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Do People Aggress to Improve Their Mood? Catharsis Beliefs, Affect Regulation Opportunity, and Aggressive Responding

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Do people aggress to make themselves feel better? We adapted a procedure used by G. K. Manucia, D. J. Baumann, and R. B. Cialdini (1984), in which some participants are given a bogus mood-freezing pill that makes affect regulation efforts ineffective. In Study 1, people who had been induced to believe in the value of catharsis and venting anger responded more aggressively than did control participants to insulting criticism, but this aggression was eliminated by the mood-freezing pill. Study 2 showed similar results among people with high anger-out (i.e., expressing and venting anger) tendencies. Studies 3 and 4 provided questionnaire data consistent with these interpretations, and Study 5 replicated the findings of Studies 1 and 2 using measures more directly concerned with affect regulation. Taken together, these results suggest that many people may engage in aggression to regulate (improve) their own affective states.

Angry, frustrated, distraught, upset people have long been regarded as being prone to aggressive behavior. The view that frustration causes aggression is one of psychology's oldest empirical hypotheses and was asserted as proven truth over one half of a century ago (Dollard et al., 1939). More recently, Berkowitz (1989) proposed that all states of negative affect—instead of only frustration—deserve to be recognized as causes of aggression. And although not all varieties of negative affect have been tested for aggression-enhancing effects, it is clear that some of them are quite capable of increasing aggression. The pragmatic importance of negative affect has not gone unnoticed by aggression researchers, who rely on it even when their hypotheses are irrelevant to affect. When researchers want to elicit high levels of aggression in the laboratory, they typically start by inducing some aversive emotional state such as anger or indignation.

Yet why should negative affect cause aggression? Emotion research has suggested a variety of consequences of negative affect, and it is plausible that some of these (e.g., impulsive action in disregard of possible consequences; Leith & Baumeister, 1996) could contribute in various ways to increasing the probability of aggression. But the pervasive power of the affect–aggression link suggests that the answer ought to be some direct, consistent factor rather than some indirect, or roundabout factor.

One major theme that does emerge from research on negative affect is that people who feel bad often try to remedy or repair their moods (e.g., Larsen, 2000; Morris & Reilly, 1987; Thayer, 1989; Wegner & Pennebaker, 1993). Isen (1984, 1987) has suggested that the prevalence of affect regulation is so broad as to pose an obstacle to researchers and theorists, because it is difficult to know whether the behavioral consequences of emotional distress follow directly from the emotional state or are mediated by the person's efforts to overcome that state and feel better. Studies suggest that people have dozens of different strategies for affect regulation, some of which work better than others (and some of which do not work at all), and none of which is perfect. Hence, people may often be looking for new ways to improve their moods.

The present research was designed to explore this possible link between affect regulation and aggression. More precisely, we sought to test the hypothesis that the attempt to regulate affect is the reason that emotional distress leads to aggression. People aggress in the hope that doing so will enable them to feel better. If people think that their emotional state will not be improved by aggressing, they will not aggress.

Venting, Catharsis, and Anger

The belief that aggression could improve one's emotional state is highly plausible. It has received support from psychological experts and from the mass media, and it remains influential.

Certainly popular wisdom has supported the view that venting anger helps one achieve a better state. For example, a large billboard in Missouri states: "Hit a Pillow, Hit a Wall, But Don't Hit Your Kids!" People advise their angry friends to "blow off

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steam," "let it out," or "get it off your chest," and "don't bottle your anger up inside." Angry outbursts are expected to "clear the air" (i.e., improve communication and mutual understanding). The metaphors of getting something off the chest or out of the self seemingly imply that anger is a caustic, evil-natured substance that causes harm to the self if it remains inside, and so putting it outside by expressing it will be beneficial to the self.

The theory of catharsis is one popular and authoritative statement that venting one's anger will produce a positive improvement in one's psychological state. According to that view, anger and aggressive impulses exist inside the psyche and seek to get out by being expressed. If they are not expressed, they remain inside the person and can cause psychological damage. Expressing them, however, removes them from the psyche and frees it from their harmful effects. It is thus considered healthy to express anger, even by venting aggressive feelings. Catharsis literally means to release or to purge, thereby capturing the idea that aggressive acts will help purge the hostile feelings from the psyche.

In Freud's view, emotional responses remained potent until they could be felt and expressed, and so refusing to express anger caused the destructive feelings to remain inside the person, where they could lead to psychological symptoms (see Breuer & Freud, 1893–1895/1955). One could aggress against the target of one's hostility or against a substitute target, but failure to vent the anger could cause mental illness.

Freud is hardly the only expert to assert that venting can be beneficial. Recent and current works, especially those of popular psychology aimed at the general public, continue to exhort people to express their feelings rather than keeping them inside, for the sake of one's own mental health. Lee (1993) exhorted angry people to hit a punching bag or pillow while imagining it as having the face of the person at whom they are angry, "so that you can stop doing violence to yourself by holding in poisonous anger" (p. 96).

Although this theory has been largely discredited, and in fact Geen and Quanty (1977) reviewed considerable evidence to conclude that the theory is empirically false, it continues to be advocated in the mass media. In the recent movie "Analyze This," for example, a psychiatrist (played by Billy Crystal) tells his New York gangster client (played by Robert De Niro): "You know what I do when I'm angry? I hit a pillow. Try that." The client promptly pulls out his gun, points it at the couch, and pumps several bullets into the pillow. "Feel better?" asks the psychiatrist. "Yeah, I do," says the gunman. In a recent article about hate crimes in the *New York Times Magazine,* Andrew Sullivan claimed that

> Some expression of prejudice serves a useful purpose. It lets off steam; it allows natural tensions to express themselves incrementally; it can siphon off conflict through words, rather than actions. Anyone who has lived in the ethnic shouting match that is New York City knows exactly what I mean. (Sullivan, 1999, p. 113)

In an article in *Vogue* magazine, female model Shalom tried boxing and agreed that it helped her release pent-up anger. She said,

> I found myself looking forward to the chance to pound out the frustrations of the week against Carlos's [her trainer's] mitts. Let's face it: A personal boxing trainer has advantages over a husband or lover. He won't look at you accusingly and say, "I don't know where this irritation is coming from"—and wonder why you can't just express your anger. Your boxing trainer knows it's in there. And he wants you to give it to him. ("Fighting fit," 1993, p. 179)

Actually there might be a kernel of truth in the catharsis theory, even if the full theory is incorrect. People may actually feel better after aggressing (or even after watching aggression depicted on film or television). After all, aggressive films would not sell so many tickets if they were not enjoyable to some degree. Even our own previous data, which are mostly quite hostile to the catharsis theory, found some evidence of enjoyment during aggressive activity (see Bushman, Baumeister, & Stack, 1999). We replicated the usual finding that engaging in aggression (in our study, by hitting a punching bag) failed to produce any decrement in subsequent aggression toward a confederate, and in fact people who performed the punching bag activity were more aggressive toward the confederate. There was thus no sign of catharsis in the sense of a reduction in aggressive tendencies. There was, however, evidence of pleasure: The majority of angry participants reported that they enjoyed hitting the punching bag. In fact, the people who enjoyed hitting the punching bag the most were also the most aggressive toward the confederate later.

The implication is that acting out one's aggression may fail to reduce subsequent aggression and thus does not purge (in the literal meaning of catharsis) any hostile impulses from the psyche—but it does sometimes feel good. When people subscribe to the positive value of venting their angry feelings, they may be less concerned with the (false) expectation that their aggressive tendencies will be reduced than with the (possibly true) expectation that they will get pleasure from the aggression and therefore feel better.

Affect Regulation Goals

Thus far, we have proposed that people may sometimes engage in aggression in the expectation that by doing so, they will get rid of their anger and feel better. In other words, the goal of affect regulation may be responsible for the link between negative affect and aggression.

How can one establish whether some behavior is undertaken as affect regulation, especially when it objectively does not accomplish that outcome? One innovative and persuasive procedure for studying affect regulation efforts was devised by Manucia, Baumann, and Cialdini (1984). The essence of their procedure is to persuade persons that their emotional states are temporarily frozen and therefore cannot be changed in the short run. Manucia et al. (1984) used a cover story of drug research and provided participants with examples of other drugs that have mood-relevant side effects, in order to make the mood-freezing properties of their pill plausible. The belief in the mood-freezing effect of the pill makes efforts at affect regulation pointless. In their study, sad people refrained from helping others when their moods were frozen, in sharp contrast to the relatively high helpfulness of other (i.e., nonfrozen) sad people. This pattern of findings enabled Manucia et al. to conclude that sad people help others in order to get rid of their own sadness and feel better, consistent with their view of helping as aimed at mood repair (Cialdini, Darby, & Vincent, 1973; Cialdini & Kenrick, 1976; but also see Miller & Carlson, 1990).

Our research adapted the mood-freezing manipulation from Manucia et al. (1984) for use with aggression. The simplest form of our hypothesis was that angry and upset people aggress in order to feel better, and so the mood-freezing pill should produce a reduction in aggressive responses.

As already noted, however, our hypothesis depends on the angry or upset person's belief that aggression will actually produce an improvement in mood. Belief in the catharsis hypothesis (or, more generally, the beneficial value of venting anger) should therefore be a crucial moderator of the effect of the mood-freezing pill on aggression. Only people who believe in catharsis and venting should engage in aggression for the sake of affect regulation, and so only they should show a reduction in aggression after taking a mood-freezing pill.

