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The Complexity of Intensity

ISSUES CONCERNING THE STRUCTURE OF EMOTION INTENSITY

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EMOTION INTENSITY: A NEGLECTED ISSUE

The topic of emotion intensity has received little systematic attention in the literature. Part of the reason appears to be that emotions are often viewed as

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activity bursts of relatively brief duration. Intensity tends to be identified with peak amplitude of such bursts, and implausible consequences result. For instance, events of widely different emotional importance often lead to equally intense peaks. When considering the entire course of emotional experiences, however, and not merely single peaks, a large number of parameters appear that qualify as parameters of intensity. The complexity of the concept of emotion intensity also appears from examining further aspects of intensity judgments. In this chapter, several key questions are discussed. First, is the felt intensity of emotion unidimensional? Second, if not, what are its dimensions? Third, how do subjective and objective dimensions relate to one another? And, finally, what are the determinants of the different intensity dimensions? Comparison of the felt intensity of different emotions poses additional problems.

The lack of attention to the fact that emotions vary in intensity is one of the more curious aspects of emotion research . This neglect is particularly surprising, given that for more than 100 years, there has been a preoccupation with the notion of intensity in an entire subfield of experimental psychology, namely, psychophysics; experimental psychology thus has a tradition of concern with intensity issues.

The failure of emotion theorists to address questions concerning emotion intensity is all the more puzzling because intensity is such a salient feature of emotions. Our phenomenal experience acknowledges this fact, as do our behavior and our language; so how is it that our science essentially ignores it? And ignore it, it does. For example, in Averill's (1982) valuable empirical study of anger, almost nothing is said about intensity, except that anger is usually more intense than annoyance; this, even though Averill collected self-reports on the level of intensity of anger experiences. In the 18 chapters in Izard, Kagan, and Zajonc (1984), there is almost no serious discussion of the question, and in many books on emotion (e.g., Buck, 1984; Ekman, 1982; Grings & Dawson, 1978; Mandler, 1984; Scherer & Ekman, 1984), "intensity" does not even appear as an index entry. This is even true in books (e.g., Izard, 1982) about the measurement of emotions.

Experimental work on emotion also tends to ignore the issue of intensity. For example, Levenson, Ekman, and Friesen (1990) report differences in ANS activity among three groups of emotions (anger, fear, and sadness; happiness and disgust; and surprise). No attempt was made to partial out intensity differences from the emotion group differences, even though it seems likely that autonomic changes are related to intensity. Not paying attention to intensity variables may well confuse empirical findings. In a study

designed to uncover the prototypical structure of different emotions, Shaver, Schwartz, Kirson, and O'Connor (1987) asked subjects to describe either actual or (their idea of) typical cases of each of five emotions. Independent judges coded the descriptions in terms of a number of features, including physically attacking the cause of anger. Reports of actual anger experiences involved this feature about half as often as descriptions of typical cases (18% versus 33%). This finding, interpreted by the authors as showing a difference between actual anger and one's anger prototype, may merely mean that the prototype is closer to intense than to average or mild anger. The possibility that physical aggression might be more prevalent in intense than in moderate anger also is not considered in Averill (1982). His conclusion that physical aggression is not a common response to anger is based on pooling a large number of anger reports without concern for the intensity of the emotions.

Emotion intensity is important for a variety of reasons. It is intensity more than anything else that determines whether emotions lead to socially consequential behavior. Also, and for that reason, it is intensity more than the nature of the emotion that leads to a particular emotion episode being considered maladaptive. Presumably, it is an emotion's strength as much as its frequency that influences an individual's course of life and his or her behavior in relation to other individuals.

So, one of the major issues for the psychology of emotions is to discover the determinants of emotion intensity. Such an enterprise turns out to be unexpectedly difficult, partly because of the complexity of the notion of emotional intensity itself. It is not a simple concept; it only seems to be. The complexity of intensity, and the puzzles it creates, form an old problem. Consider the famous story of Psammetichus, king of Egypt, given by Herodotus (*Histories,* III, 14), and, for brevity, quoted here after Montaigne (1580/1965), who devotes a chapter to the relations between emotion and its overt expression:

> The story goes that Psammetichus, king of Egypt, having been beaten and taken prisoner by Cambyses, king of Persia, seeing his equally taken daughter pass by, dressed as a slave and sent to haul water, and all his friends weeping and lamenting around him, kept himself straight without a word, eyes fixed to the ground; but having noticed one of his servants led among the captives, he began to beat his head and expressing an extreme sorrow. . . . Asked why this difference by Cambyses, Psammetichus answered: "It is because only the latter grief can signify itself by tears, whereas the former goes way beyond any means of expressing itself."

The story illustrates, first of all, the distinction between emotional experience and the outward, behavioral manifestations of emotion. The two appear to vary to some extent independently. Note that the two are discrepant in the story, not because the outward expression of the former grief is restrained but because no fitting outward expression is thought to exist. In other instances of emotion, there may be stronger outward than subjective emotion. Depersonalization or "numbness" after trauma is a case in point: Behavior is disrupted, autonomic upset may be considerable, but feelings are absent or bland (Frijda, 1986, chap. 8).

The story illustrates more. It illustrates the intuition—Cambyses' in this case—that emotional events induce an emotional impact that somehow parallels the seriousness of the eliciting event. This impact may manifest itself in both subjective and outward phenomena. The problem is how this impact should be operationalized. Does it vary along one dimension only, or are there various dimensions of subjective and of objective response? There is, of course, ample evidence that the magnitudes of objective responses in emotion are not unidimensional. It may well turn out that subjectively assessed intensity likewise cannot be represented in unidimensional terms.

In any case, it is doubtful that the intensity judgment that people make about their emotions is the only, or best, criterion for the intensity of impact. Discrepancies between felt or reported intensity and outward manifestations form one of the reasons for this doubt. Empirical research has of course amply corroborated Herodotus (see, for example, Lacey, 1956; Lang, 1977). There may be discrepancies not merely between felt intensity and manifestations like wailing and beating one's head, but also between felt intensity and the effects upon the conduct of one's life. Consider the (semifictionalized) account of the murders by Gary Gilmore, given by Norman Mailer (1979) on the basis of interview transcripts. Gary Gilmore murdered two people whom he did not know, a gas station attendant and a motel keeper. After his girlfriend had broken off their affair, he drove around in his car with the girlfriend's sister, without saying much, without being noticeably upset apart from being frozen and self-absorbed, until he came, first to the gas station, then to the motel. The strength of his emotion might have been gathered from his silence and was manifest primarily in his behavior. But it is doubtful, from the account, that this behavior could have been foretold from his subjective experience.

Little is known about the precise relationships between reported or felt intensity and behavioral and physiological intensity parameters. The

relationships are loose and probably nonlinear. It is, for instance, likely that the most severe cases of distress are not accompanied by extreme emotional expressions. This at least is what the Psammetichus story suggests and what Montaigne underwrote. In any case, there appears to be no solid ground for saying that "emotion intensity" refers primarily either to felt intensity or to the intensity of behavioral or physiological manifestations. Conceptually, neither has a privileged status with respect to the other.

