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A BEHAVIORIST ANALYSIS OF EMOTIONS

V. J. McGILL AND LIVINGSTON WELCH

INTRODUCTION

Since James defined emotion as consciousness of bodily reactions and Cannon and others detailed the nature of these reactions, there has been an increasing tendency among behaviorists to equate emotions with visceral reactions (*1*) and to neglect some of the genetic and adaptive aspects of emotion which had been discussed by Darwin (*3*).

The movements of the skeletal muscles are also recognized as an important aspect of emotion, but their wide variation from one individual, situation and culture, to another, has discouraged purely behaviorist study. The same movement of the arm might express fond farewell, angry rejection or despair, and it is, in general, only by ascertaining the situation to which the individual is reacting and to which his emotion is directed, that identification of emotions becomes possible. Photographs of faces expressing different emotions, it is true, permit identification of the emotion expressed in many cases, but only where the expression is very extreme or exaggerated, often amounting to a grimace, and even here the range of error is surprisingly great. The customary, more subtle shades of emotion, expressed by a nuance of tone, a change of posture or a flicker of the eye, require for accurate recognition an intimate knowledge of the situation, biographical facts and social norms of behavior, and the accuracy of detection seems to be in direct proportion to the adequacy of this knowledge.[1]

The danger of interpreting emotions exclusively in terms of visceral and skeletal reactions is illustrated by the phenomenon of "sham-rage". An animal whose hypothalamus is stimulated with electrodes exhibits all the external symptoms of fear except those which are most important. A cat so stimulated "begins to retract its ears, crouch, growl, raise its back and lash its tail, and show a crescendo of the following typical sympathetic and motor reactions: hyperpnea, salivation, mydriasis and widening palpebrae, piloerection, biting and striking movements with claws unsheathed. . ." (*11*). The cat displays its whole repertory of rage reactions, yet is not enraged: It laps milk, purrs, responds to petting, and does not react to rage-objects such as a rat, nor scratch the experimenter who fondles it. Another example in point is the play of animals, such as cats and dogs. To know whether play or serious attack is taking place, it is necessary in principle to ascertain the enemies of the species and individual organism in question. Whether a dog is serious or at play becomes clear when it is learned

[1] It is noteworthy that Darwin, who made the classical study of the expression of emotions in animals and man, makes a great point of describing the pattern of muscular contractions in emotion in relation to the adaptive struggle of the species and organism, and to needs, demands and "intentions". The specifically adaptive and subtly expressive nature of the emotion was largely neglected in James' theory, and is also lacking in most modern behavioristic accounts.

whether the object of his attack is his master or an unknown man, a strange cat or a friendly cat.

Such considerations suggest the need for further genetic study of emotions. Behaviorist method requires that emotions be explained as the result of learning, i.e., conditioning, adaptation, etc. What is needed, first of all, is a set of definitions of the various emotions (fear, anger, etc.) which will identify, at least provisionally, what is to be studied. Lacking such definitions, it is exceedingly difficult to compare judgments concerning emotions on the part of different observers (or even on the part of the same observer on different occasions). Are they talking about the same thing or something different? Anxiety is an example in point. Its relation to other emotions, especially fear, is never systematically explained, and the whole subject is usually left in obscurity for want of a few definitions. The emotion of love has been particularly neglected since Watson, and there has been a tendency to hand it over to psychoanalysts and popularizers, or to animal experimenters studying drives in rats. Emotions such as jealousy are also treated only obliquely and episodically in relation to pathological states. The behaviorist method calls for explanation in terms of carefully defined antecedent conditions. The other methods of studying emotions—the physiological, sociological and anthropological—are not incompatible with the behaviorist approach, but supplementary.

If the behaviorist program is to succeed, behaviorists have the obligation to explain in terms of behavioral principles how emotions are learned and under what conditions they emerge. Behaviorists can make a decided contribution to psychology by specifying, in their own terms, the behavior sequences and patterns which justify the attribution of mental states. Though empathy is doubtless an important aid in identifying emotional states of others, this method frequently goes wrong, and it is obviously important to work out definite behavioral criteria to distinguish correct from incorrect uses of empathy.

THE OBJECT OF THIS STUDY

The object is to enquire to what extent emotions can be explained, in principle, in terms of conditioning, adaptation, inhibition and other strictly behavioral principles. Explanation has many meanings. By explanation in principle we mean a set of statements tending to show that behavioral principles, together with environmental variables, imply a certain range of emotional facts, or at least that the question whether they do imply the facts or not, is decidable by further behavioral investigation, in the course of which both principles and facts may be extended and corrected. This is essentially Hull's sense of "explanation". The value of an explanation depends upon how many facts it explains and how few principles it employs. Our inquiry employs the minimum of behavioral principles, such as conditioned response and adaptation, and eschews the luxury of imputing mental states. The value of such abstention is particularly clear in the present paper, where we deal with the ontogenesis and development of the emotions, since introspective reports of infants, children and psychiatric patients are unavailable or difficult to interpret. In what follows

the effort is made to employ so far as possible only statements which are behaviorally certifiable.

Undefined Terms regularly employed are stimulus (S), response (R), satisfaction (of needs), injury, needs, expression of emotions, adaptation (in the psychological sense).

Defined Terms

1. *Motivation* takes place when stimuli occur which (a) satisfy needs or (b) injure the organism.
2. *Kinds of Needs.* Needs are either basic tissue needs, such as thirst, hunger and sex, or acquired needs (*9*, *17*)[2] such as a type of perfume or a kind of music. There are also other needs which are both tissue and acquired, such as the need for certain kinds of food which were at first disliked (e.g. caviar or olives).
3. *Motivational conflict* occurs when needs of comparable intensity (*15*) cannot all be satisfied. For example, if a child's incontinence is incompatible with its acquired need for social approval, and if the two needs are of commensurate intensity, conflict behavior is observed. Motivational conflict also occurs when injurious stimuli cannot all (or both) be avoided, and the stimuli are of comparable intensity. Conflict, as will be seen, arises in other combinations.
4. *Resolution of Conflict* takes place when incompatible needs (or drives) of similar intensity, become sufficiently dissimilar.
5. A *satisfier* is a stimulus-compound which regularly satisfies a need, a *dissatisfier*, one which regularly *dissatisfies* a need, i.e., fails to satisfy it. Although they fail to satisfy, dissatisfiers generally resemble satisfiers in other respects. As the resemblance of a dissatisfier to the corresponding satisfier increases, the dissatisfaction is intensified.
6. *A* is *responsive* if he regularly responds to the expression of a need of another individual *B* by motor, vocal or glandular activity "directed toward" B, which either satisfies or dissatisfies B's need.
7. A *responsive satisfier* is a stimulus-compound which regularly and responsively satisfies a need or needs.