We used several methods to test the moderating effect of subjective beliefs in catharsis. In Study 1, we manipulated people's beliefs by exposing them to a bogus newspaper article reporting on a recent study that had allegedly proven or disproven the efficacy of venting. This manipulation thus corresponded to the potential impact of messages in the mass media regarding the likely outcomes of expressing one's anger. In Study 2, we relied on individual differences in expressive tendencies (specifically anger-out, or the dispositional tendency to express one's anger in overt, aggressive ways). For both studies, we predicted that people who believed in the positive value of venting would aggress (when provoked) partly as a means of making themselves feel better—but would therefore respond to the mood-freezing manipulation by reducing their aggression. For them, presumably, aggression would lose part of its purpose and potential value if they believed that their emotional states could not be improved by it. Study 3 was conducted to provide an empirical link between anger-out and procatharsis messages, specifically by showing that people high in anger-out tendencies would respond more favorably to a procatharsis message than to an anticatharsis message. The opposite pattern of results was predicted for people low in anger-out tendencies; we expected them to respond more favorably to an anticatharsis message than to a procatharsis message. Study 4 was devoted to developing a new measure of belief in the value and efficacy of venting feelings, specifically to assess individual differences in the belief that expressing anger is the best way to make oneself feel better. Finally, Study 5 used this new measure to examine effects of the mood-freeze manipulation and procatharsis messages on aggressive behavior.

Study 1

Study 1 provided the first direct test of our hypothesis. We exposed people to a bogus media report saying that scientific research had either supported or contradicted the value of venting and the validity of the catharsis hypothesis. We administered the mood-freezing manipulation, after which participants had an opportunity to aggress against someone who had criticized and insulted them. Both the insulting feedback and the catharsis message have been found in previous work to increase aggression (Bushman & Baumeister, 1998; Bushman et al., 1999). The main prediction for Study 1 was that the mood-freezing manipulation would significantly reduce this high level of aggression, because mood-freezing would eliminate a major reason (i.e., affect regulation) for aggressing.

Method

Participants

Participants were 200 undergraduate students (100 men and 100 women) enrolled in introductory psychology courses. They received extra course credit in exchange for their voluntary participation.

Design

Participants were randomly assigned to pill instructions and catharsis message conditions, resulting in 25 men and 25 women in each of the four conditions. The factorial design was 2 × 2 × 2, with the independent variables consisting of pill instructions (mood freezing vs. no-freeze), catharsis message (procatharsis vs. anticatharsis), and participant sex (male vs. female).

Procedure

Experimental participants were tested individually in the laboratory session, but each was led to believe that he or she would be interacting with another participant of the same sex. Participants were told that the researchers were studying impression formation. Informed consent was obtained after participants were told that the experiment would involve reading newspaper articles, writing essays on controversial topics, and performing a reaction time task. All of the tasks were presented as ways to get information that could be used to form an impression of their partner. Participants were told that another purpose of the study was to test the effects of Bramitol, a nonharmful drug that supposedly improves reaction time.

After informed consent was obtained, the researcher flipped a coin to ostensibly determine whether participants would get Bramitol, which was actually a 50-mg tablet of Vitamin B6. Regardless of the outcome of the coin toss, all of the participants were told that they would get the drug. Participants were randomly assigned to mood-freeze conditions. One half of the participants were told: "Bramitol is totally safe and has no harmful side effects. One nonharmful effect of Bramitol is that it will freeze your mood for about 1 hour. Many drugs can affect our moods, and Bramitol is no exception." The remaining participants were told, "Bramitol is totally safe and has no harmful side effects. Although some drugs can affect our moods, Bramitol is an exception—it will *not* affect your mood." Participants then swallowed the pill with water. They were told that it would take about 30 min for the drug to start working.

Catharsis belief was manipulated by having participants read a bogus newspaper article describing the results of a study that either supported (procatharsis) or refuted (anticatharsis) catharsis. The pro- and anticatharsis articles are given in Appendix A.

The catharsis article was the first of three articles in a packet. Participants rated how scientifically credible, authoritative, believable, persuasive, and interesting they thought each article was using a 10-point Likert-type scale ranging from 1 (*not at all*) to 10 (*extremely*). Participants were told that they would discuss the articles with their partner later in the experiment.

Next, each participant wrote a one-paragraph essay on abortion, either prochoice or prolife (whichever the participant preferred). After finishing, the participant's essay was taken away to be shown to the other participant (who was in fact nonexistent) for evaluation. Meanwhile, the participant was permitted to evaluate the partner's essay, which always disagreed with the attitudinal position advocated by the participant. That is, participants who wrote prochoice essays evaluated prolife essays, whereas participants who wrote prolife essays evaluated prochoice essays. To control for handwriting, there also were male and female versions of the standard essays.

A short time later, the experimenter brought the participant's own essay back with comments ostensibly made by the other participant. All of the participants received bad evaluations consisting of negative ratings on

organization, originality, writing style, clarity of expression, persuasiveness of arguments, and overall quality. There was also a handwritten comment stating "This is one of the worst essays I have read!" Previous research has shown that the negative feedback makes people quite angry (Bushman & Baumeister, 1998; Bushman et al., 1999).

The next part of the procedure was presented as a competitive reaction time task, based on a paradigm developed by Taylor (1967). Previous studies have established the construct validity of Taylor's paradigm (e.g., Bernstein, Richardson, & Hammock, 1987; Giancola & Zeichner, 1995). The ostensible purpose of the reaction time task was to give the participant an idea of what his or her partner was like in a competitive situation. Each participant was told that he or she and the partner would have to press a button as fast as possible on each trial, and whoever was slower would receive a blast of noise. Each participant was permitted to set in advance the intensity of the noise that the other person would receive between 60 decibels (Level 1) and 105 decibels (Level 10) if the other lost. A nonaggressive no-noise setting (Level 0) was also offered. In addition to deciding the intensity, the winner decided the duration of the loser's suffering, because the duration of the noise depended on how long the winner held the button pressed down. In effect, the participant controlled a weapon that could be used to blast the other person with loud noise if the participant won the competition to react faster.

The reaction time task consisted of 25 trials. Provocation was manipulated by increasing the intensity and duration of noise set by the "other person" across blocks of trials. After the initial (no provocation) trial, the remaining 24 trials were divided into three blocks with 8 trials in each block. The average noise intensity and duration set by the "other person" were 2.5 and 0.63 s, respectively, on Block 1; 5.5 and 1.38 s, respectively, on Block 2; and 8.5 and 2.47 s, respectively, on Block 3. The participant heard noise through headphones on one half of the trials within each block (randomly determined). A Power Macintosh computer controlled the events in the reaction time task and recorded the noise levels and durations the participant set for the "other person."

Prior to performing the reaction time task, participants in the mood-freeze condition were told, "Bramitol should be in your system now and it should enhance your performance on the reaction time task. However, it will freeze your mood for about 1 hr. So whatever mood you are in right now will not change for 1 hr." The remaining participants were told, "Bramitol should be in your system now and it should enhance your performance on the reaction time task. However, it will *not* affect your mood." After the reaction time task, the study was terminated and the experimenter probed to see whether the participant was suspicious about the study. No participants expressed suspicion about the study. A full debriefing followed.

Results

Manipulation Checks

All of the participants were asked what effect the pill had supposedly had on their mood. Nearly all (98%) responded correctly with the instructions they had been given.

The possibility that the procatharsis and anticatharsis articles may have been differentially plausible was relevant to possible alternative explanations. Participants' ratings of the two articles were compared. No significant differences were found, as Table 1 shows. All of the ratings were above the scale midpoints. Thus, both articles were judged to be fairly credible, authoritative, believable, persuasive, and interesting, and they did not differ on any of those dimensions.

Table 1
Comparison of Procatharsis and Anticatharsis Articles on Various Rating Dimensions

	Procatharsis article		Anticatharsis article	
Rating dimension	*M*	*SE*	*M*	*SE*
Scientifically credible	5.88	0.23	6.11	0.23
Authoritative	5.80	0.19	6.11	0.21
Believable	6.73	0.25	6.52	0.24
Persuasive	6.01	0.25	5.55	0.24
Interesting	6.66	0.23	6.50	0.22

Note. Ratings were made on a scale ranging from 1 (*not at all*) to 10 (*extremely*).

Aggressive Behavior

The main dependent variable in Study 1 was aggressive behavior, as indicated by the loudness (intensity) and duration of noise selected by each participant for blasting the other person. Intensity and duration of noise were both measures of the same construct, namely aggression, and they were significantly correlated (r = .43). They also showed the same pattern of results. To increase the reliability of the measurement of aggression, therefore, the two measures were standardized and summed to form a single measure of interpersonal aggression. This is the same procedure we have used repeatedly in previous work (e.g., Bushman & Baumeister, 1998; Bushman et al., 1999). The aggression measures were analyzed with a three-factor analysis of variance (ANOVA) including pill expectancy (mood freeze vs. no-freeze), catharsis article (procatharsis vs. anticatharsis), and participant sex (male vs. female).

