Toward an Understanding of the Determinants of Anger

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Research bearing on several popular conceptions of the major determinants of anger arousal indicates that the particular appraisals often identified as causes of anger frequently only serve to affect the intensity of the anger that is generated. Research into effects of physical pain or other physically unpleasant conditions or involving social stresses suggests that decidedly aversive conditions are a major spur to anger. Experiments are also reviewed showing that anger-related muscular movements can also lead to anger-related feelings, memories, cognitions, and autonomic responses. Alternative explanations for the findings are discussed. The authors urge emotion theorists to widen their methodology and analyses so that they give careful, detailed attention to the many different factors that can influence anger.

A great many people are angry at one time or another. After surveying studies dating back to World War I, Averill (1982) concluded that "Depending upon how records are kept, most people report becoming mildly to moderately angry anywhere from several times a day to several times a week" (p. 1146). Perhaps because this emotion is so common,[1] specific definitions of this term often vary in detail (see Averill, 1982; Kassinove, 1995, for reviews of the many different usages of this word), and there are many different, and even opposing, cultural beliefs prescribing how and when this affective state should be managed.

Although there certainly is no shortage of research articles dealing with anger, investigators inquiring into the development and functioning of emotions would do well to devote more of their effort and ingenuity to the study of this particular affective state. It obviously is a socially very important emotion, one that has attracted a great deal of attention in the mass media as well as in the various health fields, but it also presents emotion theorists with a number of intriguing conceptual questions. As just one example, there is the often-assumed relationship between hedonic valence and approach–avoidance inclinations. According to Watson, Wiese, Vaidya, and Tellegen (1999), positive affect is typically associated with approach tendencies, whereas negative arousal is usually linked to an urge to avoid the instigating stimulus. Anger seems to be relatively unique in this regard and is often associated with approach rather than with avoidance inclinations (see Harmon-Jones & Allen, 1998; Harmon-Jones & Sigelman, 2001). Then too, research into the conditions under which anger is aroused can also touch on the metatheoretical controversy as to whether emotions can be evoked independently of cognitions. Although we do not want to revive the now well-worn argument as to just what is involved in the concept *cognition,* if one adopts the relatively restricted definition favored by Izard (1993) and Zajonc

[1] In their questionnaire study of some 2,900 university students on five continents, Scherer and Wallbott (1994) found that, for the emotions they investigated, the similarities in reported emotion-specific feelings, physiological symptoms, and bodily expressions across countries were much greater than the variations among the countries. And they concluded that "The data reported here do not support an extreme position of cultural relativism with respect to emotional experience" (p. 324). Nevertheless, we are dealing here with anger as it is usually experienced in Western-oriented, technologically advanced societies.

(1998, 2000), holding that the term should have to do with the transformation of sensory input into a new mental construction, it could be argued that at least some of the anger-arousing effects described in this article are of a bottom-up, relatively noncognitive nature.

In raising this possibility, we should hasten to add, this article is not intended to be a critique of the usual formulations of anger arousal in the emotion literature. Instead, we are basically suggesting that most conventional analyses do not go far enough in considering what factors can generate the emotion and that some important issues remain to be resolved. To highlight several of these questions, the present article is divided into several sections. The first part is concerned primarily with those features of people's appraisals of the situation before them that are often said to promote (or even produce) anger, and we spell out what several of the best-known and most active emotions researchers have said about each of these components. Reference is frequently made to appraisals, and most of the investigators cited are identified as appraisal theorists, but we are not primarily concerned with appraisal thinking as such. It is fair to say that most discussions of anger arousal in the general literature on emotions, even by researchers not known as active proponents of appraisal theory (e.g., Carlson & Hatfield, 1992; Oatley, 1992), rely heavily on this line of thought, undoubtedly largely because of its considerable utility. Our main question is whether these usual analyses give sufficient attention to other factors that might also be involved in anger generation. To show their importance, we sample a number of investigations, mostly experimental in nature, testing whether the often postulated construal features are as directly related to anger arousal as is widely supposed. Our basic argument is that if these particular appraisals do enhance the likelihood of an angry reaction, in many instances this is because they heighten the felt unpleasantness of a given situation. It is this experienced strong displeasure that presumably is one of the fundamental sources of anger arousal. Elaborating on this basic proposition, we briefly summarize Berkowitz's (1990, 1993a, 1999, 2003) cognitive–neoassociationistic (CNA) model of anger generation, one of a number of formulations (e.g., Anderson, Anderson, & Deuser, 1996; Baron & Bell, 1975; Baron & Richardson, 1994) proposing that negative affect can evoke anger and affective aggression, and provide additional evidence supporting such an effect. Even further, then, we also look at investigations of the effects of anger-related skeletal muscle move-

ments in the face and other parts of the body on angry feelings. The evidence presented here indicates that the mere performance of these movements typically characteristic of anger can modulate existing felt anger and even generate such feelings de novo, even when the persons in the study are not aware of the anger-associated nature of their bodily actions. In all, anger can be affected by processes often given little attention in many conventional discussions of anger arousal in the emotions literature.

We summarize our general conception of anger (without spelling out a detailed and fully developed analysis of this emotion) as follows: More or less in accord with several other investigators (e.g., Averill, 1982; Spielberger, Reheiser, & Sydeman, 1995), we think of *anger* as a syndrome of relatively specific feelings, cognitions, and physiological reactions linked associatively with an urge to injure some target. Such a view is compatible with other formulations of emotional states as constellations or networks of particular physiological patterns, behavioral tendencies, and cognitions (e.g., Bradley & Lang, 2000; Izard, 1991; Lang, 1979; see also Herrald & Tomaka, 2002). Although it is common to clearly separate anger as an experience from aggression as a physical or verbal action intended to harm the target, this syndrome conception holds that levels of anger, attitudinal hostility, and aggression (as well as certain physiological patterns) are frequently at least moderately positively correlated, particularly if they result from a decidedly unpleasant situation. It is true, of course, that aggression can be carried out "coldly" as an instrumental action with little if any accompanying anger, but *affectively spurred* attacks are usually associated with a substantial degree of experienced anger (see Herrald & Tomaka, 2002). In general, then, we regard measures of affectively generated aggression over a number of research participants as at least an approximate indicator of the strength of the felt anger. (More will be said about our conception of anger in the Discussion section.)

Studies of the Appraisal Features Theoretically Responsible for Anger

There is considerable, but not complete, agreement in the emotion literature as to what kinds of appraisals lead to anger (see, e.g., Ellsworth & Scherer, 2003; Lazarus, 1991, 2001; Oatley & Jenkins, 1996; Roseman, Antoniou, & Jose, 1996; Scherer, 1999, p. 639, 2001a, p. 115; Stein & Levine, 1990, 1999). In one way or another, many contemporary theoretical ac-

counts contend that people become angry when they are kept from attaining an important goal by an external agent's improper action. We begin by taking up each of the components involved in this general idea and then looking at relevant empirical evidence bearing on the effects of these postulated features. As we review the research, it should be kept in mind that most theorists typically trace any given emotion to a pattern of appraisals and do not say that any one component alone is sufficient to generate the emotion (Roseman & Smith, 2001, p. 16).

Externally Caused Obstructions to Personally Significant Goals

Motivational Relevance

Many discussions of emotion arousal start with the assumption that emotions are generated when something happens that is motivationally relevant. As Scherer (2001a) has stated, "it is not the event itself but the perceived outcomes for the individual [i.e., what the person believes are the situation's implications for her or his goals in that situation] that determines the ensuing emotion" (p. 96). Furthermore, it is often said (e.g., Roseman & Smith, 2001; Scherer, 2001a, p. 115; Smith & Lazarus, 1993) that people are all too apt to become angry if they are kept from reaching their goals (although Roseman, 1991, has also traced anger to the absence of a reward or the presence of punishment in the given situation).

Lazarus took a strong position regarding this appraisal feature in his books on emotion (Lazarus, 1991; Lazarus & Lazarus, 1994)—one that was not necessarily advocated in his articles with colleagues (e.g., Smith & Lazarus, 1993)—holding that "The basic motive to preserve or enhance self-esteem against assault, which is one *type of ego-involvement,* must . . . be activated for anger to occur" (Lazarus, 1991, p. 222; see also Lazarus, 2001, p. 57). Other analyses, however, were less extreme and maintained only that the instigating occurrence must be understood as personally significant in some way, as having a goal or motivational relevance, if there is to be an angry reaction (e.g., Frijda, 1993; Scherer, 2001a, p. 95; Smith, Haynes, Lazarus, & Pope, 1993, p. 916). Because a physically uncomfortable event can be viewed as motivationally relevant because a "basic need" for comfort or for well-being is presumably frustrated, we narrow the proposition being tested and ask only whether anger can arise even when the precipitating occurrence has little personal significance in the sense that it is not pertinent to major personal goals transcending the immediate situation.

Externally Produced Frustration

There is also near complete agreement that someone or something, an external agent, must be seen as responsible for the negative event if there is to be anger (e.g., Ellsworth & Smith, 1988; Scherer, 2001a, p. 115; Smith & Ellsworth, 1985). Indeed, Frijda (1986, pp. 198–199) pointed out that a number of eminent observers of human conduct dating back to Aristotle had proposed that anger arises when a threat is attributed to a "freely acting" external agent. Supporting such a notion, in some studies (e.g., Ellsworth & Smith, 1988) the perception that an external agent had brought about the unpleasant event was a principal determinant of this emotion.