[2] c/o Livingston Welch, "The Inclusion of Both Physiological and Acquired Needs in a Behaviorist System", *Journal of General Psychology*, and V. J. McGill, "The Mind-Body Problem in the Light of Recent Psychology," *Science & Society*, Fall, 1945. Acquired needs evidently arise through association with the satisfaction of basic tissue needs even when no reinforcement occurs. If S_1 is food and S_2 is dinner table conversation, and R_1 is satisfaction of hunger and R_2 is the satisfaction of the acquired need for conversation, we have the following four stages:

1)	2)	3)	4)
$S_1 \rightarrow R_1$	$S_1(S_2) \rightarrow R_1$	$S_1\ (S_2) \rightarrow R_1\ (R_2)$	$S_2 \rightarrow R_2$
$S_1 \rightarrow R_1$	$S_1(S_2) \rightarrow R_1$	$S_1\ (S_2) \rightarrow R_1\ (R_2)$	$S_2 \rightarrow R_2$
.....	.....	.....	.....
.....	.....	.....	.....

In the last stage (4) the acquired need instead of becoming extinct for lack of reinforcement, grows stronger. We cannot say that S_2 satisfies a "tissue need", but that it satisfies a need of *some* kind is supported by much evidence. For example, children cut off from human conversation in formative years never develop normal intelligence.

8. A *responsive dissatisfier* is one which regularly and responsively dissatisfies a need or needs, a *responsive injurer* one which regularly and responsively injures.
9. Activity "directed toward or upon" means "reactive to".
10. If an individual in its responses regularly differentiates between responsive satisfiers and non-responsive satisfiers, and his behavior shows a significant difference, this individual can be said to *identify responsive satisfiers as responsive.* The expressions "identify as responsive dissatisfier" and "identify as responsive injurer" are to be defined analogously.
11. *Emotions* arise where injury to the organism occurs, is anticipated or avoided, or where satisfaction of a need occurs, is anticipated or frustrated. In virtue of past associations, an individual carries out defense, escape, food-getting and other expressive responses directed upon a thing or individual typically identified as the satisfier, dissatisfier, injurer, etc. (Intense emotion is accompanied by alteration of visceral reactions).
12. An individual is said to *anticipate* S_2 when S_2 has been associated a sufficient number of times with S_1 and S_1 occurs and the individual responds[3] to S_1. As the intensity of S_2 increases the number of necessary associations decreases.
13. *Delight* ensues when an individual responds to the satisfaction of a need or anticipates this satisfaction, or responds to the cessation of an injurious S, or anticipates this cessation.
14. *Distress* occurs when the individual responds to injury or dissatisfaction of a need (Delight and distress are the basic emotions) (*2*).
15. *Hope* is the anticipation of delight.
16. *Fear* is the anticipation of distress.
17. A *rational fear* is one in which the individual not only responds with fear to the warning signal, but identifies the anticipated distress.
18. *Adaptive fear* responses are those which are appropriate to successful avoidance of the anticipated distress and therefore tend to diminish or to terminate the fear.

By *appropriate* is meant belonging to a class of responses having successful avoidance as its central tendency.

19. Two *emotions conflict* when the occurrence or expression of one is incompatible with the expression of the other.
20. *Anxiety* is a fear resulting from the conflict of emotions.
21. *Rational anxiety.* See rational fear.
22. *Adaptive anxiety.* See adaptive fear.
23. *Anger* (or grief) arises from frustration of needs, or injury where satsfaction of needs had formerly been encountered, the emotion being directed upon an S identified as a responsive dissatisfier or responsive injurer.

[3] The word "responds" in definitions 12, 13 and 14 means responds overtly. The response (in def. 13, 14) may be a full expression of the emotion involving sensory-motor and visceral activity, but where the expression of the emotion is inhibited, it may involve only perception. The minimum response in definitions 12, 13 and 14 is an adjustive response of the receptor appropriate to the stimulus and the accompanying central nervous activity.

24. *Love* is an activity directed upon an S identified as a responsive satisfier of needs, or a responsive reliever of distress.
25. Jealousy arises when A loves B and A identifies B as loving C, and then fears S, where S is B's *not* loving A.
26. Association will always mean spatio-temporal contiguity, but other relations such as similarity and contrast may play a part in conditioning, and so also may the many different configurations of the components of stimulus compounds (*5*).

I. *Emergence of the Social Level in Infants as Shown by the Learning of Fear, Love and Rage Reactions*

1). *The Development of Simple Love Reactions*

The infant reacts to many unconditioned stimuli before it learns to react to conditioned stimuli, such as fear, love and rage objects. Repeatedly it suffers hunger, thirst, cold, heat, constraint of movements, injurious or distressing conditions. When these tissue conditions are satisfied or remedied, the face and figure of the mother is almost always an ingredient in the situation. She is a mild, inconspicuous stimulus, and at first very indistinctly discriminated, but on the other hand she is always there, always in action when something is wrong. The articles of furniture in the infant's room are also present whenever conditions need correcting, but also at other times, and they never act until the mother acts, i.e. pushes them, whereas the mother often acts without the furniture acting. A chair, accordingly, does not become associated with the satisfaction of needs unless it is moved forward, for example, whenever the baby is fed or comforted.

A bottle, on the other hand, readily becomes a conditioned stimulus, so that when it is presented as a visual pattern, the infant makes anticipatory responses such as reaching, mouthing, salivating. A mother out of milk temporarily may even silence her baby's cries for a time by giving it the empty bottle, or the bottle filled with water. The child may refuse to be fed by breast or with a differently shaped bottle or nipple. The need for this bottle is an *acquired need*, but it may be strong enough to temporarily block the satisfaction of the *tissue need*, and cause serious concern to mother and pediatrician.

The mother's activity also becomes an acquired need, but of a vastly different order. The bottle is associated with the satisfaction of only one or two needs, and as new foods and feeding methods are introduced, the conditioning for the bottle deteriorates. The mother, on the other hand, is associated with practically all the satisfactions and remedies the infant experiences. Her at first dimly discriminated form moves. Satisfaction or relief follows. It is the mother who always acts; the bottle itself is nothing unless she brings it. The mother, too, is much more complex and many-sided than the bottle. To the ear, the eye, the touch she represents a great variety of stimulations, and it is only by degrees, presumably by differential conditioning, that the infant learns to react to the common element of all those situations in which it experiences satisfaction or relief.

The mother's activity differs from all other acquired needs in several respects:

(1) She is *the doer, the agent,* initiating movement. The bottle, Teddy bear, clean diaper, etc., are enjoyed only when the mother first moves, but the mother is seen to move when nothing else moves.

(2) The mother is also *responsive.* When the infant cries, neither the bottle nor the Teddy bear comes, but only the mother. Sometimes she brings the bottle, sometimes the Teddy bear, or something else representing a tissue or acquired need. The mother is the only object that is responsive, but the mother is also *differentially responsive,* i.e., her responsiveness is geared to specific needs as they arise. At times she also *anticipates* these needs, administering to the infant before it cries.

(3) She is the *general satisfier,* being associated with the satisfaction of not one or two needs, as is the bottle, but with nearly all of the needs of the infant, both tissue and acquired, and also with the relief of nearly all distress. Whereas the bottle comes to "mean" satisfaction of hunger, the blanket, the satisfaction of the need for warmth, the mother comes to stand for the satisfaction of all needs. (In the same way a cat might be trained to depress a lever for food, but if it also obtained drink, warmth, freedom from electric shock, etc., by depressing it, the lever would come to "mean" the satisfaction of any need.)

