Articulated Thoughts of Maritally Violent and Nonviolent Men During Anger Arousal

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The cognitive correlates of anger arousal were investigated in community-based samples of maritally violent (MV), maritally distressed-nonviolent (DNV), and maritally satisfied-nonviolent (SNV) husbands. Participants performed the Articulated Thoughts in Simulated Situations (ATSS) paradigm while listening to anger-arousing audiotapes. Trained raters coded for irrational beliefs, cognitive biases, hostile attributional biases, and anger control statements. Results indicated that MV men articulated significantly more irrational thoughts and cognitive biases than DNV and SNV men. MV men articulated more hostile attributional biases than DNV and SNV men across all ATSS scenarios. SNV men, however, articulated more anger control statements during ATSS anger arousal than MV or DNV participants. Discriminant function analyses indicated that specific thoughts discriminated between the groups and differentiated mildly from severely violent participants. ATSS cognitive distortions (a) were not correlated with questionnaire measures of cognitive distortion, and (b) were superior to questionnaire measures in discriminating between the groups. The findings are interpreted in light of recent advances in understanding the relationship between information processing, anger, and marital aggression.

Researchers have suggested that anger and hostility are discriminating characteristics of maritally violent (MV) men using both self-report and marital interaction research designs (for a review, see Eckhardt, Barbour, & Stuart, 1997). Despite these data, theories of marital violence have not adequately described how anger is aroused and how it influences the enactment of aggression in marriage. Cognitive models of emotion and psychopathology, such as those proposed by Ellis (1962) and Beck (1976), have gained clinical acceptance but have only recently been applied to marital violence (e.g., Holtzworth-Munroe, 1992; O'Leary & Vivian, 1990). To assess the degree to which various cognitive distortions and deficiencies characterize MV husbands during laboratory anger arousal, we employed a think-aloud cognitive assessment task, the Articulated Thoughts in Simulated Situations (ATSS; Davison, Robins, & Johnson, 1983), with samples of MV, maritally distressed-nonviolent (DNV), and maritally satisfied-nonviolent (SNV) men.

Although ample data indicate that anger differentiates MV from nonviolent men, Margolin et al. (1988) and Burman et al. (1993) have noted that the cognitive processes associated with anger hyperarousal have not received sufficient research attention, which is somewhat surprising for three following reasons. First, it is now commonplace for clinical researchers and community intervention programs to espouse cognitively oriented anger management therapeutic interventions for maritally aggressive individuals (Arias & O'Leary, 1988; Holtzworth-Munroe & Stuart, 1994a). If one assumes that cognitive treatments are best targeted to cognitive phenomena, it is important to demonstrate that MV men exhibit cognitive distortions and deficiencies under appropriate conditions. Second, questionnaire-based research investigating the relationship between anger and cognition in clinical and nonclinical samples has indicated endorsement of Ellis's (1962) list of irrational beliefs is associated with higher scores on various anger scales (e.g., Hogg & Deffenbacher, 1986; Kassinove & Eckhardt, 1994). One would therefore expect MV men, who also show high levels of trait anger, to demonstrate similar anger-related cognitive distortions. Third, a wealth of research has indicated that a variety of attitudinal and cognitive distortions are associated with marital dissatisfaction (e.g., Bradbury, Beach, Fincham, & Nelson, 1996). Given that MV men also experience higher levels of marital distress than nonviolent husbands (Holtzworth-Munroe et al., 1992; Rosenbaum & O'Leary, 1981), it should follow that MV men should also show distortions in cognitive processing.

Inspection of the marital violence research literature, however, suggests that many of the preceding assumptions have yet to be confirmed. Researchers examining the cognitive characteristics of MV men have typically investigated global attitudes and attributions. One consistent finding is that MV men are more...
likely to espouse favorable attitudes toward the use of aggression in marriage (e.g., Saunders, Lynch, Grayson, & Linz, 1987; Stith & Farley, 1993). Some data suggest that men who believe in conservative, traditional sex role stereotypes have higher marital aggression levels (e.g., Crossman, Stith, & Bender, 1990), but other investigators have not found differential attitudes toward women among MV and nonviolent men (e.g., Neidig, Friedman, & Collins, 1986). Unfortunately, it is difficult to draw firm conclusions about the predictive validity of these attitudinal constructs because it is not clear whether MV men hold these attitudes before the onset of marital aggression, or if they emerged as post hoc explanations for aggressive acts (Holtzworth-Munroe et al., 1997).

To guide our assessment of anger-related cognitive variables, we adopted the cognitive taxonomy presented by Kendall and colleagues (Ingram, Kendall, Smith, Donnell, & Ronan, 1987; Kendall, 1992; Kendall & Dobson, 1993). In this framework, the construct of ‘‘cognition’’ is partitioned into cognitive processes, cognitive structures, cognitive content, and cognitive products. Cognitive processes refer to active thinking processes involved in attending, storing, retrieving, and interpreting information. These processes can be further differentiated into cognitive distortions, which represent illogical, faulty, or misguided processing, and cognitive deficiencies, which represent ‘‘an insufficient amount of cognitive activity in situations wherein more forethought would be beneficial’’ (Kendall, 1992, p. 5). Cognitive structures refer to schematic templates that guide cognitive processing, such as the depressive schema hypothesized by Beck (1967) to contribute to depression. Cognitive content refers to ‘‘information that is stored and organized in memory’’ (Kendall, 1992, p. 2), such as representations of specific life events. Cognitive products refer to the end-stage cognitions that result from prior structures, processes, and content, such as causal attributions. The present research focuses on cognitive processes (both cognitive distortions and cognitive deficiencies) and cognitive products (hostile attributional bias), although all four cognitive operations are presumed to be interactive (Kendall, 1992).