There is more to the complexity of intensity. The issue of conceptualizing emotion intensity extends beyond the relation between subjective and objective manifestations. Even within the domain of subjective assessments, felt or reported intensity may not be the best indication of impact. The main reason for saying this is that we cannot know a priori to what global intensity statements refer. We do not know whether they indeed refer to a specific quantitative aspect of experience, in the same way as, for instance, assessment of the brightness of a light does. The nature of emotional experience, after all, is far from transparent. One can, however, be sure that in most cases it is an experiential structure rather than a single, unitary experiential quality. The two griefs in the Psammetichus story, for instance, do not differ only in strength. They also, or maybe even primarily, differ in quality, which makes their intensities difficult to compare. The grief for the daughter's humiliation was "way beyond" tears. There is reason aplenty to suppose similar incomparabilities among more common emotional incidents. Which can be expected to be more intense—the fear of a painful injection or the fear of the outbreak of war? The quantifying epithet *intense* would seem to mean something different in both cases. One may well wonder to what extent the expectation of a continuum of overall subjective intensity is really based upon some actual common experiential aspect or, rather, upon the mere existence of a quantitative terminology (Bergson, 1923).

This, then, is the background of our analysis of emotional intensity. *Intensity,* conceptually, refers to the total emotional impact of a given event, of which the magnitude of various objective and subjective parameters are aspects or manifestations. It may turn out to be meaningful to treat this impact as unitary, but there are reasons to expect it to be nonunitary, so that it may be more appropriate to talk about "dimensions of emotion intensity." This, as we said, may even apply to the subjective experience of emotion. Pending pertinent conclusions, we will speak about "intensity parameters" to refer to the various magnitudes that can be expected to represent the magnitude of impact, which in turn might correspond to magnitudes in the emotion-arousing events.

The possibility of distinct dimensions of emotion intensity is not only of academic interest. It also represents a problem for prediction in practical situations. What emotion intensity indices allow prediction of future behavior? As the Gary Gilmore story suggests, it may not always be subjective intensity. A satisfactory understanding of emotion intensity is also needed because discrepancy between intensity indices may have diagnostic significance. For instance, disagreement between subjective and physiological indices of distress caused by stressful stimuli (low subjective but high physiological indices) was found to correspond with high values on the MMPI repression scale (Opton & Lazarus, 1967). In other cases, however, discrepancies may not reflect defensive processes because no single sign qualifies a priori as representing "true" intensity. Recent findings on sexual excitement illustrate the issue. Subjective and physiological (genital) sexual excitement in female subjects viewing erotica often show a low, or even no, correlation. Genital arousal may be accompanied by low subjective excitement, which might be interpreted as a sign of sexual inhibition or of reticence, and indeed is sometimes so interpreted in clinical situations (Heiman, 1977). It need not be, however, because the converse (high subjective and low genital excitement) is also found and is even more frequent under particular conditions. One such condition is repeated exposure to the same stimuli, which may lead to habituation of genital but not of subjective response (Laan, van Bellen, Everaerd, & Hanewald, in press). This means that the two intensities mean something different—namely, that desire and bodily excitement are not the same thing. Evidently, the complexity of emotion intensity merits close scrutiny if only because it has practical implications.

Finally, the study of emotion intensity is important because emotions perceived in others are important mediators in social interaction. People are convinced, angered, intimidated, carried away, or mollified by other people's presumed emotions. It is likely that these social effects are graded in accordance with perceived intensities, as these may be highly relevant: Is he or she truly deeply hurt or is it a straw fire? Does his or her response promise consequences or not? An analysis of the structure of intensity may yield hypotheses for these aspects of social processes.

INTENSITY AND THE STRUCTURE OF EMOTIONS

We shall be discussing a number of potential components or dimensions of emotion intensity. The various components are distinguished on theoretical

grounds. We view emotions as *multicomponential phenomena* (to borrow a term from Scherer, 1984), whose major components are cognition, action readiness (with concomitant behavior), feeling, and physiological change. All four components contribute to subjective intensity. Emotional experience is a structure of the individual's cognitions, feelings, and awareness of his or her state of action readiness and physiological change. It is plausible to suppose that different intensities are constituted separately by these components. We briefly specify their nature.

The cognitive component includes a (not necessarily articulate) representation of the meaning of the emotion-eliciting situation (Mandler, 1984; Ortony, Clore, & Collins, 1988), and it is one of the major features that distinguishes one emotion from another. It also includes the changes in beliefs about persons and things that are instigated by the emotion. Some of these belief changes do not survive the emotion, but others may persevere.

The notion of action readiness (Frijda, 1986) refers to urges for overt action as well as to a decrease or complete loss of the desire to act (as found in apathetic grief). Action readiness may lead to overt action and expressive behavior; sometimes, however, it is only felt as an inclination or urge. Emotions tend to be distinct in their pattern of action readiness as well as in their cognitive structure. The urgency with which action readiness seeks expression—that is, the emotion's "control precedence"—varies as a function of the amount of disturbance and interference it produces, and the persistence with which the emotional goal is pursued (Frijda, 1986). Degree of control precedence constitutes a plausible intensity dimension.

The feeling component of emotions includes affect, that is, the feeling of pleasure or pain. One of the unresolved theoretical issues in the psychology of emotion is whether differences in emotional feelings involve further irreducible feeling qualities or can be understood from cognitions and the feedback from action readiness, action, and physiological changes.

Physiological change, finally, enters the analysis of emotional intensity both as actual changes and as awareness of such changes.

The various components entertain functional relations; for instance, physiological changes are related to preparations for overt action. Yet the relations are statistically loose. Data indicate that each component tends to be positively, but quite weakly correlated with the others (Lacey, 1956; Lang, 1977), suggesting that each component has its own specific determinants. Our position is that no single one of them can be considered representative of the emotion.

The supposition that the various components to some extent vary independently in magnitude follows from the hypothesis that each has a different position in the process of generation and development of an emotion. The process can be roughly sketched as follows.

Emotions are the outcomes of an appraisal process in which events, people, or things and their perceived implications are evaluated in terms of their relevance to the individual's concerns (Arnold, 1960; Frijda, 1986; Lazarus, 1966; Ortony et al., 1988; Roseman, 1984; Scherer, 1984). The term *concern* refers to major goals and motives, likes and dislikes, and norms and values. The resulting state may consist of more or less diffuse positive or negative affect or of a highly specified emotional state. The specificity of the state reflects the degree of cognitive differentiation of the emotion-producing situation. The situation may be perceived as certain or uncertain; as transpiring in the past, present, or future; as reflecting someone's agency, which can be the self or another; and so on. Such perceptions, we assume, guide the generation of a particular form of action readiness, such as that of angry opposition, fearful withdrawal, or apathy, and forms one input to expression, action-planning, and belief. In this process, the assessment of something as beneficial or harmful to one's concerns is assumed to generate positive or negative affect. The assessment of one's overall response resources may generate increases or decreases in general activation. The assessment of coping requirements may generate physiological arousal.