(4) The mother is the most complex, variable and many-sided object reacted to. As she responds to and satisfies needs she exposes different visual and other sensory aspects to the infant in a way that neither the ball nor the bottle could. Many aspects of the mother thus become acquired needs. A smile and caressing sounds, for example, by association with the satisfaction of being taken up in arms, become acquired needs. The movement of the mother's hands as she adjusts coverings or attracts the infant's attention is another example. *The smile, caressing sounds, comforting hands and other aspects of the mother, form a spatio-temporal unity, as other acquired needs do not.*

Although much more complex and variable than other objects reacted to, the mother is nevertheless one of the first identified. Apparently her incessant movement against an indifferent background and the satisfaction of needs that results for the infant, intensifies her figure and facilitates identification.

(5) The mother *is identified by the infant as the responder, the general satisfier.* The infant cries for its mother when it needs something else, when something is to be done or fetched. The infant comes to cry "Ma Ma" when any need requires satisfying, and this is unique. It cries "bottle" when hungry, but not when other needs are unsatisfied. The mother thus becomes clearly distinguished from other satisfiers as not only a satisfier, but also a "provider" of satisfactions. At first the cry "Ma Ma" may be only a circular reflex in Holt's sense. When "Ma Ma" later on becomes a cry *for the mother,* this is indicated by a change of behavior when the mother appears, or fails to come, or fails to do what is expected when she does come. Just as the infant's responses indicate when it has identified a ball, so its behavior shows when it has identified the mother as-the-general-satisfier, or giver-of-relief. The hypothesis that the infant identifies an object *as-such-and-such* is behavioral, and could be tested.

Does the infant identify the nipple on a bottle *as of a certain shape*, at least to the mouth? It makes such an identification if, when the shape of the nipple is altered, its behavior significantly changes. Whether the infant identifies the mother as the-general-satisfier could also be tested: Does the infant cry "Ma Ma" when anything goes wrong? Does its behavior change significantly when the mother appears or fails to appear, or when she appears without satisfying the need, as compared to the change when she does satisfy it? If the infant reaches out its arms to be picked up, or invites other activities on the part of the mother, but not on the part of other stimulus objects, this is evidence that it has identified her as a responsive satisfier.

Further indication that the mother is reacted to as a responsive satisfier of needs is furnished by the ease and by the relatively early stage at which infants can be taught to play with dolls and Teddy bears. In this play the infant takes the rôle of the mother, often repeating in detail the mother's administrations. If the child had not previously reacted to the mother as-the-general-satisfier-and-fixer, how could it now assume this rôle itself, and play for hours with such zeal and absorption?

If love is understood as "an emotion directed upon an individual identified as a responsive satisfier of needs, tissue or acquired", it is clear that the infant loves its mother when and only when it is able to learn to identify her as such. The identification is essentially testable by behavioral methods. Strictly speaking, the infant doesn't love its bottle or its ball at all, for love is directed only upon satisfiers which are also agents and regular responders, i.e., upon human beings. The doll itself is only loved by pretending it is human. The dog comes closer to the human because it responds to some extent. It is apt to be confused with the human. The infant's love for the mother develops only gradually, and its peculiarities are due to the infant's complete dependence. The mother's love for the infant is far more obvious, typical, and fully developed than the infant's love for her. In caring for the infant she satisfies her needs, tissue and acquired, but could not be said to love the infant unless it responded, however diffusively, to her administrations (Def. 24). Thus, a mother determined to experience a new baby as lovable, hence as human, often interprets its almost meaningless reactions, and attributes to it ideas and responsiveness which are fabulous. In part, however, such a mother is simply anticipating future responsiveness on the part of the infant, and loving it in advance. If the infant's love for its mother is characterized by its dependence upon the mother, the mother's love for the infant is determined also by the same dependence, but conversely. Thus the mother's very vigorous and responsive servicing of the infant's needs gives evidence of her love of the infant, i.e., the satisfaction of her own needs through administering to it, but also of the infant's love for her. The differential responsiveness necessary to love is at first very weak on the part of the infant and essentially promissory, but the promise is made good as the infant matures.

2). *Elementary Ambivalence*

As the infant grows older, the mother, while remaining the general satisfier, increasingly becomes a dissatisfier as well. Since the mother not only dissatisfies,

but is *identified* as a responsive dissatisfier (Def. 8) she becomes a rage object as well as a love object. The quality of this ambivalence depends upon her habitual responsiveness. For months she has responded to the infant's cry by giving it the breast, but one day she responds, i.e., she comes at the cry, but substitutes a bottle for the breast. The weaning process presents a steady train of such responsive reversals of habitual satisfying, and love of the mother is proportionately mixed with rage at her (Def. 7, 8).

Rage in the infant, which is expressed by shrieking, hitting, thrashing about, throwing things, etc., often gives way to grief, which may be expressed by weeping, or rather weeping with a weather eye on the mother, responsive to her movements. Whether rage or grief occurs, and whether one passes into the other, depends upon energetics and upon habit systems, i.e., upon which response has been attended with more satisfaction, or relief from distress. The ambivalence is mitigated in so far as anger passes into grief, and will tend to disappear, of course, when the anger response is replaced (through negative conditioning, positive conditioning, etc.) by another response (*6*).

Pavlov's dogs which raged against the harness used in his experiments, later on in many cases became perfectly adjusted to it. Domestic animals, such as the horse, even acquire a positive need for the harness which was at first repugnant.

3). *Cooperation and Love*

The mother-infant love is characterized by the infant's complete dependence. Between children of the same age a more equal love relation can develop and, in fact, will develop when it becomes possible for them to satisfy each other's needs actively and responsively. Two year olds do a great deal of what might be called playing alone together. They run together, ride tricycles together and play with buckets in the sand or water together, but these activities are also carried out each child by himself, and being together merely adds some additional satisfaction. Full-fledged love can only develop when maturation permits real cooperative-competitive games. At this stage a child is dependent upon other children for the satisfaction of its acquired needs to play certain games that cannot be played alone. It has become a social animal.

In adult life the mutual satisfaction of needs continues to determine the scope and intensity of love (Def. 24), but depends more upon the forms of labor than of play. A preponderant portion of time and energy in every society is employed in satisfying needs through work. The specific division and forms of labor prevailing in any society determine the nature of the satisfying process. When labor is cooperative, i.e., men satisfy their own needs only by satisfying the needs of other men, love and friendliness prevail. The extent of cooperative labor is thus the measure of the love or friendliness existing in any society. In the same way, the extent of antagonistic labor, i.e., labor responsively[4] dissatisfying the needs of other men, is a measure of the anger or grief in any society (Def. 23, 24).

[4] "Responsively", as we use the term, does not mean "intentionally", but reactivity to expressed needs (Def. 10 and point 2, above in Sec. I, 1).

It also follows that it is impossible to describe adequately the quality and patterning of emotion in any society without taking account of the prevailing division of labor, ownership relations and economic forms of cooperation. If the way in which needs are responsively satisfied or dissatisfied (or injuries are responsively produced or relieved) varies from one society to another, or from one sector of a society to another, so the corresponding emotion will also vary. The anger of an Indonesian indentured laborer against his European master and that of an American auto worker against the management, are very different kinds of anger. The love of an Eskimo and a New York physician for their respective wives will differ as much as the ways of satisfying do. Yet through all these variations, love remains love, anger, anger (Def. 24, 23).