Recently, Holtzworth-Munroe (1992) presented a cognitive model of social skill deficits in MV men outlining the sequence of information processing stages that can result in marital aggression. During the first stage, decoding, the individual attends to, perceives, and interprets social stimuli. However, ‘‘various cognitive deficits, including unrealistic expectations, faulty attributions, and irrational beliefs could result in the misconstrual of social stimuli’’ (Holtzworth-Munroe, 1992, p. 607). Thus, automatic, overlearned information processing distortions may alter the significance of incoming stimuli or result in other cognitive products, such as hostile attributions, that may otherwise disrupt accurate, goal-congruent processing of social stimuli. During the second decision-making stage, the individual is confronted with the task of strategically constructing a number of potential responses to manage the demands of the specific situation. After selecting the most appropriate response, the individual decides if he has sufficient skill to enact that response and judges the response’s likely positive and negative consequences. Finally, the third stage describes response enactment, during which the individual puts the selected response into action and monitors its impact. Affective variables such as anger and hostility serve as ‘‘transitory factors’’ that can disrupt the social information processing sequence.

Using the social information processing heuristic, Holtzworth-Munroe and Hutchinson (1993) assessed the attributions occurring during the decoding stage in MV, DNV, and SNV men. Nine brief conflict vignettes were presented to participants, who completed attribution questionnaires following the presentation of each vignette. Results indicated that MV men were more likely than comparison men to attribute negative intent on the part of the wife as the primary causal agent of the conflict. To assess the processes occurring during the decision-making stage, Holtzworth-Munroe and Anglin (1991) had MV, DNV, and SNV men read 22 marital conflict vignettes. When asked what they would say or do in each situation, MV men offered the fewest competent responses during scenes in which the wife rejected, teased, or taunted the husband, or wanted something from the husband. Similar findings were obtained by Dutton and Browning (1988), who found that MV men were more likely to choose coping responses that involved little constructive reasoning, more verbal aggression, and more physical aggression after imagining themselves the subject of a series of videotapes depicting marital conflict.

Although the preceding research added valuable information regarding the faulty attributions and deficient decision-making skills of MV men, additional improvements are needed. With the exception of the Holtzworth-Munroe and Anglin (1991) study, most research in this area has utilized paper-and-pencil cognitive assessment procedures. These measures assess participants’ post hoc generalizations about how they believe they usually think and do not provide ‘‘on-line’’ accessibility to more automatic cognitive activity arising without conscious deliberation or strategic filtering (Davison, Feldman, & Osborn, 1984). Given the automaticity of emotion-relevant cognitions, it follows that cognitions will be more accessible and reportable if they are assessed concurrently with mood state activation (Persons & Miranda, 1992).

Davison and associates (Davison et al., 1984; Davison et al., 1983) developed a methodology to assess naturalistic and representational on-line cognitive activity occurring during emotion activation. The ATSS paradigm provides open-ended verbal reporting of thoughts as they are experienced during an emotional reaction. In the ATSS method, participants listen to an audiotaped scenario and imagine that they are an active part of the interaction. After a brief segment of the tape is played, they are asked to articulate their thoughts for 30 seconds. The tape then continues, followed by another pause for articulation, and so on. Articulations are transcribed and subsequently rated along relevant dimensions by trained coders. Research by Davison and colleagues using nonclinical and clinical samples has supported the validity of the ATSS procedure as an alternative to questionnaire-based cognitive assessment (for reviews of the ATSS procedure see Davison, Navarre, & Vogel, 1995, and Davison, Vogel, & Coffman, 1997). The present study assessed anger-related cognitive distortions, cognitive deficiencies, and cognitive products hypothesized to occur during the decoding and decision-making stages of Holtzworth-Munroe’s (1992) social information processing model in samples of MV, DNV, and SNV men. All participants initially completed self-report measures of irrational beliefs (Ellis, 1994)
and cognitive biases (Beck, 1976). Participants then articulated their thoughts during an anger-arousing ATSS procedure, and these responses were later coded for irrational thinking, cognitive biases, hostile attributional biases, and anger-controlling statements. A number of predictions guided our data analyses. First, we hypothesized that MV men would articulate more total irrational beliefs, total cognitive biases, and hostile attributional biases during ATSS anger arousal relative to both nonviolent comparison groups. Second, we predicted that both nonviolent comparison groups would articulate more anger-controlling statements than MV men (suggesting a cognitive deficiency in MV men). Third, we predicted that specific ATSS cognitive distortions (the irrational beliefs demandingness, self/other rating, and low frustration tolerance, and the cognitive biases arbitrary inference, magnification, and dichotomous thinking) would be stronger predictors of group membership than questionnaire measures of cognitive distortion. Fourth, we did not expect a relationship to emerge between the questionnaire-assessed cognitions and those articulated by MV men in the laboratory due to the heightened accessibility of the latter cognitions during anger arousal. Finally, we expected that MV men who had engaged in severe forms of marital violence in the previous year would be characterized by higher levels of cognitive distortions and hostile attributions than MV men without episodes of severe violence.