Blame

Two formulations we have reviewed (Lazarus, 1991; Ortony, Clore, & Collins, 1988) extend further and explicitly state that someone or something must be blamed for the negative event if anger is to arise. In Lazarus's (1991, 2001) somewhat more elaborate discussion of blame, he and his associates (e.g., Smith & Lazarus, 1993) held that the separate appraisal components can be combined at a more molar level to form an overall theme, a "core relational theme." People presumably use this superordinate appraisal very quickly in defining the meaning of their transaction with the others around them "without serial processing of the individual components" (Lazarus, as cited by Scherer, 1999, p. 648). In the case of anger, the overall theme is "other blame."[2]

Unfair or Illegitimate

There is an interesting divergence of views among some investigators regarding the next component, the

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[2] Lazarus's (1991) version of the core relational theme actually is stronger. Believing that the offense has to be taken as an attack on the self if anger is to arise, he maintains that anger is evoked when one construes the event as a "demeaning offense against me and mine" (p. 222). But even though this kind of general interpretation can play an important part in anger production, the more molecular level appraisal components might also make a separate contribution to this emotion arousal. When Smith and Lazarus (1993) tested how well measures of core relational themes and the separate components were related to self-reported anger, the authors found that both were associated with the emotion. These "two levels of analysis are complementary," they concluded (p. 259).

perception of the instigating incident as unfair or improper in some way. Surveys of ordinary persons' conception of their angering experiences (e.g., Averill, 1982, 1983; Shaver, Schwartz, Kirson, & O'Connor, 1987), as well as studies more typical of most appraisal theory investigations (e.g., Frijda, Kuipers, & ter Schure, 1989), have found that the provoking event is often regarded as illegitimate, "contrary to what ought to be" (Shaver et al., 1987, p. 1077). In Frijda's (1986) words, "An angering event is one in which someone or something challenges what 'ought' to happen" (p. 199). Averill (1983) put this more dramatically, contending that "Anger, for the person in the street, is an accusation" that someone was responsible for a "perceived misdeed" (pp. 1149–1150). Also reflecting this common conception, Solomon (1993), writing on the philosophy of emotion (and following the classical approach to language concepts; see Russell & Fehr, 1994, p. 186), insisted that there cannot be anger unless there is a perceived offense. Roseman's (1991) definition of this illegitimacy was slightly different in that, for him, it had to do with the belief that the person had deserved the outcome that could not be reached or had not deserved the punishment that was received. Further supporting the angering effect of perceived injustice, Weiss, Suckow, and Cropanzano (1999) experimentally manipulated the unfairness of the outcome received by their participants and showed that the wrongdoing produced an angry reaction.

However, even with all of this support, research has uncovered some problems. In some studies (e.g., Ellsworth & Smith, 1988; Mikula, Scherer, & Athenstaedt, 1998), for example, the participants' judgment of the illegitimacy (or unfairness, or injustice) of the instigating event was strongly associated with other perceived features of the occurrence, so that it is unclear in these investigations how much, if any, of the variance in the reported anger was due to the incident's judged impropriety. Because of the negative results sometimes obtained and ambiguities such as the one just mentioned, Roseman et al. (1996) suggested, first, that illegitimacy may be a typical, but not a necessary, determinant of anger and, second, that this feature affects anger through the operation of another appraisal component: control potential. Proposing that people view an occurrence as unjust basically because they were kept from achieving a deserved outcome, Roseman and associates (1996) suggested that in making such an appraisal, the persons also have a sense of themselves as powerful, as having some control over what can happen in this situation.

This construal of their control potential presumably enables them to become angry.

Coping Potential

This brings us to the last appraisal component we consider here, one often termed *coping potential* and generally having to do with the person's perceived ability to deal successfully with the eliciting event. For Lazarus (1991), people could achieve such a sense of control by successfully attacking the threatening source. Anger occurs, rather than fright or anxiety, he maintained, when the person believes "that the . . . [demeaning] offense is best ameliorated by attack; in effect, the individual evaluates her coping potential of mounting an attack favorably" (p. 225). Other researchers preferred to think of coping more or less as the ability to overcome the obstruction and achieve one's desired objective. In Frijda's (1986) view of controllability, "Anger implies nonacceptance of the present event as necessary or inevitable; and it implies that the event is amenable to being changed" (p. 199). Stein and Levine (1989, 1990, 1999) had much the same idea. They said that an aversive occurrence gives rise to anger rather than sadness when there is the perceived ability to eliminate the unpleasant situation and attain the wanted goal. Roseman and associates (e.g., Roseman et al., 1996, p. 262) defined *coping* generally as the ability to do something about the event's "motive-inconsistent aspects." As they put it, the perception "that an emotion-eliciting event was controllable by the self, and perceiving there was something one could do about it, were generally characteristic of . . . anger and contempt, rather than mere dislike toward someone" (p. 258). Scherer (1993, 2001a) presented a more detailed analysis. In his postulated sequence of checks that people make in response to the emotion-eliciting incident, they theoretically judge the extent to which the "event or its outcomes can be influenced or controlled by natural agents" and then evaluate how much power they have "to change contingencies and outcomes" in accord with their interests (p. 97). Scherer's (2001a, p. 115) model predicts a good chance of "rage and hot anger" when the appraised coping potential is high, that is, when the persons believe there is a high level of controllability and perceived power.

Research Findings Bearing on the Interpretive Features Theoretically Linked to Anger Arousal

In the next section, we attempt to show that a variety of aversive conditions presumably generating in-

tense negative affect can activate components of the anger–affective aggression syndrome, even though in some instances the types of appraisals frequently linked to anger arousal appear not to be present. We propose that the strong negative affect is the fundamental determinant of this syndrome arousal and that the postulated construal features often facilitate (or intensify) anger generation but are not necessary for this emotion to arise. Because such an argument is controversial, we discuss the matter of alternative explanations of the findings at some length toward the end of this article.

Frustration: Obstructing Goal Attainment

The common notion that an impediment to goal attainment is likely to arouse anger obviously is very similar to the frustration-aggression hypothesis (Dollard, Doob, Miller, Mowrer, & Sears, 1939), and it is unfortunate that discussions of anger generation give so little attention to the very substantial body of studies relevant to this classic proposition. Put into modern terms, the Dollard et al. (1939) formulation essentially maintained that barriers to the attainment of an expected gratification produce an instigation to aggression. Surveys of the pertinent research (e.g., Berkowitz, 1989, 1993a) have generally supported the basic idea, with some modifications, even though it is clear that there are times when thwarted people do not become aggressive, presumably because the frustration is not especially unpleasant on these occasions and/or the afflicted persons had acquired alternative nonaggressive ways of responding to frustrations (see Berkowitz, 1989).

Although some researchers (e.g., Clore, Ortony, Dienes, & Fujita, 1993) may question whether the Dollard team's focus on aggressive behavior is relevant to the study of emotions, this article assumes that a blockage-engendered instigation to aggression—and, for that matter, any other aversively generated aggressive inclination as well—can be regarded as a case of affective aggression (Lindsay & Anderson, 2000). Our position, again, is that this affectively determined impulse to aggression is, to some degree, associatively linked to the anger experience.

Does the thwarting have to be an ego threat and/or personally significant? Yet another objection may be raised against our use of the frustration-aggression research. Where the original theory (Dollard et al., 1939) held that every goal blockage creates an instigation to aggression (along with instigations to other kinds of action),[3] many emotion theorists maintained that other appraisal components must also be present. (Interestingly, critics of the original frustration-aggression thesis also made this point; e.g., Maslow, 1941; Zillmann, 1979; see also Berkowitz, 1989.)

One important proviso, according to several analyses, is that people have to be seeking a personally significant objective if an impediment to its achievement is to be angering (e.g., Lazarus, 1991). Lazarus's (1991) conception of *personal significance* seems to imply that the crucial event has a direct bearing on very important and abiding "personal values." Other analyses (e.g., Roseman, 1991), by contrast, offered a somewhat different meaning in proposing that the anger-arousing incident need only prevent the receipt of more transient rewards or produce temporary punishments. Whatever the exact meaning of this construct, frustrations viewed as having been intentionally produced are more likely to create anger and affective aggression than are thwartings regarded as having been only inadvertent, perhaps because the obstructions or threats are regarded as relatively substantial personal affronts. And so, in a clever series of experiments by Zillmann (1979) and colleagues, the participants were much less hostile after a mistreatment when they were assured that the misbehavior was not intended to be a personal attack, particularly when this mitigating information was provided before, rather than after, the negative event.

Contrary to the strongest version of the personal significance argument, several experiments have demonstrated that the failure to obtain an expected gratification can generate an aggressive inclination even when the failure is not a blow to self-esteem. In one of these experiments (Walters & Brown, 1963), youngsters unable to watch a promised enjoyable film because the movie projector had "accidentally" broken were subsequently, in a game, especially aggressive to a peer clearly not responsible for the "accident." In this particular study, the children had previously been reinforced for engaging in make-believe aggression so that their restraints against

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[3] Neal Miller (1941) noted that he and his coauthors of the 1939 *Frustration and Aggression* monograph had recognized that the failure to attain a desired goal can instigate nonaggressive as well as aggressive responses. They proposed, however, that even when the aggressive inclination is suppressed by stronger opposing tendencies, the aggressive urge is increasingly likely to become dominant as the thwarting continues (see Berkowitz, 1989, p. 61).

aggression probably were fairly weak at that time. However, another investigation (Berkowitz, 1969) suggests that this prior reinforcement can facilitate the open display of frustration-produced aggression but is not necessary for it to occur.