4). *Inhibition and Conflict*

We have observed that the mother, while remaining the general satisfier, increasingly becomes a dissatisfier as well. The dissatisfying produces anger or grief, but also a change in behavior which may prove satisfying in itself or may be reinforced by reward, while the previous behavior is inhibited through punishment. Thus the infant at first delightedly throws its spoon on the floor, but eventually gets satisfaction from eating with it. The change of behavior is produced either by punishing the disreputable behavior, by rewardng the creditable behavior, or by the greater satisfaction afforded by the creditable behavior, or by all three. When the new behavior has been learned, the mother's intervention with reward or punishment is no longer needed. The infant has become self-correcting.

But the learning is not altogether complete—the inhibition does not always work. The child who has learned better may suddenly throw his spoon on the floor. The spoon has become a stimulus for incompatible responses and there is consequently a pull in both directions. When the infant in this conflict situation learns to inhibit the socially disapproved behavior without punishment being necessary, people say it is becoming social, or developing a social self or ego. When the emotional delight is transferred from the spoon throwing to correct manipulation, and the conflict recedes, people say that there has been further progress.

5). *The Genesis of Moral Habits*

The correction of disapproved emotional behavior can be much more complicated. Somewhere between 2 and 4 years of age, verbal and particularly moral stimuli, become powerful means of correction. The mother punishes rage reactions directed against playmates, but also associates such punishment with moral injunctions, such as, "That is bad", or "Good children don't do such things." These moral stimuli, since they are associated with punishment, can eventually be substituted for it with obvious advantages. When the disapproved behavior is punished or proves dissatisfying in itself, however, the moral stimuli ("bad" and "naughty") associated with it become strengthened, and can be applied effectively in many situations. "Bad" and "naughty" become *general*

discouragers. In the same way "good" and "nice", by repeated association with different types of approved behavior which are rewarded, or prove satisfying in themselves, become *general instigators.*

It is common experience, however, that when moral stimuli, such as "bad", have been repeatedly associated with disapproved behavior, this behavior tends to be inhibited even when the moral stimuli are absent. This is partly owing to the fact that the mother often anticipates the anger reaction and her warning use of "bad" is concomitant with the incipience of rage which she is able to observe. If at the onset of anger the child inhibits the reaction even when the moral stimuli no longer occur, the mother's moralizing has been supplanted, or internalized in the child, and we have the first beginnings of conscience and the moral self. The greater the number of internal inhibitions which have been substituted for external moral injunctions, the more evidence we have of conscience and the moral self. With increasing consistency of approved moral behavior, especially when it is accompanied by manifest delight (or absence of distress) people say that there is a relaxation of tension and conflict, and that the child is developing moral habits. When the increasing consistency of approved moral behavior is accompanied by manifest distress (or absence of delight) people say that the tension and conflict continue, and that the child is developing character or will.

Anger responses are regularly modified by verbal stimuli and so also is love. When the mother says that the child *ought* to love its father, that *good* boys do, that the father is *good*, or that it is *wrong* to be angry with him, changed behavior is often observed. Anger tends to be inhibited and love reinforced. The father, like the mother, tends to become a general satisfier, and is therefore already loved, but if the mother says the father is *good*, and elaborates the point, the love is reinforced. This happens because "good" and "nice" have become general instigators.

The reinforcement of love by verbal stimuli is, however, not purely mechanical. If the mother tells the child that the father is good, that he is going to bring home a box of candy, the degree of reinforcement will depend in part upon the issue—whether the father *does* bring home the candy. In all but the earliest phases of verbal reinforcement this seems to be the rule. The promise of satisfactions satisfies an acquired need for anticipatory satisfactions, and, therefore, tends to heighten love, but if the promised satisfactions fail to mature, a conflict between love and anger is to be expected. In the same way, if the mother denominates medicine "good" which actually tastes bad, a conflict ensues and the medicine is usually rejected. Even a child of four is not purely passive and plastic, but observes closely whether promises are kept, and reacts accordingly. Thus verbal instigators and discouragers depend for their effectiveness on the actual occurrence of the rewards and punishments, or other events, that they promise. If the mother says: "If you hit Johnny, he will hit you," and then Johnny does nothing but cry, she will not have succeeded in strengthening the inhibition to hit Johnny. Such comparing of words and deeds is doubtless one of the things people mean by saying that man is rational, but it appears to be largely explicable in terms of conditioning.

6). *Behavioral Prerequisites of The Oedipus Complex*

Discrimination of the sexes is greatly facilitated by verbal stimuli. Mistakes of gender are ridiculed and corrected insistently. The child is continually told that certain clothes, coiffure and activities belong to one sex but not to the other, and is regaled with love stories picturing intersexual, more often than intrasexual affection. The little girl is told that she will be like her mother when she grows up, and is taught to play with dolls, whereas the little boy, as a part of his regular training, is taught to admire and imitate his father, to brush his hair, tie his tie, etc., just as the father does. One of the earliest cooperative games played by children, therefore, is called "playing house," the boy playing the father, the girl the mother. As a means of inducing social behavior, the mother tells the boy that he is "her little man", and, during the long daily absences of the father, repeatedly makes remarks suggesting that he is the master of the house and that he must take responsibility and behave as the father does. When the father returns he, therefore, comes as a rival, i.e., as a dissatisfier of a certain kind. The boy is deprived of his status of father and man of the house, and loses the affection of the mother, or has to share it with the real father. The result is anger directed against the father, for he is identified as a responsive dissatisfier in a situation where satisfaction has been customarily encountered (Def. 23). But the situation is complicated by counteracting factors and the rage reaction comes to be inhibited. The situation is complicated because the father is also identified as a responsive general satisfier, and because punishment and moral stimuli such as "bad" have been associated with anger directed toward the father. The father is both satisfier and dissatisfier, both love-object and rage-object, but the rage reaction comes to be inhibited, the conflict internalized. Rage against the father is inhibited, but other behavior described as substitutive or symbolic may take place. Substitutive and symbolic behavior in conflict situations is commonly observed in children and adults and has also been demonstrated by experiments with neurosis in animals (Pavlov, Masserman).

Two other factors complicating the above situation must be mentioned. Various activities of the child, including masturbation, provide sexual stimulation and satisfaction. As the result of punishment or moral stimuli, these activities are typically inhibited. But the moral stimuli in this case are distinctive. Sex activities are not only bad, but shameful. That is, the child is taught not only to inhibit action but also speech. He is taught not to do other "bad" things but he is taught not even to mention sex. Thus the conflict, not directly dissipated or resolved by speech, becomes more internalized, and expresses itself more indirectly than is the case with the other types of conflict. The parents, who for years have fondled the child more than anyone else, unwittingly provide sexual stimulation and satisfaction, and thereby become the most important sex objects. Similarly, the child identifies the parents as responsive satisfiers of other needs, but not as satisfiers of sexual needs. For, as we have seen, not only is the child taught to inhibit the activity, but also to inhibit speech, and hence to suppress the identification.