We thus conclude that subjective as well as objective emotion components may more or less independently vary in magnitude. Additional differentiation of intensity parameters follows from the fact that the magnitude of each component can be assessed in different ways. Each component can vary along several dimensions that can be considered reflections of emotional impact, namely, the dimensions of latencies, peak and average magnitudes, and durations.

In the emotion literature, emotions are often represented as brief psychological episodes, typically lasting only a few seconds or minutes. Ekman (1984, pp. 332-333), for example, argues that there are "limits on the total duration of an emotion" and states that "the great majority of expressions of felt emotions last between 1/2 and 4 seconds, and those that are shorter or longer are mock or other kinds of false expressions." While this claim pertains to facial expression of emotions, Ekman also proposes that under normal circumstances the intensity of expression reflects the strength of felt experience. This suggests that the limits on duration apply to emotions

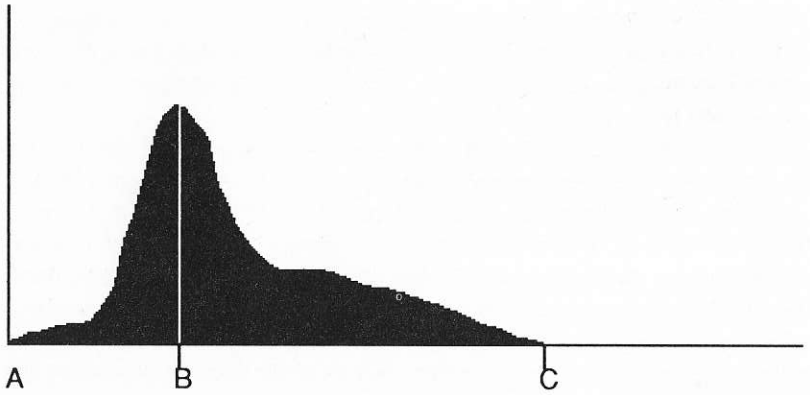

Figure 3.1. Single Peak Emotion Intensity Model

themselves, a suggestion that has in fact been embraced by others (e.g., Oatley & Johnson-Laird, 1987). In this view, an emotion is considered to be some sort of burst of activity. If one thinks in terms of plotting something like emotional arousal against time, the idea is that rather quickly, and for a relatively short period of time, the level of emotional arousal reaches a peak (see Figure 3.1). Emotion intensity is most readily represented by the height of this peak.

To the extent, however, that the course of emotions does not conform to this model, peak amplitude is less representative of other measures of response intensity, such as average intensity over the entire course or total response mass, the area under the curve. Emotion impact may correspond more to one of the latter than to the former. This applies to subjective as well as objective intensity.

In fact, self-reports of emotional incidents suggest that short-duration responses of the type given in Figure 3.1 are exceptions rather than the rule. The idea that emotion episodes tend to last longer than a brief period is more common in the literature on stress and coping than in that on emotion (e.g., Gruen, Folkman, & Lazarus, 1988). But current evidence shows that experiences of fear, anger, sadness, and joy, too, go on for hours in the majority of cases (Frijda, Mesquita, Sonnemans, & Van Goozen, 1991). In a recent study (Sonnemans, 1991), respondents to a questionnaire were asked to recall different emotions and to estimate how long these had lasted. The shortest reported durations were about half a minute. Of the reported instances, however, 60% lasted longer than one hour and 33% lasted longer than a day

(see Scherer, Walbott, & Summerfield, 1986, for comparable findings). One may be tempted to discard these findings in a discussion of emotion intensity by calling the long duration responses not emotions but moods. This does not help, however. First, we think that moods are better characterized by their diffuseness than by their longevity. Second, if these responses are called moods, the issue of intensity dimensions simply recurs in that context. We will not go further into the duration issue here, as it forms the substance of other papers (Frijda et al., 1991; Ortony, 1990). The main point is that consideration of the extension of emotion over time leads to the inclusion of a number of potential impact parameters, such as onset and peak latency, recurrence, and duration.

One might object that duration and intensity should not be confused. That is obviously true. Duration is a plausible index of total impact, however, and that is, as we indicated above, what we mean by "intensity." It correlates with the area under the response curve and can be expected to correlate with stimulus magnitude parameters. A similar argument leads us to include latencies in the analysis; latencies again are plausible indices of stimulus magnitude or impact. To the extent that duration, latency, and so on turn out to be separate dimensions in a correlational analysis, they can be said to form separate aspects of impact or intensity.

QUESTIONS CONCERNING EMOTION INTENSITY

The possible parameters of subjective intensity that we have outlined lead to some general questions with regard to emotion intensity. First, is felt or rated subjective intensity unidimensional? Second, do several dimensions of subjective intensity exist and, if so, what dimensions can be distinguished and how do they contribute to overall subjective intensity? Third, what are the relationships between the various objective (behavioral, physiological) intensity parameters, and what is their dimensionality? And, finally, how do the dimensions of subjective and objective emotion intensity relate to various aspects of emotion antecedents? Are there specific determinants for particular (subjective and objective) intensity dimensions?

(1) Unidimensionality of felt intensity. In many investigations of emotion, subjects are asked questions such as this: "How intense was your emotion?" Answers to this kind of question presumably represent a global aspect or computed judgment of one's feeling state that we refer to as *overall felt intensity.*

Questions of this kind assume unidimensionality of the underlying state; they assume the existence of a continuum along which all emotion experiences can be unambiguously ordered. The unidimensionality assumption would be violated if subjects behaved inconsistently, ranking a given experience higher than another for one reason and lower for a different one. Intransitivities in pairwise intensity orderings of emotion instances would result. The issue is well known in decision theory (Hogarth, 1987) and in the study of preferences (Coombs, 1964). Intransitive intensity ordering of emotions is plausible, because difficulties exist in deciding which of two instances of a given emotion is the stronger. We earlier gave the example of fear caused by the prospect of a painful injection as opposed to the prospect of the outbreak of war.

The problem of the unidimensionality of subjective intensity is still more glaring when one compares the intensities of different emotion types. To what extent is it meaningful to say that a given case of fear is more intense than a given case of indignation, or a given instance of joy more intense than a given instance of sorrow? To what extent are equal scores on the same scale comparable? The issue has fairly wide significance. If considerable violation of transitivity obtains, the very notion of "emotion intensity" is vulnerable because it would mean that it was impossible to predict the intensity of a given emotion occurrence on the relevant scale. This is more than an academic issue. Several systems of ethics presuppose unidimensionality here. For example, Bentham's Utilitarian Principle supposes that behavior has to be guided to ensure the greatest happiness for the greatest number of people. We will turn to the issue of the comparison between emotion types in the second part of this chapter.

(2) Multidimensionality of parameters of felt emotion intensity or felt impact. Whether or not overall felt intensity is unidimensional, several different dimensions or kinds of felt intensity may exist. "How intense was your emotion?" of course is only one of the questions that can be asked; "how violent . . .," "how powerful . . .," "how difficult to overcome . . .," "how disturbing . . .," "how much did it affect your life" are others, which do not necessarily amount to the same thing as an overall intensity question.