Suggestive research with human infants also indicates that frustrations can give rise to aggressive inclinations even in the absence of earlier aggressive training. In one study, Stenberg, Campos, and Emde (1983) frustrated human infants by restraining their arms and legs and saw that the babies then tended to display angerlike facial expressions. The researchers suggested that the restraints they imposed are inborn elicitors of anger. Much closer to the usual discussions of frustration, Lewis (1993) proposed that the thwarting of a goal-directed action is an unlearned spur to anger. After the 2- to 8-month-old infants in his experiment were conditioned to move one of their arms in order to see a picture of a baby's smiling face, the babies were exposed to an extinction phase in which the arm movement no longer revealed the happy picture. The great majority of the infants then exhibited angerlike facial expressions, whereas little anger was shown in the training phase.

It should be noted that emotion theorists disagree in their interpretations of findings such as these. Clore et al. (1993) maintained that angerlike facial expressions are not in themselves indicators of anger emotion. They said "one can have an emotional expression, engage in emotional behavior . . . [but] these constitute emotions only when they are reactions to the cognitive representation of something as good or bad" (p. 63). Stein and Levine (1999), however, who are basically sympathetic to the appraisal perspective, were willing to accept babies' facial expressions as signs of a true emotion because the facial movements indicated that the babies had representations of a changed goal state (p. 387). Izard (1991) also viewed the babies' facial expressions as indicative of an emotional state (see p. 237).

Relatively trivial aversive situations. Adding to our contention that the frustrating event's personal significance can facilitate anger arousal without being necessary for this emotion to arise, there are occasions when even trivial disturbances not directed at the individual personally—such as seemingly impersonal disruptions of routine activities—evoke anger, even if only at a mild level (Berkowitz, 1989). The laboratory studies of the effects of unpleasant atmospheric conditions (see, e.g., C. A. Anderson & Anderson, 1998; Baron & Bell, 1975; Baron & Richardson, 1994; Rotton, Barry, Frey, & Soler, 1978) also showed that impersonal aversive events can generate anger, although, of course, they might be regarded as thwarting the person's desire to be comfortable. Although the aversive conditions investigated in these experiments did not always lead to heightened overt assaults on a target, probably because the participants were primarily intent on escaping from the unpleasant conditions, the people often were angrier and had more hostile attitudes when their surroundings were decidedly uncomfortable—either uncomfortably cold (in the 57 °F–60 °F range) or unpleasantly hot (about 93 °F–96 °F)—rather than pleasant (see C. A. Anderson & Anderson, 1998, p. 284), even though the aversive conditions were not directed at them personally and were established in a legitimate scientific study. Even if the participants had blamed the experimenter for the aversive condition, there was little reason for them to hold their peer, the other person in the study with them, as responsible for their discomfort, and yet, as in the Baron and Bell (1975) and Rotton et al. (1978) studies, they expressed hostility toward this "innocent" individual.

Must the frustration be improper? Anger undoubtedly is often aroused when an external agent is viewed as having acted in an improper and disturbing manner (see Baron, Neuman, & Geddes, 1999; Weiss et al., 1999, in addition to the studies performed by appraisal theorists). However, there is good reason to think that the ordinary "person in the street" (to use Averill's, 1983, characterization) can become angry even when the aversive event is not regarded as "illegitimate." Averill (1982, 1983) found that the majority (59%) of the angering incidents reported by the community residents and university students in his investigation followed "a voluntary and unjustified act," but still, approximately 12% of the episodes were said to have been produced by "a voluntary and justified act" and another 2% by "an unavoidable accident or event" (Averill, 1983, p. 1150). Russell and Fehr (1994, p. 194) also quoted reports of some instances in which anger was not caused by an external agent's supposedly improper behavior.

Laboratory experiments have also seen anger elicited by negative events that presumably were not appraised as unjust or a violation of social standards. In a recent experiment, Herrald and Tomaka (2002) found that their participants did not regard the provocateur's anger-arousing treatment of them as improper; this individual was also not blamed for their anger. Several other studies were conducted as tests of the often-repeated contention that only unjustified or illegitimate frustrations produce aggressive reactions.

In the Dill and Anderson (1995) experiment, many of the participants faced a difficulty in performing their assigned task after having been given an adequate justification for this hardship. Other participants, by contrast, received only an arbitrary, unjustifiable explanation for the task obstruction. The participants' ratings of the experimenter at the end of the session showed that, unsurprisingly, those exposed to the unjustifiable impediment expressed the greatest hostility. However, even the people facing the justifiable difficulty were more hostile than the nonfrustrated control group. Burnstein and Worchel (1962) obtained essentially similar findings in a much earlier experiment in which groups of participants were confronted either by an arbitrary frustration (in which a confederate deliberately and for no good reason interfered with his group's goal attainment) or by a so-called nonarbitrary thwarting (in which the interference was due inadvertently to the confederate's clear physical handicap). In both experiments, the presumably proper barrier to goal attainment apparently was unpleasant enough to elicit some hostile inclinations (see also Geen, 1968, for relevant evidence).

Some Observations Regarding Blame

Other observations add to our misgivings about the frequent proposal that an external agent must be blamed for an improper action if anger is to be elicited. Several researchers (e.g., Frijda, 1993; Frijda & Zeelenberg, 2001; Parkinson & Manstead, 1992) have suggested that the blame placing found in many appraisal investigations may be an epiphenomenon, a consequent rather than an antecedent of anger arousal. Because of the verbal-report methods used in most investigations in this area, they noted, it is often impossible to ascertain whether the identified appraisal characteristics preceded or followed the arousal of the emotional experience. "Nothing in the data [obtained in these studies] resists the interpretation that the relevant appraisals were consequences rather than precedents of the emotional reactions" (p. 129).

Stein and Levine (1990, 1999) also questioned the emphasis often placed on blame. They suggested that people blame an external agent when they are emotionally bothered, at least in part because they have learned the benefits of doing so. In their studies (Levine, 1995; Stein & Levine, 1989), preschool-aged children typically did not assume that someone will become angry when she or he was intentionally harmed. The participants throughout the age range sampled all generally thought that both anger and sadness arose when there was an obstruction to an attrac-

tive goal, with sadness occurring if there was an inability to reinstate the goal, and anger resulting if the impediment could be overcome and the goal could be restored.[4] But whereas the adults and older children also believed anger was very likely to be generated by a deliberate injury (very much as appraisal research has consistently found), the younger participants did not assign any particular significance to intentional harm in the creation of anger, even though they could accurately distinguish between intentional and accidental acts. What was primarily important for them in the genesis of anger, apparently, was the possibility of overcoming the obstacle. They presumably had not yet learned to blame others when they met a frustration.

The Stein and Levine (1989, 1990, 1999) emphasis on the perceived possibility of goal restoration as an anger determinant is obviously very similar to the notion advanced by many emotions researchers (e.g., Ellsworth & Smith, 1988; Lazarus, 1991; Roseman et al., 1996; Scherer, 1993, 1999, 2001a) that perceived coping potential is one of the components in the anger-promoting appraisal. But Stein and Levine (1990) seemed to go further in stressing the significance of this coping and minimizing the role of blaming. They wondered whether "the intentional harm component associated with anger . . . [is] a function of socialization" (p. 65). Most persons learn that anger is socially permissible only under limited circumstances, they suggested, such as when a person has been deliberately hurt by someone else.

Whatever the part played by learning in the blame–anger relationship, there is no doubt that blameworthy behavior can provoke angry reactions. This does not mean, however, that every occurrence of this emotion stems from the perception of such an offense (see, e.g., Herrald & Tomaka, 2002). And furthermore, the blame placing can also be the result rather than the cause of the anger (Frijda, 1993). Indicating this, when Quigley and Tedeschi (1996) subjected people's descriptions of anger-arousing events to a LISREL analysis, they found that the data could reasonably be accommodated by a model in which "anger and blame exist in a reciprocal relationship" (p. 1280).

At least two theoretical accounts can explain how blaming may follow anger arousal. For one, Bower's

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[4] Contrary to the Stein and Levine (1989, 1990, 1999) position summarized here, Hunt, Cole, and Reis (1998) reported that their participants experienced both anger and sorrow when faced with an irretrievable loss.

(1981) associative network model suggests that when external agents are frequently seen as responsible for one's felt anger, an associative link develops in memory between the "node" representing anger state and the idea of another person's responsibility. After this connection forms, even the anger arousal not caused by another's misbehavior could activate thoughts of other people's responsibility. Keltner, Ellsworth, and Edwards (1993) reported supporting evidence from an experiment in which either anger or sadness was generated through the adoption of a physical pose characteristic of these emotional states. When the participants rated the causes of important circumstances in their lives, the angry participants typically were more likely than their sad counterparts to attribute both their present life circumstances and the problems they might encounter in the future to other people's actions. Putting this more generally, because of the existence of anger–cognition associations, once a given emotion such as anger is aroused, the linked appraisal schemata come to mind so that these particular construals are used in interpreting ambiguous events (Lerner & Keltner, 2000, 2001; Siemer, 2001). The linkage between anger state and other accountability can be bidirectional. Neumann (2000) demonstrated that a heightened readiness to think of other persons as active causal agents increases the likelihood of having angry feelings in response to negative events.