Such conflicts, if not resolved nor even dissipated by speech, might be ex-

pected to have other indirect effects and to endure longer than other conflicts. They persist because (1) our society with its narrow family circle and strict taboos does not permit easy resolution, even (2) dissipation by speech being prohibited. (3) The stimuli producing these conflicts are relatively permanent features of the child's environment, whereas the stimuli productive of other conflicts are episodic. Intensity is another factor (Def. 3, 4). The intensity of the emotions involved in the Oedipus complex is due in part to the isolation of the child, especially the middle class child, from emotional contacts outside the narrow family circle. Further discussion of the Oedipus complex must be deferred to Part III, on "Anxiety".

II. *Fear*

Whereas the objects of anger, love and jealousy are always identified as responsive individuals (Def. 23, 24, 25), the object of fear need not be identified either as responsive nor as non-responsive (Def. 16). In this respect it is like delight and distress. These emotions are therefore simpler and presumably prior ontogenetically to the more complex emotions.

Fear is a very elementary emotion but should not be confused with the startle reaction, which is not an emotion at all. Fear is essentially anticipation and, therefore, a product of learning, whereas startle, by definition, excludes anticipation and learning. Knight Dunlap pointed out that the sudden loud noise that Watson used to elicit fear in newborn infants a few days old, did not produce that emotion, but only startle (*16*). Similarly, the bar struck immediately behind the head of eleven months old Albert, in Watson's famous experiment, produced not fear but distress. The distress, however, became a component in Albert's subsequent fear of the white rat. It will be remembered that on several occasions, shortly after the rat appeared, and Albert had reached for it, the bar was struck, producing fear (or rather, startle) and that subsequently the rat evoked fear when presented alone. If S_1, is the rat and S_2 is the striking of the bar, we may say that Albert's fear of S_1 was his anticipation of S_2 (Def. 12, 16).

The survival value of fear is that it serves as a warning of coming distress, enabling the individual to respond defensively or to escape. The warning signal is always some stimulus configuration in the present, viz.: The roar of a lion, a man pointing a gun or a house on fire. The anticipated distress, however, is quite different, viz.: being eated by the lion, shot with the gun, or burned alive. Even when the warning signal is a distressful tooth ache, the expected distress is always *future* distress and clearly distinguishable from the present warning.

In what we shall call "rational" fears, the individual not only responds with fear to the warning signal, e.g. a funnel shaped cloud, but identifies the anticipated distress, e.g., injury by a tornado. An individual identifies an anticipated distress when he responds to it in an anticipatory way. Thus, when a goat is repeatedly subjected to a series of telegraph clicks followed by shock to a forelimb, it responds to the first clicks by flexing the forelimb, which is its specific response to the shock. It thus can be said to identify the anticipated distress. Later on it identifies it more accurately by waiting until the clicks have almost

been completed before flexing its limb (*8*). Another example, on the human level, can be mentioned: A man frightened by the smoke he sees all about him, turns to scrutinize the forest, which is dry and inflammable, although no flames are in view, nor injurious heat. These two examples of rational fears are perhaps especially interesting from our point of view inasmuch as neither the flexing of the foreleg nor the looking toward the forest prevents the distress. The first, however, is adaptive, since it is appropriate (Def. 18) whereas the second is a rational unadaptive fear.

Although rational fears are the rule, non-rational fears are also frequent, that is, fears in which the anticipated distress is not identified. As an example we may take Watson's famous experiment with Albert and the white rat. Albert's fear of the white rat was not rational because Albert responded to the rat, but not to the region of the loud noise. If he has looked over his shoulder to the region where the bar had previously been struck, or had extended his hands in that direction, or had made an appeal by pointing poignantly to the vicinity, his fear of the rat would have been rational. Since he did none of these things he fear was nonrational. On the other hand, if the rat had started off with biting Albert, Albert's defensive responses to the rat's approach would have clearly anticipated the distress, i.e., the rat's bite. In this case, his fear of the rat would have been rational. On the adult level irrational fears are very frequent. For example, a man may be struck with sudden fear at the sight of a person he cannot even identify. When asked why he is afraid of him, he cannot say. Later on, he is able to identify the person as an agent of his enemies who he had seen in action years before.

Irrational fears may result from (1) insufficient maturation, as in the case of infants, (2) insufficient or remote conditioning (which is analogous to recall without recognition) or (3) generalization. The last takes place, for example, when a child who has been stung by a bee develops a fear of flies or bright beads, but does not identify the expected injury. Irrational fears may also result from (4) inhibition of the responses appropriate to the avoidance or mitigation of the expected injury.

Inhibition of such responses in fear situations is generally due to the operation of moral stimuli. If parents have associated such expressions as "shameful" and "terrible," or such warnings as "You will go blind" or "You will never grow up", with acts the child has performed in dark, closed places, the child may come to fear such places. When interrogated later in its life, however, the child cannot say why he is afraid, i.e., he fails to identify the expected injury. The inhibition of such verbal reactions results, as we have seen, from the punishment or moral censure which accompanies all mention of sex by children in our society.

Inhibition of reaction to the anticipated distress is of course quite different from inhibition of the fear response. The latter occurs when the fear reaction has been punished or censured. Thus a boy who has been repeatedly thrashed by other boys may learn that expressing fear is the surest way of getting thrashed again. Fear responses are inhibited because they are associated with injury, dissatisfaction or moral stimuli. According to Definition 16, however, fear would be present in this situation even though it is not expressed.

From this circumstance arises the possibility of *substitute fear objects*, and of disguised or masked fears. If one can have an emotion without expressing it, there is room for the expression of another emotion or the same emotion directed upon a different object: A little boy who has sometimes been put to flight by a little girl of the same age or size, explains that he is really afraid of the little girl's older brother, although, in point of fact, the older brother has always been friendly or indifferent toward him. If the little boy is not afraid of big boys in general, we may say that he has substituted the big brother for the real fear object. The proviso that he is not afraid of big boys in general is necessary, because it is possible that the little boy has generalized his fear of a particular big boy, or of his father, to big boys in general, in which case he may fear both the little girl and her big brother.

