that factors are not orthogonal and allows for intercorrelations among variables, was conducted on all CAB-V (12 items) and DAB-V items (11 items). Criteria for the number of factors to retain were established, using parallel analysis (Horn, 1965; Longman, Cota, Holden, & Fekken, 1989), as well as factor interpretability. Parallel analysis is a statistical procedure that determines the break in the scree plot, and has been shown to be the most accurate rule for determining the number of components to retain when compared to other more liberal rules, such as Kaiser's (1960) eigenvalue greater than one criterion (Zwick & Velicer, 1986). The parallel analysis was conducted using mean eigenvalues, employing the following equation (Longman et al., 1989).

$$\log_e(\lambda) = a_i\log_e(n_i) + b_i\log_e(p_i) + c_i \{\log_e(n_i)\log_e(p_i)\} + d_i$$

In this equation n is the number of subjects, and p is the number of items that are to be factor-analyzed. The values of a_i, b_i, c_i, and d_i are provided by Longman et al., (1989) to be inserted into the equations . Each factor number has its own a_i, b_i, c_i, and d_i, values, and so the equation is solved each time another factor is desired. For a particular factor to be retained, the actual eigenvalue obtained for factors by components analyses must be equal to or greater than the result computed by the above equation.

In this study, the number of complete data sets or n was 481, and the number

of items to be factor analyzed was 23 (12 CAB-V items and 11 DAB-V items).

Solving the equation for Factor 1 yielded a predicted eigenvalue of 1.39. The actual

eigenvalue obtained by components analysis was 6.12, i.e., larger than the predicted

eigenvalue. Thus Factor 1 was supported and retained. Solving for Factor 2 yielded

an eigenvalue of 1.31. The actual obtained eigenvalue was 4.47, and so factor 2 was

retained. The predicted value for Factor 3 was 1.28 and the actual obtained value was

1.47, and Factor 3 was therefore retained. The predicted value for Factor 4 was 1.24,

while the actual was 1.29 and Factor 4 was therefore retained. The predicted value

for Factor 5 was 1.21 while the actual obtained value was 0.88. This obtained value

did not meet cut-off criteria, i.e., it was less than predicted, and so Factor 5 was not

supported or retained.

Results of this parallel analysis therefore supported a four-factor solution.

However this four-factor solution did not show good simple structure (Thurstone,

1947), nor did it make conceptual sense. Factor 1 and Factor 4 both contained CAB-

V items, and there were significant cross loadings between the two factors. The

division of CAB-V items into these two factors also did not make good conceptual

sense. Factor 2 and Factor 3 did show good simple structure, and made conceptual

sense. A comparison of this four-factor model to a three-factor model indicated that

the three-factor model was a much better fit. The good simple structure of this

solution is evidenced by the fact that there were no complex items (no items loading

significantly, i.e., ≤ 0.50, on more than one factor), no hyperplane items (no items

failing to load significantly on any identified factor), and a large number of salient

loadings per factor. This three-factor solution was therefore retained and accounted for 52.4% of the variance in AB-V item scores. Factor loadings obtained in the principal components analysis of AB-V scale items are shown in Table 3.

Taking salient loadings as ≤ 0.50, 12 items loaded on Factor 1, six items loaded on Factor 2, and 5 items loaded on Factor 3. Inspection of the items revealed that Factor 1 was made up of items consistent with the constructive anger behavior construct and was therefore called the Constructive Anger Behavior-Verbal (CAB-V) scale. Unexpectedly, items consistent with the destructive anger behavior construct split into two different factors. Factor 2 consisted of items representing self-justification and attribution of blame elsewhere and so was named Destructive Anger Behavior - Verbal Justification (DAB-VJ). Factor 3 consisted of items describing rumination of anger and a non-resolution of angry feelings once anger has been discussed. This factor was therefore called Destructive Anger Behavior - Verbal Rumination (DAB-VR). DAB-VJ and DAB-VR were correlated 0.35. CAB-V was negatively correlated with DAB-VR (-0.17) and positively correlated with DAB-VJ (0.04). DAB-VR, DAB-VJ and CAB-V were used as separate dependent measures in subsequent analyses.

Table 3. Principal Components (Oblique-Rotated Factor Loadings) of Anger Behavior - Verbal Scale for Study 1 and 2

	Factor 1		Factor 2		Factor 3	
	S1	S2	S1	S2	S1	S2
CAB-V						
I Discuss my anger to...						
1. To solve the problem.	0.66	0.63				
2. To see if others help me to come up with constructive solutions.	0.65	0.64				
3. To see if a resolution to the situation can be found.	0.79	0.74				
4. To try to understand the point of view of the other person.	0.72	0.73				
6. To better understand my possible role in the situation.	0.64	0.69				
8. To minimize future conflict.	0.76	0.76				
9. To deal with the situation more constructively next time.	0.79	0.78				
10. So that both sides come out feeling good.	0.76	0.76				
After Discussing My Anger...						
19. I have a better understanding of the person I am angry with.	0.66	0.68				
20. I feel better about the other person.	0.60	0.55				
22. I feel closer to a resolution.	0.68	0.67				
23. Things don't look as bad as I thought they did.	0.58	0.47*				

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Table 3 Cont'd.

	Factor 1		Factor 2		Factor 3	
	S1	S2	S1	S2	S1	S2
DAB-VJ						
I Discuss my anger to...						
5. To get people on my side.			0.75	0.80		
7. To show I'm right.			0.78	0.83		
11. To show how wrong others are.			0.74	0.80		
12. To get sympathy.			0.62	0.62		
13. So that others know I wasn't at fault.			0.80	0.80		
14. To make sure that everybody knows my side of the story.			0.74	0.73		
DAB-VR						
After Discussing My Anger...						
15. I feel compelled to discuss the situation which made me angry over and over again.					0.66	0.68
16. I continue to dwell on it.					0.75	0.82
17. I hold a grudge.					0.70	0.67
18. I feel even more agitated.					0.69	0.68
21. I feel justified in disliking the other person.					0.60	0.58

S1 = Study 1 (N= 481) S2 = Study 2 (N= 270) All factor loadings ≤ 0.50 shown except * which did not load significantly

<u>Internal Consistency:</u> The internal-item consistency estimates of CAB-V, DAB-VJ and

DAB-VR were calculated to be 0.90, 0.84 and 0.77 respectively. Given the poor

alpha coefficient obtained for the MAI's Anger-Out sub-scale in a previous study

(alpha = 0.51; Siegel, 1986), internal consistency estimates of all MAI subscales

were calculated to make sure reliabilities were adequate for each scale's inclusion in

subsequent analyses. Results indicated that alpha coefficients were good to adequate

for Anger-Arousal (0.84), Range of Anger Eliciting Situations (0.79), Hostile Outlook

(0.72) and Anger-In (0.66). However, the internal consistency of the Anger-Out scale

was so poor (0.0) that a decision was made to exclude it from all further analyses.

<u>Convergent and Divergent Validity</u>

Two different statistical procedures were used to examine convergent and divergent

validity of the AB-V scales. First, zero order correlations were calculated among all

measures to examine commonalities between individual variables. The results of these

correlations are presented in Tables 1a to 1e in Appendix B. Secondly. A Principal

Components analysis was conducted in which all subscales served as individual

variables. This procedure was utilized because it allows the commonalities among

multiple measures to be examined. As such it provides a more holistic and concise

picture of how measures are related.

<u>Correlations</u>

Intercorrelations among measure subscales and correlations among different measure

subscales were calculated to obtain information about individual relations among variables. Tables 1a to 1e in Appendix B show the results of these calculations. Although results demonstrate the relative magnitude of association among variables, it is difficult to get a coherent picture of the structure of these relations, because of the large number of correlations. Overall, however, the direction and magnitude of associations were congruent with hypotheses.

CAB-V was significantly and negatively related to negative affect and anger. More specifically, CAB-V was negatively related to depression, Trait Anger and Anxiety as well as physical, emotional and cognitive anger. Both DAB-VJ and DAB-VR were both significantly and positively related to all measures of negative affect and anger. Results also indicate that all measures of negative affect and anger were significantly and positively related to each other. Overall, results do provide divergent validity between constructive and destructive measures of verbal anger expression, and convergent validity among negative affect and anger measures but do not provide information regarding differences between DAB-VJ and DAB-VR. A Principal Components Analysis of measures was then conducted to clarify relations among variables.

Principal Components Analysis of Anger/Hostility and Mood Scales: To delineate the relations between, and shared variance of, the measures used in this study, a principal components analysis with oblique rotation, including all 14 subscales (p) was performed. The total of participants for this analysis was 457. As before, the number

of factors to retain was based on parallel analysis and factor interpretability.

Eigenvalues obtained by parallel analysis were as follows: 1.30 (Factor 1), 1.23 (Factor 2), 1.18 (Factor 3) and 1.12 (Factor 4). Actual eigenvalues obtained from principal components analysis were as follows: 6.15 (Factor 1), 1.39 (Factor 2), 1.26 (Factor 3) and 0.96 (Factor 4). As can be seen, the fourth obtained eigenvalue was less than the predicted one; the 4 Factor model was therefore not supported or retained. Results from this parallel analysis thus supported a 3 factor model. Table 3 shows the factor loadings of all measures.

A closer inspection of factor loadings revealed that a 3 factor model was not the best possible fit. Table 4 shows that CAB-V failed to load significantly on any factor in this 3 Factor model. This model therefore contained one hyperplane item. It also contained 2 variables loading significantly on all 3 Factors and 3 variables loading significantly on 2 Factors, for a total of 5 complex items. In comparison, a 2 Factor model provided slightly better interpretability and simple structure with no hyperplane items (CAB-V did load significantly on Factor 2) and 4 complex items. This two-factor solution was therefore retained and accounted for 53.9% of the variance in anger/hostility/mood scale scores.

Once again, factor loadings ≤ 0.50 were retained. Inspection of the scales revealed that factors did not distinguish measures of anger experience and measures of anger expression. All anger/hostility measures loaded positively on Factor 1. Measures of anger experience included Trait Anger, Emotional and Cognitive Anger (BPAQ), Hostile Outlook, Anger-Arousal and Range of Anger Eliciting Situations

(MAI). Measures of anger expression included Physical and Verbal Aggression (BPAQ), Anger-In (MAI) as well as DAB-VJ and DAB-VR. Factor 2 contained a positive loading from CAB-V and negative loadings from the mood measures (Trait Anxiety and BDI). Four scales from Factor 1 also substantially and negatively cross loaded on Factor 2: Anger-Arousal (MAI), Cognitive Anger (BPAQ), Anger-In (MAI) and DAB-VR. The two factors were correlated -0.40.

Discussion

Results from the first principal components analysis indicated that the Anger Behavior - Verbal scale consists of three separate scales: Constructive Anger Behavior (CAB-V), Destructive Anger Behavior-Justification (DAB-VJ) and Destructive Anger Behavior- Rumination (DAB-VR). The internal consistencies of these three scales were quite good, supporting this finding.

In the second principal components analysis, DAB-VR and DAB-VJ both loaded on Factor 1, demonstrating convergent validity with established anger/hostility measures. However, DAB-VR distinguished itself from DAB-VJ by also loading significantly on Factor 2. DAB-VR was therefore found to be related to Trait Anxiety and Depression (BDI) and to be negatively related to CAB-V, while DAB-VJ was not. This provides some discriminant validity between DAB-VR and DAB-VJ. Rumination of anger, and therefore finding no resolution to angry feelings or thoughts, is associated with the predisposition to experience anxiety and depression and is negatively associated with a problem solving, constructive style of anger resolution.

Table 4. Oblique-Rotated Factor loadings of anger/hostility/mood measures in Study 1.

Anger/Hostility/Mood Measure	Factor Solution				
	2 Factor		3 Factor		
	Factor 1	Factor 2	Factor 1	Factor 2	Factor 3
Trait Anger	0.84		0.76	-0.50	0.66
Emotional Anger (BPAG)	0.81		0.85		
Anger-Arousal (MAI)	0.73	-0.60	0.57	-0.59	0.69
Physical Aggression (BPAG)	0.72		0.81		
Verbal Aggression (BPAG)	0.68		0.81		
Cognitive Anger/Hostility (BPAG)	0.67	-0.59	0.68	-0.64	
Hostile Outlook (MAI)	0.65				0.80
Range of Anger Eliciting Situations (MAI)	0.64				0.83
Anger In (MAI)	0.62	-0.56		-0.53	0.67
DAB-VJ	0.61				0.72
DAB-VR	0.61	-0.53		-0.50	0.66
Trait Anxiety		-0.88		-0.88	
Depression (BDI)		-0.79		-0.83	
CAB-V		0.50		0.49**	

N= 457; All factors significantly loadings ≤ 0.50 shown with exception of ** CAB-V in 3 Factor solution which failed to load significantly; BPAQ=Buss-Perry Aggression Questionnaire; MAI = Multidimensional Anger Inventory; BDI=Beck Depression Inventory;DAB-VR =Destructive Anger Behavior-Verbal Rumination;DAB-VJ=Destructive Anger Behavior-Verbal Justification;CAB-V=Constructive Anger Behavior-Verbal

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Self justification and attribution of blame elsewhere did not demonstrate these associations.

These results were encouraging. Although construct validity takes many measures and studies to demonstrate, results from this study demonstrate a good starting point for the AB-V.

A second study was planned to attempt to replicate the factor structure of the AB-V scales and to provide further evidence of convergent and discriminant validity for the scales, using other established measures of anger/hostility, as well as personality.

Chapter 3

Continued Validation of the Self-Report Anger Behavior-Verbal scale
(AB-V)

Continued Validation of the Self-Report Anger Behavior-Verbal Scale (AB-V)

Results obtained from Study 1 indicated that the Anger Behavior - Verbal (AB-V) scale consists of three separate scales: Constructive Anger Behavior (CAB-V), Destructive Anger Behavior-Justification (DAB-VJ) and Destructive Anger Behavior-Rumination (DAB-VR). The internal consistencies of these three scales were quite good, supporting this finding.

Although DAB-VR and DAB-VJ both demonstrated convergent validity with established anger/hostility measures, DAB-VR distinguished itself from DAB-VJ by showing a positive relation to Trait Anxiety and Depression (BDI) and a negative relation to CAB-V. DAB-VJ did not show these associations.

These results were encouraging. A second study was therefore conducted which sought to extend construct valdity findings by replicating the factor structure of the AB-V scale, by providing further evidence of convergent and discriminant validity for the scales using other established measures of anger/hostility, as well as personality and by demonstrating high internal consistencies for AB-V scales. Thus, the goal of this study was not to replicate validity findings with measures used in Study 1. Rather, different measures were used for comparison to the AB-V scales to extend the understanding of how the AB-V scales differ from each other as well as how they differ and converge with other measures.

Anger Measures

Three measures of anger/hostility were used in the present study: The Cook-Medley

Hostility Scale (CMHS; Cook & Medley, 1954), The Anger Expression Inventory

(AEI; Spielberger et al., 1985), and The Personal Assertiveness Analysis (PAA;

Hedlund & Lindquist, 1984). The CMHS and the AEI are two of the most commonly

used measures of anger experience and expression in research (Suls, Wan, & Costa,

1995) and as such it is important to examine how the AB-V scales relate to these

measures. The PAA was included because its scales capture typical response styles of

dealing with real or potential social conflict, i.e., passivity, assertiveness and

aggression. As the AB-V scales were designed to capture anger expression styles

within a social conflict context, the inclusion of the PAA was hypothesized to provide

valuable convergent and divergent validity information.

CAB-V was hypothesized to show no relation to or a negative relation with

most scales of the CMHS and the AEI. More specifically, as CAB-V measures

perspective taking and understanding of others points of view, cognitive anger, e.g.,

cynicism and hostile attributions (CMHS) should not be present. Likewise, angry

emotions will dissipate quickly as the anger-eliciting event is discussed and solved so

that all parties involved feel relief from anger. As CAB-V is an active problem

solving strategy, it should not be related to Anger-In (suppression of anger), or

passivity, and should be positively related to how much one tries to control anger, and

how assertive one is. CAB-V should also show no association or a negative

association with aggression.

Both DAB-VJ and DAB-VR, by their very nature are not oriented towards

assertively resolving conflict. Although attempts are made to resolve personal anger,

no attempts are made to view others involved in the interpersonal conflict positively. As such both these anger expression styles include maintenance of hostile/angry cognitions and emotions. Both DAB-VJ and DAB-VR, then, should be positively related to cynicism, and hostile emotions and attributions. They should also be positively related to aggressive responding and aggression (PAA), as others are blamed and resented. Due to the maintenance of hostile thoughts and emotions, both DAB-VJ and DAB-VR have elements of both suppression of anger and outward displays of antagonistic anger and should therefore be positively related to Anger-In and Anger-Out. As a consequence, control of anger should also be negatively related to both destructive verbal anger measures. DAB-VJ and DAB-VR should differ from each other when it comes to measures of social contact. DAB-VR reflects rumination and should be associated with social avoidance and passivity, as anger is not actively resolved. DAB-VJ, on the other hand, reflects an active attempt to gain favor from others and should not be related to social avoidance and passivity.