The subjective intensity dimensions may entertain several different relationships to felt overall intensity. Some might be related, and some unrelated, to it. Also, overall intensity judgments might be related to one dimension under one condition and to a different dimension under another. For example, the felt intensity of anxiety under threat of shock may be based

primarily upon feelings of bodily excitement, whereas that under threat of loss of love might be based on preoccupation with the threat and one's sense of confusion.

(3) Dimensions of objective intensity parameters. The issue of dimensions of response intensity has turned out to be crucial in the study of the relationships among autonomic variables and between these variables and behavioral variables such as muscle tension and performance decrement. Discussions of the meaningfulness of the arousal concept mirror the concerns of this chapter: When arousal variables diverge to any significant degree, "autonomic arousal" as a unitary concept loses its sense (Davidson, 1978), and when such variables manifest low correlations with behavioral measures (Lang, 1977), the same happens to the general arousal concept (see Neiss, 1988). The tendency for data to reveal rather low correlations between autonomic variables and reported felt intensity underscores the need to be wary of any unqualified concept of emotion intensity or of the measurement of emotion intensity by any single index.

(4) Determinants of emotion intensity. One of the main questions regarding emotion intensity concerns its determinants. This main issue again is largely unexplored. There exist reasons for this neglect. Given what we have said so far, it appears likely that different aspects of emotion intensity have different determinants. When the intensity of two emotions is the same in some respects and different in others, one may suppose that the corresponding determinants show correlated similarities and differences.

Daily experience suggests a host of factors that might influence intensity variables. At the most general level, at least four categories of determinants may exert distinct influences: *concern strength,* that is, the value of the concerns at stake in the event eliciting the emotion; *event value,* by which we mean the seriousness or value of the event, given the concern(s) involved; *context,* which incorporates considerations such as unexpectedness, assessment of possibilities for coping, support, and the like; and *person,* that is, personality attributes such as emotional response thresholds for emotions generally or propensities for particular types of emotion.

One might expect different determinants to influence different intensity aspects. For instance, bodily excitement or arousal might reflect the unexpectedness of the event (a context factor), belief changes might reflect the importance of the issue to the subject (that is, concern strength), and the emotion's duration might reflect the expected impact of the event (event value). About all this, little or no systematic evidence exists.

ASPECTS OF EMOTION THAT CAN VARY IN MAGNITUDE

In this section, we shall enumerate a number of potential parameters of subjective intensity. As we said, by *parameters of intensity*, we mean those parameters that vary in magnitude and that theoretically can be expected either to contribute to total emotional impact or to correspond to magnitudes in the emotion-arousing events. Objective parameters corresponding to the subjective ones can readily be identified. We will only discuss parameters of subjective emotional awareness.

(1) Overall felt intensity. One might think of this as being whatever would go into the generation of a response to a global question such as this: "How intense was your emotional reaction to situation S?"

(2) Peak amplitude (peak felt intensity). As already indicated, we refer here to the maximum level of a phasic reaction (the height of the peak in Figure 3.1). One might suppose that the greater the impact, the more intense the most intense period. This might be captured by a question like this: "How intense was the most intense moment of your emotion?"

(3) Average felt intensity. One can conceive of several different methods of "averaging" over the entire course of an emotion. Any of these "averages" may underlie the answers to a question like: "How intense was your emotional experience over its entire course?" For example, it might be the average of peak amplitudes, perhaps weighted by their temporal proximity to the eliciting situation. Or, with reference to Figure 3.1, one might think of it as the area under the curve. One would suppose that the greater the impact, the more the average felt intensity.

(4) Felt duration. This refers to the length of time between the onset of the emotion and the return to baseline activity, that is, the distance on the X-axis (rather than the height on the Y-axis, peak amplitude). "How long did your emotional experience last?" would be a relevant question. It seems reasonable to suppose that, other things being equal, if one emotion lasts longer than another, it will be felt as more intense. One might also suppose the converse, however, namely, that emotions of brief duration are felt as more intense than those of longer duration: Those of brief duration present subjects with a sharper distinction between the baseline and their emotional state.

(5) Onset latency. This is the time that elapses between the moment that the emotional event is registered and that at which the activity level rises above the baseline. It could be assessed by a question like this one: "How soon after situation S did you begin to react emotionally?" One might conjecture that the sooner one gets into the emotional state, the more intense the emotion is.

(6) Peak latency. This refers to the time between the onset of the emotion and the point at which the maximum level of activity is reached, perhaps measurable by an item such as: "How long after situation S did your emotional reaction reach its peak?" One would expect that more intense emotions would tend to reach their peak amplitude before less intense ones.

(7) Peak duration. Peak amplitude need not be restricted to a point; indeed, in the general case, it is better regarded as a plateau. For example, on receiving wonderful news, a person might become deliriously happy and stay so for some period of time before this happiness begins to abate. A relevant question would be: "For how long was your emotional reaction at its peak?" One might suppose that the longer the period during which the maximum intensity is sustained, the more intense the emotion.

(8) Degree of recurrence of the emotion. The degree to which the emotion arises again after having once subsided may be considered a further parameter of impact. Several aspects may be distinguished. One is the total period of time during which an emotion recurs, another is the number of times that it recurs, a third is the overall felt intensity of each recurrence, and a fourth is how such recurrences are distributed over time. A general question to tap this aspect would be one like: "To what degree did the emotion in response to situation S recur?" One would expect that the greater the degree of recurrence, the more intense the emotion.

(9) Degree of preoccupation with situation-relevant thoughts. "To what extent were you preoccupied with thoughts relevant to situation S?" This notion pertains to recurrence of thoughts about the emotion-eliciting situation, its antecedents, and its consequences, that is, it pertains to rumination rather than to recurrences of the emotion itself. Of course, such thoughts may themselves give rise to recurrences of the emotion or to the occurrence of new (distinct) ones. Again, presumably, the more a person is preoccupied with thoughts about the eliciting situation, the more he or she will feel the emotion to be intense.

(10) Degree of cognitive change. An important aspect of emotions is that they frequently involve significant changes in beliefs and attitudes. "To what degree did your emotional reaction to situation S involve changes in your beliefs or attitudes?" would be a relevant question. It seems plausible to

suppose that more intense emotions entail more drastic and more long-lasting changes of this kind than do less intense ones.

(11) Effects upon the conduct of life. Here we need to be careful to separate out the effects of the emotion-inducing situation from those of the emotion itself, which is what we have in mind. For example, the behavior of a mother who, grieving over the tragic death of her young child, lapses into a state of apathy would represent a massive change in the conduct of her everyday affairs—a change brought about by the emotion impact rather than by the tragedy as such. "To what degree did your emotional reaction to situation S change the way you lead your life?" might tap what is meant.

