

## THE PSYCHOLOGY OF SOCIAL LEARNING

EDWARD C. TOLMAN  
*University of California*

Kurt Lewin, in whose honor we have come here this afternoon, was throughout concerned with the social behavior of men. Not only were his later investigations obviously social but so also, it seems to me, were most of his earlier studies. "Psychical satiation," "raising or lowering the aspiration level," "getting angry or running away as a result of barriers," "bolstering one's ego by attempting to complete interrupted tasks or by the better remembering of such interrupted tasks," "regressing because of barriers," "being immobilized by the power fields of others,"—all were behaviors which are, by and large, social. We can observe but little, if anything, like them in non-social animals such, say, as rats.

And, unfortunately, I myself have learned most of my psychology from rats. Rats may show anger to the extent of biting the hand that feeds them, but I doubt if they are living up to a level of aspiration or trying to enhance their egos when they do so. I am, therefore, very hesitant and apologetic in proposing to talk this afternoon about the social learning of men. Yet, if we can accept the assumption of some basic social drives in man which act in much the same manner as do the viscerogenic hungers in rats, then our studies of the hunger- and thirst-driven activities of these latter animals may after all contribute something to our understanding of the social behavior and the social learning of *homo sapiens*. Indeed, there is already current one common theoretical formulation which has proved useful for both species. Lewin called it the Life Space and I have called it, variously, the Sign-Gestalt Field and the Cognitive Map. I have never quite known how much of this concept I borrowed almost in its entirety from Lewin, and how much I arrived at it independently. But, in either case, I would now assert that no fruitful studies of rats in mazes or of men and women attending, say, Psychological Conventions can be made without drawing on this concept.

Let me begin my argument by citing a recent rat experiment carried out by Dr. John R. Christie at California.<sup>1</sup> (The experiment and idea, I hasten to add, were both his.) The experiment was in essence a repeat of the Spence and Lippitt<sup>2</sup> latent learning experiment. But, whereas those investigators, and others following them,<sup>3</sup> obtained negative results, Chris-

<sup>1</sup> Not yet published.

<sup>2</sup> K. W. Spence and R. Lippitt. An experimental test of the sign-gestalt theory of trial and error learning. *J. Exp. Psychol.*, 1946, 36, 491-502.

<sup>3</sup> See, for example, H. H. Kendler and H. C. Mencher. The ability of rats to learn the location of food when motivated by thirst—an experimental reply to Leeper. *J. Exp. Psychol.*, 1948, 38, 82-88; E. L. Walker. Drive specificity and learning. *J. Exp. Psychol.*, 1948, 38, 39-49; and G. R. Grice. An experimental test of the expectation theory of learning. *J. Comp. and Physiol. Psychol.*, 1948, 41, 137-143.

tie by the introduction of one important modification achieved positive ones. Christie, like Spence and Lippitt, used a single-unit maze with food at the end of one arm and water at the end of the other. The animals were first run hungry on the maze for seven days and learned where food was, but by the use of doors they were made to go an equal number of trials each day to the water side. The whole group was then made thirsty, and Christie's California rats, in contrast to the Spence and Lippitt Iowa trained rats, immediately shifted to going almost 100% to water. The Iowa rats continued to go to the food side for a surprisingly long number of trials after they had been made thirsty. What, now, was the crucial modification which Christie introduced? It consisted in giving his rats preliminary exploratory experience outside their cages on a table to a food-can and to a water-bottle approached from varying positions on successive occasions. The animals were put on the table *when satiated for both food and water but allowed to remain there for 24 hours at a stretch*. This procedure was repeated for some twenty sessions. Apparently it was the effect of these previous exploratory experiences which made his rats ready to perceive the water-bottle in the maze during their subsequent hunger trials in a way in which mere cage-dwelling rats without such previous exploratory experience are not.

In order to conceptualize this effect upon perception and in order to indicate some of the new features which I believe should be introduced into the Life Space or Cognitive Map model, let me present a diagram (Fig. 1).