Trial 1. The main prediction in Study 1 was that the mood-freeze pill would reduce aggression in people who read the procatharsis article. The most important measure of aggression was the first trial, because it is the only one uncontaminated by tendencies to reciprocate the partner's level of aggression. As predicted, ANOVA on these first-trial aggression scores yielded a significant interaction between pill expectancy and catharsis message, $F(1, 192) = 15.27$, $p < .0001$, $MSE = 1.89$. This interaction is depicted in Figure 1. Among people who were exposed to the procatharsis message, people with allegedly frozen moods exhibited significantly lower levels of aggression than did those without frozen moods, $t(192) = 2.99$, $p < .004$, $d = 0.58$. The opposite pattern was found among people who read the anticatharsis message. People with allegedly frozen moods exhibited significantly higher levels of aggression than did those without frozen moods, $t(192) = 2.54$, $p < .02$, $d = 0.52$. None of the other effects approached significance.

Remaining trials. After the first trial, aggression converged on what people believed the other person had done. This is consistent with many other findings that confirm the importance of reciprocation norms in determining levels of aggressive behavior (e.g., Bushman & Baumeister, 1998). On these remaining trials, however, men were more aggressive than women, $F(1, 192) = 5.16$, $p < .03$, $MSE = 1.45$, $d = 0.32$.

Discussion

The findings of Study 1 suggest that some people may aggress as a means of making themselves feel better. Some participants were led to believe in the catharsis theory (according to which anger can be vented effectively so that the person is less aggressive

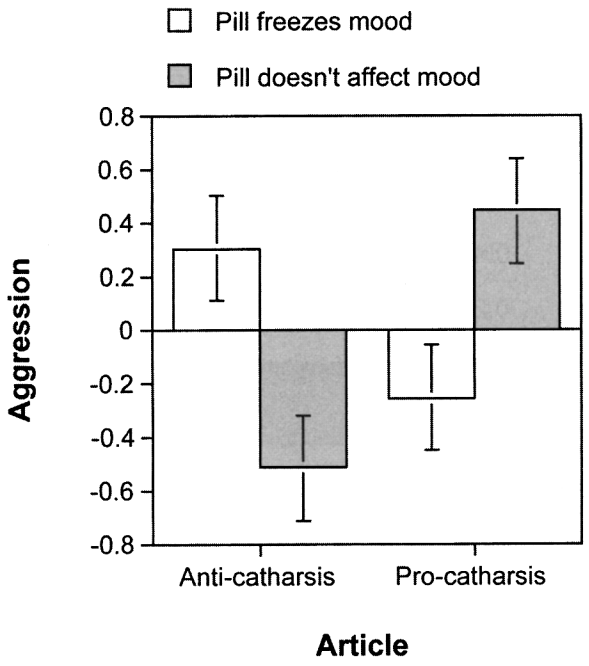

Figure 1. Interactive effects of Pill Expectancy and Catharsis Message on aggression (Trial 1, Study 1). Capped vertical bars denote 1 *SE*.

afterward). These participants behaved aggressively toward someone who had criticized and insulted them, but they were much less aggressive if they believed that they had taken a pill that would prevent their mood from changing. This pattern suggests that people aggressed because they believed it would be a good way of getting rid of their anger. When the prospect of mood repair was eliminated, aggression lost its appeal.

Meanwhile, the opposite pattern was found among people who had been exposed to the anticatharsis media message. For them, the mood-freezing pill elicited higher (rather than lower) levels of aggression in response to the insulting criticism. The anticatharsis message suggested that acting in an aggressive manner (such as by venting one's anger on a punching bag) makes one feel even more aggressive afterward. The message implied that acting aggressively would cause an individual to end up feeling even worse, such as being more angry and distraught, and these anticipated feelings were presumably one reason to hold back from aggression. In this condition, therefore, the mood-freezing pill eliminated the threat that aggressing could make one feel worse, and as a result provoked participants were more willing to aggress.

The fact that the mood-freezing pill operated in both directions (i.e., increasing and decreasing aggression) helps rule out any explanation that aggression followed directly from having a frozen mood state. Instead, it appears that the possibility of changing one's mood interacts with beliefs about how aggressive acts will affect one's mood. The most important finding was that aggression followed from the combination of having a changeable mood and thinking that aggressive behavior is good for one's mood state. Thus, the results of Study 1 suggest that aggression can be undertaken in the service of affect regulation goals.

Study 2

Study 1 found that the anticipated emotional repercussions of acting aggressively can be a factor in increasing or decreasing aggression. People will aggress only reluctantly if they have been led to think that aggression will make them feel worse. In contrast, highly aggressive responses are more likely among people who have been led to think that aggression will make them feel better.

Although these results make good theoretical sense, their generalizability may be limited by the fact that the manipulation in Study 1 relied on giving people a salient message to manipulate their attitudes about how aggression would make them feel. The results would have far more generality if they could be replicated using people's own beliefs (instead of experimentally manipulated beliefs). In particular, the conclusion that affect regulation goals can lead to aggression would be of minimal importance if nobody spontaneously believed in the catharsis hypothesis or if such prior, spontaneously held beliefs were to prove irrelevant to aggression. Study 2 therefore examined whether people's own prior beliefs about expressing anger would moderate the effects of the mood-freezing pill on aggression.

The predictions for Study 2 followed directly from the findings of Study 1, with chronic personal tendencies toward expressing anger replacing the manipulated belief in catharsis. People who habitually favor venting (such as by expressing their anger in a vigorous, aggressive fashion) may do so out of some personal belief or recognition that aggression makes them feel better. For them, therefore, a mood-freezing pill would remove an important reason for aggressing, and so they should be less likely to aggress than people with similar beliefs but no mood-freezing pill.

In contrast, people who do not habitually vent their anger may believe that such aggressive displays are either useless or counterproductive for making themselves feel better. If they regard aggressive acts as having no effect on mood, then the mood-freezing pill should have no effect on their aggressive tendencies. If they regard aggressive acts as likely to make them feel worse (as in the message manipulation in Study 1), then the mood-freezing pill may well remove one habitual restraint against aggression and hence would result in an increase in aggression.

Method

Catharsis Belief Trait Measure

No standard or established measure of beliefs in catharsis was available, but we deemed it plausible that people who habitually vent their anger would be more likely to hold such beliefs (in the efficacy and benefits of venting) than people who habitually stifle or internalize their anger. Therefore we used the eight-item Anger-Out subscale of the Anger Expression Inventory (Spielberger, 1979). People with high Anger-Out scores

> Frequently experience anger which they express in aggressive behavior directed towards other persons or objects in the environment. Anger-out may be expressed in physical acts such as assaulting other persons or slamming doors, or it may be expressed verbally in the form of criticism, sarcasm, insults, threats, and the extreme use of profanity. (Spielberger, 1979, p. 5)

It is a widely used scale with good psychometric properties. Alpha coefficients for the Anger-Out subscale range from .73 to .77 (Spielberger, 1979, pp. 10–11). Respondents are asked to indicate how they "react or

behave when they are feeling angry or furious." Sample items are "I express my anger" and "I do things like slam doors." Each item is answered using a 4-point scale ranging from 1 (*almost never*), to 4 (*almost always*). Item responses are summed to create an Anger-Out score.

Participants

Participants were 202 undergraduate college students (100 men and 102 women) enrolled in introductory psychology courses. Students received extra course credit in exchange for their voluntary participation. The data from 2 suspicious women were discarded. The final sample consisted of 100 men and 100 women. There were 50 men and 50 women in each of the pill expectancy conditions.

Participants were selected at random from a group of 973 students (378 men and 595 women) who completed the Anger-Out subscale of the Anger Expression Inventory (Spielberger, 1979) as part of a battery of questionnaires given in mass-testing sessions. The mass-testing session and experiment proper were about one month apart. In the mass-testing sample, the alpha coefficient for the Anger-Out subscale was .75. Anger-Out scores were higher for men than for women, *M*s = 16.5 and 15.0, respectively, $t(971) = 6.02$, $p < .05$, $d = 0.40$.

Procedure

The procedure was the same as for Study 1 with one exception: Students read an article unrelated to catharsis instead of a pro- or anticatharsis article.

Results

Manipulation Check of Pill Instructions

At the end of the procedure, each participant was asked to recall the pill instructions he or she had been given. Correct responses were received from 97% of the participants.

Data Analysis Strategy

The data for Study 2 were analyzed using ANOVA. Because the predictions (based on the findings of Study 1) were formulated in terms of differential effects of the mood-freezing pill on each type of person, we conducted analyses using a median split on Trait Anger-Out scores. The same pattern of results was found in alternate analyses treating anger-out as a continuous variable. As in Study 1, the main measure of aggression was constructed by standardizing the noise intensity and noise duration scores across the full sample and then adding these two scores for each participant.

Aggressive Behavior

Trial 1. The main prediction in Study 2 was that the mood-freeze pill would reduce aggression in high anger-out people. The predicted interaction between Pill Expectancy and Anger-Out was nearly significant, $F(1, 192) = 3.65$, $p < .06$, $MSE = 2.11$. This interaction is depicted in Figure 2. High anger-out individuals were less aggressive when they were told the pill would freeze their mood than when they were told the pill would not affect their mood, $t(192) = 2.20$, $p < .03$, $d = 0.41$. Pill instructions did not significantly affect low anger-out individuals, $t(192) = 0.50$, $p > .05$, $d = 0.20$. In addition, men were more aggressive than women,

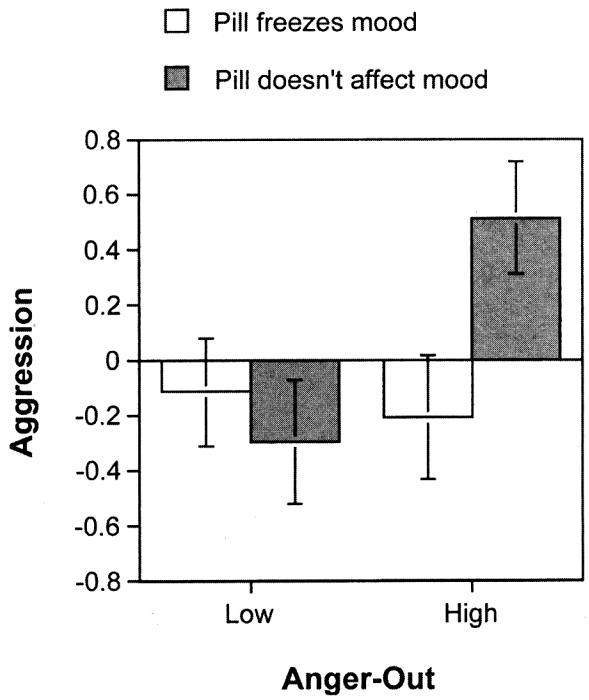

Figure 2. Interactive effects of Pill Expectancy and Anger-Out on aggression (Trial 1, Study 2). Capped vertical bars denote 1 *SE*.