(12) Felt intensity of changes in the urge to act. Intense emotions often appear to be associated with strong urges to do (or not to do) particular things. For example, strong anger can be associated with powerful aggressive impulses, and extreme distress can lead to a desire to do nothing. Thus another aspect of emotion intensity might be the degree to which such urges feel compelling. "How strong were your urges to do something with respect to the situation" and "How strong was your inclination to abandon doing anything whatever?" might be relevant questions.

(13) Drasticness of emotion-induced urges to act. The acts associated with the emotional urges may vary in drasticness. They may be potentially of great or minor import. Thus the drasticness of the acts a person has thought of might also represent an aspect of the intensity of the emotion. The wish to strike a person who annoys one is an inclination of a more drastic nature than the wish to scold such a person; not wanting to get out of bed in the morning may well represent a more intense depression than not wanting to go out for dinner. The question, "How drastic would the consequences have been, had you done what you felt inclined to do?" might tap what is meant.

(14) Drasticness of the actual emotion-induced actions. One might ask: "How drastic were the consequences of what you actually did?" Whereas the previous item pertains to what the person was tempted to do or to abstain from doing, this one pertains to what she or he actually did or did not do.

(15) Amplitude of felt physiological change. "How intense were the bodily symptoms of your emotion?" could tap the felt bodily and physiological responses that result from the emotion-inducing situation. Presumably, it is positively correlated with emotion impact.

(16) Duration of felt physiological response. Similarly, "For how long did you feel bodily symptoms of your emotion?" focuses on the length of time during which the person was aware of these physiological changes.

SOME PRELIMINARY DATA

We are currently addressing a number of the issues raised above in one of our research projects. In the first, preliminary study (Sonnemans, 1990), 306 first-year psychology students were asked to recall an instance of one of the four emotions of fear, anger, happiness, or sadness. They then rated a variety of aspects of the recalled experience on a 50-item questionnaire. The items contained variants of what in essence were 18 major questions embodying different intensity aspects. Variants differed in whether they asked for absolute estimates or for estimates relative to other instances of the same kind. They also varied with regard to the time periods after the eliciting event to which the question referred. Table 3.1 lists the substance of the major questions. The questionnaire, in addition, contained a set of 11 seven-point emotion rating scales. These scales asked for ratings of the intensity of each of 10 emotions plus a blank for the intensity of any other emotions not listed.

The scores on the questions were intercorrelated and subjected to factor analysis, which yielded 9 factors according to the 75% variance criterion; 7 of these factors showed eigenvalues > 1; the scree line bends after about 4 factors. Oblique rotation (ortotran/varimax) was performed because interrelatedness of factors was deemed more plausible than independence. Correlations between factors were quite low, except with factor 9, defined by overall felt intensity and felt peak amplitude; orthogonal rotation indeed yielded an almost identical pattern. Table 3.2 gives the loadings over .20, from the oblique rotation, of several variants of the questions listed. Table 3.3 names the factors and the items with high loadings and gives their variance contributions. The tables show that several relatively independent intensity dimensions have to be distinguished. No general factor, on which all or most variables have sizable loadings, can be detected.

Probably the most interesting are factors 1, 4, 5, and 6. An emotion's duration, its recurrence in thought, and its effect upon one's conduct of life hang together but are relatively unrelated to more momentary indices of emotion intensity such as felt peak amplitude, felt bodily arousal, and felt change in action readiness. Felt bodily arousal, felt action readiness, and drasticness of actions one felt inclined to or actually did perform all form independent components. Surgency, that is, rise time of response, again forms a separate dimension (factor 2). As hypothesized, emotion intensity can vary along one of these dimensions without varying much along the others, suggesting that the intensity of felt emotional response should be described in terms of more

TABLE 3.1 Major Questions in Intensity Questionnaire

1. How long was the interval between the eliciting event and the first emotional response? *(onset latency)*
2. How long was it before the emotional response reached its peak? *(peak latency)*
3. How intense was your emotional feeling at its peak? *(felt peak amplitude)*
4. How intense was your emotional feeling over its entire course? *(average felt intensity)*
5. How long did the entire emotional experience last? *(duration)*
6. To what degree was your emotion accompanied by bodily symptoms? *(felt arousal strength)*
7. How long did the bodily effects last? *(felt arousal duration)*
8. After the initial emotional reaction, how frequently did you think of the events and reexperience the emotion? *(recurrence)*
9. Are there events, things, or persons that trigger the original emotion? *(associational width)*
10. Did you experience some action impulse? *(felt action readiness)* How drastic was the impulse, and how strong was it?
11. How strongly did you experience an aversion or an incapacity to act? *(felt loss in action readiness)*
12. Did you actually do something during your emotional response? If so, how drastic was your action? *(action drasticness)*
13. How satisfied were you, after the emotion was over, with your behavior? *(action contentment)*
14. To what extent did you try to control your emotion? *(control strength)*
15. How pleasant or painful did you feel your emotional experience to be? *(experience pleasantness)*
16. To what extent did your emotional experience (*not* the eliciting event) change your life? *(life change)*
17. How intense was your emotional experience as a whole? *(overall felt intensity)*
18. How long ago was the emotional experience that you described?

than one dimension. *Emotion intensity* has to be qualified: intensity with respect to what?—to overall feeling, felt arousal, felt action impulse, felt duration, and influence upon the conduct of life, onset surgency?

TABLE 3.2 Factors in Intensity Questionnaire

Variable	*Factor 1*	*Factor 2*	*Factor 3*	*Factor 4*	*Factor 5*	*Factor 6*	*Factor 7*	*Factor 8*	*Factor 9*
Onset latency (1.1)		.870							
Onset latency, relative (1.2)		.730							
Peak latency (2.1)		.719						.263	
Peak latency, relative (2.2)	−.259	.497						.499	
Peak amplitude (3)									.799
Average intensity (4)									.811
Overall intensity (17)									.800
Duration (5.1)	.444							.539	
Duration, relative (5.2)							−.286	.675	.327
Arousal strength (6)				.789					
Arousal duration (7.1)				.903					
Arousal duration, relative (7.2)				.853					
Recurrence (8)	.870								
Life change (16)	.645						−.226		
Associational width (9)							.895		
Action readiness, drasticness (10.1)					.915				
Action readiness, strength (10.3)					.866				
Action aversion (11.1)						.912			
Action incapable (11.2)						.792			
Action drasticness (12)			.301		.368	.532		−.408	.319
Action contentment (13)			.889						
Control strength (14)			.873						
Experienced pleasantness (15)			.594						

Not all factors found can properly be regarded as emotion intensity dimensions, even with the meaning we have given to that notion. This applies in particular to factor 3, "evaluation." Duration correlates .41 with felt overall

TABLE 3.3 Factors Found

Factor	Name	*Main Variables*	*Percentage of Variance*[a]
Factor 1	Duration	Recurrence, life change, duration	12.5
Factor 2	Latency	Onset latency, peak latency	8.7
Factor 3	Evaluation	Action contentment, control strength, experienced pleasantness	8.7
Factor 4	Felt arousal	Felt arousal strength, felt arousal duration	10.1
Factor 5	Action impulse	Felt action readiness	7.5
Factor 6	Loss of action readiness	Felt loss in action readiness, action drasticness	8.1
Factor 7	Associational width	Associational width, variant "how often?"	4.1
Factor 8	?	Peak latency, duration, inverse of felt action drasticness	6.1
Factor 9	Overall intensity	Peak amplitude, average and overall felt intensity	10.2

a. Joint percentage of variance of obliquely rotated factors.

intensity. We described earlier why we would count it as an intensity dimension: It is a major index of total response power, the area under the response curve.