Frijda (1993) offered a more top-down explanation as to why anger can elicit blame appraisals. Taking a functionalist stance, he suggested that angry feelings can prompt a person to find an external agent who can be held responsible for the provoking aversive situation.

Must There Be an External Cause of the Negative Event?

Whatever the exact reason, everyday experience as well as the findings in many emotions studies show that a specific external agent is usually held responsible for the angering occurrence, so much so that the anger is often focused on that entity. Several analyses (e.g., Ellsworth & Smith, 1988; Lazarus, 1991; Roseman, 1991; Weiner, Graham, & Chandler, 1982) build on these observations and contend that anger cannot arise unless some external thing is seen as the cause of the offense. Nevertheless, both clinical observations and experimental results indicate that subjectively aversive conditions can generate anger even when an external entity is not seen as the cause of the negative situation.

Suggestive evidence can be seen in the studies of pain effects. Taking only a very limited sample from this research, some investigations (e.g., Hatch et al., 1992; Venable, Carlson, & Wilson, 2001) have reported that quite a few people afflicted by recurrent headaches tend to be frequently angry, hostile, or both. Of course, the anger observed in studies such as those just cited could at times contribute to the headaches that are felt; moreover, the pain experienced could well lower the afflicted person's tolerance for even relatively minor slights. Even with these possibilities, however, laboratory experiments in which physical discomfort or pain was deliberately established have shown that the decidedly unpleasant physical sensations in themselves can be angering and lead to affective aggression (e.g., C. A. Anderson, Deuser, & DeNeve, 1995; K. B. Anderson, Anderson, Dill, & Deuser, 1998; see also Berkowitz, 1993a, 1993b, 2003), perhaps particularly in people especially disposed to negative emotionality (Verona, Patrick, & Lang, 2002). What is perhaps even more intriguing, psychological discomfort—that is not physically painful—can also arouse anger, even when the discomfort cannot be attributed to an external cause. As one example, in Mikulincer's (1988) study, some of his participants were made to fail only moderately on the task given them so that they did not become completely apathetic in working on their assignment. Not having given up entirely, these persons reported feeling angry and frustrated. What is important here is that the individuals who attributed their failure to internal factors reported feeling the most anger. Providing even more direct evidence, Geen (1968) asked his participants to work on a jigsaw puzzle in the presence of a supposed "other student." In one group, the participants were thwarted in their efforts because of the other person's disturbance, whereas in another condition, the puzzle (unknown to them) actually was insoluble so that it seemed they were responsible for their failure. When all of the participants were later given an opportunity to administer electric shocks to the other student, those who had been obstructed by this individual were most punitive to him. But even the participants who believed their failure was internally caused were more aggressive to their peer than were the nonfrustrated controls. In both the Mikulincer (1988) and Geen (1968) studies, then, the frustrated persons did not have to fault an external source in order to be angry with their target.

It is quite possible, though, that people may well be somewhat discomfited by not having an external

agent to blame for their thwarting-produced anger. At the very least, they may come to think their anger was "unreasonable," as Parkinson (1999) has noted. On asking his respondents about the "reasonable" and unreasonable emotional reactions they had experienced, Parkinson (1999) found that the theme of other blame was a less important correlate of the reported anger when the participants believed their anger had been unreasonable rather than reasonable. Prior negative moods, however, evidently had a more significant influence on the unreasonable anger episodes (indicating that the respondents' designation of their feelings as unreasonable was not only because of a later belief that their emotional reaction had been unwarranted). These anger-prompting negative feelings conceivably could have been a reaction to some subconscious stimulus. Johnson-Laird and Oatley (1989) had essentially raised just such a possibility when they proposed that anger sometimes arises for no clearly apparent reason.

The attribution of the felt anger to an external source may have other effects as well. In line with Schachter and Singer (1962) and the misattribution experiments of the 1960s and 1970s, the perceived cause could conceivably help form the anger experience; in attributing their emotion arousal to a salient external agent, the affected persons may well be especially likely to believe they are angry (see Neumann, 2000). Then too, following the original frustration-aggression formulation (Dollard et al., 1939) and its later extensions (e.g., N. E. Miller, 1948) and slight revisions (Berkowitz, 1989, 1993a), the perceived source of the displeasure might function as an aggressive cue so that the strongest anger–aggressive reactions are directed at that entity. By the same token, the sight or even thought of the causal agent could evoke a more intense anger–aggression reaction than otherwise might have occurred. In Hullian-behavior theory terms, the other agent is the goal object for the instigation to injure the source of the displeasure. The sight or thought of this goal object theoretically elicits "anticipatory goal responses" (in this case, anger–aggressive reactions), and these reactions should intensify the anger that is felt. All this suggests that when there is no one person (or thing) to focus on as the cause of the unhappy event, the aversively generated anger may be too diffuse and maybe even too weak to register decidedly on the aroused person's phenomenal field.

This brings us back again to one of our central arguments: The appraisal components, such as an external agent's judged responsibility for the incident, may intensify the anger reaction rather than being necessary for this emotion to occur.

Coping Potential

As we noted previously, a number of discussions of anger arousal in the emotions literature contend that a perceived ability to control the instigating event is necessary if anger is to arise, although these formulations do not always agree in detail as to just what is involved in this felt control component (see, e.g., Lazarus, 2001; Roseman et al., 1996, pp. 246–247, 262; Scherer, 1993, 2001a; Smith & Lazarus, 1993, pp. 263–264; Stein & Levine, 1989, 1990, 1999). Further exploration of the role of perceived coping potential clearly would do well to define this appraisal component more precisely, especially with regard to how the coping is to be achieved.

Generally viewing this concept as having to do with the perceived effectiveness of any action that might be undertaken to lessen or eliminate the disturbing situation, our first question here is whether angry persons always think, consciously or unconsciously, that they can master the disturbance, even a fraction of a second before this emotion arises. The reports of how people feel when they are angry seem to indicate that their angry outbursts are often impulsive in nature. According to Shaver et al. (1987), the anger prototype possessed by university students tends to include such features as "Loud voice, yelling, screaming, shouting," "Attacking something other than the cause of anger," and even "Incoherent, out-of-control, highly emotional behavior" (p. 1078). Similarly, a number of the students who were queried about their anger experiences by Roseman, Wiest, and Swartz (1994) said that they had "felt blood rushing through the body and felt as if they would explode . . . and felt like yelling and like hitting someone" (pp. 212–213), whereas 50% of the men and women studied by Davitz (1969; see also Carlson & Hatfield, 1992, p. 347) reported they had "an impulse to strike out, to pound, or smash, or kick, or bite, to do something that will hurt" when they are angry. Assuming these and other similar statements can be accepted as veridical, we wonder whether these apparently involuntary urges indeed grow out of the angry person's appraisal, even a nonconscious one, that he or she can resolve the disturbing situation. Do they not seem more indicative of a loss of control over a strong impulse to strike out at the aversive target rather than the product of some calculation that a difficulty can be overcome?

Perhaps more to the point, we also ask whether the empirical support for the coping potential proposition

is not only correlational in nature. In many of the studies said to show the importance of control potential, the reported sense of control did not clearly precede the felt anger and only accompanied this emotion.[5] The results of several laboratory experiments indicate that anger can occur even when those afflicted by the negative event cannot successfully overcome the unpleasant occurrence. One of these investigations was a direct test of the effects of *perceived coping ability,* defined as the possibility of eliminating a moderate threat. Harmon-Jones, Sigelman, Bohlig, and Harmon-Jones (2003) used a measure of university students' left frontal cortical activity relative to the activity in their right frontal cortex to index the strength of their motivation to do something about the disturbance confronting them (see Harmon-Jones & Allen, 1998). The students were first told of a proposed increase in tuition fees, a step they all opposed, but some of them were informed that such a raise definitely would occur, whereas the message given others was that the increased tuition charge was still not definite and that petitions were being circulated in opposition to the jump in tuition costs. They then listened to a radio editorial arguing for the greater fee. The participants' rated feelings immediately afterward indicated that the disturbing message had angered them (and that anger was the predominant emotional reaction). More interestingly, only when the students had been led to believe it was possible to ameliorate the aversive situation (a) was there a significant increase in the cortical indication of the readiness to act—the rise from the baseline in relative left frontal activity—and (b) did this index also predict the person's willingness to undertake the action (sign the supposed petition opposing the tuition rise). Clearly, then, the students who were told it was possible to eliminate the threat perceived a fairly strong coping potential and were ready to act. However, contrary to the usual coping proposition, the participants' self-reported anger was just as high when action was not possible (and supposedly nothing could be done about the disturbance) as when the possibility of eliminating the threat existed. In this experiment, then, coping potential did not affect the level of self-reported anger.