*M*s = 0.17 and −0.25, respectively, $F(1, 192) = 3.91$, $p < .05$, $MSE = 2.11$, $d = 0.29$. No other effects were significant.

Remaining trials. After the first trial, aggression converged on reciprocation of what the partner had ostensibly done. Still, on these remaining trials, high anger-out participants were more aggressive than were low anger-out participants, *M*s = 0.21 and −0.25, respectively, $F(1, 192) = 5.41$, $p < .03$, $MSE = 1.86$, $d = 0.41$. Men also tended to be more aggressive than did women, *M*s = 0.17 and −0.21, respectively, $F(1, 192) = 3.60$, $p < .06$, $MSE = 1.86$, $d = 0.33$.

Discussion

Study 2 corroborated and extended the results of Study 1. People who habitually tend to express their anger overtly responded like the participants in Study 1 who received the procatharsis message. They showed high aggression in response to insulting criticism, but the mood-freezing pill eliminated this increase in aggression. Thus, the mood-freezing pill reduced aggression among people who habitually favor overt expression of anger. This is consistent with the hypothesis that such people aggress in the hope or expectation that their emotional state will be improved by venting their anger.

The secondary finding from Study 1, in which the mood-freezing pill increased aggression among people who were led to disbelieve in catharsis, was not replicated with significance for low anger-out people, but the effect was in the same direction. We cannot therefore draw a firm conclusion about whether people who habitually restrain their expressions of anger may do so out of a belief that aggressive venting would put them into a bad or worse mood.

Overall, the convergence between trait anger-out tendencies and consequences of exposure to procatharsis versus anticatharsis messages suggests that the trait may well be linked to cognitive responses to such messages. Study 3 was carried out to verify the link between anger-out tendencies and these cognitive responses.

Study 3

Studies 1 and 2 yielded similar patterns with different moderators. The mood-freezing pill eliminated some aggressive tendencies among people who had been exposed to a procatharsis media message (Study 1) and people with dispositionally high anger-out tendencies (Study 2). Although our investigation regarded the media procatharsis message and the high anger-out trait level as conceptually similar, we recognized that they differ in some respects, and some readers might wonder whether the similarity in results is only superficial and possibly misleading.

A third study was therefore conducted to determine the relation between our manipulated and measured catharsis belief variables. The purpose was to demonstrate some affinity between trait anger-out tendencies and procatharsis media messages. We predicted that high anger-out people would give the procatharsis article higher ratings than the anticatharsis article, whereas low anger-out people would give the anticatharsis article higher ratings than the procatharsis article.

Method

Participants

Participants were 100 undergraduate college students (50 men and 50 women) enrolled in introductory psychology courses. Students received extra course credit in exchange for their voluntary participation. Participants were selected at random from a group of 973 undergraduate college students (378 men and 595 women) who completed the Anger-Out scale as part of a battery of questionnaires given in mass-testing sessions. This is the same large pool of students who were sampled for Study 2. If the individual had participated in Study 2, however, he or she was not eligible to participate in Study 3.

Procedure

Participants were tested in small groups, but they were randomly assigned to conditions within each group. They also worked independently. Participants were told that the researchers were studying perceptions of scientific studies reported in newspaper articles. By the flip of the coin, participants were randomly assigned to pro- or anticatharsis message conditions. The articles were the same as those used in Study 1 (see Appendix A). The catharsis article was the first of three articles in a packet. Participants in Study 3 rated the articles on the same dimensions as did participants in Study 1 (i.e., how scientifically credible, authoritative, believable, persuasive, and interesting they thought each article was). The items were rated along a 10-point Likert-type scale ranging from 1 (*not at all*) to 10 (*extremely*). After rating the articles, each participant was debriefed regarding the purpose of the study.

Results

Factor Analysis

Principal-components factor analysis was conducted to determine whether the observed ratings of the catharsis article (i.e., scientifically credible, authoritative, believable, persuasive, interesting) could be summarized using a fewer number of unobserved factors. The analysis revealed that over 49% of the variation in the five ratings could be explained using one unobserved factor. The eigenvalue for Factor 1 was 2.46; the next largest eigenvalue was 0.88. Because factor coefficients are highly dependent on sample characteristics, the five ratings were standardized and summed to form a measure called *perception of article* (see Dawes, 1979; Wainer, 1976). The correlation between items combined using factor weights and items combined using unit weights was .999. The alpha coefficient for the scale was .73, a large value considering the small number of items. Men and women did not differ in their perceptions of the article, $t(98) = 0.42$, $p > .05$.

Data Analysis Strategy

The data for Study 3 were analyzed using a three-way ANOVA including catharsis article (procatharsis vs. anticatharsis), anger-out (high vs. low), and participant sex (male vs. female). Participants were classified as high or low in their tendency to express anger outwardly by means of a median split.

Perception of Article

The main prediction in Study 3 was that high anger-out people would perceive the procatharsis article more favorably than the anticatharsis article, whereas low anger-out people would perceive the anticatharsis article more favorably than the procatharsis article. Consistent with this prediction, the interaction between Catharsis Article and Anger-Out was significant, $F(1, 92) = 5.77$, $p < .02$, $MSE = 11.49$. High anger-out individuals tended to rate the procatharsis article more favorably than the anticatharsis article, although this difference by itself was not significant, $t(92) = 0.97$, $p > .05$ (due to small sample sizes, power = .17). Still, the effect was in the predicted direction and the magnitude of the effect was not trivial ($d = 0.27$, which exceeds Cohen's, 1988, conventional value for a "small" effect). Low anger-out individuals perceived the anticatharsis article much more favorably than the procatharsis article, $t(92) = 2.40$, $p < .02$, $d = 0.70$, which is just what we predicted. Overall, the articles were perceived more favorably by low anger-out individuals than by high anger-out individuals, Ms = −0.73 and 0.64, respectively, $F(1, 92) = 3.97$, $p < .05$, $MSE = 11.49$, $d = 0.42$. No other effects were significant.

Discussion

The results of Study 3 confirm that there is a conceptual affinity between the independent variables that moderated the effects of mood-freezing manipulations on aggression in Studies 1 and 2. Specifically, people who were dispositionally high in anger-out tendencies tended to favor the procatharsis message more than the anticatharsis message. People with low trait anger-out scores showed the opposite preference for the anticatharsis message.

These findings may have implications beyond supporting the internal consistency of our investigation. In particular, they show that people's expressive styles seem to be congruent with their cognitive structures. People who habitually express their anger in an overt fashion tended to react more favorably to a news report that claimed benefits for venting anger than to a news report that

drew the opposite (anticatharsis) conclusion. By the same token, people who do not habitually vent their anger were more favorably impressed with an anticatharsis news item than a procatharsis one. Thus, in both cases, people favored news reports that told them their own habitual strategy was the most effective and socially desirable one.

Such findings do suggest some limitations on what media messages can accomplish, for good or ill. People may be far more receptive to messages that confirm their own beliefs, than to messages that disconfirm their beliefs. This pattern is consistent with the findings of Lord, Ross, and Lepper (1979), who found that people selectively criticized attitude-inconsistent messages more than attitude-consistent ones. With regard to the present focus on aggression, however, the findings of Study 3 suggest that there are many people who are likely to be receptive to procatharsis messages in the media.

Study 4

Studies 2 and 3 relied on the Anger Expression Inventory (Spielberger, 1979). Although this measure did produce the predicted results, the link to our hypotheses could be questioned insofar as that measure was designed to tap what people habitually do with their anger rather than whether they believe that expressing anger will produce an improvement in their mood. For example, some people might score high on anger-out but not believe that venting will make them feel better, perhaps because they feel they cannot restrain themselves from futile outbursts when they get mad. This would change the interpretation of our findings and weaken the case for the conclusion that aggression can be undertaken as a form of affect regulation.

What was needed, therefore, was a direct measure of whether people believe that expressing anger and acting aggressively will make them feel better. The purpose of Study 4 was to develop a new instrument, called the Angry Mood Improvement Inventory, to measure people's beliefs about how to improve their angry moods. We especially wanted to measure the belief that venting anger will improve one's mood. We also wanted to test whether the beliefs people have about reducing angry moods are related to the behaviors people engage in when they are angry.