Method

Participants

The participants were 88 married men who responded to local newspaper and radio advertisements. The men were contacted by phone by trained interviewers who administered a variety of screening measures to determine group membership. All participants were paid $40.

Husbands' reports were used to determine group assignment, as recent research has indicated that husbands' reports of wife-directed violence are not strikingly dissimilar from the reports of their wives (see Jacobson et al., 1994, p. 983). Participants in the MV group consisted of 31 men who reported at least four incidents of physical aggression against their wives within the past 12 months on the Modified Conflict Tactics Scale (MCTS; Pan, Neidig, & O'Leary, 1994a), which assesses the frequency of psychological aggression (12 items; e.g., threatened to leave relationship), mild physical aggression (5 items; e.g., pushed, grabbed, or shoved spouse), and severe aggression (6 items; e.g., beat up spouse) used during marital conflicts. The validity of the qualitative distinction between mild and severe MCTS marital aggression is supported by data presented by Pan, Neidig, and O'Leary (1994b). Inclusionary criteria for the 23 DNV men were (a) a score of 95 or below on the Short Marital Adjustment Test (SMAT; Locke & Wallace, 1959), a 15-item screening measure that assesses both general marital happiness as well as the degree to which couples agree on a variety of more specific marital issues (e.g., finances, sex, recreation), and (b) no reported incidents of physical aggression used against their wives at any point in the marriage on the MCTS. Thirty-four men classified as SNV were required to (a) score 115 or above on the SMAT; and (b) report no incidents of physical aggression used against their wives at any point in the marriage on the MCTS. Finally, potential participants answered various demographic questions.

All participants were required to be between the ages of 19 and 49 and married for at least 1 year. There were no significant differences between the groups on age, race-ethnicity, socioeconomic status, yearly household income, length of marriage, number of children, years of education, and frequency of weekly alcohol and drug usage. The average participant was White, age 35, and was married for 8 years; had 14.5 years of education, two children, and a household income of $46,500; and reported drinking 4.5 alcoholic beverages per week and using other drugs less than once per week. We also asked participants if they were involved in individual or marital counseling. Only 1 MV man and 2 DNV men indicated that they had been involved in marital counseling. On the Dyadic Adjustment Scale (DAS; Spanier, 1976), MV and DNV groups were well matched, and both groups' mean DAS scores were significantly lower than SNV husbands' scores (MV: $M = 86.9, SD = 20.2$; DNV: $M = 85.7, SD = 14.9$; SNV: $M = 122.0, SD = 12.2$).

Materials

State Anger Scale. To provide a measure of participants' anger levels at the time of the experiment, we administered the State Anger Scale from the State–Trait Anger Expression Inventory (STAXI; Spielberger, 1988). This 10-item scale assesses the intensity of angry feelings at the time of assessment. An alpha of .90 was reported in a large sample of nonclinical men (Spielberger, 1988) and accumulated data point to the scale's excellent validity (Spielberger, 1988; Spielberger, Reheiser, & Sydeman, 1995).

Survey of Personal Beliefs. The 50-item Survey of Personal Beliefs (SPB; Demaria, Kassinove, & Dill, 1989) was used to assess the endorsement of irrational ideation. Items on the SPB assess the four hypothesized core irrational beliefs of rational emotive behavior therapy (Ellis, 1994; Ellis & Dryden, 1987) along a 6-point Likert scale. The SPB yields subscale scores for avulatizing (e.g., "Some situations in life are truly terrible"), low frustration tolerance (e.g., "I can't stand some of the things that have been done by members of my family"), demandingness (e.g., "My family should be reasonable in what they ask of me"), self/other rating (e.g., "A person who sins or harms others is a 'bad person'"), and a total rationality score. Higher scores indicate greater rationality. Previous research has supported the reliability of the SPB (Demaria et al., 1989; Kassinove, 1986). The items make no mention of emotion, which addresses criticisms made by Smith (1982) regarding the lack of discriminant validity used in the construction of other measures of irrational ideation that use affect-laden wording. The SPB has been shown to correlate significantly with various

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1 Recruitment began by placing advertisements in local newspapers and on radio stations for married men willing to participate in a research project about their opinions of their marriage and their spouse. Participants left their first names on a voice mail system and were later contacted by trained interviewers who administered the screening measures over the telephone.

2 Nevertheless, other researchers have indicated that MV men tend to minimize their own violence frequency. The issue at hand is the degree of confidence that our samples are actually representative of the population from which they are purported to be drawn. This is less of an issue for the MV husbands, who had to indicate four incidents of violence to qualify. The DNV group (and to a lesser extent the SNV group), however, may include men who did not report on their own marital aggression. However, if this were true, group differences between violent and nonviolent husbands would be harder to discover.