Personality Measures

One personality measure was used in the present study: The Big Five Inventory-54 (BFI-54; John, Donahue & Kentle, 1992). AB-V scales are hypothesized to reflect typical and enduring styles of anger expression. Thus, any investigation of the validity of the AB-V scales would be incomplete without an examination of how they relate to personality dimensions (characteristic and enduring styles of interacting). It is hypothesized that CAB-V should be positively related to more positive personality

dimensions, such as extraversion (sociable, fun-loving), and agreeableness (good natured, sympathetic), as CAB-V reflects a desire to understand others and maintain positive relations with others. Thus, it should also be negatively related to neuroticism (worried, nervous, emotional). No specific hypotheses were made regarding the relation of CAB-V to conscientiousness (reliable, hardworking) and openness (imaginative, creative). Results from study 1 suggested that DAB-VR, and not DAB-VJ, is associated with depression and anxiety. Thus, it was hypothesized that in the present study DAB-VR, and not DAB-VJ, will be associated with Neuroticism. Both scales should be negatively associated with extraversion and agreeableness. No specific hypotheses were made regarding DAB-VJ's and DAB-VR's associations with conscientiousness and openness.

The goals of this second study therefore included 1) replicating the factor structure of the AB-V scale, 2) replicating internal-item consistency estimates for subscales, and 3) obtaining convergent and discriminant validity with other anger/hostility measures and personality measures. As in Study 1, it was hypothesized that CAB-V, DAB-VJ, and DAB-VR would be independent constructs and be differentially related to other anger and personality measures.

Method

Participants. Two hundred and seventy-two undergraduate students at the University of Alabama voluntarily participated in this study for credit towards their Psychology course. Questionnaire packages were completed during class time with confidentiality

ensured by use of identification numbers, rather than names on all materials. Age of

participants ranged from 18 years to 84 years, however.

<u>Measures.</u>

<u>Anger- Behavior Scale (AB-V)</u>: The AB-V consists of three sub-scales, as determined

in Study 1: a 12-item constructive verbal anger behavior scale (CAB-V), a 6-item self

justification scale (DAB-VJ) and a 5-item rumination scale (DAB-VR). Persons rate

themselves on a 4-point, Likert scale ranging from 1 "almost never", to 4 "almost

always", according to how frequently each item applies to them. The CAB-V score is

calculated as the sum of all constructive items under both prompts, " I discuss my

anger.....", and, " I find that after discussing my anger....". DAB-VJ is calculated as

the sum of all destructive items assessing motivations for discussing anger and

therefore falling under the prompt, " I discuss my anger.....", and DAB-VR is

calculated as the sum of all destructive items assessing the consequences of anger

discussion and therefore falling under the under the prompt, " I find that after

discussing my anger....".

<u>The Cook-Medley Hostility Scale (CMHS)</u>: The CMHS scale (Cook & Medley, 1954)

is a 50- item, self-report, multidimensional measure of hostility derived from MMPI

items. Recent investigation has identified six subscales: Cynicism, Hostile

Attribution, Aggressive Responding, Hostile Affect, Social Avoidance and Hostile-

Other, and has established that three of these sub-scales (Aggressive Responding,

Hostile Affect and Cynicism) are reliable and valid, and are superior at predicting

cardiac mortality, when compared to the prediction success of the CMHS as a whole

(Barefoot, Dodge, Peterson, Dahlstrom, & Williams, 1989).

The Anger Expression Inventory (AEI): The AEI (Spielberger et al., 1985) is a 20-

item, self- report scale measuring individual tendencies to express anger in different

ways. The Anger-In scale (8 items) measures the frequency with which angry feelings

are held in or suppressed. The Anger-Out scale (8 items) measures how often anger is

expressed towards other persons or objects in the environment. The Anger Control

scale (8 items) measures the frequency of attempts to control the expression of anger.

The Internal consistency of the AEI scales has been shown to be acceptable to good:

Anger-In from 0.73 to 0.86, Anger Out from 0.73 to 0.78 and Anger Control from

0.81 to 0.85 (Spielberger et al., 1985; Spielberger, 1988).

The Personal Assertiveness Analysis (PAA): The PAA (Hedlund & Lindquist, 1984)

is a 30-item, self-report scale that was designed to distinguish between passive,

aggressive and assertive behavior. The Passivity scale comprises items that describe

difficulty expressing oneself in front of others and items that describe the inability or

unwillingness to engage in social conflict. The Aggression scale describes physical or

verbal displays of antagonistic behaviors. The Assertiveness scale consists of items

that describe verbal assertiveness in situations of potential social conflict. Each scale

consists of 10 situations/items. Respondents are instructed to rate themselves on a 5-

point, Likert scale according to how accurately each item describes them: from 1

"just like me", to 5 "not at all like me". One week test re-test reliability was

demonstrated at 0.82 for Passivity, 0.70 for Aggression and 0.70 for Assertion. The

PAA has also been shown to be negatively related to the Crowne-Marlowe Social Desirability Scale (Hedlund & Lindquist, 1984).

The Big-Five Inventory (BFI-54): The BFI-54 (John, Donahue & Kentle, 1992) is a 54-item, self-report scale designed to assess five dimensions of personality. Nine items measure Extraversion, nine items measure Agreeableness, nine items measure Conscientiousness, eight items measure Neuroticism and 18 items measure Openness. Persons rate themselves on a 5-point Likert scale ranging from 1 "strongly agree", to 5 "strongly disagree", according to how characteristic each item is of them.

Procedure Participants completed the five questionnaires they were provided with in the following order: The BFI-54 (BFI-54; John, Donahue & Kentle 1992), The Cook-Medley Hostility Scale (CMHS;(Cook & Medley, 1954), the AB-V, The Anger Expression Inventory (AEI; (Spielberger et al., 1985), and The Personal Assertiveness Scale (PAA: Hedlund & Lindquist, 1984). Participants completed the questionnaire package within one and a half hours. The means and standard deviations of all measures are shown in Table 5.

Results

As in Study 1, a principal components analysis was first conducted to determine the factor structure of the AB-V items. Internal consistency estimates of all factors were then calculated. After an acceptable factor structure was obtained, these scales were examined for their convergent and discriminant validity by entering them into another

Table 5. Means and standard deviations for measures in Study 2.

Scale	Subscale	N	Mean	SD
AB-V Scale	CAB-V	271	30.1	(7.4)
	DAB-VJ	272	12.4	(4.4)
	DAB-VR	271	9.3	(3.1)
BFI-54	Extraversion	270	32.3	(6.5)
	Agreeableness	270	34.5	(6.0)
	Conscientiousness	270	31.8	(5.8)
	Neuroticism	271	24.3	(6.2)
	Openness	268	64.8	(10.0)
CMHS	Cynicism	273	6.6	(2.9)
	Aggressive Responding	273	4.1	(1.9)
	Social Avoidance	273	1.4	(1.1)
	Hostile Attributions	273	4.3	(2.5)
	Hostile Emotions	273	2.3	(1.5)
	Hostile Other	273	3.0	(1.4)
AEI	Anger-Out	273	17.0	(4.4)
	Anger-In	271	17.3	(4.3)
	Anger-Control	273	7.9	(2.2)
PAA	Passivity	271	21.9	(4.6)
	Aggression	269	21.1	(5.2)
	Assertiveness	271	28.6	(4.2)

AB-V = Anger Behavior -Verbal scale CAB-V = Constructive Anger Behavior-Verbal; DAB-VJ = Destructive Anger Behavior - Verbal Justification; DAB-VR = Destructive Anger Behavior - Verbal Rumination; CMSDS = Crowne Marlowe Social Desirability Scale; BFI-54 = Big Factor Inventory; CMHS = Cook-Medley Hostility Scale; AEI= Anger Expression Scale; PAA = Personal Assertion Analysis

principal component analysis with all of the other anger/hostility and personality measures used in this study.

Principal Components Analysis of AB-V items: As in Study 1, a principal components analysis with oblique rotation was conducted with all 23 AB-V items. Parallel analysis and factor interpretability were once again used in deciding how many factors to retain. The value for p = 23 items and the value for n = 270. The calculated eigenvalues for each Factor were as follows: 1.61 (Factor 1), 1.50 (Factor 2), 1.43 (Factor 3) and, 1.36 (Factor 4). The actual obtained eigenvalues were as follows: 6.02 (Factor 1), 4.60 (Factor 2), 1.53 (Factor 3) and, 1.16 (Factor 4). As can be seen the obtained eigenvalue for Factor 4 is less than the predicted one and therefore the 4th Factor was not retained.

Results from parallel analysis supported a three-factor solution which showed good simple structure and made conceptual sense. The good simple structure of this solution is evidenced by the fact that there were no complex items, only one hyperplane item (#12), and a large number of salient loadings per factor. This three-factor solution accounted for 52.9% of the variance in AB-V item scores. Factor loadings obtained in the principal components analysis of AB-V scale items are shown in Table 3.

Taking salient loadings as $\leq$ 0.50, 11 items loaded on Factor 1 (CAB-V), 6 items loaded on Factor 2 (DAB-VJ) and 5 items loaded on Factor 3 (DAB-VR). Results therefore replicated findings in Study 1. Item # 12 on CAB-V barely missed

inclusion criteria, but was included anyway due to its significance in Study 1, which had a larger sample size. DAB-VR was correlated 0.34 with DAB-VJ and -0.21 with CAB-V. DAB-VJ and CAB-V were correlated 0.02.

Internal Consistency: The internal-item consistency estimates of CAB-V, DAB-VJ and DAB-VR were calculated to be 0.89, 0.86 and 0.78, respectively.

Convergent and Divergent Validity

As in Study 1, two different statistical procedures were used to examine convergent and divergent validity of the AB-V scales. First, zero order correlations were calculated among all measures to examine commonalities between individual variables. The results of these correlations are presented in Tables 2a to 2i in Appendix B. Secondly. A Principal Components analysis was conducted in which all subscales served as individual variables. This procedure was once again utilized to examine commonalities among multiple measures and provide a more holistic and concise picture measure relations.

Correlations

Intercorrelations among measure subscales and correlations among different measure subscales were calculated to obtain information about individual relations among variables. Tables 2a to 2i in Appendix B show the results of these calculations. Overall, the direction and magnitude of associations was congruent with hypotheses.

CAB-V was significantly and negatively related to social avoidance, hostile attributions and emotions, passivity, aggression and neuroticism. It was positively related to anger control, assertiveness, extraversion, agreeableness, conscientiousness and openness. Both DAB-VJ and DAB-VR were both significantly and negatively related to anger control and agreeableness. Both were positively related to Anger In, Anger-Out, cynicism, aggressive responding, hostile attributions and emotions, passivity, aggression and neuroticism. DAB-VR differed from DAB-VJ in that it was significnatly positively related to social avoidance and was significantly negatively related to extraversion and conscientiousness. DAB-VJ did not show these significant relations. For information regarding the associations of all other measures used in this study refer to Tables 2e to 2i in Appendix B.

Principal Components Analysis of Scales: To delineate the relation and shared variance of the measures used in Study 2, a principal components analysis with oblique rotation including all 20 subscales (p=20) was performed. The total of complete data sets used was 257 (n=257). As before, the number of factors to retain was determined by parallel analysis and factor interpretability. Predicted eigenvalues for each Factor were calculated as follows: 1.58 (Factor 1), 1.47 (Factor 2), and 1.39 (Factor 3). Actual Eigenvalues obtained through principal components analysis were as follows: 5.69 (Factor 1), 2.51 (Factor 2), and 1.37 (Factor 3).

Results therefore supported a 2 Factor model. However, this solution contained three hyperplane items. Comparison of this model to a three-factor solution

indicated that the three-factor model was a slightly better fit, showing only two hyperplane items (Social Avoidance and Openness), and only two complex items (Hostile Affect and DAB-VR). It also provided more information regarding the discriminative validity of DAB-V subscales. This three-factor model was therefore retained and accounted for 47.8% of the variance in anger/hostility/personality scores. Table 6 shows the factor loadings of all measures for both a 2 and a 3 Factor solution. Loadings of $\leq$ 0.50 were considered significant.

Inspection of the items revealed that Factor 1 consisted of most of the anger (both expression and experience) and hostility measures. Cognitive and affective (anger experience) measures included Hostile Attributions, Hostile Affect, Cynicism and Hostile Other from the CMHS. Anger/Hostility behavior (anger expression) measures included Aggressive Responding (CMHS), Aggression (PAA), Anger-In and Anger-Out (AEI) as well as DAB-VJ and DAB-VR. Factor 2 consisted of two types of responding to actual or potential conflict and one personality characteristic: Extraversion (BFI-54) and Assertiveness (PAA) loaded positively and Passiveness (PAA) loaded negatively. Factor 3 consisted of three personality characteristics and two types of anger expression: Agreeableness and Conscientiousness (BFI-54), Anger Control (AEI) and CAB-V all loaded positively, while Neuroticism (BFI-54) loaded negatively. Two items from Factor 1 also loaded significantly and negatively on Factor 3: Hostile Emotions (CMHS) and DAB-VR. Factor 1 correlated -0.03 with Factor 2 and -0.30 with Factor 3. Factor 2 and 3 were correlated 0.17.

Table 6. Oblique-Rotated Factor loadings of anger/hostility measures in Study 2.

Anger/Hostility/Mood Measure	Factor Solution				
	3 Factor			2 Factor	
	Factor 1	Factor 2	Factor 3	Factor 1	Factor 2
Hostile Attributions (CMHS)	0.77			0.74	
Hostile Emotions (CMHS)	0.70		-0.52	0.75	
Aggressive Responding (CMHS)	0.70			0.71	
Cynicism (CMHS)	0.69			0.60	
DAB-VJ	0.65			0.62	
DAB-VR	0.64		-0.50	0.69	
Anger-Out (AEI)	0.61			0.74	
Anger-In (AEI)	0.57			0.48*	
Hostile Other (CMHS)	0.56			0.50	
Aggression (PAA)	0.54			0.71	
Passiveness (PAA)		-0.69			-0.68
Extraversion (BFI-54)		0.67			0.73
Assertiveness (PAA)		0.66			0.59
Social Avoidance (CMHS)		-0.49*			-0.42*
Openness (BFI-54)		0.44*			0.50
Anger Control (AEI)			0.73	-0.51	
Agreeableness (BFI-54)			0.70	-0.62	
Neuroticism (BFI-54)			-0.62		-0.56
CAB-V			0.58		0.49*
Conscientiousness (BFI-54)			0.55		0.50

N= 257; All factors with significant loadings (≤ 0.50) shown, with the exception of * items which failed to load significantly. CMHS = Cook-Medley Hostility Scale; AEI= Anger Expression Scales; DAB-VR = Destructive Anger Behavior-Verbal Rumination;DAB-VJ = Destructive Anger Behavior-Verbal Justification;CAB-V=Constructive Anger Behavior-Verbal;PAA = Personal Assertion Analysis; BFI-54 = Big Factor Inventory.

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Discussion

Results from the principal components analysis of AB-V items replicated results from

Study 1. The Anger Behavior-Verbal Scale was found to consist of three separate sub-

scales: Constructive Anger Behavior (CAB-V), Destructive Anger Behavior-

Justification (DAB-VJ) and Destructive Anger Behavior-Rumination (DAB-VR). The

internal-item consistency estimates of these three scales were similar to the ones found

in Study 1, indicating that the three AB-V scales are stable across samples.

Although both DAB-VR and DAB-VJ loaded on Factor 1 in the scale principal

components analysis, demonstrating convergent validity with established

anger/hostility measures, DAB-VR distinguished itself from DAB-VJ by also loading

substantially on Factor 3. DAB-VR was therefore found to be related to Neuroticism

(BFI-54) and to be negatively related to Agreeableness, Conscientiousness, Anger

Control and CAB-V. DAB-VJ did not show these associations. This finding provides

some discriminant validity between DAB-VR and DAB-VJ. Rumination of anger, and

therefore finding no resolution to angry feelings or thoughts, is associated with a

tendency towards neuroticism and is negatively associated with a problem-solving,

constructive style of anger resolution. DAB-VJ (self justification and attribution of

blame elsewhere) was independent from these measures. Overall then, results suggest

that the AB-V scale is a valid and reliable new measure of a newly proposed

dimension of anger expression: anger discussion or verbal anger behavior.