As we just said, the various dimensions are grouped together under the notion of intensity. In fact, most of them show sizable correlations with factor 9, composed of the global felt intensity measures: overall felt intensity, average felt intensity, and felt peak amplitude. This suggests that felt overall intensity ratings, as well as those of felt peak and average intensity, can be viewed as the joint product of a number of the other variables. Felt emotion intensity would seem to result from some intuitive computation performed over other, more elementary estimates that are closer to more directly perceptible variables such as duration, felt action readiness, and felt bodily change. To investigate whether this is indeed the case, multiple regression

TABLE 3.4 Multiple Linear Regressions, Stepwise[a] (percentage of variance predicted)

Dependent Variable	R^2
Peak amplitude (3):	
recurrence (8)	.23
arousal (6)	.34
relative duration (5.2)	.39
Overall felt intensity (17):	
arousal (6)	.19
recurrence (8)	.33
relative duration (5.2)	.39
action consequence (12)	.42
Overall felt intensity (17):[b]	
peak amplitude	.44
arousal (6)	.47
relative duration (5.2)	.51
recurrence (8)	.52
control strength (14)	.53

a. Question 11 was not included due to the large number of missing values.
b. Peak amplitude (question 3) was included among the independent variables.

analyses were performed with the variables in factor 9 as dependent variables. Some of the results are given in Table 3.4.

About 40% of the variance of overall felt intensity is explained by three to four other variables: recurrence of thoughts about the emotional event, bodily arousal, duration of the emotion, and action drasticness. Ratings of overall felt intensity, as well as of felt average intensity, thus appear to be a result of some combination of the strength of one's felt arousal, the felt drasticness of one's actions, the duration of one's emotion, and the degree to which emotional thoughts tend to recur. It should be noted that action drasticness falls into one factor with loss of action readiness; one may suppose that, in the current material, the drastic action ratings refer to drastic inactions, such as not getting out of bed or neglecting one's important tasks. Obviously, the recurrence item can apply only to emotion recollections; one can only guess whether ratings of thought recurrence (or of the closely related question 16, life change) could also be measured by some question at the time of the initial emotional experience (e.g., "How great an impact do you expect this will have on the way you lead your life?").

Several multiple regression analyses were also performed with peak amplitude among the independent variables. They indicated that overall felt intensity is determined to a large degree by felt peak amplitude. The degree to which the three variables—overall, average, and peak amplitude—hang together is probably at a level that is close to what reliabilities allow. Either the three questions in fact tap the same thing or ratings of average and overall intensity are largely determined by what is recalled of peak amplitude.

The function relating the various variables to overall and peak amplitude appears to be somewhat different for different emotions. Multiple regression analyses were performed separately for the different emotions, with overall and peak amplitude as the dependent variables. Differences were found in the variables entering the equations. None of the variables significantly predicted the intensity of sadness. Felt bodily arousal strongly contributes to the felt overall intensities of fear and anger, but not of joy; relative duration and action drasticness contributed to the intensity of anger but not to that of fear and joy. These differences are plausible, because fear and anger will more often take the form of phasic upset than will joy and sadness; overt action probably is more frequent in anger than in fear. To the extent that this preliminary evidence holds upon further analysis, it clearly underscores the problem of how to compare the intensities of different emotions.

As indicated, the data we have reported are preliminary. Yet, they warrant the conclusion that our hypotheses concerning the multiplicity of intensity dimensions and the composite nature of overall intensity ratings are viable. Whether the overall intensity ratings give rise to intransitivities remains unexplored.

INTER-EMOTION COMPARISONS OF INTENSITY

The data on different emotion types lead to the difficult problem that we mentioned earlier, namely, whether the intensity of different emotions can be represented on the same scale. Is there a common and general dimension of emotional intensity? The fact that we can ask the question "How intense was your emotion?" of every emotion does not guarantee the existence of such a scale. More particularly, it does not imply that the comparative question ("How much stronger was that given instance of fear than that given instance of anger?") can be meaningfully and consistently answered.

The problem has various aspects. The more basic one is posed by the results just given: Aspects of the intensity of one kind of emotion may not be relevant to that of another kind. But a number of questions arise at a more pragmatic level. One may wonder whether a given scale value, say "moderate intensity," has the same meaning for different emotions, and whether the maximum possible felt intensity of, say, embarrassment is the same as that for anger, sadness, or hatred. Furthermore, one might wonder whether there is a systematic difference between positive and negative emotions: Is the maximum possible felt intensity for positive emotions the same as for negative emotions?

Questions such as these involve both theoretical and practical considerations. The practical issue is that when we wish to investigate subjective intensity, we usually elicit self-reports by mentioning a particular emotion word. For example, in investigating anger, one might ask subjects, "How intense was your anger?" while having little or no idea about the behavior of this question relative to questions such as: "How intense was your irritation?" or "How intense was your rage?" To set the problem, let us assume that when subjects are faced with the need to make a judgment of this kind, they use a presumed typical level of intensity associated with the emotion word in the question and then decide to what degree the particular case being judged falls short of or exceeds that value. If it should turn out that the typical level of intensity associated with one emotion word, say, *irritation,* is located on a different point of the scale than that associated with another, say, *rage,* the same scale values for the two words would in fact have quite different meanings. This problem is difficult enough when we think in terms of different emotion words from the same family (e.g., different "anger" words). It is more difficult still when we consider judgments with respect to words from different emotion types.

We have begun to explore how different emotion words reflect different aspects of intensity. In one study (Clore, Ortony, Fujita, Kerr, & Pritchard, in preparation), there were two conditions. In one condition, subjects were asked to decide where the maximum and minimum levels of each emotion fall on a scale, and in the other, different subjects estimated the typical level of intensity associated with each emotion word. All ratings were made on 10-point scales anchored at the low end with the description "barely noticeable" and at the high end with the phrase "the strongest feeling you could possibly imagine." This study took as its stimuli 285 emotion words (or, more accurately, phrases such as "being disappointed in [someone]" or