Other experimental findings support our doubts regarding the necessity of a perceived coping potential for anger arousal. Geen's (1968) previously mentioned results suggest that affectively instigated aggression can occur even when there is little sense of being able to overcome the frustration and attain the goal. Experimental investigations of learned helplessness are also relevant. In their review of the learned helplessness research up to the late 1970s, I. W. Miller and Norman (1979, p. 96) reported that as the participants learned to feel helpless in the situation in which they found themselves, many of them became hostile. The growing sense of being unable to master the difficulty facing them evidently promoted anger. They may have been unwilling to carry out a planned effortful and sustained attack, as Seligman's (1975) learned helplessness formulation would suggest, but this does not mean they would not display impulsive aggression. Also somewhat contradictory to the coping potential thesis, other experimental research cited later in the present article shows that the perceived ability to eliminate a stressor often lessens rather than increases the disturbance-elicited anger.

Given these experimental results and the correlational nature of the findings obtained in the appraisal studies of coping potential, it is by no means clear that a sense of being able to overcome the confronting disturbance is necessary for anger arousal. Moreover, some of the other reactions that have at times been found to be correlated with coping potential appraisals suggest why this perception is so often associated with anger generation. In several investigations, angry persons not only reported believing they had the power to master the goal-inconsistent event but also said they felt themselves "becoming stronger (higher in potency) and more energized in order to fight or rail against the cause of anger" (Shaver et al., 1987, p. 1078). They also were apt to think they had relatively high control over events, were optimistic about their lives, and were willing to make relatively risky decisions (Lerner & Keltner, 2001). Taken together, the appraised coping potential as well as this sense of being energized and powerful might parallel rather than cause the anger arousal. Izard (1991) suggested just this idea in his analysis of anger. He observed that "a feeling of power" (p. 237) and a sense of "self-assurance" (p. 254) often accompanies anger.

Aversive States of Affairs as Anger Determinants

Emotion theorists have given relatively little attention to the question of just why the specific appraisals

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[5] Even correlational studies have not always found that the sense of being able to overcome the difficulty is related to anger. Thus, contrary to Roseman's theoretical expectation, the Roseman, Spindel, and Jose (1990) data "revealed that people did not perceive themselves as particularly powerful in situations leading to frustration, anger, and regret" (p. 911).

postulated to generate anger have this effect. For Berkowitz (1983, 1989, 1993a, 2003), however, the basic reason, whatever else may be involved, is that many of these interpretations affect the unpleasantness of the given situation. The terms *frustration, goal incongruence, obstacles to goal attainment,* and *negative outcomes* generally all refer to an aversive condition, a state of affairs the person ordinarily seeks to escape or avoid, and it is the experienced displeasure produced by the aversive situation that presumably gives rise to the anger. From this perspective, as Berkowitz's (1989) reformulation of the frustration-aggression hypothesis holds, a barrier to the achievement of an expected gratification activates the anger–affective aggression syndrome only to the extent that it is decidedly unpleasant. And by the same token, intentionally inflicted harm, unjustified thwartings, and ego threats are usually more unpleasant than accidental injuries, socially proper frustrations, or impediments to the attainment of personally insignificant objectives, and therefore are apt to generate stronger anger and affective aggression.

Other researchers (e.g., C. A. Anderson & Anderson, 1998; C. A. Anderson et al., 1995; Baron & Bell, 1975; Baron & Richardson, 1994; Lindsay & Anderson, 2000), even in the appraisal theory camp (Stein & Levine, 1989, 1990, 1999), have also recognized the anger–aggression-eliciting effects of aversive conditions. In summarizing one of their studies, Stein and Levine (1990) concluded that their results were in accord with Berkowitz's (1983, 1989) thesis "that aversive events . . . prime anger, irritation, and hostility across a variety of contexts" (p. 69).

Berkowitz's analysis (1983, 1990, 1993a, 1993b, 2003; see also Geen, 1998), labeled a *CNA model,* does not claim that anger will always be seen after a decidedly unpleasant occurrence or that other factors cannot intervene to determine what emotions are manifested. Along with other formulations (e.g., Leventhal, 1984; Leventhal & Scherer, 1987; Russell, 2003; Scherer, 2001a; Smith & Kirby, 2000, 2001), CNA is a multistage, multiprocess model proposing that there can be different reactions to the intensely aversive event, depending on what processes are in operation. Nevertheless, there are some important differences among them. As an example, Russell's (2003) conception proposes that a "core affect," experienced only as either "good" or "bad" to some degree, does not become differentiated into a specific emotion until the affect is attributed to a particular source and then appraised. CNA, however, maintains that the strong negative affect initially automatically activates feelings, thoughts and memories, and motor impulses, all associatively linked in an anger–affective aggression syndrome, without the operation of attributions and appraisals. Importantly, it also recognizes that other syndromes such as one associated with the fear–flight pattern may also be evoked at the same time. A host of factors—genetic, learned, and situational—govern the relative dominance of these different emotional constellations, but according to the model, several syndromes can be activated at the same time, although to different degrees. And thus, fear is dominant over anger in the face of a strong sense of overwhelming danger, whereas anger is apt to be the prominent emotion in the absence of clear signs of great danger to the person.

This analysis, then, maintains that with more elaborated "higher order" cognitive processing, interpretive schemes, social rules, and anticipated costs and benefits can come into play so that the initial affective and action tendencies can be altered. If the first-stage reactions are not too strong, it is presumably at this later time that appraisals can have a primary role in shaping what the person will feel and do. Of course, cognitive processes activated by the felt anger, or perhaps even by the preceding strong negative affect, may increase the accessibility of particular anger-facilitating appraisals so that these thoughts also could play some role in the elicitation of the anger–aggression syndrome. The anger evoked by the aversive state of affairs could at times seem unreasonable to those affected and thereby provoke a search for some external source to blame, as Frijda (1993) had suggested, perhaps in an attempt to justify the feelings, ideas, and impulses that are experienced. This blaming reaction might be facilitated by the anger-generated inclination, identified by Keltner et al. (1993), to attribute unpleasant occurrences to external sources. But even if construals such as these do come to mind, the present analysis holds that aversive events in themselves can be a direct spur to anger (among other feelings) and hostile tendencies.

Pain and Stress

Physical pain is the clearest example of an aversive state of affairs, and a rapidly accumulating body of research testifies to the way pain often produces anger. Izard (1991) pointed to some of this research in arguing that "pain is a direct and immediate cause of anger. Even in very young infants," he wrote, "we see anger expression to inoculation long before they can appraise or understand what has happened to them" (p. 237). At the adult level, the connection between

pain and anger can be seen in the high levels of anger often displayed by people experiencing chronic pain for any of a wide variety of reasons, including arthritis, severe episodic headaches, and spinal injuries (Berkowitz, 1993b; Fernandez & Turk, 1995; Hatch et al., 1992). The anger is not always revealed openly, of course, but, even so, can at times be detected by subtle, indirect measurements and/or by "anger-in" assessments of "bottled-up" anger (see Fernandez & Turk, 1995, p. 169). Correspondingly, conditions that ameliorate physical discomfort can lessen the anger produced by the aversive experience, and one way this physical discomfort reduction can be achieved is through muscle relaxation. Psychotherapists have successfully lowered their clients' proclivity to anger by teaching them to progressively relax their muscles when under stress (see Tafrate, 1995). As just one illustration of this, Weber, Arck, Mazurek, and Klapp (2002) demonstrated that relaxation training reducing the stress of the persistent ear-ringing of tinnitus sufferers also lowered the anger generated by this disturbance.

In their discussion, Fernandez and Turk (1995) properly pointed out that one cannot exclude the possibility that appraisals played at least some part in the pain–anger relationship. However, laboratory experiments such as Anderson's previously cited investigations of the anger-producing consequences of unpleasantly hot and cold temperatures (C. A. Anderson & Anderson, 1998; C. A. Anderson et al., 1995; see also Baron & Bell, 1975), Rotton's studies of the effects of foul odors (e.g., Rotton et al., 1978), and the studies of people exposed to the cold stressor procedure reported by Berkowitz, Cochran, and Embree (1981) indicate that persons facing physically uncomfortable conditions can become angry and hostile even when it is unlikely that they made the particular appraisals often postulated as the anger-evoking profile (see also Berkowitz, 2003, for other investigations). As one case in point, Zillmann, Baron, and Tamborini (1981) found that people exposed to unpleasant secondary cigarette smoke were relatively hostile to a nearby individual even when this person was clearly not responsible for the aversive state of affairs. Perhaps what is even more unanticipated by a number of traditional analyses, with the possible exception of the Smith and Kirby (2000, 2001) formulation, is that there is also evidence—mostly from animal studies, but also from experiments with humans (see Berkowitz, 1983, 1993b, p. 282)—that even the presence of a stimulus associated with previously experienced pain can evoke stronger affective aggression than

otherwise would have occurred (Fraczek, cited in Berkowitz, 1993b, p. 282).

Some of the research in this area adds to the doubts we previously expressed about the presumed anger-eliciting effect of an appraised control potential: The perceived ability to overcome a stressor can lessen rather than heighten anger. In an experiment by Geen (1978), the participants who believed they could eliminate a very unpleasant noise to which they were exposed were less punitive to a person who had provoked them earlier than were their provoked counterparts, who lacked this perceived control over the aversive noise. Comparable results have been reported by Donnerstein and Wilson (1976) in a similar experiment.