It is a matter of common knowledge and experimental evidence that many fear objects are established by *generalization*, just as many fears are eliminated by *differential conditioning* in the course of which harmless components of fear objects or situations are neutralized (*negative adaptation*). In principle it appears that the origin and elimination of fear objects is largely explicable in behavioral terms. For example, even of the very difficult case of substitute fear objects, something can be said on the purely behavioral level. Suppose that, in the above example, the little boy had been ridiculed or scolded repeatedly for expressing fear of little girls of his own size, whereas fear of big boys had been condoned. Big boys would have become approved fear objects, little girls, disapproved fear objects. When confronted by the little girl, and in the absence of adults, the little boy may express his fear fully by screaming and running away. When confronted later on by adults who have so often ridiculed such behavior, the little boy finds the confession of his fear object distressing: It dissatisfies his acquired need for social approval, and the confession is inhibited. To make the example easy, let us suppose that the little boy's father at this point says: "You couldn't have been afraid of little Nell; you must have been afraid of her big brother." When the father had made such barbed inquiries in the past, the satisfying response for the little boy had been, "No, I wouldn't be afraid of a little girl, but only of big boys," and his response is now the same. He avoids distress by saying that he is afraid of the big brother. Having learned to avoid one dissatisfying response, however, the same strategy may be generalized to similar situations, and may even affect his future behavior when confronted by big boys and aggressive little girls. This is a very simplified example, but it is not obvious that it is essentially different from more difficult and complicated cases.[5]

The most important distinction between fear responses is that of *adaptive* and *unadaptive*. Adaptive fear responses are those which are appropriate to successful avoidance of the anticipated distress, and therefore tend to diminish or to terminate the fear. By appropriate is meant belonging to a class of re-

[5] It should be noted that substitutive and symbolic behavior in relation to the hunger drive has been authenticated by animal experiments. Thus when Masserman's cats had been taught to depress a lever to get food, they sometimes continued to depress it, even when no food resulted (*11*).

sponses having successful avoidance as its central tendency. Thus if you respond to a man who has often hit you, by putting up your guard, this defense is adaptive even though it fails to prevent the blow, because it is appropriate to the situation. The child's fear of the candle flame is also adaptive if it withdraws its hand or keeps at a safe distance, but the response in this case is not only appropriate but also successful. In adaptive responses fear tends to fulfill its biological role of warning the organism against impending injury or dissatisfaction.

The rationality of fears facilitates adaptation. In rational fears the individual identifies the anticipated distress, and is often able to ward it off. But this is, of course, not always the case. It frequently happens that people identify the anticipated distress but have not learned the behavior appropriate to avoid it. A man on hearing the roar of engines and loud explosions may accurately identify the anticipated distress as death or injury by an exploding bomb, but may not have learned the behavior appropriate to the situation, or may inhibit this behavior because of some conflicting fear.

The irrationality of fears prevents adaptation in typical situations, but not in all cases. Substitute and symbolic fear reactions are sometimes adaptive, but since they involve conflict and anxiety they will be considered in the next section.

Methodological Note.

Before turning to a consideration of anxiety, it is appropriate to mention three points of method. A) Following our definition of fear (Def. 16) we have attempted to avoid statements not behaviorally certifiable. It is apparent, however, that physiological states were presupposed throughout. Even our definitions of the emotions involve a process of conditioning in which the organism changes in a manner not directly observable. If for the same organism, S → −R, but subsequently S → R, it must be concluded that neural changes have taken place in this organism, even though they are not accessible to observation. Pavlov refers to such changes as "cortical traces," while Hull speaks of "afferent discharges." We shall use the term "brain trace". We shall assume that concomitant brain traces have an additive property, so that if (O) and (S) are concomitant brain traces, and (S) produces R, (OS) will also produce R, providing (S) is prepotent in relation to (O). The following is a very simple example:

Stimulus		*Response*
1) Odor (of camphor)	→ Brain Trace (O)	→ No P.G.R.
2) Shock	→ Brain Trace (S)	→ P.G.R.
3) Odor Shock	→ Brain Trace (O-S)	→ P.G.R.
4) Odor	→ Brain Trace (O-S)	→ P.G.R.

The change in the individual from stage 1) to 4) is the formation of (O-S) which is now activated whenever the odor occurs.

B) We have also attempted to avoid the attribution of conscious states because, like neural conditions, they are not directly observable. It seemed important to define the purely behavioral situations in which various kinds of subjective emotion can be validly ascribed. Instead of saying that in unadaptive fear a man is not conscious, or does not know why he is afraid, for example, we said that "he does not identify the expected injury." At the same time we define "expected" and "identify" without reference to consciousness. This seems to be a worthwhile undertaking even if our definitions turn out to be inadequate, for in the latter case either better definitions will be offered or we will have discovered a barrier beyond which explanation in terms of conscious states has become a necessity.

C) It also seemed important to define the emotions without reference to the field or

"total situation," for the definitions should be general, and, therefore, abstract, while the same emotion (fear, anger, etc.) can be experienced in different total situations. In the concrete study of emotions, however, behaviorism often takes account of situational configurations. Thus even Watson makes clear that little Albert's reactions to the rat depended upon its position and movement in Albert's space-time situation. Recent behaviorists have made use of the environmental press in curing neurosis in animals (*11*) and considerable attention has been given to space as it must appear to the experimental animals during the experiment (*8*) and to the environmental determinants when the animals are not at work. Whether the total situation, or any part of it, has an effect on the formation of emotions, is essentially decidable, in behavioral terms, by experiments in which the environment, or some part of it, is suitably varied. Thus behaviorist experiments have shown that neurosis does not develop, in many cases, if the experimental room is enlarged. Environmental factors seem to be exceedingly important in the concrete study of emotions, but need not enter into genetic definitions.

III. *Anxiety*

Anxiety is a fear resulting from the conflict of emotions.[6]

Thus, anxiety may arise from a conflict of anger and fear, as when a boy is angry with his father (or his teacher) but also afraid of him. Two fears may also conflict, producing anxiety, as when a boy fears the reprisals of his gang but also the punishment of his father, or a man is afraid to break off relations with his mistress, but also afraid of his wife if he doesn't. Two angers do not appear to promote conflict, but love and anger, and love and jealousy provide many examples. For instance, anxiety arises when A loves and is also jealous of B at the same time, as when a child loves and is jealous of a younger sibling.

The conflict of emotions is analogous to motivational conflict (Def. 3). Two emotions conflict when the occurrence or expression of one is incompatible with the expression of the other (Def. *19*). As we have seen, (1) two fears may conflict, as when a soldier fears to remain in the trenches and also fears to desert. (2) Two loves may also conflict, as when a man falls in love with two women simultaneously, though in this case fear also enters into the pattern: e.g., fear that expression of love for one will forfeit the love or arouse the wrath of the other. On the other hand, jealousies do not even appear to conflict, nor do angers. Combinations of other emotions can also result in conflict, namely, (3) anger and fear, (4) love and anger (5) love and jealousy (6) fear and jealousy. And of course there are other combinations involving "special forms" of these emotions, or more than two of them (Special forms of fear are awe and terror, of anger, indignation and resentment).

Conflict resulting in anxiety may also arise where no conflict appears to be present. For example, H. S. Liddell produced neurosis in sheep and goats, merely by repeated shocks administered to the animal's leg, preceded by a buzzer (*8*). No conflict might seem to be present in this situation, but only the

[6] Although anxiety is usually defined as a conflict of drives, we prefer to define it as arising from a conflict of emotions. For one thing, the drives, which are activities directed upon the satisfaction of needs, are already involved in our definitions of various emotions. While drives are always functioning in anxiety situations, they appear to function as components of emotions.

fear of the shock and the fear of the buzzer, which are, of course, not incompatible. It is important to remember, however, that the animal, during the experiment, is harnessed up in the Pavlov frame, which prevents free movement—prevents escape. "Early in the training", Liddell remarks, "the animal is unable to repress bursts of activity not associated with signal or shock" (*8*). Pavlov had already spoken of the struggle of the harnessed dogs for freedom, and of the long training they underwent before negative conditioning could be, in a measure, successfully established. There is no doubt that the Pavlov frame dissatisfies a need—the need to move about or to escape—and that the animal learns to anticipate this dissatisfaction. Thus, according to our definition (Def. 16) the animal fears the frame as well as the buzzer-shock. These two fears, however, are clearly in conflict, for the expression of one fear excludes the expression of the other.