Method

Angry Mood Improvement Inventory

We used the Anger Expression Inventory (Spielberger, 1979) as a starting point for developing the Angry Mood Improvement Inventory. The Anger Expression Inventory is a 24-item scale that measures how people react or behave when they are angry or furious. The scale contains three subscales: Anger-Out, Anger-In, and Anger-Control. The Anger-Out subscale was described previously. It was used in Studies 2 and 3. People with high Anger-In scores "frequently experience intense angry feelings, but they tend to suppress these feelings rather than expressing them either physically or in verbal behavior" (Spielberger, 1979, p. 5). Sample items are "I boil inside, but I don't show it," and "I am secretly quite critical of others."

People with high Anger-Control scores "tend to invest a great deal of energy in monitoring and preventing the experience and expression of anger" (Spielberger, 1979, p. 5). Sample items are "I control my temper," and "I keep my cool."

The Anger-In and Anger-Control subscales, like the Anger-Out subscale, are widely used and have good psychometric properties. Alpha coefficients for the Anger-Control subscale range from .73 to .84 (Spielberger, 1979, pp. 10–11). Alpha coefficients for the Anger-In subscale range from .84 to .85 (Spielberger, 1979, pp. 10–11).

We modified the Anger Expression Inventory (Spielberger, 1979) to measure people's beliefs about how to reduce anger and improve their bad mood. We did not change the 24 items on the Anger Expression Inventory, but we did change the instructions and the stem preceding the items (see Appendix B). Instead of asking people how they behave when angry, we asked them how they try to get rid of angry feelings and improve their mood.

Participants

Participants were 906 undergraduate college students (410 men and 496 women) enrolled in introductory psychology courses. Participants received extra course credit in exchange for their voluntary participation.

Procedure

Participants completed the Anger Expression Inventory (Spielberger, 1979) and the Angry Mood Improvement Inventory as part of a battery of questionnaires given in mass-testing sessions. Several other questionnaires were inserted between these two scales. About a month later, a random sample of 300 participants (150 men and 150 women) were given the Angry Mood Improvement a second time. This allowed us to test the reliability of the inventory over time.

Results

The alpha coefficients for the Anger-Out, Anger-In, and Anger-Control subscales of the Angry Mood Improvement Inventory were .75, .77, and .86, respectively. Alpha coefficients did not differ for men and women. Anger-Out scores were higher for men than for women, *M*s = 15.7 and 14.7, respectively, $t(904) = 4.11$, $p < .0001$, $d = 0.27$. There were no significnat sex differences on the Anger-In or Anger-Control subscales.

The alpha coefficients for the Anger-Out, Anger-In, and Anger-Control subscales of the Anger Expression Inventory were .76, .76, and .87, respectively. Anger-Out scores were higher for men than for women, *M*s = 15.8 and 14.9, respectively, $t(904) = 3.46$, $p < .001$, $d = 0.23$. There were no significant sex differences on the Anger-In or Anger-Control subscales.

Table 2 gives the correlations between the Anger-Out, Anger-In, and Anger-Control subscales of the Angry Mood Improvement Inventory and the Anger Expression Inventory. No sex differences

Table 2
Correlations Between Anger-In, Anger-Out, and Anger-Control Subscales of the Anger Expression Inventory and the Angry Mood Improvement Inventory

Anger Expression Inventory	Angry Mood Improvement Inventory		
	Anger-Out	Anger-In	Anger-Control
Anger-Out	.85*	.13*	−.53
Anger-In	.15*	.83*	−.11
Anger-Control	−.52*	−.09*	.83*

Note. $N = 906$. No sex differences were found for any of the correlations.
* $p < .01$.

were found for any of the correlations. As can be seen in Table 2, the subscales of the Angry Mood Improvement Inventory were very highly correlated with subscales of the Anger Expression Inventory. The highest correlation was for the Anger-Out subscale (r = .85); this is the correlation of primary interest in the present article.

The one-month test–retest correlations for the Anger-Out, Anger-In, and Anger-Control subscales were .68, .62, and .69, respectively. Thus, the Angry Mood Improvement Inventory appears to be quite stable over time.

Discussion

The results of Study 4 suggest that our measure of mood improvement beliefs is a valid tool that can be useful for examining the effects of people's beliefs about anger. Specifically, it seems to differentiate people who believe that anger will make them feel better from people who do not believe that.

The Angry Mood Improvement Inventory and the Anger Expression Inventory were found to be very highly correlated. This pattern adds confidence to our interpretation of Studies 2 and 3. It indicates that people who believe that venting will make them feel better are also the ones more likely to express their anger. In other words, when we compared what people actually do when they are angry (Anger Expression Inventory) with what they believe about how to improve their mood (Angry Mood Improvement Inventory), the correlations were very strong. Most likely, therefore, people vent their anger because they believe they will feel better after doing so.

Study 5

In Study 5 we replicated the findings of Studies 1 and 2 using more direct manipulations and measures. Two changes were especially important. First, we used the Angry Mood Improvement Inventory to assess the specific belief that expressing anger will make oneself feel better. This measure was therefore more directly related to the hypothesis than the measure used in Study 2.

Second, we changed the text of the bogus news article from Study 1 to emphasize changes in mood. In Study 1, the article claimed to offer support for (or contradictory evidence to) the catharsis hypothesis by proving that aggressive activity led to less aggression afterward. It did not, however, make any direct claim that the aggressive activity would make the person feel better (although this was presumably inferred). In Study 5, we added direct claims about mood improvement to the text of the article.

The prediction was the same as for the previous studies: Among people who believe that venting anger will make them feel better, aggression will be high in response to a provocation, but the mood-freeze manipulation will eliminate that increase in aggression.

Method

Participants

Participants were 200 undergraduate college students (100 men and 100 women) enrolled in introductory psychology courses. Students received extra course credit in exchange for their voluntary participation.

Procedure

The procedure was the same the one used in Study 1, with four exceptions. First, participants completed the Anger-Out subscale of the Angry Mood Improvement Inventory prior to completing the experiment proper. Second, we modified the pro- and anticatharsis articles to emphasize the effect of venting anger on one's mood (see Appendix C). The procatharsis article said that hitting a pillow was 3 times *more* likely to lead to an improved mood than trying to relax, whereas the anticatharsis article said that hitting a pillow was 3 times *less* likely to lead to an improved mood than trying to relax.

Third, participants completed a mood form that measured anger, positive affect, and negative affect. Anger was measured using 15 adjectives (e.g., angry, annoyed, furious) from the Hostility subscale of the revised Multiple Affect Adjective Checklist (MAACL; Zuckerman & Lubin, 1985). Positive affect was measured using 10 adjectives (e.g., alert, determined, enthusiastic) from the Positive Affect subscale of the Positive and Negative Affect Schedule (Watson, Clark, & Tellegen, 1988). Watson and his colleagues defined positive affect as a state of "high energy, full concentration, and pleasurable engagement" (p. 1063). Negative affect was measured using 10 adjectives (e.g., afraid, nervous, upset) from the Negative Affect subscale of the Positive and Negative Affect Schedule (Watson et al., 1988). Watson and his colleagues defined negative affect as a "general dimension of subjective distress and unpleasurable engagement that subsumes a variety of aversive mood states, including anger, contempt, disgust, guilt, fear, and nervousness" (p. 1063). Two adjectives (irritable, hostile) on the Hostility subscale of the revised MAACL also appear on the Negative Affect subscale of the Positive and Negative Affect Schedule. All of the adjectives were rated along a 5-point Likert-type scale: 1 (*very slightly or not at all*), 2 (*a little*), 3 (*moderately*), 4 (*quite a bit*), and 5 (*extremely*). Participants were told to "Indicate to what extent you feel this way right now, that is, at the present moment." The alpha coefficients for the measures of anger, positive affect, and negative affect were .91, .76, and .62, respectively. The mood form was administered immediately after participants completed the competitive reaction time task.

Fourth, we included several items to check the pill manipulation (see Appendix D). These items were given to participants after they had completed the mood form. We not only asked participants to recall the pill instructions they were given, but we also asked them whether the pill actually affected their mood. As a control, we asked participants whether the pill improved their reaction time. All of the students were told that the pill would improve their reaction time, but only one half were told that the pill would freeze their mood. Believing that the pill would freeze their mood for about 1 hr once it entered their blood stream, some participants might have tried to put themselves in a good mood, such as by thinking about positive things. Thus, we asked participants if they tried to put themselves in a good mood after taking the pill.

Results

Manipulation Check of Pill Manipulation

All of the participants were asked what effect the pill had supposedly had on their mood. Nearly all (98%) responded correctly with the instructions they had been given. This percentage is similar to the percentages found in Studies 1 and 2.

In Study 5, participants were also asked whether the pill affected their mood, froze their mood, and improved their reaction time (see Appendix D). As expected, participants who were told that the pill would not affect their mood reported that the pill actually affected their mood less than did participants who were told that the pill would freeze their mood, Ms = 2.11 and 2.71, respectively, $t(198) = 2.41$, $p < .02$, $d = 0.33$. Pill instructions did not significantly influence whether participants thought the pill froze

their mood, $t(198) = 1.28$, $p < .2$. Although this difference was nonsignificant (because of small sample sizes, power = .24), the effect was in the predicted direction ($M = 6.35$ for the mood-freeze condition, and $M = 6.19$ for the no-mood-freeze conditions). The magnitude of the effect was small, but not trivial ($d = 0.17$; see Cohen, 1988). Because all of the participants were told that the pill would improve their reaction time, pill instructions were not expected to affect these scores. As expected, participants in the mood-freeze and no-mood-freeze conditions had almost identical scores on this measure, Ms = 4.79 and 4.80, respectively, $t(198) = 0.08$, $p > .05$, $d = 0.01$. Thus, the pill manipulation appears to have been effective.