3 Analysis of the MV group's MCTS-assessed marital aggression indicated that 67.7% ($n = 21$) engaged in only "mild" acts of physical aggression and 32.3% ($n = 10$) reported at least one act of severe violence.

4 Although the widely used SMAT is adequate as a gross screening measure of marital satisfaction (e.g., Smith, Vivian, & O'Leary, 1990), the Dyadic Adjustment Scale (DAS; Spanier, 1976) was also administered upon participants' arrival to the laboratory to provide a more comprehensive assessment of marital quality and cohesion.
measures of negative emotion and psychopathology in nonclinical and clinical samples from the United States and abroad (Kassnove & Eckhardt, 1994; Muran, Kassnove, Roes, & Muran, 1989).

**Dysfunctional Attitudes Scale.** The 40-item Dysfunctional Attitudes Scale (DYS; Weissman & Beck, 1978) was originally designed to measure specific depressogenic cognitive biases. More recent findings have indicated that the DYS assesses cognitive biases that are not necessarily specific to depressive syndromes; nondepressed clinical samples also scored higher than relevant comparison samples (Hollon, Kendall, & Lumsy, 1986). As such, the DYS represents the only available measure of general cognitive bias. Items are rated on a 7-point Likert scale. A total cognitive bias score is computed by summing across the 40 items with higher scores reflective of greater cognitive bias.

**Procedure**

**ATSS.** Upon arrival at the laboratory, all men signed a consent form acknowledging that the study was investigating negative emotions in marriage and that the actual experience of negative emotions during the experiment was likely. Following completion of an assessment packet, participants were introduced to the ATSS procedure via tape-recorded instructions, which stated that they would be asked to listen to several taped scenarios, imagine that they were actually involved in each, and when prompted by a tone, to talk out loud about their thoughts and feelings into a microphone connected to a hidden tape recorder. The anonymity of participants’ responses was emphasized to encourage open and frank thought articulation. When participants indicated that they understood the procedure following a nonarousing practice scenario, the digital-quality ATSS scenarios were played by means of a Sony Digital Audio Tape (DAT) player and Pioneer large cup headphones. The experimenter left the laboratory room until the end of the ATSS procedure.

The ATSS procedure included three stimulus scenarios (control, overheard conversation, and jealousy), each divided into eight 30-s segments. The taped characters were portrayed by paid professional actors. On the basis of pilot data by Eckhardt and Kassnove (in press), we used three stimulus scenarios, two of which were anger-inducing. In the control scenario, the participant was asked to imagine that he and his wife were invited to another couple’s house, where they all played a game. Although the couple was somewhat competitive and annoying, the source of this annoyance had nothing to do with the participant’s wife. In the anger-arousing overheard conversation scenario, the participant imagined that he was overhearing a conversation between his wife and her friend, who negatively evaluated the participant and expressed uncertainty about remaining in the marriage. This scenario was Scripted around the themes of wife abandonment and wife-to-husband ridicule, which have been previously shown to be associated with spousal violence (e.g., Daly & Wilson, 1988; Holtzworth-Munroe & Hutchinson, 1993). In the jealousy scenario, the participant imagined that he had arrived home early to find his wife talking and laughing with a male acquaintance. The participant decided to listen to their conversation, which consisted of subtly flirtatious dialogue. The purpose was to elicit anger by suggesting that the wife may have been or might become amorous with another man, capitalizing on the theme of male sexual jealousy (Daly, Wilson, & Weghorst, 1983).

The three stimulus tapes were presented to participants successively on a single tape. Because it was expected that participants might initially be uncomfortable with the procedure, the control tape was always presented first. The presentation order of the two anger-arousing tapes was counterbalanced. Following the ATSS procedure, the State Anger Scale was again administered.

**Debriefing.** Following the ATSS procedure, participants were fully debriefed for a period of 15 to 30 min. The “process” debriefing was designed to fully explain the rationale of the study and explore the nature of the men’s affective reactions to the procedure. All participants were given the opportunity to engage in relaxation training, and all MV participants were given the phone numbers to local spouse abuser support groups and mental health centers. No participant was allowed to leave the laboratory in emotional distress, and follow-up telephone calls were made to MV participants to assess postexperimental reactions.

**ATSS Coding Procedures**

Each participant’s tape containing his articulated thoughts for the three stimulus situations was transcribed by undergraduate research assistants. Two raters (advanced undergraduates) who were not aware of the experimental conditions received 30 hr of training according to an ATSS coding manual and on basic issues regarding cognitive theories of emotion. Following training to criterion, the two raters read transcriptions of participants’ articulated thoughts while listening to their articulated thoughts tape and independently rated each segment on a specialized coding sheet. Pearson product–moment coefficients were computed to assess inter-rater agreement.

Ratings were made in four dependent variable categories: irrational beliefs, cognitive biases, hostile attributional biases, and anger-control strategies. Irrational beliefs and cognitive bias verbalizations were rated on a 5-point scale (0–4) that assessed the degree to which each variable was present in each segment, with 0 indicating not present at all and 4 indicating extremely present. Scores were calculated by averaging the two coders’ ratings on each variable for each segment, and summary scores were calculated by totaling the averaged ratings across the eight segments of each scenario. We assessed the hostile attributional bias and anger-control statements variables by tallying the frequencies of each verbalization across each scenario.