Social Stress

Being decidedly unpleasant, social stresses can also generate anger and aggressive inclinations (see Berkowitz, 2003, for a more complete discussion). An example can be seen in the influence of economic hardships on violence toward Blacks in the U.S. South. Basically corroborating the findings originally reported by Hovland and Sears (1940) and supported by a more sophisticated reanalysis of the data conducted by Hepworth and West (1988, cited in Berkowitz, 2003), Green, Glaser, and Rich (1998) showed that there was a significant relationship between sudden drops in the market value of cotton in the southern United States and the lynching of Blacks in that part of the country, but only for the period up to the Great Depression and not afterward. Evidently, whatever aggression inclinations arose from the region's economic troubles were displaced onto Blacks in this exceedingly violent fashion only when widespread cultural attitudes and values in the South defined such people as dangerous and also permitted these kinds of assaults. More generally, the national survey conducted by Straus (1980, cited in Berkowitz, 2003) provides more evidence of the violence-generating effects of social stress. When the investigators asked their adult respondents whether they had experienced a number of stressful life events such as "the death of someone close" or "a move to a different neighborhood or town," they found that the people reporting the greatest number of stressors in the past year were also the ones most likely to say they had abused their children in that period.

An experiment by Passman and Mulhern (1977, cited in Berkowitz, 2003) is also relevant. The mothers in this study worked on an assigned task at the same time that they monitored their child's perfor-

mance on a puzzle. Those women who were under stress, because they had been deliberately given confusing instructions, were more punitive to their youngsters for any mistakes made than were their less stressed counterparts. Adding to all this, a much more recent experiment by Pedersen, Gonzales, and Miller (2000) found that situationally induced negative affect also contributes to displaced aggression. Some of the participants in this investigation were mildly annoyed by a confederate soon after they had been deliberately provoked by the experimenter. Although others who had not been previously mistreated by the experimenter were not especially bothered by the confederate's slight wrongdoing, those who had been given the earlier unpleasant treatment were now more hostile to the annoying confederate. What is especially significant for us here is that the latter participants' displaced hostility was more strongly determined by the intensity of their negative feelings at that time than by their appraisal of how fair and reasonable had been the confederate's behavior toward them.

Some Apparent Anomalies: When Anger Is Not Manifest

Fear can be dominant over anger. Exceedingly aversive events obviously do not always lead to open attacks on the perceived source of the displeasure or even against other available targets. As Dollard et al. (1939) and CNA clearly recognized, the afflicted persons might restrain their aggressive urges or even suppress their anger if they believe any such open display of the anger–affective aggression syndrome could be punished. The latter theoretical model notes (in accord with the frustration-aggression formulation; Miller, 1941, cited in Berkowitz, 1989, p. 61) that there can be a variety of responses to an unpleasant state of affairs, some dominant over the anger-linked reaction. CNA holds that aversive events generate inclinations to both fight and flight (along with other possible action tendencies), not only one or the other, and in many circumstances these other reactions may be stronger than the anger-related ones. A clear and present danger will usually lead to fear being predominant over anger. However, the model says anger could also exist at the same time, although submerged by the overwhelming feeling of fright and the accompanying strong urge to flee from the threat.

There unfortunately is not much direct evidence at the human level supporting this flight-and-fight contention. In one of the very few relevant studies indicative of such an effect, Blanchard, Hebert, and Blanchard (1999) asked their male and female students to describe their affective and behavioral reactions to presented scenarios, one frightening and the other angering in nature. It was found that "these two scenarios elicited a variety of strongly differentiated physiological responses and subjective feelings;" nevertheless, "they were both associated with a perceived tendency to either attack, or to want to attack, the opponent" (p. 8). However, observations suggestive of the co-occurrence of fear/anxiety and anger can be found in several studies of people facing the threat of death. In one such investigation (Sugimoto & Oltjenbruns, 2001), police officers exposed to death-related stressors and showing symptoms of posttraumatic stress disorder at times exhibited inappropriate outbursts of anger, and in another observation (Toren, Wolmer, Weizman, Magal-Vardi, & Laor, 2002), Israeli citizens traumatized by real and threatened missile attacks reported feeling angry as well as highly anxious. Perhaps more to the point, N. E. Miller's (1948) internal-conflict model of hostility displacement implicitly posits the coexistence of both fear/anxiety-based "avoidance" tendencies and anger-derived "approach" inclinations. In keeping with N. E. Miller's thesis, Berkowitz's reanalysis of Fitz's results (1976, cited in Berkowitz, 1998, pp. 54–55) demonstrated that the fear arousal established in angry people led to very little aggression toward the tormentor, but still, the frightened–angered persons assaulted another individual identified as the tormentor's friend much more intensely because it was safe to do so. In this case at least, as the N. E. Miller (1948) analysis and our model both propose, anger was not eliminated by a fear-arousing threat.

Whatever implications these observations have for CNA's analysis of aversively generated anger, they, together with the studies of displaced aggression, suggest that the stimulus characteristics of the other persons in the situation contribute to the nature of the emotional reactions that are felt and displayed.

Self-regulation of the aversively activated anger. The fear-induced anger suppression just discussed is in a sense a reaction to external occurrences. However, internally generated self-regulatory cognitive processes can also lessen or even eliminate the overt manifestations of anger after an aversive incident. This self-regulatory process has often been observed in studies of feeling effects on judgments. Although there is a widespread tendency for people's evaluations of some target object to become more congruent with, or assimilated to, the valence of their affective state at that time, there are occasions when judgments seem to move in the opposite direction, toward greater

incongruity with the hedonic tone of one's feelings. The Wegener and Petty (1997) flexible correction model holds that this incongruity, or contrast, effect is particularly likely to occur when the persons (a) are highly aware that their feelings can bias their assessments of the target (see also Stapel, Martin, & Schwarz, 1998) and (b) are motivated to be accurate in their judgments. If we extend this line of reasoning to the effect of anger on evaluations, it may well be that people who are aware of their anger and are concerned that their emotion will unduly affect what they say or even think about someone will attempt to correct (or even overcorrect) for the possible biasing influence of their anger to the extent that they want to be fair and objective in their assessments (see Berkowitz et al., 2000, for supporting research).

Effects of Anger-Related Muscular Movements

As is well-known, William James (1890) maintained that "bodily changes follow directly the perception of the exciting fact . . . and feeling of the same changes as they occur, IS the emotion" (p. 449). Emotional experiences result from emotion-related muscular actions. James's basic thesis has been taken up in recent years by a number of investigators, most notably by Tomkins (1962–1963), Izard (1971, 1993), Ekman (1984, 1993), and Laird (e.g., Laird & Bresler, 1992). Although these researchers typically devoted most of their attention to the emotion-arousing effects of facial expressions, some of them (e.g., Duclos et al., 1989; Riskind & Gotay, 1982) subsequently extended their research to the consequences of muscular movements in other parts of the body.

However, in spite of the many studies showing that facial and bodily actions can affect emotional experience (see Adelmann & Zajonc, 1989; Izard, 1993; Rutledge & Hupka, 1985), much of the emotions literature has largely ignored this matter of muscular (or peripheral or bodily feedback) influences on emotions, perhaps partly because of the controversial nature of the research. Tourangeau and Ellsworth (1979), for example, did not find a reliable effect of the adoption of sad or fearful facial expressions on the self-reported sadness and fear of people who were watching emotion-arousing films. Laird (1984), among others, took issue with the Tourangeau and Ellsworth conclusion, noting that the overwhelming majority of the published investigations have obtained the expected positive outcomes.[6] He insisted that "The facial feedback effect has been demonstrated with a wide variety of emotions, including anger, happiness, sadness, fear, pain, and humor, with various

cover stories and procedures for producing expressions, and with various durations of expression" (p. 914).

The present article highlights this general research area to encourage the greater integration of these bodily feedback findings into the analyses of anger arousal presented by emotions theorists. For space reasons, however, we look only briefly at a very small fraction of the relevant studies, focusing primarily on a few of those experiments published after the Tourangeau and Ellsworth (1979) article. And moreover, because the accumulating research has now demonstrated that skeletal muscle movements in other parts of the body besides the face can also affect emotional states (e.g., Duclos et al., 1989; Riskind & Gotay, 1982), we include bodily movement studies in this survey.

Along with other researchers (e.g., Rutledge & Hupka, 1985), Adelmann and Zajonc (1989) distinguished between (a) those studies in which the bodily movements modulated existing feelings, either intensifying or weakening an already established experience; and (b) those in which the muscular movements initiated the emotional state. Research by Rutledge and Hupka (1985) and by Jo (1993) are among the relatively few investigations showing a modulation influence on angry feelings. The Rutledge and Hupka (1985) study was very well designed and conducted, but because it dealt only with manipulated facial expressions, we look only at Jo's more novel research. Because anger is often accompanied by clenched fists as well as a general muscular tightness (see, e.g., Shaver et al., 1987), in one of Jo's experiments she required some of her participants to hold one hand tightly in a fistlike manner while they described an earlier experience in their lives, whereas the other participants did not make a fist while relating the

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[6] Discussing some of the procedural differences that might have led to the different outcomes, Laird (1984) pointed out that he and other researchers typically used within-subjects designs, whereas Tourangeau and Ellsworth (1979) used a between-subjects design. According to Adelmann and Zajonc (1989, p. 274), a meta-analysis of the studies reviewed by Laird (1984) showed that the facial manipulations had a "moderate" influence on self-reported emotional experience. Consistent with our earlier discussion of self-regulation, we wonder whether the Tourangeau and Ellsworth participants had become very aware of their emotional state for some reason, and deeming this state inappropriate under the circumstances, suppressed their feelings.

event. Jo found that the anger-associated fist clench intensified the anger generated by the recollection of the angering incident and, furthermore, had no effect on self-reported ratings of sadness, anxiety, or cheerfulness.