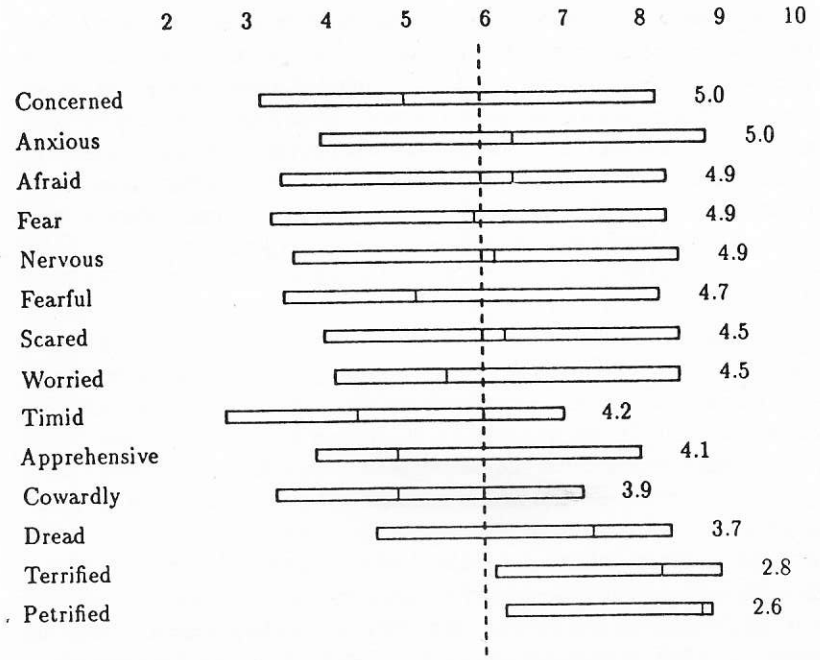

Figure 3.2. Intensity of Emotion Words in the Fear Category

NOTE: The bars represent the range (from mean minimum value to maximum value) for each word. The number following each bar is the size of the range. The short vertical line inside each bar represents the mean typical value associated with each word, and the vertical dashed line shows the overall mean intensity value from the entire data set.

"being jealous"). In a previous study, these words had been grouped together in categories representing different emotion types along the lines described in Ortony et al. (1988). For example, "fear" words had been grouped together on the basis of subjects' assigning them to one category ("a negative feeling about the possibility of something bad happening") rather than to another.

A reasonable hypothesis is that an important respect in which members of an emotion category vary is intensity. This is not to say that there are no other differences, for there certainly are, but intensity is probably a major one. Figure 3.2 illustrates the data for 14 words in the fear category.

The scale at the top of the figure is the intensity scale. The bars against each item represent the location and size of the mean intensity range (the size of the range is indicated by the number following the bar). The items are

listed in order of range size and show that the range of the broadest terms (such as "concerned," "anxious," and "fear") is approximately twice that of the least broad term ("petrified"). Another aspect of the range distribution is worth noting, namely, that the broad-range terms tend to be symmetrically distributed about the overall mean intensity value derived from the entire data set (shown by the vertical dashed line), whereas the lower range terms tend to be displaced from the mean. The narrow range terms appear primarily to emphasize particular intensity levels, that is, they represent small and more extreme portions of the potential range.

Although these data show differences in the range and location of intensities of different fear words, they also show considerable similarities, especially among the broad-range terms. In some cases, these similarities simply reflect the fact that one word (e.g., the adjective *afraid*) is a syntactic variant of another (e.g., the noun *fear*). In other cases, however, the different terms appear to highlight differences in aspects other than intensity (for example, *afraid, nervous,* and *anxious*). These differences might reflect something about the nature of that which is feared, such as a physical versus a psychological object (see Scherer, 1986), or about the kinds of behavioral impulses involved (Frijda, 1986).

It is clear that in investigations of emotion in which one presents subjects with a name of an emotion about which one wants data, care should be taken in selecting an appropriate emotion name. Ideally, one would select that term that is least marked for intensity. If we wanted to do this, the data we have discussed so far leave us with too many reasonable choices. Two additional criteria could be used, however. One would be to select on the basis of some sort of goodness of exemplar judgment. Another criterion would use ratings of "typical intensity." The mean values for the typicality ratings are represented in the figure by a vertical line in the bar for each emotion. When these ratings are viewed in conjunction with the range and location data, a clear pattern begins to emerge. Narrow range terms, which, as already mentioned, tend to be somewhat displaced from the overall mean intensity, usually have their levels of typical intensity displaced still more. For example, in Figure 3.2 the term *petrified* is the most extreme exemplar on the intensity scale (its mean level of intensity is almost 8). Its typical intensity level is displaced even further. As we move to the broader-range terms, the typical intensity levels tend to lie closer to the overall mean. This suggests that the most representative emotion terms within an emotion category—that is, those least marked with respect to intensity—might be expected to have the following properties: First, they have (relatively) broad ranges; second, they tend to be

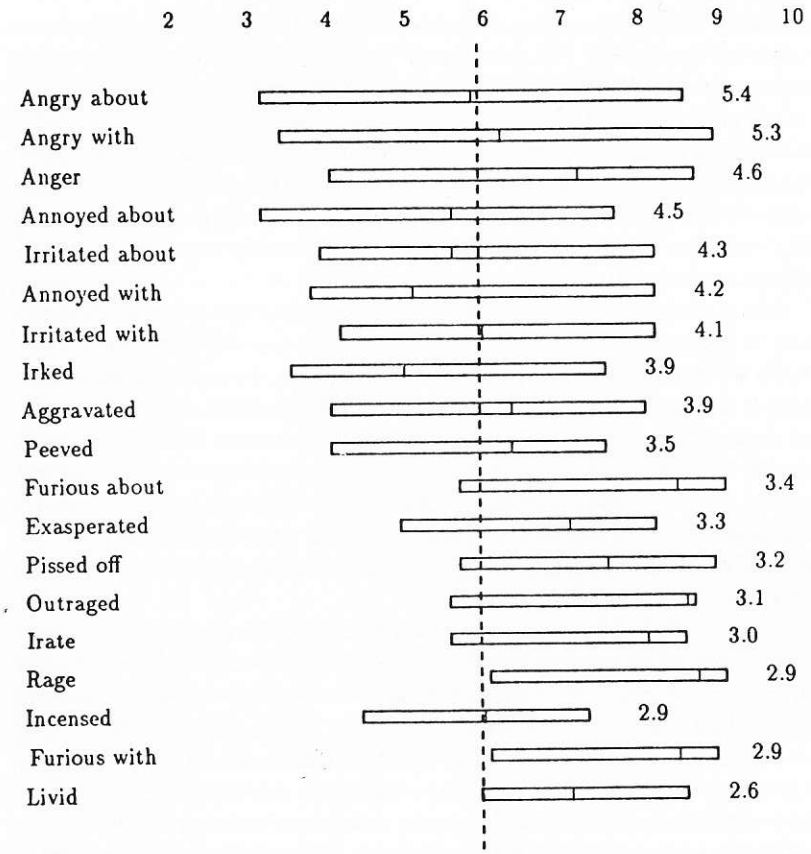

Figure 3.3. Intensity of Emotion Words in the Anger Category

symmetrically distributed about the overall mean; and, third, their typical intensity levels are relatively close to the overall mean (and, concomitantly, to their own midpoints). If we apply these criteria to the terms show in Figure 3.2, *fear* appears to be the best general label for the fear category, with *nervous* and *anxious* close competitors.