**Irrational beliefs.** The total irrational beliefs score, a composite of the four specific irrational beliefs, had very high interrater reliability (r = .92). As outlined by Ellis and Dryden (1987), four core irrational beliefs are presumed to contribute to a general style of irrational thinking: (a) awfulizing (an exaggerated rating of the “badness” of an aversive event evidenced by words such as “awful,” “horrible,” “terrible,” or “catastrophic”); (b) low frustration tolerance (a severe intolerance for discomfort evidenced by phrases such as “can’t stand,” “can’t take,” “can’t tolerate”); (c) demandingness (rigid, absolutist beliefs that events or people must be a certain way and that conditions such as...
success and approval are absolute necessities); and (d) self/other rating (evaluations of the total value or worth of a human being on the basis of a specific behavior or attribute in the basic form of “If/She/They/ I feel/unfair a ______”). Interrater reliabilities ranged from .67 (artificially lowering even when presented with situations having little to do with the self); and (f) dichotomous thinking (categorizing an event in one of two extremes and thinking in all-or-none terms). Interrater agreement ranged from .11 (selective abstraction) to .88 (magnification), with an average of .72. Omitting the very low reliability for selective abstraction results in r = .84.

Hostile attributional biases. This variable was coded by tallying the number of statements wherein participants blamed the cause of an event on the malicious and hostile intentions of another character. Hostile attributional bias was considered a special case of the arbitrary inference distortion in that the individual arrives at a conclusion in the absence of confirming evidence (an incorrect conclusion regarding the protagonist’s intentionality). However, the hostile attributional bias involves not only the misperception of causal intent but also the assumption of hostile motivation (Epps & Kendall, 1995). For example, the statement “It’s all her fault!” would be classified as arbitrary inference because it is not clear if this intentionality conclusion is valid. However, the statement “She meant for this happen just to get back at me!” is classified as hostile attributional bias because there is a question of both intent and hostile motivation. Interrater agreement was very high (r = .92).

Anger-control statements. Finally, articulated usage of strategies for anger control were rated by summing their frequency of occurrence. These statements included expressing the desire to walk away from the character or escape the situation in order to calm down, attempting to actively change one’s views about the situation or characters in order to decrease negative emotionality, suggesting counseling or other external mediation, initiating a request to calmly talk over the situation, or other anger-control strategies. Interrater agreement was again very high (r = .94).

Results

Validity of ATSS Anger Induction

To assess whether the three groups of men were indeed angered by the ATSS procedure, we conducted three dependent samples t tests on STAXI State Anger scores gathered before and immediately after the ATSS procedure. Results indicated that men in all three participant groups reported significant increases in state anger after the ATSS procedure: For MV, t(27) = 3.82, p < .001; for DNV, t(22) = 3.55, p < .002; and for SNV, t(32) = 3.23, p < .003. The three groups did not significantly differ in post-ATSS state anger, F(2, 84) = 2.26, ns.

Group Differences on ATSS Cognitive Variables

Table 1 presents means and standard deviations for all ATSS cognitive variables. As post hoc analyses revealed that there were nonsignificant within-group differences between ATSS jealously scenario and hearder conversation scenario scores for any cognitive variable, the total scores of these two scenarios were averaged into a single anger scenario score. To examine general group differences in articulated cognitive processes, products, and deficiencies, we present the results of four 3 X 2 (Group X Scenario) mixed ANOVAs on the ATSS variables of total irrational beliefs, total cognitive biases, frequency of hostile attributional biases, and frequency of anger-control statements. Effect sizes are reported in the form of eta squared. Where significant main effects coexisted with significant interaction terms, only significant interactions were probed. Finally, direct discriminant function analyses were undertaken with group membership being predicted by the four irrational beliefs, six cognitive biases, frequency of hostile attributional biases, and frequency of anger-control statements.

Irrational beliefs. On the total irrational beliefs score, the ANOVA indicated significant effects of group, F(2, 77) = 7.08, p < .001, η = .39; scenario, F(1, 77) = 27.57, p < .001, η = .51; and the Group X Scenario interaction, F(2, 77) = 4.63, p < .01, η = .33. To explore this interaction, we evaluated within-group differences between the control scenario and anger scenario using dependent t tests. In addition, we examined group differences within each scenario using univariate ANOVAs and Tukey’s (1977) honestly significant difference (HSD) test as a control for Type I errors resulting from multiple pairwise comparisons. Although MV and SNV husbands articulated a significantly greater level of articulated irrational beliefs in the anger tape versus the control scenario—for MV, t(27) = 4.91, p < .001; for SNV, t(30) = 4.07, p < .001—DNV men articulated a similar degree of irrationality across the two scenarios. t(20) = .66, ns. During the control scenario, the ANOVA indicated a significant effect of group, F(2, 79) = 4.23, p < .02. The HSD test indicated that MV men were not significantly different than DNV men during the control scenario, with both MV and DNV men articulating greater levels of irrational beliefs than SNV men. During the anger scenario, the univariate ANOVA indicated a significant group effect, F(2, 77) = 7.42, p < .05, with MV husbands scoring significantly higher than DNV and SNV men. DNV did not differ significantly from SNV men.