Chapter 4

Conclusions from Study 1 and Study 2 and Proposed Links Between

AB-V and Health

Conclusions from Study 1 and Study 2 and Proposed Links Between DAB-VR and

Health

Results from Study 1 and Study 2 support the conceptualization of verbal anger

behavior as having both constructive or positive and destructive or negative

dimensions. A new self-report measure of anger behavior, the Anger Behavior -

Verbal Scale (AB-V) was developed that reflects these dimensions. Principal

components analysis of AB-V items indicated that it consists of three scales.

The first factor captures a constructive verbal anger behavior (CAB-V) style

that reflects a goal-oriented, problem solving method of responding to the experience

of anger, as well as successful resolution of anger. Items describe intentions or

motivations to resolve interpersonal conflict and anger by understanding the other

person's point of view, as well as by clarification of one's own role in the conflict.

Consequently, anger is dealt with directly with the target of anger in a reflective,

assertive and constructive manner. Discriminant validity of this measure was

demonstrated by the absence of associations with established measures of anger and

hostility. CAB-V was not associated with destructive expressions of anger or with

negative affective or cognitive dimensions of anger. It was also not associated with

Neuroticism or with the predisposition to become angry, anxious or depressed. Those

who intend to resolve anger constructively therefore do not demonstrate the

predisposition to become angry, irritated or loathful under a number of different

circumstances (affective anger), nor do they demonstrate resentfulness or

suspiciousness (cognitive anger). Such persons are also unlikely to demonstrate their

anger outwardly via verbal or physical antagonism, or to suppress their anger and hold grudges.

CAB-V was however related to Agreeableness, Conscientiousness and control of angry feelings. Research has shown that individuals scoring high on agreeableness perceive less conflict in their interactions with others, like others more and rate others more positively than do those scoring low on agreeableness (Graziano, Jensen-Campbell, & Hair, 1996). Highly agreeable persons are therefore motivated to maintain positive relations with others and it may be this motivation that induces the generation of positive perceptions and attributions about provocative behavior. Positive attributions, then, induce responding to conflict with less negative affect and selection of more constructive conflict resolution tactics (Lewin, 1935 in Graziano, et al., 1996). For example, low agreeable people have been shown to evaluate power assertion resolution tactics as more effective than highly agreeable people (Graziano et al. 1996). Indeed it has been shown that agreeable people are better able to control anger and negative affect in situations involving frustration (Ahadi & Rothbart, 1994).

These findings suggest that those who score highly on CAB-V are characterized as unselfish, cooperative, trusting and warm (agreeable) and are organized, thorough and efficient (conscientious) and are able to control their angry feelings and thoughts. It stands to reason that such persons would be able to understand a conflict situation from another's perspective and see the situation through to resolution, all the while keeping their composure. This profile suggests that this way of expressing anger would be conducive to good health, as anger would be

resolved and no ill will for the other person would remain .

Results from principal components analysis of AB-V items in both studies indicated that a second scale exists which captures a destructive verbal anger behavior style that focuses on intentions or motivations at self justification/vindication and attribution of blame elsewhere in an anger eliciting situation (DAB-VJ). Items reflect attempts at persuading others that one is not at fault in a conflict situation, attributing blame to others and obtaining others' sympathy. Items do not directly assess whether anger has been resolved. Convergent validity of DAB-VJ was demonstrated by its associations with other established measures of anger experience (both affective and cognitive) and anger expression, and an absence of associations with desirable personality traits like Agreeableness, and Conscientiousness and constructive problem solving (CAB-V). In fact DAB-VJ showed no associations, one way or another, with any personality measure.

Results from principal components analysis of AB-V items in both studies revealed a third scale that also captured elements of a destructive verbal anger behavior style (DAB-VR). Items in this third scale reflect a mental and verbal rumination of anger, indicated by dwelling on anger and the need to keep discussing the anger over and over again. Items therefore reflect negative consequences of discussing anger, as anger is not resolved, and increased agitation and justification for disliking the other person occur. Convergent validity was demonstrated by similar factor loadings found for DAB-VJ (i.e., affective, cognitive and destructive behavioral measures of anger and hostility). However, DAB-VR diverged from DAB-VJ, as

demonstrated by the fact that DAB-VR alone showed associations with Neuroticism, trait anxiety and depression.

The split of the DAB-V scale into separate scales was a somewhat unexpected but interesting finding. It suggests that although self justification and attribution of blame elsewhere represent destructive motivations for anger resolution and are not conducive to problem solving, such motivations do not necessarily lead to the negative consequence of anger discussion, rumination and nonresolution of anger. DAB-VJ and DAB-VR are correlated but they do not form one unified construct. Those who score high on DAB-VR and those who score high on DAB-VJ are both characterized by affective anger (eg., the predisposition to become angry easily and to feel impatient and bitter in a range of situations), cognitive hostility (eg., suspicious of others, resentful and intolerant) and destructive anger expression behaviors (eg., argumentative, physical and or verbal aggression or suppression of anger). However, those high on DAB-VR are also characterized by the predisposition to become anxious and depressed and emotionally unstable (moody, tense, not handling stress well).

Proposed Links Between AB-V and Health

Past research has demonstrated that both the expression of anger in an outwardly aggressive or antagonistic way (Anger-Out), and the suppression of angry feelings and behaviors (Anger-In) are detrimental to health (Gentry et al., 1982; Harburg et al., 1991; Suls, Wan, & Costa, 1995). Other researchers (Siegman 1994; Stoney & Engbretson, 1994; Thomas 1993) have concluded that communicative anger

expression may be important for cardiovascular health as well. However, until the development of the AB-V, no psychometrically valid measure of this form of verbal anger behavior has been available. Studies 1 and 2 have demonstrated that the AB-V is a valid and reliable self-report measure of this dimension of anger expression.

The next step for assessing the utility of the AB-V as an instrument for examining the links between anger and health is to establish its predictive validity with respect to specific health indexes, such as blood pressure (BP). Research has already demonstrated that those who score highly on an objective Observer-report version of CAB-V (same items as self-report, but written in 3rd person) have lower resting systolic and diastolic BP than those scoring low on CAB-V, even after controlling for standard hypertension risk factors such as age, smoking, and family history of hypertension (Davidson, Stuhr, & Chambers, 1998a; Davidson et al., 1998b). This research suggests that those persons who have a tendency towards using a goal-oriented, problem-solving, perspective-taking method of responding to the experience of anger may be protected against detrimental health outcomes, such as hypertension. However, the relation between all self-report AB-V scales and BP has yet to be determined.

Anger and Blood Pressure

Cannon (1929) first postulated that emotion was associated with autonomic activity. He believed that undifferentiated autonomic arousal occurred during different emotional states. However it has now been shown that different emotions elicit

different patterns of cardiovascular arousal, supporting the idea that discrete emotion specific autonomic activity occurs during negative emotions versus positive emotions. James, Yee, Harshfield, Blank, & Pickering (1986) demonstrated that anger and anxiety (negative emotions) increased diastolic blood pressure (DBP) more than happiness, which was associated with a decrease in DBP. The effects of negative emotions, such as fear (associated with anxiety) and anger, on BP have also been distinguished from each other. Sinha, Lovallo, & Parsons (1992) found that fear was associated with increased heart rate and systolic blood pressure (SBP), and produced large decreases in peripheral vascular resistance (vasodilation) which kept DBP low. On the other hand, anger was associated with increases in cardiac output accounted for by increases in both SBP and DBP, and increased peripheral resistance (vasoconstriction).

Research has indicated that anger causes more cardiovascular arousal than any other emotion (Thomas, 1995). Anger is associated with concomitant activation of both the sympathetic nervous system (SNS) and the hypothalamic-pituitary-adrenal axis (HPA axis) (Hardy & Smith, 1988; Houston, Smith, & Cates, 1989; Suarez & Williams, 1989), as well as decreased parasympathetic nervous system activation (PNS) (Fukudo et al., 1992). Theorists hypothesize that it is the chronic activation of neuroendocrine, and hence the cardiovascular system, that leads to essential hypertension (measured as resting BP) over time (Costa, McCrae, & Dembroski, 1989; Harburg, Gleiberman, Rusell, & Cooper, 1991; Girdler, Turner, Sherwood & Light, 1990; Obrist, 1981). It should be noted that increased blood pressure

constitutes a linear risk for Coronary Heart Disease (CHD). In other words, as resting

blood pressure increases, so too does the risk for CHD (Pickering, 1991). Therefore,

persons do not need to exhibit hypertension to be at risk for CHD.

There have been two proposed mechanisms by which SNS arousal results in

elevated resting BP over time: blood pressure hyper-reactivity and poor blood

pressure recovery. The blood pressure reactivity hypothesis postulates that frequent or

prolonged episodes of anger manifest themselves in frequent or prolonged episodes of

cardiovascular reactivity and hence BP reactivity. Such BP hyper-reactivity then leads

to increasing resting BP levels (or resting BP upwards drift) over time (Julius, 1993;

Schachter & Singer, 1962). However, recent research has suggested that support for

this hypothesis is not as robust as had been hoped, as studies examining BP reactivity

in upwardly drifting BP levels suffer from methodological flaws (Pickering & Gerin,

1990) or have remained equivocal (for a review, see Pickering & Gerin, 1988). As

such, other researchers have suggested that other mechanisms be considered in

conjunction with BP reactivity to explain upwardly drifting BP (Christenfeld, Gerin &

Glynn, 1995; Gerin, 1998; Linden, Earle, Gerin & Christenfeld, 1997). Another such

mechanism is the focus of the BP recovery hypothesis. This hypothesis suggests that

poor recovery, i.e., return to baseline, of sympathetic activation (including elevated

BP) after a stress or anger provoking incident leads to hypertension and

Cardiovascular Disease (Linden, Earle, Gerin, & Christenfeld, 1997). SNS activation

may persist long after the eliciting stimulus has ended and such continued sympathetic

activation maintains elevated BP, eventually leading to upwards drift of BP.

The Present Hypothesis

To assess the relation between anger expression styles as measured by the self-report AB-V scales and resting blood pressure a third study was conducted.

Results from Studies 1 and 2 have demonstrated that those who score highly on CAB-V are characterized as agreeable, conscientious, and are able to control their angry feelings and thoughts and have little cognitive and affect anger. As such, persons who express their anger verbally and constructively find resolution to the anger eliciting situation, and so will recover from sympathetic arousal. More complete blood pressure recovery, over time, should lead to less stress on the cardiovascular system and as a result, resting BP should not significantly drift upwards. Indeed research has already shown that higher Observer report CAB-V scores are related to more complete DBP recovery and lower resting DBP across two years (Davidson et al., 1999).

Results from Studies 1 and 2 demonstrated that those who score highly on DAB-VJ (a destructive verbal anger behavior style that focuses on the intent or motivation of self justification/vindication and attribution of blame elsewhere in an anger-eliciting situation) also scored highly on measures of affective and cognitive anger. Research has shown that those classified as "victims" in interpersonal conflict (eg., argument) situations see the "perpetrators'" actions as arbitrary, gratuitous or incomprehensible, while the "perpetrator" views his/her own behavior as meaningful and comprehensible (Baumeister, Stillwell, & Wotman, 1990). The "victim" is

therefore likely to attribute the cause of transgressions to the perpetrator, and not take responsibility for the anger-eliciting event. The other person's perspective will continue to seem incomprehensible. Research has shown that those who attribute hostility to the actions of another in the absence of sufficient evidence for the objective quantification of hostility evidence greater anger/aggression across multiple self-reported indicators of attitude and behavior (Epps & Kendall, 1995). In other words, those persons who fail to take the perspective of the other person and find a resolution to conflict are more likely to have hostile thoughts, feelings and behaviors. Although DAB-VJ items do not directly assess the consequences of such a style of anger expression, it is hypothesized that those who score highly on DAB-VJ will not find resolution of anger, because they make no attempt to solve the conflict. Continued and unresolved anger should manifest itself in continued autonomic activation, with less BP recovery and hence over time, higher resting BP.

Results from Studies 1 and 2 have also demonstrated that DAB-VR (a destructive verbal anger behavior style that focuses on mental and verbal rumination of anger after it has already been discussed with others) is also associated with affective, cognitive and destructive behavioral measures of anger and hostility. These persons are also characterized by the predisposition to become anxious and depressed and emotionally unstable (moody, tense, not handling stress well). This supports findings that those with a dispositional tendency to ruminate also tend to be more sad and anxious (Wood, Saltzberg, Neale, Stone, & Rachmiel, 1990). Research has also demonstrated that the more people brood about the person who has harmed them, the

more their unfavorable evaluation of the person becomes reinforced (Tesser, 1978). This then leads to continued or even heightened anger. Indeed, research has shown that self-focused rumination about a provoking event maintains and intensifies anger (Rusting & Nolen-Hoeksema, 1998). Continuation of anger will result in the need to further discuss the emotional event (verbal rumination)(Rime et al., 1992), which in turn, then leads to further maintenance and even intensification of anger. DAB-VR items directly assess this lack of resolution and intensification of anger. Those who score highly on DAB-VR dwell on resentments, irritations and grudges and do not resolve anger. This lack of resolution and intensification of anger manifests itself in chronic or continued SNS arousal and poor recovery. Over time, such arousal should lead to elevated BP.

Chapter 5

Destructive Anger Behavior-Verbal Rumination predicts resting blood

pressure

<u>Anger Behavior-Verbal Predicts Resting Blood Pressure</u>

To assess the relation between anger expression styles, as measured by the self- report AB-V scales and resting blood pressure, a third study was conducted. This study had three main hypotheses: 1) as age increases high CAB-V scores should predict lower resting BP; 2) as age increases high DAB-VJ scores should predict higher resting BP; and 3) as age increases high DAB-VR scores should predict higher resting BP. Although the mechanism by which BP increases over time is not directly assessed in this study, resolution of anger, and hence the recovery of sympathetic arousal to baseline levels, is hypothesized to theoretically contribute to resting BP levels over time.

Those who use a constructive verbal anger expression style (CAB-V) directly seek to resolve anger, and accomplish this resolution through problem solving and perspective taking. Hence as age increases, such persons may have had many eliciting situations in life, but sympathetic recovery would have been more complete. On the other hand, as age increases, persons who score high on DAB-VJ and DAB-VR will have longer exposure to unresolved anger and this should lead to increased resting BP. Three BP measures will be used in the present study: 1) mean arterial pressure (MAP); 2) systolic blood pressure (SBP); and 3) diastolic blood pressure (DBP).

A secondary purpose of the present study was to further demonstrate construct validity of AB-V scales by evaluating the relation among self report AB-V scales and friend and trained rater (observer) report AB-V scales. Friend and observer report AB-V scale items are identical to self report items, except that items are written in third

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person. It was hypothesized that all individual AB-V scales from the three report types should significantly correlate with each other. In other words, DAB-VR scores from self, friend and observer reports should be significantly correlated. Likewise, DAB-VJ scores should be correlated and CAB-V scores should be correlated. The ability of the friend and observer report AB-V scales to predict resting blood pressure was was tested in the present study.

Other Measures

In order to demonstrate that the AB-V scales contribute a significant source of variability in BP levels, it was necessary to include other measures that have been shown to predict BP. In order for the AB-V scales to be considered a unique and valuable assessment instrument for hypertension, it must significantly predict BP levels above and beyond variables that are known hypertension risk factors. As such, measures that are considered known hypertension risk factors were included for analysis in the present study. These measures included: health and demographic information including age, gender, body mass index, amount of weekly exercise, alcohol consumption and cigarette smoking and family history of hypertension, The Cook-Medley Hostility Scale (CMHS; Cook & Medley, 1954), and The Anger Expression Inventory (AEI; Speilberger et al., 1985).

Several other measures were included in the present study, as results from Studies 1 and 2 demonstrated significant associations of these measures with the AB-V scales. It was considered appropriate to control for these measures' influence on the

relation between AB-V scales and resting BP indices. These measures included: State

and Trait Anger (STAS; Speilberger, 1988), Range of Anger-Eliciting Situations and

Anger Arousal scales from the Multidimensional Anger Inventory (MAI; Siegel,

1986), The Crowne and Marlowe Social Desirability Scale (CMSDS; Crowne &

Marlowe, 1964), and one question asking how often one talks when angry.

Method

Participants: A total of 108 persons (49 men and 59 women) volunteered to

participate in this study. Only persons who were not currently taking medication for

high blood pressure were included. Some persons were university undergraduates at

Dalhousie University (N=63) who consented to participate either for credit towards

their Psychology course or for $10. Other participants were University employees

recruited via e-mail and recruitment posters (N=46) and who were paid $10 for their

time. Ages of participants ranged from 18 to 55 years, with a mean age of 29.1

(10.1).