It might be said, however, that at any particular time it is the frame, not the fear of the frame, which prevents the animal from escaping. This is true enough as far as the present moment is concerned, but irrelevant to anxiety, since anxiety, like other fears, refers to the future and never to the present. One is afraid or anxious about what will happen, never about what has happened. In anxiety it is the anticipation that the frame *will* prevent escape which prevents the expression of the fear of the buzzer-shock.

Situations producing anxiety involve a conflict of emotions, even though this is not at first apparent. Conflict turns up in both experimental and clinical anxiety. A particular fear does not produce anxiety unless coupled with another fear, the fear that there is small chance of escape, or combined with some other emotion. As expectation of escape recedes, anxiety may approach actual panic.

Pavlov's famous experiment in which neurosis in dogs was first discovered, also seems to present a case of anxiety without emotional conflict. An illuminated circle was associated with food, while an ellipse with the ratio of 2:1 was presented without reinforcement. When the ellipse was gradually made rounder (3:2, 4:3, etc.), the dog could still discriminate it from the circle, and salivated to the one but not to the other. When the ratio of 9:8 was reached, however, the dog not only failed to discriminate, but now, as Pavlov says, developed "all the symptoms of a condition of acute neurosis" (*14*).

Conflict seems to be lacking in this situation, but analysis may show that it is present. As the ellipse (the dissatisfier) becomes more similar to the circle (the satisfier) we should expect (Def. 5) that the fear of the ellipse would be heightened. But negative adaptation counteracts this tendency. By the time the ellipse with a ratio of 8:7 is reached, the dog *may* experience no fear whatever. At the next stage, however, when the ellipse is 9:8, fear of it is unmistakable. Failing to discriminate the ellipse from the circle, the dog now hopes (Def. 15) the figure is the circle and immediately fears it is the ellipse, i.e., the same figure has become a stimulus for two emotions, the fear of deprivation of food (or of the hope of food) and also delight. These two emotions are in conflict (Def. 19). The salivation and preparation for eating are incompatible with the anticipation of deprivation.

The hero of Pirandello's play, "As you Desire Me" is subject to a similar, though a much more complicated, anxiety. Years before he had lost his wife whom he adored, and now

he finds a woman suffering from amnesia who is apparently, though he is not certain, the same woman. Throughout the play he is torn between love for this woman as his lost wife and fear that she is another. There is an undercurrent of anxiety even when he seems happily convinced of her identity.

Two emotions conflict when the occurrence or expression of one is incompatible with the expression of the other. "Incompatibility", in turn, is a function of the relative strength of the emotions and of their duration. By relative strength of the emotions we mean the relative intensity of the constituent delight and distress (Def. 13, 14). It is therefore the intensity of the needs (tissue or acquired) which are satisfied or dissatisfied, or the degree of the injury responded to, which finally determines the conflict of emotions. There is also the summation effect of protracted duration. Emotions of intensities below the conflict threshold may nevertheless conflict if they persist for a sufficient time. As the intensities of conflicting emotions approach equality, (or their duration is sufficiently protracted), anxiety nears its maximum at which point neither emotion can be expressed to any degree. As they diverge, the conflict diminishes and finally ceases. When a boy becomes more afraid of his father, or less angry with him, or vice versa, anxiety recedes, its place usurped by plain fear or out and out anger.

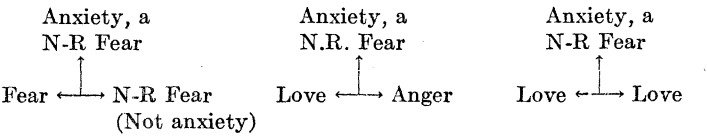
Anxiety, like other forms of fear, serves as a warning of coming distress. If the warning is heeded, the anxiety is rational, i.e., the fearful individual identifies the anticipated distress. In non-rational anxieties, on the contrary, this is not the case.[7] Rational anxieties are typical of normal life, whereas non-rational anxieties are more frequently found in the abnormal area. As implied in the section on fear, rationality facilitates adaptation, while non-rationality prevents it, at least on the normal adult level. The following four combinations, however, are all possible:

1) Adaptive response to rational anxiety.
2) Adaptive response to non-rational anxiety.
3) Unadaptive response to rational anxiety.
4) Unadaptive response to non-rational anxiety.

The first case (1) is self-explanatory and several examples of it have already been given. It is simply an adaptive response to anxiety in which the subject identifies the anticipated distress, i.e., he knows why he is anxious. The third and fourth cases (3) (4), also present no special difficulties. In (3) the individual knows what he is anxious about, but has not learned or has inhibited the appropriate response to it. Examples of this have also been given. (4) Likewise

[7] Anxiety as we have seen, is a kind of fear, but fear, in most cases, also occurs as one of the conflicting emotions which produce the anxiety. In non-rational anxiety, similarly, non-rational fear, which we will shorten to "N-R Fear," can occur twice, or only once, in different anxiety situations:

(a)



is easy to interpret. Unadaptive responses in the clinic may be trembling, wringing of hands, nail biting, etc., which may involve either rational or non-rational anxiety. (2) On the other hand, is at first glance enigmatical. How can an individual adapt to the anxiety state if he does not know what he is anxious about, i.e., if he does not identify the anticipated distress? In order to answer this question in behavioral terms, let us go back to the Oedipus complex, which has already been discussed, for our illustration.

The infant boy loves both parents, identifying them as responsive general satisfiers. Since the mother, in our society, is on duty much more of the time, she is usually identified as responsive general satisfier, first class, whereas the father is only second class. That is, the infant calls for the mother first and generally, but for the father only on special occasions, or when the mother dissatisfies. The parents, as we have seen, become the chief love objects, especially the mother. On many occasions she unwittingly provides sexual stimulation and satisfaction. As the weaning process begins, however, both parents, while remaining general satisfiers, become also responsive general dissatisfiers, especially the father. Ousted by the father from his early position of bed fellow and lover of his mother, the boy develops an ambivalent attitude toward him, that is, conflict ensues between incompatible emotions as follows:

(1) Anger against the father conflicts with (2) love toward him, (3) love of the mother conflicts with (4) fear of the father. Emotions (1) and (3) are also ordinarily in conflict, and so are (2) and (4).

Out of this complicated conflict arises an anxiety which is inhibited, as we have argued, owing to the impact of moral stimuli, which stigmatize not only hostility toward the father, for example, but all mention of sex. The boy is repeatedly told, in effect, that his sex needs do not exist, that there is no such thing, and that hostility toward the father is simply unthinkable. As the result of constant repetition of these intense moral stimuli (in our society) the boy's anxiety becomes non-rational (Def. 21). This does not prevent adaptation (Def. 22) however, for the sex needs do exist and remain dissatisfied. The Freudian literature contains numerous examples of adaptation to non-rational anxiety, viz., sublimation.