This diagram will remind you somewhat of one of Lewin's. For what I am trying to do is little more than to elaborate certain features which were, I believe, already implicit in his concepts. The elliptical figure at the bottom I have labelled either the "Outer Life Space," or the "Cognitive Map." Above this I have placed another, also more or less elliptical figure, which indicates some of the contents which I would put into what Lewin sometimes called the Psychological Person and sometimes the Inner Life Space. I shall call it the Personality Structure.

Look, now, in more detail at this Personality Structure. We see in it near the top a bulbous mass labelled Drive System. Within this latter is a compartment labelled libido—without any preconception on my part as to the basic nature of this libido other than that it results from some general physiological energy, which probably varies, on the average, from individual to individual and goes up and down in any one individual with health and sickness. Further, the libido compartment is drawn as in contact with specific drive-compartments, such as: H, a hunger compartment; Th, a thirst compartment; and P.A., a pain-avoidance compartment. When the energy in the libido is great, there will be more energy than there otherwise would be in these adjacent specific drive-compartments; and when the libido is low, there will be less energy in these specific compartments than there otherwise would be. It is to be noted next that I have introduced into the compartments both positive and negative charges.

This introduction of two kinds of charges is an electromagnetic elaboration which should not be taken too literally. I find it useful, however, as a way of summarizing the facts of wanting or of positively valuing, on the one hand, and of not wanting or of negatively valuing, on the other. When one's libido and one's specific drives are high, one has both strong positive values (plus charges) *for* certain types of objects or situations and strong negative values (negative charges) *against* certain *other* types of objects or situations.

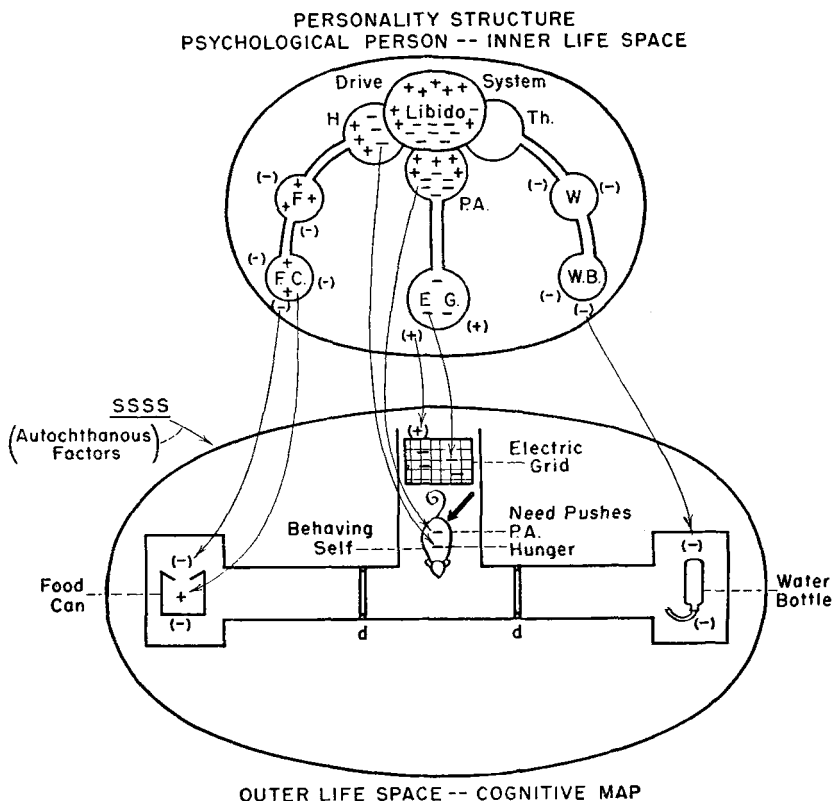


Fig. 1

Observe, next, the channels, which connect the hunger, thirst and pain-avoidance compartments to other small compartments. **Hunger** (here drawn on the left) is connected to a compartment corresponding to food, F, and then still further to one corresponding to food-cans, F.C. **Thirst** (drawn on the right) is connected to a compartment corresponding to water, W, and then to one corresponding to water-bottles, W.B. Pain-avoidance is connected to a compartment corresponding to electric grids, E.G. In the cases of hunger and thirst, positive charges are conceived to