Measures

The Anger Behavior - Verbal Scale (AB-V). As previously demonstrated, the AB-V

is a 23-item self-report scale that measures verbal expression of anger. The scale is

comprised of three subscales: Destructive Anger Behavior- Verbal Rumination (DAB-

VR), Destructive Anger Behavior- Verbal Justification (DAB-VJ), and Constructive

Anger Behavior - Verbal (CAB-V). Respondents indicate on a 4-point Likert scale,

ranging from 1 "almost never", to 4 "almost always", the frequency with which they

engage in each item as a form of anger expression.

The CAB-V is a 12 item self report measure of constructive problem solving reasons for discussing anger, as well as of a positive outcome to this discussion. Internal-item consistency has been shown to be good (0.90 and 0.89; See Studies 1 and 2)

The DAB-VJ is a 6-item, self-report measure of a self-justification reason for discussing one's anger with others. Internal-item consistency has been shown to be good (0.84 and 0.86; see Studies 1 and 2).

The DAB-VR is a 5-item, self-report measure of anger rumination. Items reflect verbal rumination about anger after an anger-provoking incident has already occurred. Internal-item consistency has been shown to be good (0.77 and 0.78; see Studies 1 and 2).

The AB-V scale items were also re-written into third person so that outside observers could complete the questionnaire. The friend-report AB-V then utilizes information provided by persons who know the subject fairly well, while the observer-report version utilizes information provided by a trained rater who does not know the subject. Both versions were included in the present study.

The Multidimensional Anger Inventory (MAI) - Anger Arousal and Range of Anger Eliciting Situations Subscales. The MAI Anger-Arousal scale is an 8 item self report scale measuring the frequency, duration and magnitude of the experience of anger (Siegel, 1986). The Range of Anger Eliciting Situations is a 7-item self-report scale, measuring the range of situations in which anger is experienced. Persons rate items on

a 5-point Likert scale according to how descriptive of them each item is, where 1

represents "completely undescriptive of you", and 5 represents "completely

descriptive of you". The internal-item consistency of these two sub-scales is good:

Anger-Arousal (0.83) and Range of Anger Eliciting Situations (0.80) (Siegel, 1986).

The State-Trait Anger Scale (STAS). The STAS (Speilberger, 1988) is a 30-item,

self-report measure of the experience of anger. Fifteen items assess individual

differences in the disposition to experience anger (Trait anger; TAS) where persons

rate themselves on a 4-point Likert scale according to how they generally feel, with 1

representing "almost never", to 4 representing "almost always". The other 15 items

measure intensity of angry feelings at the present time (State anger; SAS), where

persons rate themselves on a 4-point Likert scale according to how they feel

presently, with 1 representing "not at all", to 4 representing "very much so". Internal-

item consistency has been shown to be good: .82 to .84 for the TAS and .87 to.93 for

the SAS (Speilberger, 1988).

The Cook-Medley Hostility Scale (CMHS). The CMHS (Cook & Medley, 1954) is a

50-item, self-report, multidimensional measure of hostility derived from MMPI items.

Recent investigation has identified six sub-scales: Cynicism, Hostile Attributions,

Aggressive Responding, Hostile Affect, Social Avoidance and Hostile Other and that

three of these sub-scales (Aggressive Responding, Hostile Affect and Cynicism) are

reliable and valid and are superior at predicting cardiac mortality, when compared to

the predictive success of the CMHS as a whole (Barefoot et al., 1989). Therefore,

only these three scales were used in the present study.

The Anger Expression Inventory (AEI). The AEI (Speilberger et al, 1985) is a 20-item, self-report measure assessing individual tendencies to express anger in different ways. The Anger-In scale (8 items) assesses the frequency with which angry feelings are held in or suppressed. The Anger-Out scale (8 items) assesses how often anger is expressed towards other people or objects in the environment. The Internal consistency of the AEI scales has been shown to be acceptable to good: Anger-In from 0.73 to 0.86, and Anger Out from 0.73 to 0.78 (Speilberger et al., 1985, 1988).

The Crowne and Marlowe Social Desirability Scale (CMSDS). The CMSDS (Crowne & Marlowe, 1964) is a self-report 63-item, true or false format measure designed to assess a person's tendency to present him/herself in a favorable fashion to others. The CMSDS shows high levels of test-retest reliability (0.89) and internal consistency (0.88) (Crowne & Marlowe ,1964).

Health and demographic questionnaire. This questionnaire obtained information about age, smoking pattern (number of cigarettes currently smoked per day), height and weight (to calculate body mass index, or BMI), amount of physical exercise per week (expressed in hours), medication use and family history of hypertension (ie: number of first degree relatives with known hypertension). An extra question was also added to this questionnaire: When you get angry, how often do you talk about what made you angry with other people? Respondents rate themselves on a 5-point Likert scale where 1 is 'never', and 5 is 'always'.

The Expanded Structured Interview (ESI). The ESI is a 12-minute, interpersonally stressful interview designed to assess anger and hostility by asking persons about their

characteristic responses to different situations (Hall et al., 1998). The ESI is based on the original Structured Interview (SI; Rosenman, 1978), which was designed to assess Type-A personality characteristics but has additional questions specifically addressing anger expression and defensiveness. The interview was videotaped for later scoring of the observer report AB-V scales.

Resting blood pressure. Resting mean arterial, systolic, and diastolic blood pressure (MAP, SBP, and DBP respectively) were measured using an oscillometric Spacelabs 90207 ambulatory monitor (Redmond, WA). Four blood pressure readings, each separated by six-minute intervals were obtained. Resting blood pressure was calculated as the average of the second, third and fourth blood pressure readings. Because participants had stood up and moved to a different chair just prior to the first blood pressure readings, the first readings were not included in blood pressure calculations. The initial few minutes of being hooked up to the ambulatory monitor were thus taken to reflect habituation to a seated position as well as to the sensation of the blood pressure cuff around the arm.

Procedure

Participants were first shown into the experimental room. They were then told that the study was examining the relationship between anger and blood pressure. After being seated at a table participants were asked to complete the questionnaire package. At this time, participants were also asked to provide the phone number of someone (friend, family member, co-worker, etc.) who knew them well, and had known them

for longer than 6 months. They were told that this individual would be contacted by phone at a later time and asked questions about participants' anger. They were then informed that after completion of the questionnaires they would be interviewed (ESI) and that this interview would be videotaped through a one-way mirror on the wall facing them. After gaining written consent from participants, the experimenter left the room while questionnaires were completed. The completion of all questionnaires usually took about one hour.

After questionnaire packages were completed the experimenter re-entered the room. Participants were asked to move to a more comfortable chair. An ambulatory blood pressure monitor cuff was then attached to their non-dominant arm. After an initial trial to make sure the cuff was comfortable for the participant, the monitor was set to automatically inflate every 6 minutes before, during and after the interview (ESI). The experimenter then left the room to let the participant relax alone. During the next 18 minutes, four baseline blood pressure readings were taken. After the last baseline reading (after minute 18), the video camera was turned on and the experimenter re-entered the room, sat down facing the participant and conducted the Expanded Structured Interview (lasting from 12 to 18 minutes). After the interview, the experimenter left the room and left participants alone for 18 more minutes while 3 blood pressure recovery readings were obtained. The video camera was turned off during this phase of the study. At the end of this time, the experimenter re-entered the room, took the blood pressure cuff off, and debriefed the participant fully. The experimenter kept track of time throughout the study with a stopwatch. As baseline,

or resting, blood pressure was the focus of interest in the present study, only blood pressure readings taken before the ESI was conducted were employed in subsequent analyses. Table 7 shows the means and standard deviations for all measures.

Within a few days of the interview, an experimenter who was blind to the participant's self-report AB-V scores, contacted the friend by telephone to obtain the friend AB-V report. This procedure usually took about 10 to 15 minutes. Another experimenter trained to code the ESI for AB-V and who was blind to both the self- and friend-reported AB-V scores, coded the ESI videotapes for Observer report AB-V scores.

Results

Participants: The mean age of the men (30.9 (11.2)) did not differ significantly from the mean age of the women (27.6 (9.0)), (t(107) = 1.72, n.s). Given this finding, as well as due to the fact that gender differences were not the focus of examination in the present study, the data from males and females were combined into one sample.

The large majority of participants were Caucasian (87%) followed by African-Canadian (6.5%), "other" including Middle Eastern (4.6%) and Asian-Canadian (1.9%). Because of the small representation of ethnic minorities, separate analyses by ethnicity were not performed.

Just over half of participants (57.4%) were university undergraduates, with the majority of the remaining sample employed in more traditional white collar occupations: executive (11.1%), and administration and administration support (11.1%), professional specialties, (7.4%), technicians and related occupations,

Table 7   Demographic information for Study 3.

Measure	Sub-scale	Mean SD
Demographics and social desirability	Age	29.2 (10.2)
	Body Mass Index	24.0 (4.5)
	Alcohol	3.3 (4.8)
	Smoking	2.0 (4.8)
	Family history of hypertension	1.9 (0.7)
	Exercise	7.2 (9.5)
	Resting mean arterial pressure	87.5 (8.1)
	Resting diastolic pressure	73.0 (7.8)
	Resting systolic pressure	119.1 (10.8)
	Talk when angry	3.6 (1.2)
Multidimensional Anger Inventory	Anger Arousal	15.8 (5.7)
	Range of anger eliciting situations	21.5 (4.8)
State-Trait Anger Scale	Trait Anger	27.6 (5.7)
	State Anger	18.4 (6.1)
Cook Medley Hostility Scale	Hostile Affect	2.2 (1.3)
	Cynicism	5.0 (3.0)
	Aggressive Responding	3.6 (1.9)
Anger Expression Inventory	Anger-In	16.5 (4.5)
	Anger-Out	14.6 (3.1)

Table 7 Cont'd

Measure	Sub-scale	Mean SD
Anger Behavior-Verbal Scales		
Self-Report	CAB-V	30.9 (6.0)
	DAB-VJ	11.0 (3.8)
	DAB-VR	8.8 (2.6)
Friend-Report	CAB-V	30.5 (6.0)
	DAB-VJ	11.8 (4.1)
	DAB-VR	8.69 (2.7)
Observer-Report	CAB-V	28.7 (5.3)
	DAB-VJ	13.2 (2.9)
	DAB-VR	7.8 (1.6)

N = 108   Smoking = # of cigarettes currently smoked per day; Alcohol = number of drinks per week; Exercise = # of hours/week of physical activity; DAB-VR = Destructive Anger Behavior-Verbal Rumination;DAB-VJ = Destructive Anger Behavior-Verbal Justification;CAB-V = Constructive Anger Behavior-Verbal

(5.6%), and marketing and sales, (2.8%). A minority of participants were employed in more traditional blue collar occupations: service industry, (1.9%), precision production, (1.9%), and operators, fabricators and labourers, (0.9%). Overall, the sample was representative of a white and fairly high SES population.

Friends: Just over half of all persons contacted by phone to complete the friend AB-V

scales were classified as friends (51.9%), followed by family members (27.8%),

others such as roommates and coworkers (18.5%) and acquaintances (1.9%). Most of

these persons had known the participant for over 2 years (87%), while the remaining

persons reported that they knew the participant for less than one year (7.4%) or

between 1 and 2 years (5.6%).

Internal Consistency

The internal-item consistency was assessed by Cronbach alpha coefficients for the

self, friend and observer-report AB-V scales. Self report alphas were found to be

acceptable to good: 0.89 for CAB-V, 0.85 for DAB-VJ, and 0.69 for DAB-VR.

Friend report alphas were also found to be acceptable to good: 0.86 for CAB-V,

0.85 for DAB-VJ, and 0.70 for DAB-VR. Finally, observer-report alphas were found

to be good: 0.91 for CAB-V, 0.87 for DAB-VJ, and 0.74 for DAB-VR.

Correlations Among AB-V Report Types

Table 8a shows the intercorrelations among self report AB-V scales. As in studies 1

and 2, DAB-VR was significantly and positively correlated with DAB-VJ. DAB-VR

and DAB-VJ were not significantly related to CAB-V scores.

Table 8a. Intercorrelations Among Self-Report AB-V scales

	DAB-VR	DAB-VJ	CAB-V
DAB-VR	1.00	**0.38*****	-0.07
DAB-VJ	-	1.00	0.04
CAB-V	-	-	1.00

N=108; DAB-VR = Destructive Anger Behavior-Verbal Rumination; DAB-VJ=Destructive Anger Behavior-Verbal Justification; CAB-V=Constructive Anger Behavior-Verbal

Table 8b shows the intercorrelations among self, friend and observer report AB-V scales. As with the results for self report, friend report DAB-VR and DAB-VJ were significantly and positively correlated. Friend report DAB-VR and DAB-VJ were not significantly related to friend report CAB-V. Friend report DAB-VR and DAB-VJ were not significantly related to self report DAB-VR and DAB-VJ. However, friend report CAB-V was significantly and positively related to self report CAB-V.

Results indicate that all observer report AB-V scales were significantly correlated. Observer report DAB-VR was positively related to DAB-VJ and negatively related to CAB-V. Observer report DAB-VJ was significantly and positively related to observer report CAB-V. Results also show that self report and observer report DAB-VR and CAB-V were significantly and positively related. Self report and observer

report DAB-VJ were not significantly related.

Observer and friend report AB-V scales were significantly related. Observer report DAB-VR, DAB-VJ and CAB-V were positively correlated with friend report DAB-VR, DAB-VJ and CAB-V, respectively. Observer report DAB-VR was also significanly and positively related to friend report DAB-VJ.

Correlations among Self Report AB-V Scales and measures of anger/hostility

Table 9 shows the intercorrelations among the anger/hostility measures and AB-V scales. As expected, CAB-V scores showed no significant relation to most measures of anger/hostility. CAB-V was positively related only to state anger, how often one talks about what made one angry with other people, and social desirability. It showed a negative relation only to Range of Anger Eliciting Situations (MAI). Thus, those who scored highly on CAB-V were also experiencing a high intensity of angry feelings at the time of questionnaire completion, were more likely to discuss anger with others and were more likely to try to present themselves in a favorable fashion to others. A higher frequency of constructive problem-solving in response to angry feelings was also related to a less varied range of anger-eliciting situations.

As can be seen, DAB-VJ scores were positively related to hypertension risk factors of weekly alcohol consumption and family history of hypertension. DAB-VJ also showed no significant associations with cynicism or aggressive responding, or how often one talks about what made one angry with other people. DAB-VJ was significantly and positively related to all measures of affective anger as well as with

Table 8b. Intercorrelations Among AB-V scale Types

Measure	Friend			Observer		
	DAB-VR	DAB-VJ	CAB-V	DAB-VR	DAB-VJ	CAB-V
Self						
DAB-VR	-0.04	-0.01	-0.11	0.40***	0.00	-0.25
DAB-VJ	-0.00	0.10	0.01	0.15	0.06	0.02
CAB-V	-0.00	-0.09	0.26**	-0.04	0.06	0.27**
Friend						
DAB-VR	1.00	0.51***	-0.08	0.20*	0.18	0.05
DAB-VJ	-	1.00	0.09	0.24**	0.31***	0.11
CAB-V	-	-	1.00	-0.09	0.07	0.40***
Observer						
DAB-VR				1.00	0.23*	-0.21*
DAB-VJ				-	1.00	0.53***
CAB-V				-	-	1.00

N=108; DAB-VR = Destructive Anger Behavior-Verbal Rumination; DAB-VJ =Destructive Anger Behavior-Verbal Justification; CAB-V=Constructive Anger Behavior-Verbal

Anger-In and Anger-Out, and was significantly negatively related to social desirability. Thus the higher the frequency of self-justification of anger, the higher the hostile outlook and affect, as well as the increased proneness to experience anger in general, and, at the time of questionnaire completion, the increased likelihood of suppressing anger or expressing it antagonistically, experiencing anger more frequently, more intensely and for a longer duration of time over a variety of situations and a decreased likelihood presenting oneself favorably to others.

Results indicate that DAB-VR was not related to hypertension risk factors (age, sex, BMI, alcohol consumption, smoking, family history of hypertension or exercise). It was, however, significantly and positively correlated with almost all measures of anger expression and experience and was negatively correlated with social desirability. It showed no significant relation with how often one talks about what made one angry with other people. Thus, the higher the frequency of ruminating about anger, the higher the hostile affect, cynicism and aggressive responding. Higher rumination was also related to an increased proneness to experience anger in general, and at the time of questionnaire completion, an increased likelihood of suppressing anger or expressing it antagonistically, experiencing anger more frequently, more intensely and for a longer duration of time over a variety of situations and a decreased likelihood of presenting oneself favourably to others.