Cognitive biases. On the total cognitive biases score, the ANOVA indicated significant effects of group, F(2, 77) = 15.32, p < .001, η = .53; scenario, F(1, 77) = 121.92, p < .001, η = .58; and the Group X Scenario interaction, F(2, 77) = 7.49, p < .001. All three groups significantly increased their level of cognitive bias articulations from the control scenario to the anger scenario: For MV, t(27) = 7.69, p < .001; for DN, t(20) = 3.09, p < .006; for SNV, t(30) = 9.66, p < .001. During the control scenario, the univariate ANOVA indicated a significant effect of group, F(2, 78) = 9.06, p < .001. The HSD test indicated that MV men were not significantly different from DNV men, with both MV and DNV men articulating greater levels of cognitive bias than SNV men. During the anger scenario, the univariate ANOVA indicated a significant group
effect, $F(2, 78) = 14.49, p < .001$, with MV husbands articulating a significantly greater degree of cognitive biases than DNV and SNV men. DNV men did not differ significantly from SNV men.

**Hostile attributional biases.** On the hostile attributional bias variable, the ANOVA indicated a significant effect of group, $F(2, 79) = 9.52, p < .001, \eta = .44$. No significant effects were found for the scenario effect, $F(1, 79) = 2.56, n.s.$, or the Group × Scenario interaction, $F(2, 79) = 2.35, n.s.$ Across both scenario conditions, MV men articulated a significantly greater number of hostile attributional biases than DNV men, $t(79) = 3.06, p < .003$, and SNV men, $t(79) = 4.19, p < .001$. DNV men did not differ from SNV men, $t(79) = .78, n.s.$

**Anger-control statements.** For the frequency of articulated anger-control statements variable, the ANOVA indicated a significant effect of group, $F(2, 79) = 10.36, p < .001, \eta = .46$; a significant effect of scenario, $F(1, 77) = 58.15, p < .001, \eta = .65$; and a significant Group × Scenario interaction, $F(2, 79) = 10.50, p < .001$. All three groups significantly increased their level of anger-control statements from the control scenario to the anger scenario: For MV, $t(28) = 4.24, p < .001$; for DNV, $t(21) = 6.67, p < .001$; for SNV, $t(30) = 6.09, p < .001$. During the control scenario, the ANOVA indicated no effect of group, $F(2, 79) = 0.96, n.s$. During the anger scenario, the univariate ANOVA indicated a significant group effect, $F(2, 79) = 10.50, p < .001$, with SNV husbands scoring significantly higher than MV and DNV men. MV men did not differ significantly from DNV men.

**Predicting group status from ATSS cognitive variables.** Because our prior analyses clearly indicated that MV men were characterized by excesses on aggregate cognitive variables during anger arousal, in the present section we examine the role of specific cognitive variables in the differentiation of participant groups. To control for the increase in Type I error rates that would have resulted from numerous univariate ANOVAs for specific cognitive variables and to more directly answer the research question, we used a direct discriminant function analysis with specific ATSS anger scenario cognitive variables to predict group status. In accordance with recommendations by Pedhazur (1982) and Mueller and Cozad (1993), interpretation of the functions will be made primarily using structure coefficients (pooled within-group correlations between predictors and functions) rather than standardized discriminant function coefficients, although both types of data are presented in Table 2.

The first of the two obtained functions explained 59% of the variance in group membership, $\chi^2(22) = 63.76, p < .0001$, and the remaining function explained 15% of the variance in group membership, $\chi^2(10) = 11.65, n.s$. Using predictor-function correlations above $.30$ as the guideline for determining significance (Pedhazur, 1982), examination of correlations between the two functions and the set of cognitive predictor variables indicated that hostile attributions, magnification, dichotomous thinking, self/other rating, and arbitrary inference were significantly correlated with Function 1, whereas anger-control statements and personalization loaded significantly on Function 2. Anger control statements were negatively correlated with Function 1. Analysis of group centroids indicates that high scores on Function 1 were characteristic of MV participants (Function 1 centroid = 1.32; Function 2 centroid = .17), whereas higher scores on Function 2 were
more characteristic of SNV participants (Function 1 centroid = -1.01; Function 2 centroid = .31). DNV participants’ group centroid was low on both Function 1 (centroid = -.26) and Function 2 (centroid = -.68). Overall classification results indicate that 70% of cases were correctly classified according to the two discriminant functions.

Self-Report Measures of Cognitive Distortion

Between-group one-way ANOVAs on the total scores of the SPB and DYS were examined. Results indicated a significant group effect on Total SPB score, $F(2, 71) = 4.04, p < .02$, with MV men endorsing greater irrationality than SNV men, $t(71) = -2.68, p < .009$, but not DNV men, $t(71) = -4.7, ns$. DNV men endorsed greater irrationality than SNV men, $t(71) = -2.03, p < .05$. On the total score of the DYS, no significant group effects were observed, $F(2, 79) = 2.72, ns$.