There are many more experiments indicative of emotion-initiating effects. Duclos et al. (1989) carried out two of these in which they investigated, first, the influence of sad, fear, disgust, and anger facial expressions and, second, the consequences of fear, sad, and anger body postures. In both experiments, the muscular movements typical of the given emotional state, in the face alone or in the more general body, led to the highest level of the particular feeling characteristically accompanying that form of expression. And furthermore, in another investigation (Flack, Laird, & Cavallaro, 1999), when the facial expression linked to a particular emotion matched the emotional nature of the posture adopted, the combination of these two types of muscular movements led to the strongest emotional feelings.

It is also now clear that emotion-related bodily movements can have widespread effects consistent with the persons' emotional state in their physiology and thinking as well as on their feelings. Ekman, Levenson, and Friesen (1983) showed that manipulated facial expressions typical of each of six different emotions led to distinctive changes in heart rate and finger temperature. The previously mentioned study conducted by Keltner et al. (1993) testifies to the cognitive effects. People who adopted the facial expression and bodily posture characteristic of anger made the external-agency appraisals predicted by most appraisal accounts of anger, whereas the sad pose resulted in more situational attributions. Even memory can be influenced by the peripheral facial–muscular movements. And so, in one of the experiments reported by Laird, Wagener, Halal, and Szegda (1982), people who held an angry facial expression while attempting to remember sentences heard earlier had the best recall for the sentences that were angry in nature, that is, whose semantic content matched their affective state.

Laird and his colleagues (e.g., Duclos & Laird, 2001; Duclos et al., 1989; Laird & Bresler, 1992) have consistently interpreted findings such as these in keeping with Bem's (1972) self-perception perspective. The persons assuming an emotionlike expression on their faces, in their body posture, or both presumably detected the muscular changes that had come about and then automatically and nonconsciously used these cues, together with cues from the surround-

ing situation, in forming their emotional experience. (Martin, Harlow, & Strack, 1992, advanced a somewhat similar conception by proposing that people use their bodily sensations as information when making judgments.) Laird also used this self-perception framework to account for the individual differences in the degree to which the emotion-related muscular changes give rise to emotional experiences (e.g., Duclos & Laird, 2001; Duclos et al., 1989; Laird, 1984; Laird & Bresler, 1992). Some people theoretically are more inclined to rely on their inner sensations, that is, their self-produced cues, in developing their knowledge of what emotion they are feeling, whereas others tend to rely more heavily on cues from the external circumstances in forming this knowledge. Having found that these individual differences are fairly general and stable over time (e.g., Flack et al., 1999), Laird and his colleagues, in many of their experiments, used the participants' responses to a preliminary assessment to divide them into either a self-produced cue group or a situational-cue group and showed that the former participants' reported emotions typically were more strongly affected by the muscular movements they made.

Duclos and Laird (2001) have argued that these differences in responsiveness to bodily cues can account for the inconsistent findings in studies as to whether expression inhibition can lessen emotional feelings. Using a wide variety of participants, they compared the effectiveness of two different procedures for reducing experimentally aroused anger and sadness: One was a distraction technique in which the persons sorted playing cards, whereas the other asked the participants to sit quietly and keep their facial, bodily, and hand muscles as relaxed as possible. On differentiating the participants into the personal- and situational-cue responders, based on the extent to which prior facial manipulation trials had led to angry and happy feelings, the investigators found that (a) distraction was better at lowering angry feelings for the situational-cue responders than for those designated as personal- (i.e., self-produced) cue responders; and (b) the muscle relaxation procedure effectively lessened anger and sadness in those most responsive to their internal, self-produced bodily cues. Supporting findings have also been reported in a study (Laird et al., 1994) dealing with the effects of a suppressed happy facial expression.

Even with all of these results consistent with Laird's self-perception thesis (Laird & Bresler, 1992), we wonder whether associationistic processes do not

also play some part in the facial and bodily movement effects. Essentially in accord with Bower's (1981; see also Berkowitz, 2000) associative network view of mood-memory effects, we suggest that the various physiological, skeletal muscle, experiential, and cognitive components of an emotional syndrome are interconnected associatively so that the activation of any one component will spread to other components in proportion to the strength of the associations between them. Just as the arousal of a distinctive emotional feeling, such as anger, will tend to activate the cognitions, such as other-agency appraisals, with which it is linked, a facial expression and/or bodily posture that is characteristic of a particular emotional state will activate the other components in that emotional syndrome. The consequence, as the previously summarized evidence demonstrates, is that the performance of the emotion-related muscular movement will have widespread congruent physiological, experiential, and cognitive effects. Following this perspective, it might be that those participants who were designated as self-produced cue users in the Laird studies were highly responsive to their facial and bodily sensations because they had fairly strong associative links among the various components of emotional syndromes. These associative connections were presumably weaker in those persons who were the situational-cue users so that the activation resulting from any given emotion-related facial or bodily expression was less likely to activate the other syndrome components.

Studies dealing with a bodily action-induced "mood contagion" are not as well-known as these bodily feedback experiments, but they are also suggestive for emotion research. There is now increasing evidence that one individual's emotion-related bodily movements can at times trigger that emotion in other persons (see Bargh & Chartrand, 1999; and Neumann & Strack, 2000, for a summary of relevant research). The intriguing experiments reported by Neumann and Strack (2000) demonstrated, for example, that a spoken statement whose content was affectively neutral but that was expressed in either a slightly happy or slightly sad tone of voice evoked a congruent affective state in the listeners. Moreover, this contagion occurred even though the listeners had not consciously wanted to share the speaker's emotion, had not devoted much of their cognitive resources to what was said so that they had not fully understood the content, and were unaware that their mood had been affected by the statement's emotional tone.

Discussion

It would serve well to attempt to resolve a number of the misgivings that undoubtedly have been raised in many readers' minds by points we have made. Some of these may deal with our very general conception of anger, but others undoubtedly are both methodologically and theoretically oriented and have to do with alternative explanations of findings we have cited.

On the Nature of Anger

The conception of anger favored here is much broader than the one preferred by several researchers. Where we speak of anger generated at times by bodily movements or painful events or even by relatively unpleasant environmental conditions lacking in direct personal significance, other researchers, such as Clore et al. (1993), have argued that many of the cases of affective aggression we mentioned are not really emotional reactions. For these researchers, "The term *emotion* is reserved for instances in which the characteristic physiology, feelings, and behavior of emotion is a reaction to an appraisal or evaluation rather than arising from other causes" (p. 62). People may have angerlike feelings in response to certain stimuli, perhaps such as a painful accident, but Clore et al. (1993) maintained that these reactions do not constitute true anger unless the requisite appraisals occur. Such an exclusion of angerlike feelings from the realm of supposedly "true" anger implicitly raises the possibility that there are different kinds of anger. Ellsworth and Scherer (2003) were explicit in this regard, arguing that "Rather than a single emotion of anger, there can be many varieties of 'almost anger' and many nuances of the anger experience" (p. 575).

We do not want to reject such a possibility out of hand, and, partly for heuristic purposes, offered a broader view proposing that there is a commonality overriding the "nuances" of anger experience. Spielberger et al. (1983, 1995) reflected this widely held supposition in regarding *anger* as encompassing low-intensity feelings such as irritation or annoyance as well as high-intensity feelings such as fury and rage. A factor analysis of the items in his State–Trait Anger scale (e.g., "I am furious" and "I feel irritated") obtained only a single factor, suggesting that the feelings tapped by these items reflected a unitary affective state varying in intensity. Spielberger et al.'s (1983, 1995) well-known distinction between "anger-in" and "anger-out," it should be noted, refers to differences in the predisposition (i.e., trait) to openly express the

motoric concomitants of anger rather than qualitative differences in the nature of the angry feelings (see, e.g., Spielberger et al., 1995), although there is suggestive evidence that when they are provoked, high anger-outs tend to feel stronger anger and are more likely to engage in impulsive acts of aggression (e.g., Deffenbacher, Filetti, Richards, Lynch, & Oetting, 2003). Our wide-ranging notion of the anger experience is also, in some respects, in accord with the prototype view of emotion concepts espoused by Shaver et al. (1987) and Russell and Fehr (1994). The Shaver et al. (1987) investigation of the anger prototype indicates that a wide variety of feelings labeled *irritation, annoyance, exasperation, disgust,* and *hate* are often included within the general notion of anger. Furthermore, in their discussion of the present issue, Russell and Fehr (1994) said that Clore et al. (1993) were basically following the classical approach to language concepts in which a concept "is defined by a set of common features, each necessary and together sufficient to determine membership" (Russell & Fehr, 1994, p. 186). Russell and Fehr (1994) showed that anger does not possess the set of necessary features assumed by this approach. Evidently people do not necessarily think of the various instances of anger they have experienced as arising only because of some perceived frustration, or injustice, or blameworthy occurrence. Also suggesting some commonality among these different feelings, Alvarado and Jameson (2002) have reported that many different terms connoting anger are significantly associated in people's minds with the same exemplary anger facial expression, although, of course, these anger-related words do not all imply the same degree of physiological anger activation. Ortony et al. (1988) also recognized this commonality in holding that these aforementioned different feelings were all "tokens" of anger. In summary, there is some justification to not regarding the various nuances of anger experience as distinctly different affective states.[7]