Table 10 shows the intercorrelations among anger/hostility measures and resting MAP, SBP and DBP. Only age and BMI showed significant and positive relations with all three resting BP measures. Cynicism was negatively correlated with

Table 9. Intercorrelations among anger/hostility measures and self report Anger Behavior- Verbal subscales

Measure	DAB-VR	DAB-VJ	CAB-V
Demographics and Social			
1) Age	-0.13	-0.09	0.02
2) Sex	0.15	-0.10	0.01
3) Body Mass Index	0.03	-0.14	-0.10
4) Alcohol	-0.05	0.20*	0.15
5) Smoking	-0.05	-0.03	-0.02
6) Family history of hypertension	0.14	0.20*	-0.05
7) Exercise	-0.07	0.10	-0.03
8) Social desirability	-0.27**	-0.30**	0.29**
ANGER EXPERIENCE			
A) Cognitive Anger			
1) Cynicism (CMHS)	0.36***	0.09	-0.11
B) Affective Anger			
1) Anger-Arousal (MAI)	0.41***	0.31***	-0.09
2) Range of Anger Eliciting Situations(MAI)	0.43***	0.27**	-0.20*
3) Trait Anger (STAS)	0.57***	0.34***	-0.11
4) State Anger (STAS)	0.42***	0.25**	0.20*
5) Hostile Affect (CMHS)	0.39***	0.33***	-0.06
ANGER EXPRESSION			
1) Anger-In (AEI)	0.44***	0.22*	-0.05
2) Anger-Out (AEI)	0.36***	0.31***	0.04
3) Aggressive Responding (CMHS)	0.24**	0.14	-0.05
4) Talk when angry	0.02	0.08	0.38***

N= 108   *p <.05; **p <.01; ***p <.001; Smoking = # cigarettes currently smoked per day; Alcohol = # drinks/week;Exercise = # hours/week of physical activity
MAI = Multidimensional Anger Inventory; CMHS = Cook-Medley Hostility Scale; AEI = Anger Expression Inventory; STAS = State-Trait Anger Scale; DAB-VR = Destructive Anger Behavior-Verbal Rumination;DAB-VJ=Destructive Anger Behavior-Verbal Justification;CAB-V=Constructive Anger Behavior-Verbal

resting DBP and talking to others when angry (the single item) was significantly and negatively related to resting SBP. No other measure was significantly related to any blood pressure index.

Table 10 also shows the intercorrelations among AB-V scales and resting blood pressure measures. Self report DAB-VJ was significantly and negatively correlated with resting MAP ($r = -0.20$), SBP ($r = -0.21$) and DBP ($r = -0.19$). No other AB-V measure was significantly related to any blood pressure index.

Because of the socially negative content of the anger/hostility scales, responses to such questionnaires may have been influenced by the desire to present oneself more positively. As expected, Table 11 shows that social desirability was significantly and negatively correlated with most of the anger measures and was positively related to how often one talks about what made one angry with other people. It was not significantly correlated with any hypertension risk factor, State Anger, Anger-Out, or Aggressive Responding.

Social desirability was significantly related to all self report AB-V scales. It was negatively related to self report DAB-VR ($r = -0.27$) and DAB-VJ ($r = -0.30$) and positively related to CAB-V ($r = 0.29$).

Hierarchial Multiple Regression Analyses

A series of hierarchical multiple regression analyses were conducted in which resting blood pressure indices served as the dependent measures. Variables were entered in each analysis in three steps. Variables included in Steps 1 and 2 were included for

Table 10.Intercorrelations among anger/hostility measures and resting blood pressure

Measure		MAP	SBP	DBP
Demographics and	1) Age	0.42***	0.27**	0.45***
Social Desirability	2) Sex	-0.23*	-0.38***	-0.13
	3) Body Mass Index	0.41***	0.45***	0.38***
	4) Alcohol	0.16	0.16	0.12
	5) Smoking	-0.07	-0.06	-0.09
	6) Family history of hypertension	-0.05	-0.01	-0.10
	7) Exercise	-0.11	-0.00	-0.14
	8) Social desirability	0.01	0.01	0.03
ANGER EXPERIENCE				
A) Cognitive Anger	1) Cynicism (CMHS)	-0.12	-0.09	-0.19*
B) Affective Anger	1) Anger-Arousal (MAI)	0.07	0.06	0.06
	2) Range of Anger Eliciting Situations (MAI)	0.13	0.11	0.11
	3) Trait Anger (STAS)	-0.03	-0.04	-0.04
	4) State Anger (STAS)	0.09	0.11	0.02
	5) Hostile Affect (CMHS)	0.08	0.03	0.10
ANGER EXPRESSION	1) Anger-In (AEI)	0.06	-0.01	0.09
	2) Anger-Out (AEI)	-0.13	-0.16	-0.16
	3) Aggressive Responding(CMHS)	0.03	0.05	-0.07
	4) Talk when angry	-0.11	-0.20*	-0.06
	5) CAB-V	0.02	-0.02	0.04
	6) DAB-VJ	-0.20*	-0.21*	-0.19*
	7) DAB-VR	0.02	0.04	-0.01

N= 108   *p <.05; **p <.01; ***p <.001; Smoking = # cigarettes currently smoked/day Alcohol = # drinks/week; Exercise = # hours/week of physical activity; MAI = Multidimensional Anger Inventory; CMHS = Cook-Medley Hostility Scale; AEI = Anger Expression Inventory; DAB-VJ = Destructive Anger Behavior-Verbal Justification;CAB-V = Constructive Anger Behavior-Verbal; DAB-VR = Destructive Anger Behavior-Verbal Rumination STAS = State-Trait Anger Scale.

Table 11. Correlations of anger/hostility measures to social desirability.

Measure		Social Desirability
Demographics	1) Age	0.13
	2) Sex	0.10
	3) Body Mass Index	0.01
	4) Alcohol	-0.04
	5) Smoking	-0.12
	6) Family history of hypertension	-0.15
	7) Exercise	-0.05
ANGER EXPERIENCE		
A) Cognitive Anger	1) Cynicism (CMHS)	-0.23*
B) Affective Anger	1) Anger-Arousal (MAI)	-0.51***
	2) Range of anger eliciting situations (MAI)	-0.43***
	3) Trait Anger (STAS)	-0.39***
	4) State Anger (STAS)	-0.18
	5) Hostile Affect (CMHS)	-0.47***
ANGER EXPRESSION	1) Anger-In (AEI)	-0.36***
	2) Anger-Out (AEI)	-0.11
	3) Aggressive Responding (CMHS)	-0.13
	4) Talk when angry	0.21*
	5) CAB-V	0.29**
	6) DAB-VJ	-0.30**
	7) DAB-VR	-0.27**

N= 108   *$p < .05$; **$p < .01$; ***$p < .001$

Smoking = number of cigarettes currently smoked per day; Alcohol = number of drinks per week Exercise = number of hours/week of physical activity; MAI = Multidimensional Anger Inventory; CMHS = Cook-Medley Hostility Scale; AEI = Anger Expression Inventory; DAB-VR = Destructive Anger Behavior - Verbal Rumination; DAB-VJ = Destructive Anger Behavior-Verbal Justification;CAB-V = Constructive Anger Behavior-Verbal; STAS = State-Trait Anger Scale.

two reasons. First, to determine whether AB-V scales predicted resting BP indices above and beyond known hypertension risk factors. Secondly, as the other anger/hostility measures were significantly correlated with AB-V scales, it was considered appropriate to control for their influence on the relation between AB-V scales and resting BP indices.

Variables that are considered to be hypertension risk factors were entered as a block in Step 1. Step 1 therefore contained the following demographic variables: sex, age, number of cigarettes smoked per day, BMI, amount of alcohol consumed per week, amount of physical activity per week, and family history of hypertension. Additionally, anger measures that have been shown to predict hypertension and CHD were added to step one. Cynicism, aggressive responding and hostile emotions (Cook Medley Hostility Scale) and Anger-In and Anger-Out (Anger Expression Inventory) have all been shown to be significantly related to BP (Barefoot et al., 1989; Harburg et al., 1991; Suls, Wan, & Costa, 1995), and were thus added to Step 1. Because of concern that self-report AB-V was heavily influenced by social desirability, social desirability was added in Step 1 to attenuate error variance associated with this measure. Moreover, social desirability, when considered conceptually as defensiveness, has also been shown to predict BP (Jamner, Shapiro, Goldstein & Hug, 1991).

In order to demonstrate that AB-V scales measure constructs not measured by other existing anger measures, and to demonstrate that AB-V scales predict blood pressure above and beyond existing measures, it was considered necessary to include

the following measures in Step 2: State and Trait anger, MAI subscales Anger

Arousal and Range of Eliciting Situations, and frequency with which one talks with

others about one's anger. State anger was included to control for the degree of anger

experienced at the time of the experiment, as a high level of anger at the time would

have influenced baseline blood pressure. Trait anger was included to control for

individual proneness to become angry in various situations. Anger Arousal was

included because it taps dimensions of anger not tapped by any other measure, i.e.,

anger frequency, duration and magnitude. Range of anger-eliciting situations was

included for the same reason: it measures how wide a range of situations will evoke

anger. Step three included all AB-V self report scales, i.e., DAB-VR, DAB-VJ and

CAB-V, as well as each scale's interaction with age.

Resting MAP. Results from the final model of the hierarchical regression analysis in

which resting MAP served as the dependent measure are presented in Table 12. The

first step accounted for a significant 37% of the variance associated with resting

MAP, (only age, sex, BMI and hostile affect were uniquely significant). Step 2

accounted for an additional 4% of the variance, with none of the entered variables as

uniquely significant. The last step included DAB-VR, DAB-VJ and CAB-V and their

interactions with age and this step explained a significant additional 11% of the

variance in resting MAP. Table 11 shows that all variables, taken together in the final

model, accounted for 53% of the variance in resting MAP. This final model

indicated that sex, BMI, self-report DAB-VR, and the self-report DAB-VR x Age

interaction significantly predict resting MAP.

In order to test and plot the interaction of DAB-VR and age, a second

hierarchical regression analysis was conducted in which resting MAP served as the

dependent measure, and where Step 3 included only DAB-VR and DAB-VR x age.

The variables entered in Steps 1 and 2 were identical to the procedure outlined

previously. Results from the final model are presented in Table 13. The first step

accounted for a significant 37% of the variance associated with resting MAP, (only

age, sex, BMI and hostile affect were uniquely significant). Step 2 accounted for an

additional 4% of the variance, with none of the entered variables as uniquely

significant. The last step explained a significant additional 8% of the variance in

resting MAP. Table 12 shows that all variables, taken together in the final model,

accounted for 49% of the variance in resting MAP. This final model indicated that

age, sex, BMI, aggressive responding and the self-report DAB-VR x Age interaction

significantly predict resting MAP.

The data for the significant interaction are presented in Figure 1. MAP levels

were calculated for younger (19 years of age) and older (39 years of age) participants,

based on the procedure outlined in Aiken and West (1991), in which ± 1 standard

deviation from the mean (29 years of age) is displayed. Slope analysis (Aiken &

West, 1991) revealed: 1) that higher DAB-VR scores were associated with increasing

Table 12.

Hierarchical regression analysis including self report AB-V scales predicting resting mean arterial pressure

Variable	B	SE B	β
Age	-0.58	0.45	-0.74
Sex	-3.90	1.64	-0.24*
Body Mass Index	0.43	0.16	0.24**
Alcohol	0.14	0.15	0.08
Smoking	-0.18	0.15	-0.11
Family history of hypertension	0.00	1.03	0.00
Exercise	-0.00	0.00	-0.15
Anger-In (AEI)	-0.26	0.20	-0.15
Anger-Out (AEI)	-0.21	0.27	-0.08
Hostile Affect (CMHS)	1.21	0.65	0.19
Aggressive Responding (CMHS)	-0.82	0.43	-0.19
Cynicism (CMHS)	-0.42	0.28	-0.15
Social Desirability	0.10	0.16	0.07
State Anger (STAS)	0.19	0.14	0.14
Talk when angry	-0.44	0.72	-0.07
Range of Anger Eliciting Situations (MAI)	0.29	0.18	0.17
Anger Arousal (MAI)	0.25	0.16	0.17
Trait Anger (STAS)	-0.10	0.18	-0.07
Self-report DAB-VR	-2.14	1.03	-0.69*
Self-report DAB-VR x age	0.09	0.03	1.19**
Self-report DAB-VJ	-0.81	0.61	-0.38
Self-report DAB-VJ x age	0.01	0.02	0.23
Self-report CAB-V	0.06	0.29	0.06
Self-report CAB-V x age	-0.00	0.01	-0.05

N = 108   *p <.05; **p <.01; **p <.001.

Note. R² = .37*** for Step 1; Change in R² = .04 (n.s.) for Step 2; Change in R²= .11** for Step 3.

Smoking = number of cigarettes currently smoked per day; Alcohol = number of drinks per week Exercise = number of hours/week of physical activity;MAI = Multidimensional Anger Inventory CMHS = Cook-Medley Hostility Scale; AEI = Anger Expression Inventory; DAB-VR = Destructive Anger Behavior - Verbal Rumination; DAB-VJ = ·Destructive Anger Behavior - Verbal Justification; CAB-V = Constructive Anger Behavior - Verbal; STAS = State-Trait Anger Scale.

Table 13.
Hierarchical regression analysis including self report DAB-VR predicting resting mean arterial pressure

Variable	B	SE B	ß
Age	0.34	0.07	0.42***
Sex	-3.58	1.63	-0.22*
Body Mass Index	0.45	0.16	0.25**
Alcohol	0.07	0.15	0.04
Smoking	-0.17	0.15	-0.10
Family history of hypertension	-0.25	1.02	-0.02
Exercise	-0.00	0.00	-0.15
Anger-In (AEI)	-0.32	0.20	-0.18
Anger-Out (AEI)	-0.29	0.25	-0.11
Hostile Affect (CMHS)	1.16	0.65	0.19
Aggressive Responding (CMHS)	-0.89	0.43	-0.21*
Cynicism (CMHS)	-0.35	0.28	-0.13
Social Desirability	0.12	0.15	0.08
State Anger (STAS)	0.24	0.13	0.18
Talk when angry	-0.54	0.68	-0.08
Range of Anger Eliciting Situations (MAI)	0.27	0.18	0.16
Anger Arousal (MAI)	0.24	0.16	0.17
Trait Anger (STAS)	-0.13	0.18	-0.09
Self-report DAB-VR	0.30	0.35	0.10
Self-report DAB-VR x age	0.11	0.03	0.33***

N = 108   *p <.05; **p <.01; **p <.001.
Note. R² = .37*** for Step 1; Change in R² = .04 (n.s.) for Step 2; Change in R² = .08*** for Step 3.
Smoking = number of cigarettes currently smoked per day; Alcohol = number of drinks per week
Exercise = number of hours/week of physical activity; MAI = Multidimensional Anger Inventory
CMHS = Cook-Medley Hostility Scale; AEI = Anger Expression Inventory; DAB-VR = Destructive
Anger Behavior - Verbal Rumination; STAS = State-Trait Anger Scale.

resting MAP as age increases ($\underline{p} < .0001$), and that, 2) this relationship was

significantly different from the Low DAB-VR simple slope, ($\underline{p} < .001$) which itself

was not significantly different from zero.
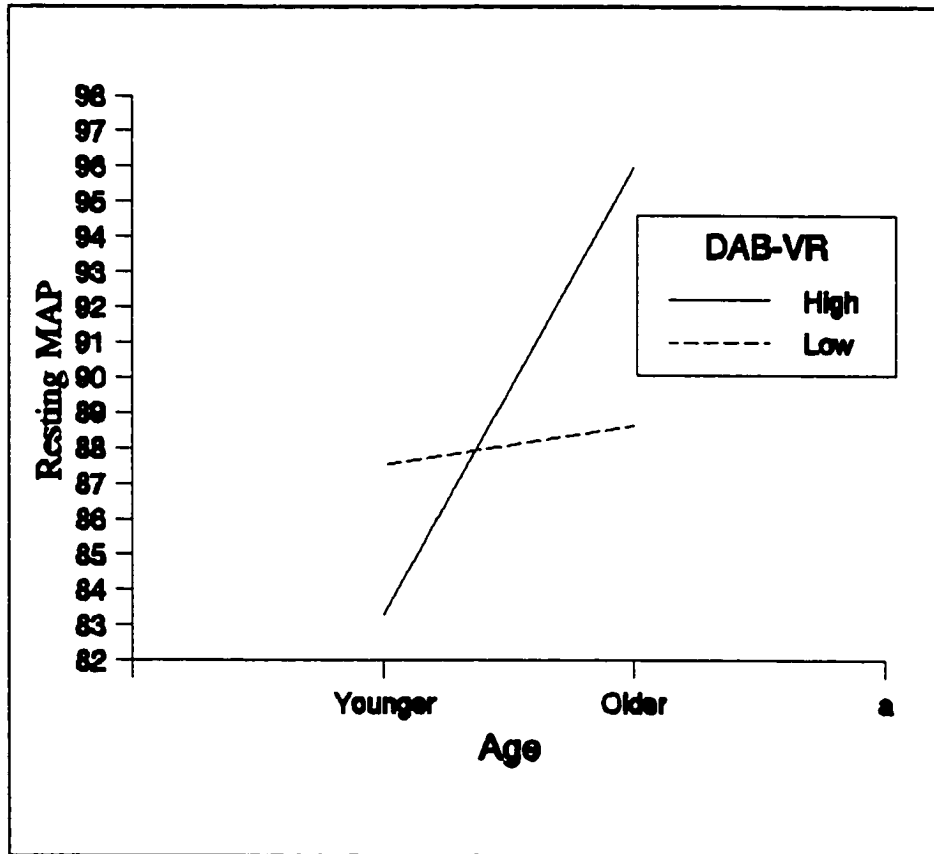
Figure 1. Interaction of Destructive Anger Behavior-Verbal Rumination (DAB-VR)

scores with Age, predicting mean arterial blood pressure (MAP). High DAB-VR

scores showed significantly increased resting MAP as age increases ($\underline{p} < .0001$) which

was significantly different from Low DAB-VR across age, ($\underline{p} < .001$), which was not

itself significant.