It is also possible (but unlikely) that participants in the mood-freeze condition tried to improve their mood before Bramitol entered their bloodstream and froze their mood for about 1 hr. But they did not. Participants in the mood-freeze and no-freeze conditions had similar scores on this measure, Ms = 5.77 and 5.71, respectively, $t(198) = 0.39$, $p > .05$, $d = 0.05$.

Data Analysis Strategy

The data for Study 5 were analyzed using ANOVA. Because the predictions were formulated in terms of differential effects of the mood-freezing pill on each type of person, we conducted analyses using a median split on Trait Anger-Out scores. The same pattern of results was found in alternate analyses treating anger-out as a continuous variable. As in Studies 1 and 2, the main measure of aggression was constructed by standardizing the noise intensity and noise duration scores across the full sample and then adding these two scores for each participant.

Aggression

Trial 1. We predicted that the mood-freeze pill would reduce aggression in people who read the procatharsis article. The expected interaction between Pill Expectancy and Catharsis Message was significant, $F(1, 184) = 6.75$, $p < .02$, $MSE = 1.95$. This interaction is depicted in Figure 3. Among people who were exposed to the procatharsis message, people with allegedly frozen moods exhibited significantly lower levels of aggression than did those without frozen moods, $t(184) = 2.49$, $p < .02$, $d = 0.51$. The opposite pattern was found among people who read the anticatharsis message, although the difference was nonsignificant, $t(184) = 1.18$, $p > .05$, $d = 0.26$. This interaction replicated the results from Study 1 using a more direct manipulation of the belief that venting anger makes one feel better.

We also predicted that the mood-freeze pill would reduce aggression in high anger-out people. The predicted interaction between pill expectancy and anger-out was significant, $F(1, 184) = 6.21$, $p < .02$, $MSE = 1.95$. This interaction is depicted in Figure 4. High anger-out individuals were less aggressive when they were told the pill would freeze their mood than when they were told the pill would not affect their mood, $t(184) = 2.31$, $p < .03$, $d = 0.52$. The opposite pattern was found among low anger-out individuals, although the difference was nonsignificant, $t(192) = 1.06$, $p > .05$, $d = 0.28$. This interaction replicated the results from Study 2 using a more direct measure of the belief that venting anger makes one feel better. No other effects for Trial 1 aggression were significant in Study 5.

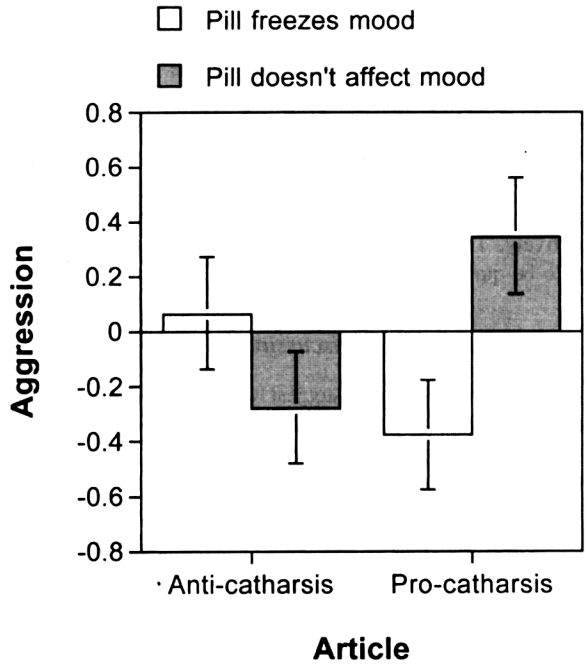

Figure 3. Interactive effects of Pill Expectancy and Catharsis Message on aggression (Trial 1, Study 5). Capped vertical bars denote 1 *SE*.

Remaining trials. After the first trial, aggression converged on reciprocation of what the partner had ostensibly done. On these remaining trials, men were more aggressive than were women, Ms = 1.00 and −0.88, respectively, $F(1, 184) = 7.42$, $p < .008$, $MSE = 21.32$, $d = 0.41$. High anger-out participants also tended to be more aggressive than did low anger-out participants, Ms = 0.72 and −0.54, respectively, $F(1, 184) = 2.99$, $p < .09$, $MSE = 21.32$, $d = 0.27$.

Emotional State

We assessed people's moods and emotional states after the aggression. These may be relevant to the question of whether aggression actually does accomplish mood repair, although our study was not designed to provide definitive evidence on that question. Our measures included general positive affect, general negative affect, and specifically hostile and angry affect. The relevant comparisons involve the mood-freeze manipulation and levels of anger-out. Hostility and negative affect were strongly correlated, $r(198) = .71$, $p < .0001$. Positive and negative affect were also correlated, $r(198) = .21$, $p < .002$. Positive affect and hostile affect were not significantly correlated, $r(198) = .10$, $p > .05$.

Mood repair would presumably begin with negative affect, and so we investigated whether people who believed in the value of venting actually reported any lowering of negative affect after aggression. Although we do not have change score data, we can compare their final levels of negative affect against those reported by people who do not believe that venting will improve their moods. The results do not support the efficacy of venting. Hostile affect was actually higher among people who scored high than those who scored low in anger-out on the Angry Mood Improve-

ment Inventory, *M*s = 25.6 and 20.5, respectively, $F(1, 184) = 17.99$, $p < .0001$, $MSE = 77.23$, $d = 0.62$. Thus, the people who most believed that aggression will get rid of anger ended up significantly more angry than other people after aggressing. A similar conclusion emerged with the general measure of negative affect, *M*s = 18.2 for high and 16.1 for low anger-out participants, $F(1, 184) = 11.12$, $p < .0001$, $MSE = 20.38$, $d = 0.45$. No other effects were significant for hostile affect or negative affect.

The data on positive affect do however lend a little support to the mood repair hypothesis. Analyses of positive affect scores showed a main effect for Sex, $F(1, 184) = 8.98$, $p < .004$, $MSE = 53.70$, and a two-way interaction between Sex and Pill Instruction, $F(1, 184) = 6.40$, $p < .02$, $MSE = 53.70$. These effects, however, were qualified by a three-way interaction among Sex, Pill Expectancy, and Anger-Out, $F(1, 184) = 4.95$, $p < .03$, $MSE = 53.70$. The three-way interaction indicates that anger-out made relatively little difference on positive affect with one exception. Among men in the changeable mood condition, positive affect was higher among those who scored low in anger-out than among those who scored high, *M*s = 31.4 and 26.6, respectively, $t(184) = 2.34$, $p < .03$, $d = 0.35$ (see Figure 5). No significant anger-out differences were found women in either the mood-freeze or changeable mood conditions (see Figure 6).

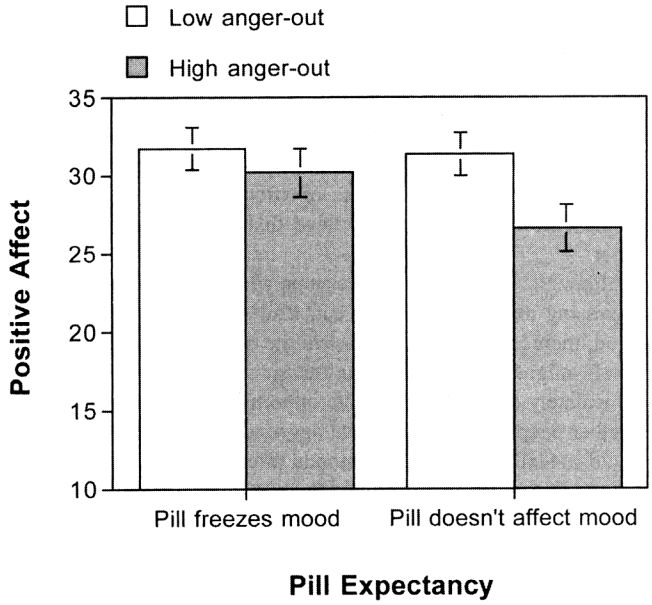

Figure 5. Interactive effects of Pill Expectancy and Anger-Out on positive affect in men. Capped vertical bars denote 1 *SE*.

Discussion

The findings of Study 5 provide the clearest confirmation of the hypothesis that people sometimes aggress to improve their mood. A skeptical reader might regard the findings from Studies 1 and 2 as ambiguous because neither the manipulation (Study 1) nor the measure of anger-out (Study 2) directly featured mood improvement. In Study 5, both the measure and the manipulation emphasized mood improvement. The close resemblance between the findings obtained in Study 5 and the findings obtained in Studies 1 and 2 suggests that the same process (i.e., affect regulation) was at work in all three studies.