To assess the differential ability of the questionnaire measures of cognition to predict the group status of individual cases, the SPB subtests of awfulizing, demandingness, low frustration tolerance, and self/other rating, and the DYS total score were entered into a discriminant function analysis. The analysis produced two nonsignificant functions, with Function 1 explaining 19.2% of the variance in group membership, $\chi^2(10) = 14.24, p < .16$, and Function 2 explaining 2.7% of the variance in group membership, $\chi^2(4) = 1.86, p < .76$. As might be expected from the lack of significance among the two functions, only 48.61% of cases were accurately classified and no additional analyses were undertaken.

Correlations Between ATSS and Questionnaire Cognitive Variables

This lack of convergence led us to evaluate the degree of correlation between the cognitions articulated by MV men during the ATSS procedure and those assessed by the questionnaires. No significant correlations were obtained ($range = .01-.26$). However, because participants experienced anger during the ATSS anger scenario but not during the completion of the questionnaires, we also evaluated correlations between ATSS control scenario articulations (no anger arousal) and questionnaire measures of cognitions within the MV sample. Once again, no significant correlations were obtained. The overall pattern of nonsignificance remained even when the three groups were collapsed into one, although one significant correlation emerged between ATSS anger scenario total irrational beliefs and SPB total irrationality ($r = -.33, p < .01$).

Differentiating Mildly Versus Severely Aggressive Men

To evaluate the ability of ATSS cognitive data to discriminate between MV men who engaged in “mild” acts of physical aggression and those who reported engaging in at least one act of severe wife-directed violence, a discriminant function was calculated using all ATSS cognitive variables as predictors. The resulting function, although nonsignificant, $\chi^2(12) = 17.32, p < .14$, explained 58% of the variance in the prediction of mild versus severe aggression. Because the eigenvalue, canonical correlation, and amount of explained variance were of large magnitude, the function was deemed interpretable. As can be seen in Table 3, the ATSS anger scenario articulations of demandingness, magnification, and awfulizing were significantly correlated with the function. Frequency of anger-control statements approached significance. Analysis of group centroids indicated that high scores on the function were associated with being classified a severe batterer (severely aggressive = 1.79; mildly aggressive = -.72). Overall, the function correctly classified 92.9% of MV participants.

Using cognitive data gathered from the SPB and DYS, we
How might cognitive distortions contribute to marital violence? A social information processing framework (Holtzworth-Munroe, 1992) posits that MV men may selectively attend to, actively misconstrue, or otherwise distort situations in ways that increase the likelihood of marital anger and aggression. MV participants in the present study, for example, were characterized by verbalizations reflective of a tendency to magnify the importance of aversive situations, dichotomous thinking that establishes rigid all-or-none ground rules for acceptable and unacceptable behavior, inflammatory ratings of other individuals' worth, articulations characterized by absolutist demands that people act appropriately, and arbitrary inferences established in the absence of confirming evidence. In addition, we found that specific cognitive distortion articulations distinguished between violent husbands who had engaged in more severe forms of marital violence and those husbands who used more mild forms of aggression. The 32% of our MV sample who reported at least one act of severe violence were discriminated on the basis of high levels of ATSS demandingness, magnification, and awfulizing, and low levels of anger-control statements. If these cognitive distortions are assumed to be trait-like, automatic processes that are applied in a wide variety of potentially provocative situations, it follows that MV men will experience anger arousal and perceive threat provocation at a higher frequency than individuals who do not exhibit this pattern of information processing.

Social information processing models also predict that deficiencies in making effective and appropriate decisions can also contribute to aggressive outcomes (Holtzworth-Munroe, 1992; Holtzworth-Munroe & Anglin, 1991). MV men in the present research did not spontaneously produce thought articulations that function to de-escalate and control anger arousal. SNV husbands articulated anger-controlling cognitions at a significantly higher rate than MV and DNV men, which corresponds to similar findings by Dutton and Browning (1988) and Holtzworth-Munroe and Anglin (1991). As reported by numerous marital interaction researchers (e.g., Burman et al., 1993), MV

<table>
<thead>
<tr>
<th>Predictor</th>
<th>Correlations with discriminant functions</th>
<th>Standard discriminant function coefficients</th>
</tr>
</thead>
<tbody>
<tr>
<td>Demandingness</td>
<td>.44</td>
<td>1.48</td>
</tr>
<tr>
<td>Magnification</td>
<td>.40</td>
<td>.44</td>
</tr>
<tr>
<td>Awfulizing</td>
<td>-.30</td>
<td>-.04</td>
</tr>
<tr>
<td>Anger-control statements</td>
<td>-.29</td>
<td>-.29</td>
</tr>
<tr>
<td>Selective abstraction</td>
<td>.24</td>
<td>.43</td>
</tr>
<tr>
<td>Overgeneralization</td>
<td>-.21</td>
<td>-.51</td>
</tr>
<tr>
<td>Self/other rating</td>
<td>.14</td>
<td>.22</td>
</tr>
<tr>
<td>Arbitrary inference</td>
<td>.10</td>
<td>-.30</td>
</tr>
<tr>
<td>Dichotomous thinking</td>
<td>.04</td>
<td>94</td>
</tr>
<tr>
<td>Hostile attributions</td>
<td>.02</td>
<td>-.38</td>
</tr>
<tr>
<td>Low frustration tolerance</td>
<td>.01</td>
<td>.22</td>
</tr>
<tr>
<td>Personalization</td>
<td>.00</td>
<td>.58</td>
</tr>
</tbody>
</table>