Resting SBP. Results from the final model of the hierarchical regression analysis in

which resting SBP served as the dependent measure and Step 3 included all self-report

AB-V scales and their interactions with age are presented in Table 14. Steps 1 and 2

and the variables within these steps were identical to analysis for resting MAP. Step 1

accounted for 40% of the variance, with only Sex, BMI and Anger-Out being

uniquely significant. Step 2 accounted for an additional 3% of the variance with only

Sex, BMI and Anger-Out being uniquely significant. None of the variables entered in

Step 2 were uniquely significant. The last step accounted for an additional 10% of the

variance with only DAB-VR x age being significant. The final model accounted for a

total of 54% of the variance in resting SBP and indicated that age, sex, BMI, and

DAB-VR x Age interaction predicted resting SBP.

In order to test and plot the interaction of DAB-VR and age, a second

hierarchical regression analysis was conducted in which resting SBP served as the

dependent measure, and where Step 3 included only DAB-VR and DAB-VR x age.

The variables entered in Steps 1 and 2 were identical to the procedure outlined

previously. Results from the final model are presented in Table 15. The first step

accounted for a significant 40% of the variance associated with resting SBP, (only

sex, BMI and Anger-Out were uniquely significant). Step 2 accounted for an

additional 3% of the variance, with none of the entered variables as uniquely

significant. The last step explained a significant additional 7% of the variance in

resting SBP. Table 14 shows that all variables, taken together in the final model,

accounted for 51% of the variance in resting SBP. This final model indicated that

age, sex, BMI, Anger-In and Anger-Out and the self-report DAB-VR x Age

interaction significantly predict resting SBP.

The data from this second significant interaction are presented in Figure 2.

Slope analysis (Aiken & West, 1991) revealed: 1) that high DAB-VR scores showed

significantly increased resting SBP as age increases ($p < .001$), and that, 2) this

relationship was significantly different from that for Low DAB-VR across age

($p < .01$), which was not significant.

Resting DBP. Results from the final model of the hierarchical regression analysis in

which resting DBP served as the dependent measure and Step 3 included all self-

report AB-V scales and their interactions with age are presented in Table 16. Steps 1

and 2 and the variables within these steps were identical to the analysis for resting

MAP and SBP. Step 1 accounted for 40% of the variance, with only age, BMI

exercise and hostile affect being uniquely significant. Step 2 accounted for an

additional 3% of the variance, with only age, BMI, exercise and hostile affect being

uniquely significant. None of the variables entered in Step 2 were uniquely

significant. The last step accounted for an additional 9% of the variance with only

DAB-VR x age being significant. The final model accounted for a total of 51% of the

variance in resting SBP and indicated that BMI, exercise, hostile affect and cynicism ,

and DAB-VR x Age interaction predicted resting SBP.

Table 14.

Hierarchical regression analysis including self report AB-V scales predicting resting systolic blood pressure

Variable	B	SE B	ß
Age	-0.80	0.59	-0.76
Sex	-8.71	2.15	-0.40***
Body Mass Index	0.84	0.20	0.35***
Alcohol	0.07	0.20	0.03
Smoking	-0.27	0.19	-0.12
Family history of hypertension	0.32	1.35	0.02
Exercise	-0.00	0.00	-0.04
Anger-In (AEI)	-0.47	0.27	-0.20
Anger-Out (AEI)	-0.55	0.36	-0.16
Hostile Affect (CMHS)	0.96	0.85	0.12
Aggressive Responding (CMHS)	-0.19	0.57	-0.03
Cynicism (CMHS)	-0.51	0.37	-0.14
Social Desirability	0.14	0.21	0.07
State Anger (STAS)	0.25	0.18	0.14
Talk when angry	-0.83	0.95	-0.09
Range of Anger Eliciting Situations (MAI)	0.18	0.24	0.08
Anger Arousal (MAI)	0.36	0.21	0.19
Trait Anger (STAS)	-0.14	0.24	-0.08
Self-report DAB-VR	-1.78	1.36	-0.43
Self-report DAB-VR x age	0.10	0.04	0.94*
Self-report DAB-VJ	-0.95	0.80	-0.34
Self-report DAB-VJ x age	0.01	0.03	0.14
Self-report CAB-V	0.02	0.38	0.01
Self-report CAB-V x age	0.00	0.01	0.03

N = 108   *p <.05; **p <.01; **p <.001.

Note. R^2 = .40*** for Step 1; Change in R^2 = .03 (n.s.) for Step 2; Change in R^2= .10** for Step 3.

Smoking = number of cigarettes currently smoked per day; Alcohol = number of drinks per week Exercise = number of hours/week of physical activity;MAI = Multidimensional Anger Inventory CMHS = Cook-Medley Hostility Scale; AEI = Anger Expression Inventory; DAB-VR = Destructive Anger Behavior - Verbal Rumination; DAB-VJ = Destructive Anger Behavior - Verbal Justification; CAB-V = Constructive Anger Behavior - Verbal; STAS = State-Trait Anger Scale.

Table 15.
Hierarchical regression analysis including self report DAB-VR predicting resting systolic blood pressure

Variable	B	SE B	ß
Age	0.21	0.10	0.20*
Sex	-8.21	2.15	-0.38***
Body Mass Index	0.88	0.21	0.36***
Alcohol	-0.03	0.19	-0.01
Smoking	-0.24	0.19	-0.11
Family history of hypertension	-0.02	1.34	-0.00
Exercise	-0.00	0.00	-0.04
Anger-In (AEI)	-0.56	0.26	-0.24*
Anger-Out (AEI)	-0.71	0.33	-0.20*
Hostile Affect (CMHS)	0.83	0.84	0.10
Aggressive Responding (CMHS)	-0.28	0.57	-0.05
Cynicism (CMHS)	-0.41	0.37	-0.11
Social Desirability	0.18	0.20	0.09
State Anger (STAS)	0.31	0.18	0.18
Talk when angry	-1.01	0.88	-0.11
Range of Anger Eliciting Situations (MAI)	0.16	0.24	0.07
Anger Arousal (MAI)	0.37	0.21	0.19
Trait Anger (STAS)	-0.18	0.24	-0.10
Self-report DAB-VR	0.79	0.47	0.19
Self-report DAB-VR x age	0.12	0.04	0.27**

N = 108   *p <.05; **p <.01; **p <.001.
Note. R² = .40*** for Step 1; Change in R² = .03 (n.s.) for Step 2; Change in R²= .07** for Step 3.
Smoking = number of cigarettes currently smoked per day; Alcohol = number of drinks per week
Exercise = number of hours/week of physical activity;MAI = Multidimensional Anger Inventory
CMHS = Cook-Medley Hostility Scale; AEI = Anger Expression Inventory; DAB-VR = Destructive
Anger Behavior - Verbal Rumination; STAS = State-Trait Anger Scale.
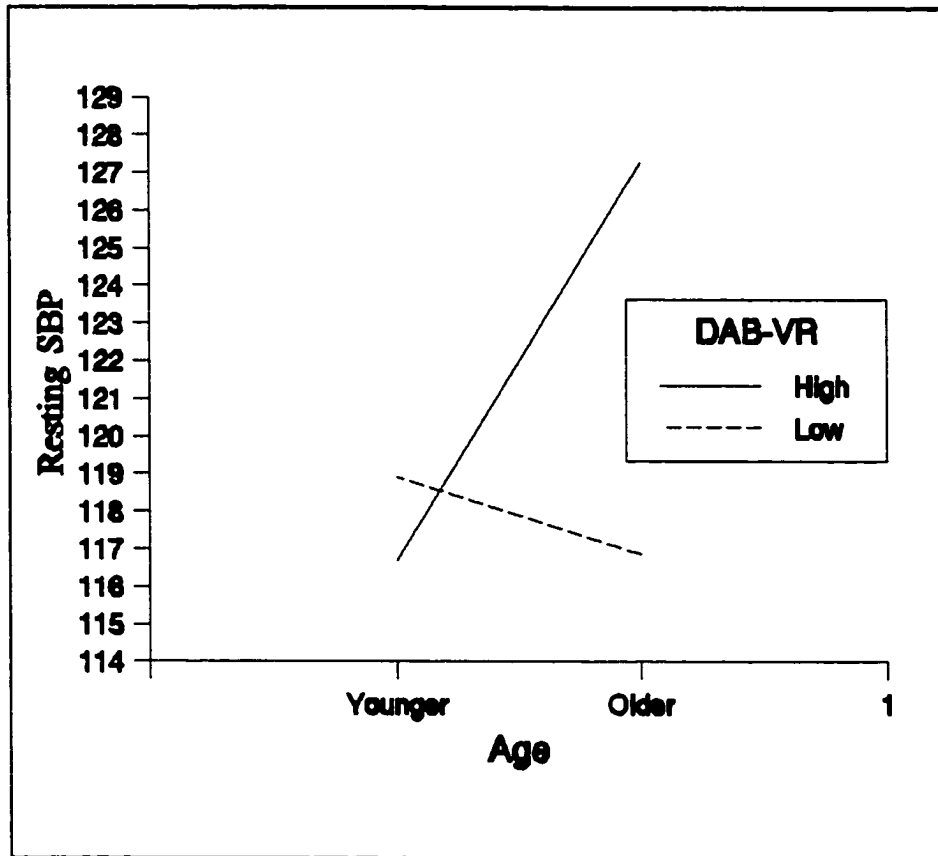
Figure 2. Interaction of Destructive Anger Behavior-Verbal Rumination (DAB-VR) scores with Age, predicting resting systolic blood pressure (SBP). High DAB-VR scores showed significantly increased resting SBP as age increases ($p < .001$) which was significantly different from that for Low DAB-VR across age, ($p < .01$), which was not itself significant.

In order to test and plot the interaction of DAB-VR and age, a second

hierarchical regression analysis was conducted in which resting DBP served as the

dependent measure, and where Step 3 included only DAB-VR and DAB-VR x age.

The variables entered in Steps 1 and 2 were identical to the procedure outlined

previously. Results from the final model are presented in Table 17. The first step

accounted for a significant 40% of the variance associated with resting DBP, (only

age, BMI, exercise and hostile affect were uniquely significant). Step 2 accounted for

an additional 3% of the variance, with none of the entered variables as uniquely

significant. The last step explained a significant additional 5% of the variance in

resting DBP. Table 16 shows that all variables, taken together in the final model,

accounted for 48% of the variance in resting DBP. This final model indicated that

age, BMI, exercise, aggressive responding, cynicism and the self-report DAB-VR x

Age interaction significantly predict resting DBP.

The data from this third significant interaction is presented in Figure 3. Slope

analysis (Aiken & West, 1991) revealed: 1) that high DAB-VR scores showed

significantly increased resting DBP as age increases ($p < .0001$), and that, 2) this

relationship was significantly different from Low DAB-VR across age, ($p < .01$),

which was not itself significant.

Table 16.

Hierarchical regression analysis including self report AB-V scales predicting resting diastolic blood pressure

Variable	B	SE B	β
Age	-0.29	0.43	-0.37
Sex	-2.37	1.59	-0.15
Body Mass Index	0.33	0.15	0.19*
Alcohol	0.14	0.15	0.09
Smoking	-0.17	0.14	-0.11
Family history of hypertension	-0.36	1.00	-0.03
Exercise	-0.00	0.00	-0.19*
Anger-In (AEI)	-0.10	0.20	-0.06
Anger-Out (AEI)	-0.25	0.26	-0.10
Hostile Affect (CMHS)	1.64	0.63	0.27**
Aggressive Responding (CMHS)	-0.78	0.42	-0.19
Cynicism (CMHS)	-0.61	0.28	-0.23*
Social Desirability	0.14	0.15	0.10
State Anger (STAS)	0.06	0.13	0.05
Talk when angry	-0.18	0.70	-0.03
Range of Anger Eliciting Situations (MAI)	0.29	0.18	0.18
Anger Arousal (MAI)	0.21	0.16	0.15
Trait Anger (STAS)	-0.04	0.18	-0.03
Self-report DAB-VR	-1.58	1.00	-0.53
Self-report DAB-VR x age	0.07	0.03	0.90*
Self-report DAB-VJ	-0.85	0.59	-0.42
Self-report DAB-VJ x age	0.02	0.02	0.30
Self-report CAB-V	0.18	0.28	0.17
Self-report CAB-V x age	-0.00	0.01	-0.24

N = 108   *p <.05; **p <.01; **p <.001.

Note. R^2 = .40*** for Step 1; Change in R^2 = .03 (n.s.) for Step 2; Change in R^2= .09* for Step 3.

Smoking = number of cigarettes currently smoked per day; Alcohol = number of drinks per week Exercise = number of hours/week of physical activity;MAI = Multidimensional Anger Inventory CMHS = Cook-Medley Hostility Scale; AEI = Anger Expression Inventory; DAB-VR = Destructive Anger Behavior - Verbal Rumination; DAB-VJ = Destructive Anger Behavior - Verbal Justification; CAB-V = Constructive Anger Behavior - Verbal; STAS = State-Trait Anger Scale.

Table 17.

Hierarchical regression analysis including self report DAB-VR predicting resting diastolic blood pressure

Variable	__B__	SE __B__	ß
Age	0.33	0.07	0.43***
Sex	-2.15	1.59	-0.14
Body Mass Index	0.35	0.15	0.20*
Alcohol	0.08	0.14	0.05
Smoking	-0.17	0.14	-0.10
Family history of hypertension	-0.65	0.99	-0.06
Exercise	-0.00	0.00	-0.19*
Anger-In (AEI)	-0.14	0.19	-0.08
Anger-Out (AEI)	-0.29	0.24	-0.11
Hostile Affect (CMHS)	1.64	0.62	0.27**
Aggressive Responding (CMHS)	-0.84	0.42	-0.20*
Cynicism (CMHS)	-0.54	0.27	-0.21*
Social Desirability	0.15	0.15	0.11
State Anger (STAS)	0.11	0.13	0.09
Talk when angry	-0.24	0.65	-0.04
Range of Anger Eliciting Situations (MAI)	0.27	0.17	0.17
Anger Arousal (MAI)	0.20	0.15	0.15
Trait Anger (STAS)	-0.09	0.18	-0.06
Self-report DAB-VR	0.12	0.34	0.04
Self-report DAB-VR x age	0.09	0.03	0.27**

N = 108   *p <.05; **p <.01; **p <.001.

Note. R^2 = .40*** for Step 1; Change in R^2 = .03 (n.s.) for Step 2; Change in R^2= .05** for Step 3.