Study 5 examined the effects of both habitual belief and manipulated belief about whether venting anger will improve one's mood. Both variables yielded interactions with the mood-freezing manipulation, with parallel conclusions. People who believed in the efficacy of venting—either because of their habitual belief or

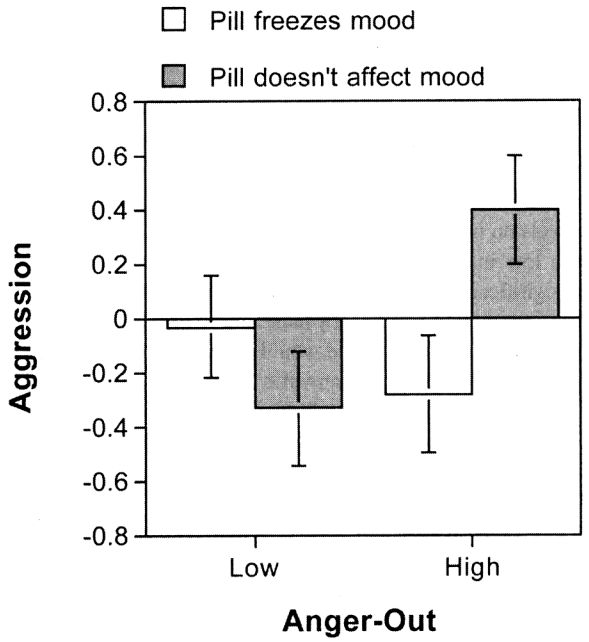

Figure 4. Interactive effects of Pill Expectancy and Anger-Out on aggression (Trial 1, Study 5). Capped vertical bars denote 1 *SE*.

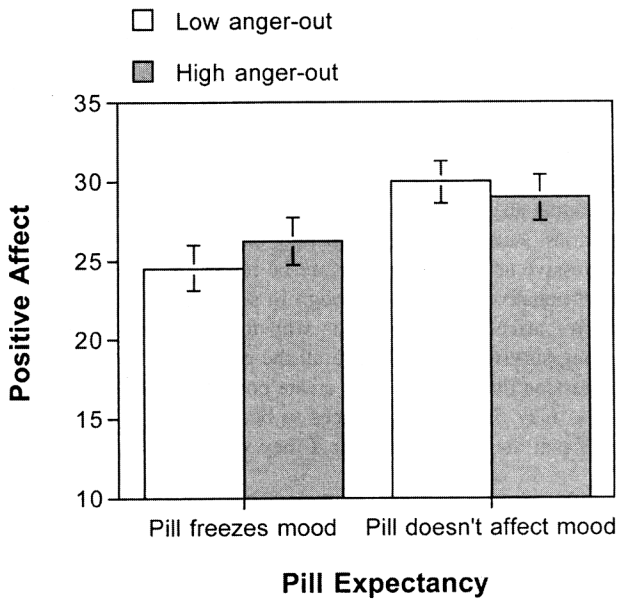

Figure 6. Interactive effects of Pill Expectancy and Anger-Out on positive affect in women. Capped vertical bars denote 1 *SE*.

because of the manipulated message about the effects of venting—showed higher levels of aggression than other people, but in both cases the effect was eliminated by the mood-freeze manipulation. Thus, they responded to anger with increased aggression, but only when they believed that their moods might improve. The convergence in results lends particular confidence to the conclusion that aggression is done for the sake of affect regulation, at least by people who have reason to believe that it will make them feel better.

Although our emphasis has been on whether people believe that aggressing and venting anger can lead to improvement in their mood, there is also some interest in the question of whether these beliefs might be justified. Our measure of mood was obtained immediately after the aggressive opportunity, and so we can see whether people who believe that aggression improves their mood would actually report better moods afterward. The findings are mixed. The data on negative affect and hostility showed that people who believe in the value of venting actually felt worse after aggression, as compared with other people. This finding is directly opposite to what one would expect on the basis of a belief in the efficacy of venting.

On the other hand, the data on positive affect provide some signs that aggression can produce a good mood, although these should be regarded with extreme caution, particularly because they differ by gender. Women reported lower positive affect following aggression in the mood-freeze condition than in the changeable mood condition, which suggests that aggression does improve a woman's mood as long as she believes her mood is open to change. Women's own prior beliefs about the efficacy of venting apparently made no difference. Men's beliefs did moderate how they were affected by aggression, but ironically the men who most believed in the efficacy of venting reported the least amount of positive affect after aggressing (in the changeable mood condition). The effects of aggressing on the aggressor's mood appear to depend on a complex interplay of gender, prior beliefs about venting, and probably several other factors. Further work may be required before a full understanding of the effects of aggression on mood can emerge.

The mood findings do converge with findings about the catharsis hypothesis. Most studies have found that angry impulses and hostile tendencies are not reduced by acting aggressively (see Geen & Quanty, 1977, for review). On the other hand, we have found that angry people did positively enjoy some of the cathartic activities, such as hitting a punching bag (Bushman et al., 1999). Aggressive activity may therefore be relatively useless at getting rid of negative affect even though in some cases it may increase positive affect. Perhaps this is why the belief in catharsis and venting survives today despite all the contrary research findings. Aggression does occasionally create positive emotions, and some people may find those instances to be sufficient to sustain their belief that they will feel better if they vent their anger.

General Discussion

The results of these studies suggest that aggression can be undertaken in the service of affect regulation. We reasoned that states of negative affect would make people receptive to ways to improve their emotional states. Aggression would therefore rise, at least among people who believed that expressing or venting their anger would be an effective way to feel better.

How could one establish that some behavior is aimed at affect regulation? Studies 1, 2, and 5 relied on the procedure developed by Manucia et al. (1984). The procedure relies on bogus mood-freezing, which is to say it relies on convincing some participants that their moods have been made impervious to change for a short period of time. That belief makes attempts at affect regulation seemingly useless. If aggressive behavior drops when affect regulation is (allegedly) impossible, then we infer that aggression is done partly for the sake of affect regulation. Our investigation was based on that assumption.

Sure enough, we found that some people's aggressive tendencies were reduced or eliminated by the mood-freezing manipulation. Specifically, people who believed in the desirable or beneficial impact of venting anger showed this pattern. In Study 1, some people were induced to believe in venting and catharsis by means of a bogus newspaper report about research findings that confirmed the value of venting anger. These people tended to respond to criticism with aggression, but this aggressive pattern was eliminated by the mood-freezing pill. In Study 2, we relied on people's habitual personal style of dealing with anger, to provide converging evidence. People whose habitual style of coping involves expressing anger in visible, dramatic ways, tended to respond to criticism with aggressive attack. Again, this pattern was eliminated by the mood-freezing pill. In Study 5, we replicated both findings.

Thus, some aggression depends on the prospect of feeling better. People who are upset sometimes believe that aggressive activity will improve their emotional state. When that belief is absent, aggression is reduced. The implication is that aggression is sometimes undertaken as a strategy of affect regulation. In other words, the goal of affect regulation (feeling better) may be one significant cause of aggression.

The decisive moderating role of subjective beliefs was evident in these studies. Study 1 included a condition in which people were exposed to an ostensible news report of scientific evidence that expressing anger would lead to aversive, undesirable consequences. The mood-freezing pill did not reduce aggression among people in this condition. On the contrary, the mood-freezing manipulation actually led to a significant increase in their aggression (compared with the condition in which the pill was alleged to have no effects on mood). The same effect was found in Study 2 among people low in anger-out tendencies, although the effect was not quite significant. Low anger-out people tended to be more aggressive in the condition in which their mood was frozen than in the condition in which their mood would be subject to change. Study 5 replicated both findings. Meanwhile, people did not aggress when they believed that doing so would make them feel worse. Thus, concern about affect regulation may underlie both aggressive and nonaggressive responses.

These findings lend credence to the mood-freezing manipulation. For participants who heard the anticatharsis message, and for people who habitually disbelieve that venting anger will produce mood improvements, aggression entailed the danger that one would end up feeling worse. The prospect of emotional change (toward a less pleasant mood) was therefore a likely deterrent to aggression. The mood-freezing pill instructions removed this deterrent, rendering these people more willing to aggress.

In our view, however, the most important finding is that some people (i.e., those who believe in venting and catharsis) will engage in aggressive behavior in the apparent hope that it will change a bad mood. Studies 1 and 5 showed this effect among people who had been manipulated to believe in the value of venting, by virtue of a bogus news report. Because the mass media do periodically support and encourage this belief, the results of Studies 1 and 5 would already indicate a potentially important cause of aggression. The converging evidence from Studies 2 and 5 greatly increases the generality of these conclusions, because Studies 2 and 5 relied on naturally occurring, unmanipulated beliefs, and it showed that one half of the sample (as identified by anger-out tendencies above the median score) will respond aggressively to criticism in order to make themselves feel better. Apparently, it is not necessary to have salient media messages encouraging venting in order to promote aggression, because many people are already thus inclined. To generalize from our sample to the relevant population, it seems reasonable to conclude that one half of the population will respond aggressively to criticism (given the opportunity) because they anticipate that doing so will enable them to improve an aversive mood.

Study 3 provided evidence that the moderators in Studies 1 and 2 are conceptually related. Specifically, Study 3 found that people with high anger-out tendencies tended to respond more favorably to the procatharsis than to the anticatharsis message used in Study 1, whereas people low in anger-out tendencies showed the opposite preference. Thus, dispositional tendencies to express anger overtly are linked to greater willingness to believe that overt expression of anger has beneficial effects.

Study 4 was devoted mainly to developing the trait measure of belief in the value of venting, but it too contributed some confirming evidence. In Study 4, we found a very high correlation between whether people believe in the value of venting and whether they habitually deal with their anger by venting it. Thus, people who believe that venting will make them feel better are likely to engage in venting. This is consistent with the general hypothesis that people aggress because they expect it to make them feel better.