A Few Comments About Moods

Because some of the anger-evoking factors we discussed, such as ambient temperature, are relatively diffuse in nature, some readers might well maintain that the reactions of interest to us are basically moods rather than emotions. It is often held that emotions, unlike moods, are about something in particular; they have a more definite cause, more specific target, or both. However, this clarity and/or focus is a matter of

degree, as Frijda (1986, pp. 59–60) recognized, and people can vary in the extent to which they believe they know what produced the mood they are experiencing. Also attesting to the ambiguity and arbitrariness in the distinctions often drawn between moods and emotions, Siemer (2001) essentially favored a difference based on causal clarity but demonstrated in his research that a supposed induction of an "angry mood" had the same effect on subsequent appraisals that other investigators had obtained in their studies of "angry emotion." All in all, as Frijda (1986) put it, the distinction between mood and emotion is "unsharp" (p. 60). If people can vary in the extent to which they have a clear conception of the cause of their affective arousal, where do we place the cutting point on this continuum, putting mood on one side and emotion on the other?

The Question of Alternative Explanations

A more important issue for many readers has to do with the theoretical scheme we advanced: that strong negative affect as well as anger-related skeletal muscle movements can arouse angry feelings even without the mediation of appraisals. Such a sweeping position undoubtedly can be countered with the argument that, in many instances at least, appraisals could have been operating in the investigated situations. Does the evidence we presented really question appraisal theorizing?

Our answer depends greatly on our subscription to Karl Popper's view that theories must be falsifiable if they are to be considered truly scientific. In Popper's (1981) words, excerpted from a longer series of comments,

> A theory which is not refutable by any conceivable event is non-scientific. Irrefutability is not a virtue of a theory . . . but a vice. . . . Some genuinely testable theories,

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[7] Self-report measures of felt anger used in a number of laboratory experiments also point to the commonality among different types of angerlike experiences. In several of Leonard Berkowitz's studies (e.g., Berkowitz et al., 1981), a factor analysis of negative feelings elicited by exposure to a decidedly aversive treatment found that feelings such as "unhappy," "irritable," and "angry" were together included in the main factor uncovered. Somewhat similarly, Bushman (1995) used a combination of 15 adjectives such as *annoyed, hostile,* and *irritated* as his measure of "hostile mood" and found that the coefficient alphas for this index were over .9 (see also Harmon-Jones & Sigelman, 2001; and Harmon-Jones et al., 2003).

when found to be false, are still upheld by their admir-
ers—for example by introducing ad hoc some auxiliary
assumption. . . . Such a procedure is always possible, but
it rescues the theory from refutation only at the price of
destroying, or at least lowering, its scientific status. (pp.
96–97)

Theoretical accounts opposing (as well as support-
ing) the interpretations we offer here should be ca-
pable of being refuted and not rest only on assertions
of what might have happened. These alternative ex-
planations could be valid in some, or even many,
situations, but this in itself does not necessarily mean
they are appropriate for all of the circumstances of
interest to us here. Consider two related arguments
that are likely to be advanced as alternatives to our
formulation: Where we suggested that an aversive
state of affairs automatically evokes an aggression-
related constellation of feelings, ideas, and action ten-
dencies (as well as, among other things, a fear-linked
syndrome), these alternatives propose that (a) the af-
flicted people could have blamed the target for their
suffering and/or (b) the decidedly unpleasant situa-
tion might have lowered the research participants'
threshhold for irritating situations. These afflicted
persons then could have readily appraised another in-
dividual's troubling action in an anger-provoking
manner.

Attributions and appraisals could indeed have op-
erated in these ways in a number of experiments. As
an example, it is conceivable that the participants ex-
posed to the presumably justified or legitimate frus-
trations in the Dill and Anderson (1995) and Burn-
stein and Worchel (1962) studies cited earlier had
blamed the sponsoring experimenter for their difficul-
ties, to some degree at least. Nevertheless, it seems to
us that these particular interpretations cannot account
for all of the results we reported. And so, in regard to
the first possibility just mentioned, in some investi-
gations the available target was clearly not the source
of the aversive experience but was still assaulted
fairly severely. We can see this in the Passman and
Mulhern (1977, cited in Berkowitz, 2003) experiment
in which the mothers under stress because of the re-
searcher's confusing instructions were more punitive
to innocent bystanders, their children. The Verona et
al. (2002) study is another example. Perhaps more
important, other investigations deliberately manipu-
lated the perceived source of the noxious stimulation
given the participants (e.g., Zillmann et al., 1981) and
found that the suffering persons were hostile toward
an individual not responsible for the unpleasant con-
dition. In much the same vein, studies of displaced

aggression essentially also demonstrate that angered
people can direct their anger and aggression at per-
sons who had not provoked them earlier (Marcus-
Newhall, Pederson, Carlson, & Miller, 2000; see also
Berkowitz, 1998, pp. 54–55). Some of these instances
of displaced aggression are also relevant to the sec-
ond-listed possibility, a lowered threshhold for annoy-
ance. In a number of the studies, the substitute target
attacked was a neutral fellow student whose perfor-
mance on an assigned task was to be judged and who
had not misbehaved in any way. In these instances,
the participants had no reason to think of the target's
behavior as a particular annoyance. Quite a few stud-
ies along these lines (see Baron & Richardson, 1994;
see also Berkowitz, 1998; Berkowitz et al., 1981; Ve-
rona et al., 2002) have shown that aversive conditions
often promote hostility toward innocent victims. In an
experiment by Baron and Bell (1975; see also Baron
& Richardson, 1994, pp. 169–170), as a case in point,
the results showed that even clearly innocent bystand-
ers can be victimized by people troubled only by de-
cidedly unpleasant situations. With the present re-
searchers and others, Baron and his colleagues (see
Baron & Richardson, 1994) proposed that strong
negative affect tends to evoke an aggressive inclina-
tion as well as a desire to escape from the unpleasant
situation.

A brief comment should also be made about the
possible role of "demand compliance." Critics might
well contend that quite a few of the participants in
experiments we cited had actually suspected the in-
vestigation's true purpose and had deliberately acted
to confirm what they thought was the researcher's
hypothesis. Although this line of thought is wide-
spread in social psychology, research findings indi-
cate there may well be much less of this biasing ar-
tifact in the studies of interest to us here than is often
supposed. In the aggression area, Turner and Simons
(1974) demonstrated that the participants' awareness
of the experimenter's interest in their aggressiveness
led to a reduction in the punishment they administered
because of their evaluation apprehension, rather than
to the heightened aggression predicted by the demand
compliance thesis. Moreover, the results in a number
of studies, such as the findings of Pedersen et al.
(2000), suggesting that the participants' displeasure
predicted their subsequent hostility but not their re-
ported appraisals, seem too subtle to have been deter-
mined by "demand awareness." In the bodily feed-
back realm, Laird (1984) and his associates (see also
Duclos & Laird, 2001; Duclos et al., 1989) have re-
peatedly discussed the many reasons why it is implau-

sible to say that the results obtained in their experiments were due to "demand" influences. Strack, Martin, and Stepper (1988) also argued against demand interpretations of their findings. Then too, both Laird (1984) and Rutledge and Hupka (1985) presented evidence indicating that the heightened anger resulting from anger-associated facial expressions stems from the performance of these muscular movements rather than from any awareness of the experimenter's true purpose.

Finally, some of the factors we have identified as contributors to anger arousal may have little if any role in what most people regard as their typical angering experience. Russell and Fehr (1994) found such an apparently anomalous anger-generating occurrence when they asked their research participants to relate incidents that had aroused their ire. According to the investigators, one respondent had become angry as the result of accidentally bashing his kneecap on the edge of a swimming pool (Russell & Fehr, 1994, p. 194). Accidents such as this may not be a major source of the anger felt in the everyday world, and indeed, the participant telling the story had regarded the event as "only a slightly good example" of anger-producing incidents (Russell & Fehr, 1994, p. 194). Nevertheless, painful accidents have been known to create bursts of anger. Frijda (1993) pointed to other such events: "hitting one's head on the kitchen shelf . . . hammering one's thumb"(p. 362). Averill's (1982, 1983) investigation of angering incidents also had some unusual findings. According to his summary, about 14% of the anger-arousing events reported by the people in his sample were not in keeping with the conventional appraisal theory expectations.

Even though incidents such as these may be quite out of the ordinary,[8] we believe a truly comprehensive theory of affective states should attempt to deal with relatively unusual occurrences as well as the more common ones. Addressing these instances may at the very least point to affect-generating factors that operate in all of the cases—factors that are unfortunately neglected in the conventional analyses of the more common emotional episodes.

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[8] We should note that Festinger (1957; see also Harmon-Jones & Mills, 1999) developed his theory of cognitive dissonance, a theory relevant to a good deal of everyday thinking and behavior, in part on the basis of rare events— the prediction by a cult that the continent would be destroyed and also the spreading of rumors after catastrophes.

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