Smoking = number of cigarettes currently smoked per day; Alcohol = number of drinks per week Exercise = number of hours/week of physical activity;MAI = Multidimensional Anger Inventory CMHS = Cook-Medley Hostility Scale; AEI = Anger Expression Inventory; DAB-VR = Destructive Anger Behavior - Verbal Rumination; STAS = State-Trait Anger Scale.
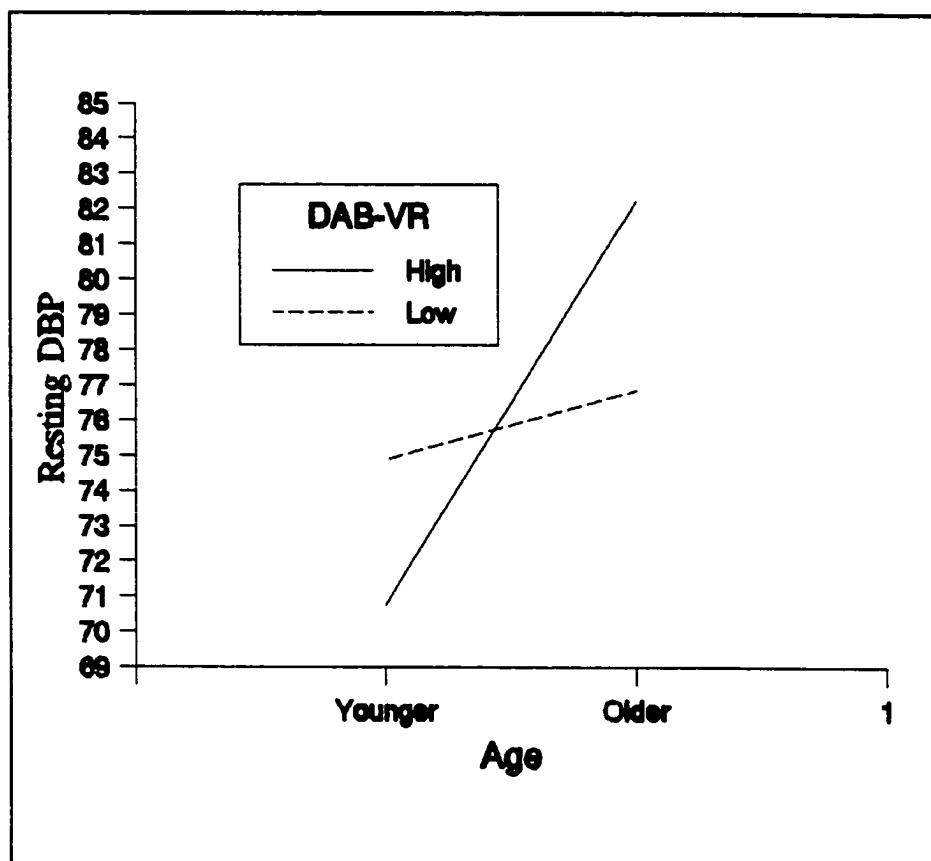
Figure 3. Interaction of Destructive Anger Behavior-Verbal Rumination (DAB-VR)

scores with Age, predicting resting diastolic blood pressure (DBP). High DAB-VR

scores showed significantly increased resting DBP as age increases ($p < .0001$) which

was significantly different from that for Low DAB-VR across age, ($p < .01$), which

was not itself significant.

Discussion

Construct Validity

Results indicated that the internal consistencies of all three AB-V scales were similar for self, friend and observer report types. This information provides further evidence of construct validity for the AB-V. Items are grouped according to their underlying constructs (constructive anger behavior, self justification and rumination) consistently for three types of observers (Self, Friend and trained rater).

Construct validity of the CAB-V scale was also demonstrated by the significant positive correlations among rater type. In other words, Self, Friend and Observer CAB-V reports all agreed with each other. DAB-VR and DAB-VJ did not show this pattern of associations. Self-Report DAB-VJ did not correlate with either Friend- or Observer-Report. However, Friend- and Observer-Report DAB-VJ did significantly and positively correlate. Perhaps due to the socially negative content of DAB-VJ items, persons do not accurately describe their typical anger expression behaviours, or alternatively honestly do not believe that they engage in self-justification. Other persons observing them however do recognize this style of anger expression. Self-Report DAB-VR did not correlate with Friend-Report DAB-VR but did correlate significantly and positively with Observer-Report DAB-VR. Friend- and Observer-Report DAB-VR also correlated positively, but not to the same magnitude as Self- and Observer-Report. The meaning of this pattern of results is somewhat unclear. Self- and Observer-Report were related and Friend- and Observer- Report were related but Self- and Friend-Report were not related. Future research needs to clarify the

relations among report types.

Self-Report and Blood Pressure

Results indicated that high Self-Report DAB-VR significantly predicted mean arterial, systolic and diastolic blood pressure with increasing age above and beyond traditional risk factors for hypertension, as well as established measures of anger expression and experience. Unexpectedly, neither CAB-V, DAB-VJ, nor their interactions with age, significantly predicted any BP measure.

Overall, these results indicate that increased resting BP measures were predicted by rumination (cognitively and verbally) about anger-eliciting events and anger itself irrespective of how often, how intensely, how long or how wide the range of different situations provoking anger, or how often anger is discussed. Thus it is the destructive anger verbal expression style of rumination itself that appears to result in increased BP over time. This finding suggests that regardless of how easily one is prone to become angry or how often or strongly anger is experienced under a variety of different circumstances, it is the frequency with which the destructive anger expression *style* of rumination is utilized that is detrimental to health as one gets older. Thus, a style which focuses on mental and verbal rumination of anger after it has already been discussed with others, where grudges are held, and where anger is maintained and intensified remaining unresolved, results in elevated BP for older persons. For persons having such a behavioral style, the goal of finding emotional relief by discussing anger with others goes unmet, leading to further attempts at relief

by discussion (verbal rumination) as well as continued thoughts about the anger

(mental rumination), which, over time, takes a physiological toll.

Unexpectedly, self-reported CAB-V and DAB-VJ did not predict any BP

measure, either by themselves or with their interactions with age. There are different

reasons why the lack of significant findings occurred for these measures. These

reasons will be discussed further in Chapter 6.

Chapter 6

Overall Discussion and Conclusions

Past research has indicated that both aggressive and/or antagonistic anger,

directing of anger outwardly and the inhibition of anger expression are detrimental to

health (Barefoot, 1992; Gentry et al., 1982; Harburg et al, 1991; Mendes de Leon,

1992; Suls, Wan, & Costa, 1995). Other researchers have suggested that another

dimension of anger expression, anger discussion or communicative anger expression,

is also important to health (Stoney & Engbretson, 1994; Thomas, 1995).

Because of the dearth of information regarding a psychometrically valid

measure of communicative anger expression or verbal anger behavior, a new measure

of this dimension of anger expression (The Anger Behavior-Verbal scale (AB-V) was

developed, validated and tested for its ability to predict blood pressure and therefore

health.

The Self-Report AB-V

Based on empirical evidence, Davidson, Stuhr, and Chambers (1998b) have

proposed that there are two verbal anger behavior (or discussion) constructs:

constructive and destructive. A constructive verbal anger behavior style is a goal-

oriented, problem-solving method of responding to the experience of anger. It consists

of the intent or motivation to resolve interpersonal conflict and anger by

understanding the other person's point of view, as well as clarification of one's own

role in the conflict. Anger is dealt with directly with the target of anger in a

reflective, assertive and constructive manner, and, as a result, anger is resolved. A

destructive verbal anger behavior style focuses on the intent or motivation of self

justification/vindication and attribution of blame elsewhere in an anger-eliciting

situation. Grudges are held, and anger is ruminated over, both outwardly and internally, with the person feeling even angrier than before discussion, reinforcing dislike for the target of anger. As a consequence of destructive verbal anger behavior then, anger is not resolved.

The present work has indicated that the AB-V scale indeed measures these two underlying dimension of anger discussion and thus shows construct validity. Results from factor analyses conducted in Studies 1 and 2 suggest that the AB-V scale consists of three scales, one constructive and two destructive. Constructive anger expression is measured by the 12-item Constructive Anger Behavior-Verbal scale (CAB-V). Destructive anger expression is measured by two scales. The 6-item Destructive Anger Behavior-Verbal scale (DAB-VJ) measures the intent or motivation of self-justification/vindication and attribution of blame elsewhere in an anger-eliciting situation. The 5-item Destructive Anger Behavior-Verbal scale (DAB-VR) measures mental and verbal rumination of anger. Results from Studies 1 and 2 also indicate that these scales are valid and reliable measures of anger expression.

Construct validity of the CAB-V scale was also demonstrated in Study 3 by the significant positive correlations among rater types. In other words, Self, Friend and Observer CAB-V reports all agreed with each other. However, DAB-VR and DAB-VJ did not show this pattern of associations. Self-Report DAB-VJ did not correlate with either Friend- or Observer-Report, whereas Friend- and Observer-Report DAB-VJ did significantly and positively correlate. Perhaps due to the socially negative content of DAB-VJ items, persons do not accurately describe their typical anger expression

behaviours, or alternatively honestly do not believe that they engage in self-justification. Other persons observing them however do recognize this style of anger expression. Self-Report DAB-VR did not correlate with Friend-Report DAB-VR but did correlate significantly and positively with Observer-Report DAB-VR. Friend- and Observer-Report DAB-VR also correlated positively, but not to the same magnitude as Self- and Observer-Report. The meaning of this pattern of results is somewhat unclear. Future research needs to clarify the relations among AB-V report types before any definitive conclusions are made about how and why they may or may not be related to one another.

Self-Report AB-V Scales

Constructive Verbal Anger Expression

Results demonstrated that CAB-V is not associated with destructive expressions of anger or with negative affective or cognitive dimensions of anger, Neuroticism or with the predisposition to become angry, anxious or depressed. CAB-V was, however, related to Agreeableness, Conscientiousness and control of angry feelings. Thus those who score highly on CAB-V are characterized as unselfish, cooperative, trusting and warm (agreeable), are organized, thorough and efficient (conscientious) and are able to control their angry feelings and thoughts. Such persons may also be more likely to be motivated to maintain positive perception of and relations with others, respond to conflict with less negative affect, and select more constructive conflict resolution tactics (Lewin 1935 in Graziano, et al., 1996) than those who do

not customarily use this style of anger expression.

Hypothetically, those who adopt a constructive style of anger expression, i.e., who score highly on CAB-V, should demonstrate more positive health outcomes, such as lower blood pressure over time. Research using an objective observer report form of the CAB-V has shown that CAB-V indeed predicts lower resting blood pressure (Davidson et al., 1998b). However, results from Study 3 using the self-report version of the CAB-V did not show this relation. Self-report CAB-V did not predict resting MAP, SBP or DBP in the present work. Thus, even though the self-report demonstrates good psychometric properties, it is perhaps not the most accurate way of assessing this dimension of anger expression. It may be that persons are simply unable to accurately report positive or constructive intentions and behaviors to genuinely resolve anger. It is theoretically possible that people may *believe* that they have good intentions, i.e., take the perspective of others, take responsibility for their role in conflict and constructively problem-solve during or after an anger-eliciting event. If so, they would rate themselves highly on CAB-V. However, it is possible that in reality they may not appear this way towards others and in fact do not resolve the situation or anger at all. Self-reported CAB-V may therefore not be congruent with physiological measures. Other objective observers may thus be more accurate in judging whether constructive anger expression is utilized or not. This certainly appears to be the case, as observer CAB-V has consistently predicted lower resting blood pressure in different samples (Davidson et al., 1998b; Davidson et al., 1999).

Destructive Verbal Anger Expression: Self Justification

Results demonstrated that DAB-VJ is associated with other established measures of anger experience (both affective and cognitive) and anger expression, and is not associated with desirable personality traits like Agreeableness, Conscientiousness and constructive problem solving (CAB-V). Thus, those who frequently employ an anger expression style that focuses on intentions or motivations at self-justification/vindication and attribution of blame elsewhere (DAB-VJ) are characterized by affective anger (eg., the predisposition to become angry easily and to feel impatient and bitter in a range of situations), cognitive hostility (eg., suspicious of others, resentful and intolerant) and destructive anger expression behaviors (eg., argumentative, physical and or verbal aggression or suppression of anger). Results indicated that this scale has good psychometric properties, but that it did not predict negative health consequences as predicted.

Results from Study 3 indicated that self reported DAB-VJ did not predict resting blood pressure. This finding may be due to the very nature of the scale itself. DAB-VJ items describe attempts at persuading others that one is not at fault in a conflict situation, attributing blame to others and obtaining others' sympathy. Items do not directly assess whether anger has been resolved or not. It could be that some people who are convinced that others are to blame in an anger-provoking incident, and who are convinced they share no responsibility, actually feel vindicated, and so anger will be resolved. For others, this may not be enough to resolve anger. Perhaps, these people will continue to dwell on the anger and anger eliciting situation/person

(DAB-VJ and DAB-VR are significantly correlated). Thus this scale by itself may not be accurate enough to distinguish who will resolve anger and who will not. At this time then, the self report DAB-VJ scale as it is now constructed provides no clarification of the relation between this dimension of destructive anger behavior and blood pressure. This scale needs further development and its predictive validity needs to be demonstrated before its employment as a useful measurement instrument.

Destructive Verbal Anger Expression: Rumination

Results demonstrated that DAB-VR is associated with other established measures of anger experience (both affective and cognitive) and anger expression, and is negatively associated with desirable personality traits like Agreeableness, Conscientiousness and constructive problem-solving (CAB-V). It also showed associations with Neuroticism, trait anxiety and depression. Thus, those who mentally and verbally ruminate about anger, and find no anger resolution, and experience increased agitation and justification for disliking the other person, are also characterized by affective anger, cognitive hostility and other forms of destructive anger expression behaviors (eg., argumentative, physical and or verbal aggression or suppression of anger). They are also characterized by having the predisposition to become anxious, depressed and emotionally unstable (moody, tense, not handling stress well). It has been suggested that such anger-prone persons may be especially likely to ruminate in response to anger-provoking situations, because they habitually focus attention on anger provoking incidents. They are, therefore, likely to form

further angry associations in memory which may predispose them to experience further anger (Rusting and Nolen-Hoeksema, 1998). Results from the present work indicate that DAB-VR has good psychometric properties and that it predicts resting BP.

Results obtained in Study 3 demonstrated that as age increases, those who frequently use this style of anger expression also show elevated resting BP. Although blood pressure levels did not reach hypertensive levels, this is still a significant finding as increased blood pressure constitutes a linear risk for CHD (Pickering, 1991). As blood pressure increases, so too does the risk for CHD. For those persons scoring highly on DAB-VR, anger is not resolved cognitively or physiologically. This supports findings from research on rumination.

Research has indicated that in the hours, days and weeks following an emotional experience or episode, (like anger or conflict), this episode will intrude into persons' thoughts in a repetitive manner that will manifest itself in two ways (Rime, 1995). First, it will manifest itself as mental rumination, defined as the thoughts and behaviors that focus a person's attention on the negative affect or mood as well as the causes and consequences of this mood (Rusting and Nolen-Hoeksema 1998). Mental rumination is apparently quite common. For example, after an ordinary (not traumatic) emotional experience, 50% to 59.2% of persons reported spontaneous thoughts about the event once or twice, while 38% to 45.8% reported these thoughts often or very often (Rime, Mesquita, Phillipot, & Boca, 1991; Rime, Noel, & Phillipot, 1991). Secondly, the emotional event will manifest itself as verbal

rumination which can take the form of "social sharing" or telling of this experience to

others (Rime, 1995), or it can take the form of repeatedly telling others how badly

one feels (Morrow & Nolen-Hoeksema, 1990). It has been shown that after an

emotionally arousing event, most persons (90% to 96.3%) spontaneously talk with

other persons about that event (Rime, Philippot, Boca, & Mesquita, 1992), and that

this tendency does not vary with age, gender or valence (positive or negative aspect)

of emotion. Moreover, the number of persons talked to, as well as the frequency with

which this social sharing occurs, is positively correlated with the intensity of the

emotional disruptiveness (Bouts, Luminet, Manstead, & Rime, 1994; Rime, et al.,

1991). In other words, the more upset a person is, the more they will talk to others,

and the more they will talk to a number of different persons.

Although some researchers contend that these emotional rehearsals

(ruminations) have some instrumental function in the recovery from negative

emotional experiences (eg Martin & Tesser, 1989), and that talking about emotional

events (disclosure) is beneficial to health (eg Pennebaker, Barger, & Tiebout 1989),

evidence also points in the opposite direction. Rusting and Nolen-Hoeksema (1998)

found that ruminating about an anger experience exacerbated an angry mood. Rime et

al., (1994) found that the emotional events that were more ruminated about were also

those less recovered from. In other words, the emotional experience had not been

resolved. Moreover, the amount of social sharing, or talking about the event with

others, had no effect on emotional recovery. It appears, then, that mental and verbal

ruminations are associated with poor emotional recovery from the emotional event

that caused the rumination in the first place. Why might this be so?