Our findings may seem at odds with the general conclusion that the catharsis hypothesis is wrong. This contradiction is however more apparent than real. The catharsis hypothesis is wrong in the sense that aggressing does not reduce subsequent aggression. It may even fail to reduce negative affect. But people may nonetheless believe that venting and aggressing will make them feel better. Our findings also provide a tentative suggestion as to how that belief may be sustained, because there were some signs that aggression did lead to some positive affect in some cases. These findings converge well with the evidence about violence in the media, which also fails to elicit any decrease in hostile, aggressive tendencies among viewers—but the continuing popularity of violent films suggests that some people must derive pleasure or enjoyment from watching them.

In sum, negative affect motivates people to engage in aggression as a means of affect regulation. People who believe that aggressive actions will make them feel less angry and hostile are prone to respond aggressively to provocations. The aggression does not appear to get rid of the negative affect, but it may be effective at stimulating positive affect in some cases. Such experiences, personal inclinations, and messages in the mass media appear to be enough to sustain some people's belief that aggression will succeed at affect regulation.

Limitations

Several limitations of this work must be noted. We did not obtain direct measures of emotional states prior to aggression or of conscious intentions to alter moods (apart from measures of general belief that venting will improve mood). Relatively few aggression studies contain such measures of mediating emotional and cognitive processes, partly because these measures tend to be powerfully reactive and to interfere with the aggression measures. The affect regulation goal thus remains implicit and inferred rather than explicitly confirmed. If viable alternative explanations of the Manucia et al. (1984) procedure could be devised, the present findings (as well as those in the original work by Manucia et al.) would lose their clear meaning. But the observation that a particular behavior occurs only when moods have not been frozen does support the view that that behavior is guided by the hope of changing one's mood. This method is a welcome asset to researchers in affect regulation, and we hope that other researchers will be able to use it profitably to investigate whether some behavior is performed in the service of affect regulation.

Our line of analysis should also not be taken as casting the mass media in the role of principal villains. For one thing, as already noted, other sources including psychology itself have contributed voices in support of the false belief in the efficacy of cathartic venting. For another, our findings show that media messages that speak against catharsis can apparently reduce aggressive responding (unless moods are artificially believed to be frozen—an unlikely situation in normal, everyday life). To the extent that the media can begin to inform the general public that research findings depict hostile expression and aggressive venting as costly, destructive behaviors, aggression may be reduced.

Another important limitation is that all of the participants in the present studies received insulting criticism from the eventual target of their aggression. Although our findings raise concern about factors that can increase aggression, we have not shown that media messages, subjective beliefs, or affect regulation goals can produce aggression among nonangry people. The present results should not be generalized to people who have not been provoked and angered—who, after all, typically do not have any anger to vent.

A final set of limitations concerns the Angry Mood Improvement Inventory. Although Study 4 suggests that it has reasonable psychometric properties, we did not go to sufficient lengths to be able to claim that it constitutes a fully validated scale. Moreover, its items were the same as on the Anger Expression Inventory (with only the instructions and sentence stem changed). It is therefore conceivable that some participants ignored the instructions and responded on the basis of how they habitually deal with anger rather than on the basis of how they would improve their angry moods. This explanation would be consistent with the finding that scores on the Angry Mood Improvement Inventory were highly correlated with scores on the Anger Expression Inventory. This explanation is rendered less plausible by the fact that the laboratory manipulations produced results pointing toward angry mood improvement, but it cannot be entirely ruled out. Also, the items referred to what people do in order to improve angry moods and thus do not literally assess beliefs about what will be effective

in improving angry moods, although one would assume that people mainly select goal-directed behavior on the basis of believing that those behaviors will actually help them achieve those goals. Also, some people might refrain from behaviors that they think would succeed in improving their moods, which would create another (probably small) gap between belief and behavior.

Conclusion

The fact that aversive emotional states lead to aggression has been asserted for decades and supported by many empirical findings. The explanation for this well-established link has remained unclear, however. Several reasons may be responsible for the persistent unclarity about why bad moods lead to aggression, and these reasons include the tendency for affect measures to interfere with aggression measures and the general difficulty of studying affect regulation. The present investigation benefited from the mood-freezing manipulation developed by Manucia et al. (1984). It is unfortunate that there are not many more such methodological tools available to researchers interested in affect regulation.

Still, the present results do provide one answer to the question about why bad moods increase aggression. Some people believe that aggressive acts will make them feel better. Study 1 manipulated these beliefs, Study 2 relied on spontaneously held beliefs, and Study 5 examined both. In all cases, people's aggression depended on their expectation that their mood could be changed by the aggressive act. When that expectation was removed, their aggressive responses decreased.

We are not asserting that affect regulation is the only link between negative affect and aggression. Berkowitz's (1989, 1990, 1993) theory that negative affect evokes motor responses that can include aggression is certainly plausible and suggests a different kind of link, and our data do not disconfirm that in any way. Still, affect regulation is one link, especially among people who believe that aggressing will feel good.

Not everyone holds such beliefs. But among those who do, aggression may be performed in the hope of feeling better. Although aggression is an interpersonal act with often serious consequences for victims, our results suggest that sometimes it may stem from intrapsychic processes and goals. Affect regulation goals are pervasive, and a great deal of harm can follow from the dubious belief that aggression will serve affect regulation functions. Our results also offer some positive hope for reducing aggression, however. When people believe that aggression will make them feel worse, they prefer to restrain their aggressive impulses.

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Appendix A

Pro- and Anticatharsis Articles Used in Study 1

This is the text of the procatharsis article. The anticatharsis article was identical except for the changes noted in brackets.

Research Shows that Hitting Inanimate Objects Is an Effective [Ineffective] Way to Vent Anger

Cambridge, Mass (AP)—Do you believe that you can vent anger by hitting a pillow? According to the results of a study published this week in *Science,* you could not be more right [wrong].

The study confirms a long history of research on the effectiveness [ineffectiveness] of displacing anger to inanimate objects. The study was conducted by Dr. Elias Boran, a psychological researcher at Harvard University. Boran says that his results provide direct confirmation of the idea that anger can[not] be vented harmlessly when people can displace their anger to an inanimate object.

The findings are the results of a 2-year study involving over 1,000 university students living in the university's residence halls. Participants in the study were randomly divided into one of two groups. One group hit a pillow when they were angry. The other group tried to relax when they were angry. Boran found that students who hit a pillow when angry were 4 times less [more] likely to have complaints filed against them by other students in the residence hall and were 2 times less [more] likely to have been reported to campus police for aggressive incidents than were students who tried to relax.

Boran says that his study is consistent with the results of scores of studies showing that people can[not] effectively vent anger to inanimate objects. According to Boran, "When you are angry, the best [worst] thing that you can do is to find something inanimate to hit or kick to vent your anger."

Appendix B

Angry Mood Improvement Inventory Instructions

The Angry Mood Improvement Inventory was modified from the Anger Expression Inventory (Spielberger, 1979). The instructions for the Anger Expression Inventory are given below. The text we deleted is crossed out. The text we added is given in brackets.

Everyone feels angry or furious from time to time, but people differ in the ways that they ~~react when they are angry~~ [try to get rid of angry feelings so they will feel better]. A number of statements are listed below which people use to describe ~~their reactions~~ [how they improve their moods] when they are angry or furious. Read each statement below and then fill in the circle with the number which indicates how often you generally react or behave in the manner described when you ~~are feeling angry or furious~~ [want to get rid of angry feelings]. Remember that there are no right or wrong answers. Do not spend too much time on any one statement.

Fill in 1 for ALMOST NEVER Fill in 3 for OFTEN
Fill in 2 for SOMETIMES Fill in 4 for ALMOST ALWAYS

[TO IMPROVE MY MOOD] WHEN ANGRY OR FURIOUS . . .

The 24 items from the Anger Expression Inventory (Spielberger, 1979) follow.

Appendix C

Pro- and Anticatharsis Articles Used in Study 5

This the text of the procatharsis article. The anticatharsis article was identical except for the changes noted in brackets

Research Shows that Hitting Inanimate Objects Is an Effective [Ineffective] Way to Improve Your Mood

Cambridge, Mass (AP)—Do you believe that hitting a pillow can make you feel better if you are angry? According to the results of a study published this week in *Science,* you could not be more right [wrong].

The study confirms a long history of research on the effectiveness [ineffectiveness] of improving one's mood by displacing anger to inanimate objects. The study was conducted by Dr. Elias Boran, a psychological researcher at Harvard University. Boran says that his results provide direct confirmation of the idea that people can[not] improve their mood by venting anger to an inanimate object.

The findings are the results of a 2-year study involving over 1,000 university students living in the university's residence halls. Participants in

(*Appendix continues*)

the study were randomly divided into one of two groups. One group hit a pillow when they were angry. The other group tried to relax when they were angry. Both groups completed mood questionnaires several times during the two year period. Boran found that hitting a pillow was three times more [less] likely to improve a bad mood than trying to relax.

Boran says that his study is consistent with the results of scores of studies showing that people can[not] improve their moods by hitting inanimate objects. According to Boran, "When you are angry and want to feel better, the best [worst] thing that you can do is to find something inanimate to hit or kick to vent your anger."

Appendix D

Manipulation Check Items Used in Study 5

1. How is the pill (Bramitol) we gave you supposed to affect your mood?
   (a) Produce mood swings
   (b) Freeze mood
   (c) Not affect mood.

Answer the questions below using the following scale.

1 2 3 4 5 6 7 8 9 10

Strongly disagree Strongly agree

2. The Bramitol improved my reaction time.
3. Bramitol affected my mood.
4. Bramitol froze my mood.
5. I tried to put myself into a good mood after taking Bramitol.

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