In the field of psychopathology, it will be evident that many phobias and compulsions and hysterical conditions are also adaptations to non-rational anxiety.

Adaptation takes different forms in evolutionary theory. It may effect the survival of the individual or the species, or both, and the survival may be of a long range type, or short range. Thus certain species of Palaeolithic lizards adapted to the incessant inter-species conflict by growing more and more enormous. By this means, certain of these species survived for a time, but eventually outgrew the food supply the environment offered, and became extinct. In adapting to intraspecies conflict they had become badly adapted to their natural environment.

There is also progressive and regressive adaptation, depending upon whether there is an increase or decrease in the number of stimuli to which the species differentially responds. Some animals develop new sensitivites, others adapt by

losing sense organs and becoming parasites. These different forms of adaptation are also found on the human level, though all are transformed by man's capacity to adapt, by adapting the environment and other species to his own needs (*13*). Owing to this capacity to recreate their environment, societies of men and individual men can make rapid and decisive changes in the conditions of life and in the frequency of delight and distress, not by natural selection, as is usually the case with other species, but by learning. In spite of such differences the broad resemblance between animal and human adaptation is important, and seems to justify the use of the same term in both cases.

Adaptive anxiety can be (1) individual or societal (2) long range or short range (3) progressive or regressive (4) social or anti-social. If a man adapts to a conflict situation by marrying the girl his mother hates, and then embarking on a long range project of reeducating his mother, we say that his anxiety is individual, long range, progressive and social. If a man adapts to a conflict situation by developing hysterical blindness, we say his adaptation to anxiety is individual, probably short range, regressive and anti-social.

Societal anxiety is an anxiety shared by groups or prevalent in a whole society, and arises from conditions which affect great numbers of men. One type of societal anxiety prevalent in Nazi Germany arose from a conflict between two fears: fear of disobeying the Gestapo and fear of the consequences of obeying them. When groups of men in Nazi Germany adapted to their anxiety by conforming to Gestapo rules and Nazi practices, while inhibiting all expression of indignation, fear of consequences and love of Nazi victims, their adaptation was societal, short range, regressive and anti-social. By anti-social we mean adaptation at the expense of society or the wider social group. When an individual or group adapts to its anxiety, i.e., resolves its anxiety, by producing social distress, we say the conduct is anti-social.

Societal anxieties probably exist in all societies, but their frequency and intensity depends largely upon the proportion of cooperative to antagonistic labor. When labor is cooperative, i.e., men satisfy their own needs only by satisfying the needs of other men, love and friendliness prevail (Def. 24). Here love and friendships are not conflictful. Conversely, when antagonistic labor (See Sec. I) is the rule, anxiety prevails. Case histories of the Alor prople of the Dutch East Indies show a great proportion of anxiety neurosis, which Kardiner found directly related to the economic and social institutions of this society (*7*). In other societies with different economic pursuits, division of labor and social traditions, Kardiner found anxiety much reduced in intensity and scope, or affecting different social strata or age groups. Some anthropologists have come to similar conclusions. One of the most interesting studies of the variation of a particular anxiety was made by Malinowski (*10*). Among the Trobriands, he states,

"There is no friction between the father and son, and all the infantile craving of the child for its mother is allowed gradually to spend itself in a natural, spontaneous manner. . . . Applying to each society (European and Trobriand) a terse though somewhat crude formula, we might say that in the Oedipus complex there is the repressed desire to kill the father and marry the mother, while in the matrilineal society of the Trobriands the wish is to marry the sister and to kill the maternal uncle."

In United States societal anxiety is also widespread, being rooted, as Horney (*14*) has emphasized, in the broad social conflicts of our time, or as we should say, in the extent of antagonistic labor. The proportion of cooperative to antagonistic labor also determines, in large part, the kind of adaptation that is made. In our society there is much more long range, progressive and social adaptation than in the essentially predatory Nazi State. Whereas some anthropologists measure the proportion of neurosis in a society only in terms of the standards of normality of that society, the definitions we have adopted enable us to avoid this ethical relativity. We say that any society in which long range, progressive social adaptation prevails is more adaptive than a society in which the opposite forms of adaptation predominate, because in the former case far more distress is avoided, and delight produced.

COMMENT AND CONCLUSION

We have defined the basic emotions in behavioral terms and exhibited systematic relations between them. It appeared that psychological theory could be advanced in this way, and research procedure clarified. (1) For example, there is a clear advantage in defining emotions, genetically, in terms of present and antecedent stimuli, since these stimuli are observable and can be reproduced in experimental situations. (2) Our account of the emotions avoided ascriptions of mental states. By introducing the idea of "identifying responsive satisfiers as responsive," for example, it was found possible to eliminate all reference to consciousness, even in the case of rather complex behavior. Just as a dog's behavior can indicate that he is reacting to an illuminated circle, as a circle, and not as an area, or color spread, so the infant's behavior can demonstrate that it is reacting to the mother, as mother, i.e. as a "responsive general satisfier." This abstention from mental ascriptions has its procedural value, especially when dealing with emotions in animals, infants and psychiatric cases. It is important to determine what kind of behavior sequences and situations justify the ascription of conscious emotional states. Though empathy is a great aid in identifying the emotions of others, it is also very fallible. The final criterion is *behavior* of the kind we have attempted to describe. (3) For systematic reasons, we have restricted the basic terms of the analysis to the bare minimum, and have attempted to define them strictly. The undefined terms, and the principles employed, are limited to those which are accepted in experimental behaviorism. (4) Since behaviorist method is commonly charged with inability to deal with anything but the simplest of human behavior, we have attempted to show that in principle elementary ambivalence, the genesis of moral habits and the beginnings of the Oedipus complex can all be explained in purely behavioral terms. The emergence of the social self or ego, and the rise of character or will did not appear, *prima facie*, to offer any insuperable obstacle to purely behavioral analysis. Somewhere along the line of increasing complexity, however, mental ascriptions doubtless become unavoidable. By pursuing a purely behaviorist analysis can we discover where that point lies. (5) Our definitions of love and anger yielded definitions of social cooperation and conflict, and of cooperative

and antagonistic labor. The definition of social conflict, behavioristically, in terms of conflicts in the individual, has the following advantage: Social conflict has no real meaning unless there is an emotional conflict of individuals, but the converse is not always true. (6) It seemed feasible to define anxiety as a fear resulting from a conflict of emotions, and to detail the combinations of emotions which can conflict. Some current confusions as to the relation of fear and anxiety were probably avoided. (7) Fears (including anxieties) were distinguished as either rational or irrational, adaptive or unadaptive. In discussing irrational adaptive anxiety we were dealing with what is called unconscious phenomena, but the analysis remained behavioral, with no reference to the unconscious. (8) Various kinds of adaptive fears and anxieties were distinguished. They not only afflict individuals but also pervade groups and societies. The structure of fear and anxiety in a democratic society is basically different from that in a fascist society. Adaptation to anxiety in a fascist society, for example, is "short-range," "regressive" and "anti-social," in what we should describe as a behaviorally certifiable sense.

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