In a review of the origin of ruminative thought, Gold and Wegner (1995) discuss Incompleteness Theory and conclude that rumination is oriented towards the past, rather than towards solving problems for the future (Gold & Wegner, 1995). Incompleteness Theory holds that emotional experiences, like anger, occur because of the attainment or nonattainment of goals, be it conflict resolution (Klinger, 1978), or the search for meaning of past events (Baumeister, 1991). Thus, after experiencing an emotional event like anger, this anger-eliciting situation is thought about and socially shared (discussed) with others with the goal of feeling better or obtaining relief from emotional distress. Ruminations then occur because there is an interruption or blockage in reaching these goals. Because anger often includes feelings of perceived injustice and involves attributions of blame (Tice & Baumeister, 1993), discussing anger ruminatively with others may not foster anger resolution. If the purpose of socially sharing the anger is to tell others how badly one feels (Morrow & Nolen-Hoeksema, 1990), to blame others, and not attempt to understand the perspective of others, feelings of blame will turn into grudges or even feelings of vengeance. Indeed, high ruminators have been found to tend to harbor thoughts and feelings of vengeance (Collins & Bell, 1997). Moreover, persons are likely to keep socially sharing the event (i.e. verbally ruminate about the event because the easiest way to complete the initial goal of relief is to repeat the same behavior engaged in during the initial attempt at goal attainment) (Mandler, 1975). If the goal continues to go unmet, negative affect and rumination will continue. Thus rumination may cause further

emotional disruption, because ruminative responses to anger involve a focus of attention on and rehearsal of the causes of the anger that occurred in the past. It is more difficult to distract attention away from these feelings in an unresolved situation than when the situation has been somewhat resolved (Rusting and Nolen-Hoeksema, 1998). Thus it is the content of angry ruminations that fuels the angry mood (Rusting and Nolen-Hoeksema, 1998).

Present findings suggest that this continued anger, both cognitive and affect, leads to poor sympathetic recovery, which eventually leads to elevated resting BP. Although DAB-VR is associated with depression and anxiety, it appears that it is anger which predominates. The effects of negative emotions such as fear (associated with anxiety) and anger on BP have been distinguished from each other. Sinha et al. (1992) found that fear was associated with increased heart rate and systolic blood pressure (SBP), and produced large decreases in peripheral vascular resistance (vasodilation) which kept DBP low. On the other hand, anger was associated with increases in cardiac output, accounted for by increases in both SBP and DBP, and increased peripheral resistance (vasoconstriction). The present results indicate that both DBP and SBP were elevated for those scoring highly on DAB-VR. This suggests that anger, and not anxiety or depression had been experienced frequently. Although BP recovery was not directly assessed in the present work, slow BP recovery is the proposed mechanism by which resting blood pressure increased or drifted upwards over time.

The BP recovery hypothesis suggests that poor recovery of sympathetic

activation (including elevated BP) after a stress or anger provoking incident leads to

hypertension and cardiovascular disease (Linden, Earle, Gerin, & Christenfeld, 1997).

This occurs as SNS activation persists long after the eliciting stimulus has ended.

Continued sympathetic activation maintains elevated BP, which eventually leads to

upwards drift of BP. Those who score highly on DAB-VR do not resolve anger, and

may even become angrier. This anger persists and is maintained by the anger itself.

Hence, over time, these persons demonstrate elevated resting blood pressure.

Overall, then, the DAB-VR scale appears to be a valid and reliable measure of

destructive verbal anger behavior. Its utility has been demonstrated by its ability to

predict elevated BP. This is an exciting discovery because it is now possible to

identify and assess a dimension of anger expression which has never before been

conceptualized or investigated for its relation to health and which has now been

shown to be clearly detrimental to health. The results obtained from the present series

of studies represents an important advancement in the understanding of how

individuals express anger verbally and the consequences this expression has for

health. This knowledge may now be used to assist the development of intervention

strategies aimed at reducing this health risk factor.

Limitations to the present work and areas for future investigation

Although findings from the present research constitute an important

contribution to the scientific literature on the relation between anger expression and

health, there are also limitations to it. For example, Study 3 used a cross section of

participants. Results indicate what destructive verbal rumination looks like and how it is related to health, but can not answer important questions like how or why this style of anger expression develops and is maintained in the first place. In order to answer these questions a longitudinal study that follows people over time, perhaps even from childhood would be need to be conducted. Such research would also suggest possible prevention strategies that could be employed to change this maladaptive anger expression style before it leads to detriments in health. Secondly, the current research assessed resting BP only, and hypothesized about a possible mechanism by which BP upward drift may have occurred. In order gain a better understand of the mechanism by which BP upward drift occurs, BP recovery itself needs to be examined. Thirdly, the present sample was representative of a well educated, Caucasian population and it is unclear how the present findings would generalize to persons of other ethnic backgrounds and socioeconomic status. Future research needs to be conducted in order to examine this issue. Lastly, gender differences were not a focus of examination in the present work. It has been demonstrated that, compared to men, women prefer to talk about their anger with the target of their anger or with a supportive listener (62% vs. 40%) (Thomas, 1995). The question of whether there are gender differences in the relation between self-report DAB-VR and BP warrants future investigation.

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Appendix A

ANGER BEHAVIOR - VERBAL SCALE (AB-V)

Directions: A number of statements that persons use to describe the reasons for and consequences of discussing their anger are given below. Read each statement and then, using the scale which follows, indicate, in the space next to each item, the number that corresponds to how often you feel or act in the manner described. There are no right or wrong answers. Do not spend too much time on any one statement but give the answer which seems to describe how you **generally** feel or act. Use the following scale to record your answers.

1 = ALMOST NEVER
2 = SOMETIMES
3 = OFTEN
4 = ALMOST ALWAYS

I DISCUSS MY ANGER....

1._____   To solve the problem.

2._____   To see if others help me to come up with constructive solutions.

3._____   To see if a resolution to the situation can be found.

4._____   To try to understand the point of view of the other person.

5._____   To get people on my side.

6._____   To better understand my possible role in the situation.

7._____   To show I'm right.

8._____   To minimize future conflict.

9._____   To deal with the situation more constructively next time.

10._____   So that both sides come out feeling good.

11._____   To show how wrong others are.

12._____   To get sympathy.

13._____   So that others know I wasn't at fault.

14._____   To make sure that everybody knows my side of the story.

I FIND THAT <u>AFTER</u> DISCUSSING MY ANGER....

    1 = ALMOST NEVER
    2 = SOMETIMES
    3 = OFTEN
    4 = ALMOST ALWAYS

15._____   I feel compelled to discuss the situation which made me angry over and over again.

16._____   I continue to dwell on it.

17._____   I hold a grudge.

18._____   I feel even more agitated.

19._____   I have a better understanding of the person I am angry with.

20._____   I feel better about the other person.

21._____   I feel justified in disliking the other person.

22._____   I feel closer to a resolution.

23._____   Things don't look as bad as I thought they did.

Appendix B

Correlation tables for Study 1 and Study 2

Table 1a. Intercorrelations among AB-V, Trait Anxiety and Anger and Depression measures for Study 1.

Measure	CAB-V	DAB-VJ	DAB-VR	Trait Anxiety	Trait Anger	Depression(BDI)
CAB-V	1.00	-0.05	-0.19***	-0.25***	-0.21***	-0.22***
DAB-VJ	-	1.00	0.53***	0.24***	0.46***	0.17***
DAB-VR	-	-	1.00	0.44***	0.55***	0.35***
Trait Anxiety	-	-	-	1.00	0.46***	0.66***
Trait Anger	-	-	-	-	1.00	0.41***
Depression (BDI)	-	-	-	-	-	1.00

N = 457   *** p ≤ .001   CAB-V = Constructive Anger Behavior- Verbal; DAB-VJ = Destructive Anger Behavior- Verbal Justification;
DAB-VR = Destructive Anger Behavior- Verbal Rumination; BDI = Beck Depression Inventory

Table 1b. Correlations Among AB-V, Trait Anxiety and Anger and depression measures and Buss Perry Aggression Questionnaire in Study 1.

Measure	CAB-V	DAB-VJ	DAB-VR	Trait Anxiety	Trait Anger	Depression(BDI)
Physical Aggression	-0.22***	0.29***	0.35***	0.19***	0.56***	0.28***
Verbal Aggression	-0.02	0.26***	0.22***	0.11*	0.52***	0.16***
Emotional Anger	-0.22***	0.35***	0.41***	0.34***	0.69***	0.35***
Cognitive Anger	-0.22***	0.31***	0.45***	0.58***	0.57***	0.49***

N = 457   * p ≤ .05   *** p ≤ .001   CAB-V = Constructive Anger Behavior- Verbal; DAB-VJ = Destructive Anger Behavior-Verbal Justification; DAB-VR = Destructive Anger Behavior- Verbal Rumination; BDI = Beck Depression Inventory

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Table 1c. Correlations Among AB-V, Trait Anxiety and Anger and depression measures and the Multidimensional Anger Inventory in Study 1.

Measure	CAB-V	DAB-VJ	DAB-VR	Trait Anxiety	Trait Anger	Depression(BDI)
Anger Arousal	-0.29***	0.38***	0.47***	0.49***	0.61***	0.43***
Hostile Outlook	-0.20***	0.42***	0.36***	0.26***	0.46***	0.22***
Anger In	-0.25***	0.34***	0.50***	0.43***	0.52***	0.32***
Range of Anger Eliciting Situations	-0.18***	0.44***	0.39***	0.36***	0.51***	0.21***

N = 457   *** p ≤ .001   CAB-V = Constructive Anger Behavior- Verbal; DAB-VJ = Destructive Anger Behavior- Verbal Justification; DAB-VR = Destructive Anger Behavior- Verbal Rumination; BDI = Beck Depression Inventory

Table 1d. Intercorrelations The Buss Perry Aggression Inventory Questionnaire scales in Study 1.

Measure	Physical Aggression	Verbal Aggression	Emotional Anger	Cognitive Anger
Physical Aggression	1.00	0.47***	0.64***	0.49***
Verbal Aggression	-	1.00	0.53***	0.45***
Emotional Anger	-	-	1.00	0.59***
Cognitive Anger	-	-	-	1.00

N = 457   *** p ≤ .001

Table 1e. Correlations among The Buss Perry Aggression Inventory Questionnaire and The Multidimensional Anger Inventory scales in Study 1.

Measure	Physical Aggression	Verbal Aggression	Emotional Anger	Cognitive Anger
Anger Arousal	0.43***	0.34***	0.64***	0.48***
Hostile Outlook	0.31***	0.28***	0.36***	0.39***
Anger In	0.35***	0.27***	0.43***	0.45***
Range of Anger Eliciting situations	0.30***	0.24***	0.35***	0.35***

N = 457   *** p ≤ .001

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Table 2a . Intercorrelations among AB-V and The Anger Expression Inventory scales for Study 2.

Measure	CAB-V	DAB-VJ	DAB-VR	Anger-In (AEI)	Anger-Out (AEI)	Anger Control (AEI)
CAB-V	1.00	-0.04	-0.25***	-0.12	-0.00	0.25***
DAB-VJ	-	1.00	0.50***	0.33***	0.43***	-0.18**
DAB-VR	-	-	1.00	0.44***	0.49***	-0.39***
Anger-In (AEI)	-	-	-	1.00	0.25***	-0.10
Anger-Out (AEI)	-	-	-	-	1.00	-0.49***
Anger Control (AEI)	-	-	-	-	-	1.00

N = 255   **** p ≤ .001   CAB-V = Constructive Anger Behavior- Verbal; DAB-VJ = Destructive Anger Behavior- Verbal Justification; DAB-VR = Destructive Anger Behavior- Verbal Rumination; AEI = Anger Expression Inventory.

Table 2b. Correlations among AB-V, The Anger Expression Inventory and the Cook-Medley Hostility Scales for Study 2.

Measure	CAB-V	DAB-VJ	DAB-VR	Anger-In (AEI)	Anger-Out (AEI)	Anger Control (AEI)
Cynicism	0.10	0.34***	0.29***	0.28***	0.34***	-0.15*
Aggressive Responding	-0.10	0.38***	0.34***	0.20***	0.48***	-0.25***
Social Avoidance	-0.19**	0.10	0.20***	0.24***	-0.03	-0.09
Hostile Attributions	-0.20***	0.38***	0.45***	0.37***	0.45***	-0.29***
Hostile Emotions	-0.25***	0.39***	0.50***	0.42***	0.46***	-0.41***
Hostile Other	-0.10	0.28***	0.29***	0.23***	0.27***	-0.15*

N = 255   ** p ≤ .01   *** p ≤ .001   CAB-V = Constructive Anger Behavior- Verbal; DAB-VJ = Destructive Anger Behavior- Verbal Justification; DAB-VR = Destructive Anger Behavior- Verbal Rumination; AEI = Anger Expression Inventory

Table 2c . Correlations among AB-V, The Anger Expression Inventory and the Personal Assertiveness Scales for Study 2.

Measure	CAB-V	DAB-VJ	DAB-VR	Anger-In (AEI)	Anger-Out (AEI)	Anger Control (AEI)
Passivity	-0.19**	0.19**	0.25***	0.35***	-0.02	-0.12
Assertiveness	0.13*	-0.02	-0.03	-0.13*	0.12*	0.04
Aggression	-0.22***	0.37***	0.38***	0.25***	0.47***	-0.28***

N = 255   * p ≤ .05   ** p ≤ .01   *** p ≤ .001   CAB-V = Constructive Anger Behavior- Verbal; DAB-VJ = Destructive Anger Behavior- Verbal Justification; DAB-VR = Destructive Anger Behavior- Verbal Rumination; BDI = Beck Depression Inventory

Table 2d . Correlations among AB-V, The Anger Expression Inventory and the Big Five Inventory-54 scales for Study 2.

Measure	CAB-V	DAB-VJ	DAB-VR	Anger-In (AEI)	Anger-Out (AEI)	Anger Control (AEI)
Extraversion	0.32***	-0.11	-0.12*	-0.30***	0.05	0.13*
Agreeableness	0.38***	-0.31***	-0.39***	-0.33***	-0.41***	0.37***
Conscientiousness	0.28***	-0.10	-0.22***	-0.21***	-0.14*	0.20***
Neuroticism	-0.20**	0.20***	0.36***	0.26***	0.23***	-0.45***
Openness	0.12*	-0.12	-0.03	-0.13*	-0.01	0.13

N = 255   * p ≤ .05   ** p ≤ .01   *** p ≤ .001   CAB-V = Constructive Anger Behavior- Verbal; DAB-VJ = Destructive Anger Behavior- Verbal Justification; DAB-VR = Destructive Anger Behavior- Verbal Rumination; AEI = Anger Expression Inventory

Table 2e .   Intercorrelations among The Cook-Medley Hostility scales for Study 2.

Measure	Cynicism	Aggressive Responding	Social Avoidance	Hostile Attributions	Hostile Emotions	Hostile Other
Cynicism	1.00	0.51***	0.16**	0.49***	0.40***	0.26***
Aggressive Responding	-	1.00	0.14*	0.48***	0.39***	0.31***
Social Avoidance	-	-	1.00	0.30***	0.20**	0.15*
Hostile Attributions	-	-	-	1.00	0.59***	0.40***
Hostile Emotions	-	-	-	-	1.00	0.39***
Hostile Other	-	-	-	-	-	1.00

N = 255   * $p \leq .05$ ** $p \leq .01$ *** $p \leq .001$

Table 2f. Correlations among The Cook-Medley Hostility scales and the Personal Assertiveness Scales for Study 2.

Measure	Cynicism	Aggressive Responding	Social Avoidance	Hostile Attributions	Hostile Emotions	Hostile Other
Passivity	0.10	0.01	0.29***	0.21***	0.23***	0.22***
Assertiveness	0.08	0.19**	-0.10	0.01	-0.01	0.05
Aggression	0.28***	0.48***	0.04	0.33***	0.39***	0.22***

N = 255   ** p ≤ .01   *** p ≤ .001

Table 2G. Correlations among The Cook-Medley Hostility and the Big Five Inventory-54 scales for Study 2.

Measure	Cynicism	Aggressive Responding	Social Avoidance	Hostile Attributions	Hostile Emotions	Hostile Other
Extraversion	-0.04	0.05	-0.35***	-0.07	-0.16**	-0.05
Agreeableness	-0.24***	-0.37***	-0.20***	-0.44***	-0.47***	-0.23***
Conscientiousness	-0.12	-0.08	-0.01	-0.22***	-0.19**	-0.16**
Neuroticism	0.11	0.09	0.17**	0.35***	0.49***	0.17**
Openness	-0.03	-0.05	-0.08	-0.01	-0.05	-0.12*

N = 255   * $p \leq .05$ ** $p \leq .01$ *** $p \leq .001$

Table 2h. Intercorrelations among the Personal Assertiveness Scales for Study 2.

Measure	Passivity	Assertiveness	Aggression
Passivity	1.00	-0.43***	0.13*
Assertiveness	-	1.00	0.20***
Aggression	-	-	1.00

N = 255   * p ≤ .05   *** p ≤ .001

Table 2i.

Correlations among the Personal Assertiveness Analysis Scales and the Big Five Inventory-54 scales for Study 2.

Measure	Passivity	Assertiveness	Aggression
Extraversion	-0.34***	0.29***	-0.05
Agreeableness	-0.23***	-0.01	-0.41***
Conscientiousness	-0.29***	0.22***	-0.22***
Neuroticism	0.29***	-0.15*	0.07
Openness	-0.20***	0.29***	-0.05

N = 255   * p ≤ .05   *** p ≤ .001