Note. Significant loadings in boldface type. ATSS = Articulated Thoughts in Simulated Situations.
couples appear to be entrenched in a communication style during marital conflicts that involves an escalating cascade of reciprocated anger, contempt, and belligerence. The present data suggest that, in part, MV men are unable to extricate themselves from this aversive communication pattern because of their inability to spontaneously generate anger-controlling, prosocial coping strategies. There are important clinical implications associated with this finding. Whereas cognitively oriented therapies are generally structured around the goal of identifying and modifying distortions in information processing that affect emotions and behavior, merely substituting rational beliefs for their irrational counterparts, or objectively valid thoughts in place of faulty automatic inferences, does not address the individual's decision-making skill deficiencies in the area of anger coping and conflict management. Skill-building techniques such as social skills training, problem-solving therapy, or interventions that teach couples how to argue "better" (Gottman, 1994) may thus be important treatment adjuncts for MV men.

Do the ATSS data support the primacy of cognition in the enactment of marital aggression? Perhaps, but our data are correlational and not without their limitations. First, it is still unknown whether MV men possessed these cognitive processes and products before engaging in violence against their wives, or whether they emerged as a result of the violence. Second, the present assessment scheme coded for the presence of hostile attributional biases regardless of the individual they were directed toward, which stands in contrast to previous studies of MV men (e.g., Holtzworth-Munroe & Hutchinson, 1993) that only assessed wife-directed attributional biases. In addition, although the ATSS anger-arousing scenarios depicted conflict situations of direct relevance to the marital relationship, they did not involve an actual husband–wife argument per se. Future studies might examine the utility of including argument-based scenarios. Finally, although the ATSS procedure provides an optimal method for assessing affect-relevant cognitions as they are occurring on-line, there is still an opportunity for respondents to withhold or otherwise distort their responses. However, the fact that respondents do not verbalize everything that is on their minds during ATSS assessment does not compromise data that are coded schematically (Kashima & Davison, 1990), as they were in the present study. Indeed, the relatively large effect sizes reported in the present research suggest that MV men were minimally affected by social desirability and censoring issues. Thus, given these limitations, the present data suggest that cognitive variables may strongly influence affective arousal and play a key role in the complex interaction of events that unfold during relationship conflicts.

Because cognitions are so heavily connected to intense affective states such as anger, it is critical that future researchers continue to tailor cognitive assessment methods to address this cognition–emotion association. A strength of the ATSS procedure is its ability to tap into on-line, affect-relevant cognitive processes that may not be accessible in the absence of affective arousal. One may hypothesize that for participants in the present study, the elicitation of anger during the ATSS procedure activated anger-relevant cognitive processes. In accordance with a spreading activation perspective on cognition and emotion (Anderson & Bower, 1973; Bower, 1981; Collins & Loftus, 1975), MV men are hypothesized to possess more associative connections between cognitive operations (e.g., cognitive distortions, memories, images) and angry affect that are activated and articulated during think-aloud tasks such as the ATSS procedure. This theoretical position, which Persons and Miranda (1992) have recently modified into the mood-state hypothesis, may explain the lack of relationship found in the present study between the questionnaire measures of cognitive distortion and ATSS cognitive data. The SPB and DYS possess strong psychometric properties but were nevertheless poor predictors of group membership and severity of marital violence in the discriminant function analyses. According to the mood-state hypothesis, one might hypothesize that cognitions were more accessible, and thus more reportable, during the ATSS procedure because the individual's emotional state was manipulated at the time of assessment. However, it should be kept in mind that anger induction data in the present study are limited because anger was only assessed before and immediately after the ATSS tapes were presented. Future studies should more precisely assess the process of anger arousal in MV men and at what point this arousal influences cognition.

The present data support a social information processing model of marital aggression (Holtzworth-Munroe, 1992). MV men were differentiated from DNV and SNV husbands on the basis of articulated cognitive processes and products during anger arousal, and these cognitions further distinguished mildly aggressive from severely aggressive husbands. Future research should address whether additional patterns of cognitive activity distinguish between different subtypes of MV men (Holtzworth-Munroe & Stuart, 1994b). For example, are batterers who present with a psychopathic pattern of emotional (under) arousal and behavior (generally aggressive/antisocial subtype) characterized by a different set of distorted cognitive processes than batterers who are aggressive while intensely angry and enraged (dysphoric/borderline subtype)? In addition, researchers could examine whether information processing mechanisms operating at a preattentive level differentiate violent from nonviolent husbands. Do MV men characterized by high levels of anger bias their attention during preliminary information processing toward anger-relevant cues at the expense of other contextual cues that would otherwise not induce anger? It appears crucial to continue to integrate findings from diverse theoretical perspectives and experimental methodologies in order to arrive at a comprehensive model of marital violence to aid in the treatment of abusive men and the prevention of the suffering experienced by their victims.

References


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