This is an encouraging result, but does it generalize? Unfortunately, it is too early to tell, although, as Figure 3.3 shows, the results of a similar analysis for anger emotions reflects the same pattern of data and a similarly comforting candidate for the category label. Again we can see evidence of a

correlation between typical intensity and displacement (of the midpoint of the range) from the overall mean as well as between displacement and range size (this time a negative correlation). The single item that seems to defy this generalization is *incensed,* which may well be because subjects did not really know what it means. Of the broad-range terms, the best candidates are *angry about* and *angry with,* and on both counts the former is superior.

What does all this have to say about the calibration of emotion intensity? Let us suppose that a subject in an experiment is asked to indicate the intensity with which he or she experienced a number of emotions. The first thing we need to note is that it makes a big difference whether the emotion term that is provided is or is not already marked for intensity. We saw, for example, that the typical level of petrification is very close to its maximum level, and that all levels of petrification lie toward the intense end of the range of fear. Suppose, next, that subjects are provided with an intensity scale for each emotion. What will they take as their reference point? In indicating, for example, how intense their petrification was, they might use as their reference point either the typical intensity of petrification or its average (midrange) level. In the former cases, most cases of petrification are likely to be rated toward the upper end of the scale; in the latter, they might be closer to the middle. This ambiguity will to some extent be alleviated by the use of terms such as *fear* and *anxiety*, which we saw there unmarked with respect to intensity. In such cases, the mean level of intensity and the typical level are virtually the same.

A problem remains in that, even with respect to the unmarked terms, the midpoints and typical levels are not perfectly aligned. This can be clearly seen from Figure 3.4, which shows the data for the 22 emotion types discussed in Ortony et al. (1988). Suppose that subjects were to indicate that they experienced an average amount of "admiration" and "self-anger." It would be wrong to conclude that the actual felt intensity was the same. The data show that average and typical self-anger are more intense than average and typical admiration.

The conclusion is that considerable care has to be taken in comparing intensity results among emotions. Even if one takes the precautions we have just discussed, the problems do not all go away. New methods will have to be developed to make interemotion comparisons meaningful. One might think of methods that employ some cross-modal reference scale or use an empirically established basis for transforming the scores on the scales used with different emotions.

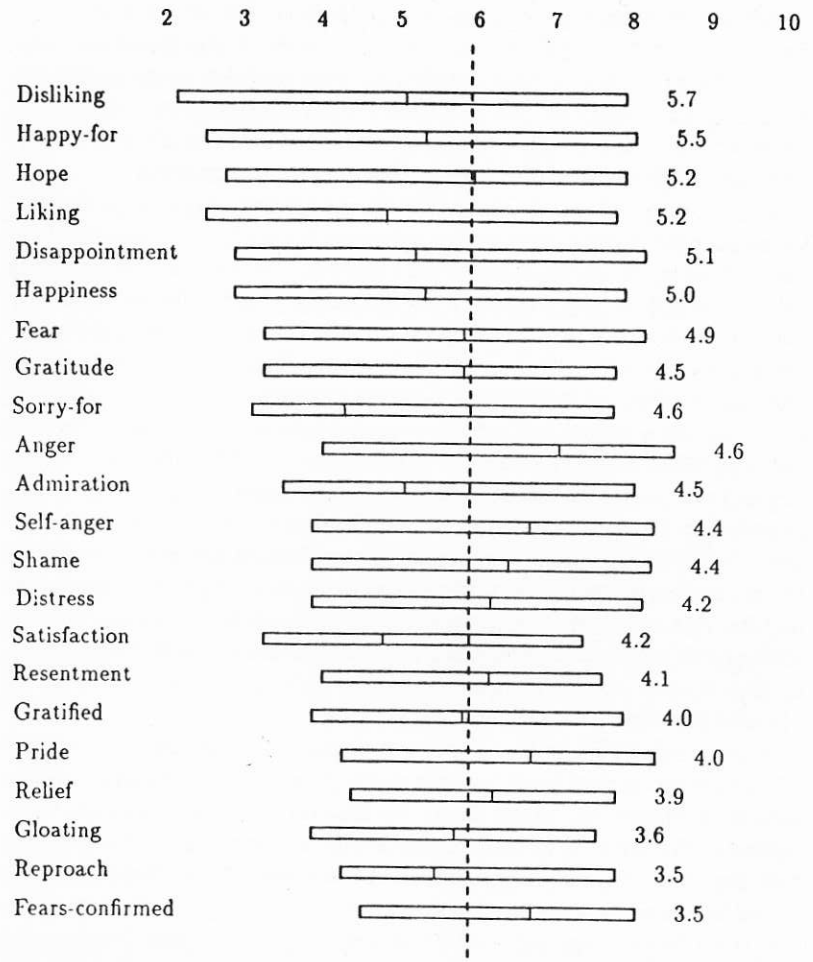

Figure 3.4. Intensity of Emotion Words

CONCLUSIONS

We have argued that the notion of emotion intensity has been an inappropriately neglected topic in emotion research. We then raised two questions about intensity. The first concerned the concept of emotion intensity itself, asking whether and under what conditions the concept is meaningful. More than a dozen possible kinds of intensity were discussed. It appears that emotion intensity is a concept involving multiple dimensions, of which duration and recurrence are relatively independent of intensity of felt arousal and intensity of felt action readiness. In general, the four dimensions enter with independent contributions into estimates of overall felt emotion intensity.

The second question asked whether qualitatively distinct emotions are also quantitatively distinct. That is, whether different emotions and different forms of the same emotion share the same scale of intensity. Data were presented for various terms referring to "anger" and "fear." As might be expected, terms that are unmarked for intensity (e.g., *afraid*) have a broader intensity range, and typical and mean intensity levels that are closer, than do terms that are marked for intensity (e.g., *petrified*). Comparison of the self-reports of the intensity of different emotions requires at least the use of terms that have comparable ranges and midpoints.

A further question concerns how the two domains of multiple intensity dimensions and the comparability of the intensity scales for different emotions intersect. Are the dimensions to which one attends when judging the intensity of anger the same as, or different from those to which one attends when judging the intensity of fear? When people consider how intensely angry they are, the extremity of their action tendencies might be a more important cue, whereas when people judge how fearful they are, they may attend more to a "felt peak amplitude." It seems likely that, when labeling one's emotion, the word used is in part determined by the variables involved in emotion intensity because individual emotion words often focus on one rather than another facet of emotion. So, when people say, "I was very worried," they may imply that they have been preoccupied with troublesome thoughts, which in turn implicates the intensity dimensions of duration and recurrence. But when they say, "I was very scared," they are more likely to mean that they had a momentary fright of large amplitude. We found some preliminary indications that this is indeed the case.

The two major problems for which the analysis of emotion intensity are relevant have so far remained almost untouched: that of the determinants for the various intensity aspects and that of their consequences. We are currently investigating the first problem, by looking at the relations between concerns and situational features, on the one hand, and intensity components, on the other. With regard to consequences, the preliminary study reported here provides at least a hypothesis: Duration, rather than, for instance, autonomic upset or impulsive behavior, would be predictive of long-term effects such as life changes or belief changes. Here, too, research that is under way may provide some helpful data and insights.

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