flow through the channels into the connected compartments—leading (when the animal is hungry or thirsty) to positive values for food and for water and thence to positive values for food-cans and water-bottles. In the case of pain-avoidance, the channel is conceived to conduct negative charges into the electric grid compartment—leading, as long as the pain-avoidance drive is active, to a negative value for electric grids.

Observe next that surrounding the means-object and goal-object compartments I have placed scattered plus or minus charges *in parentheses*. These parenthetical charges, either plus or minus, are to represent perceptual readiness.

Consider further the channels themselves. These represent what I call simple instrumental “beliefs,” i.e., the beliefs that: “if hungry, food is good,” and “if food is good, food-cans are good”; or “if thirsty, water is good,” and “if water is good, water-bottles are good”; or, again, “if pain is bad, electric grids are bad.” As I have already indicated, it is these channels, or beliefs, which conduct positive or negative charges to the goal-object compartments and means-object compartments and produce values. And, finally, it is these values which, among other factors, give rise to perceptual readiness.

A further point, however, has to be assumed to explain the Christie results. This is that once a type of goal-object or means-object has been strongly perceived due to special training—such as was given the table-explorers—then the perceptual readiness charges, which during this special exploratory training collected around the compartments for the given goal-objects or means-objects, will tend to persist in these regions for some time afterwards. In other words, due to their special training Christie’s table-explorers had become very attentive to water-bottles and to food-cans, as such. So that, when later run hungry in the maze, these animals still retained considerable perceptual readiness for water-bottles and perceived where the given water-bottle was, even though they were not thirsty and did not go to it except when they were forced to.

Turn now to the bottom—the Cognitive Map—part of the diagram. It is to be noted that I have drawn the outlines of the maze in relatively metrical and non-topological form. I believe, in short, that after a reasonable number of trials (the situation for which this diagram is drawn) the concrete expectations of the rats as to distances, directions and retaining walls can be assumed to be relatively well coordinated to the actual physical facts. Obviously, however, much more experimentation needs to be done to discover just what the limits of the rat’s perceptual capacities are. Secondly, it is to be noted that the symbol for the animal himself, which I have represented as just nosing into the choice point and labelled the Behaving Self, is not to be considered as a mere telescoping of the diagram of the personality structure presented at the top of the diagram. Here my notation differs somewhat from Lewin’s. For him the Psychological Person, whether represented in telescoped form inside the Outer Life Space

or expanded into a separate drawing, was one and the same. But what I have really done is to separate his Psychological Person into two parts. The part which may be thought of as the inner core of Lewin's Psychological Person I have put above and called the Personality Structure and that which may be thought of as the outer core of his Psychological Person I have put inside the Life Space or Cognitive Map and called the Behaving Self. This latter, the Behaving Self, has, it will be noted, as one of its most important properties what I would call need-pushes.<sup>4</sup> These need-pushes are indicated by the negative charges drawn within it. Need-pushes are conceived as derived from the negative charges of the drive tensions above (see connecting arrows) but not as necessarily equal in amount to the latter. Thus, even though the drives of hunger, thirst, pain-avoidance may at the moment be strong, the need-pushes derived from them may be relatively weak.

Let me present an illustration of this in an early finding of Richter's.<sup>5</sup> The rat lived in an activity cage which had attached to it, by a short tunnel, a very small, cramped food cage. The movements of the animal in both cages were recorded automatically. It was found that after each eating in the small cage the rat went back into the main one, cleaned itself, and went to sleep. After some relatively constant time-period of, say two hours, quiescence, the rat would wake up and begin exploring the large cage and indulging in a variety of other general activities. Only some half hour later would he finally, when his hunger drive had become really strong, pass over again into the food cage and eat. According to the present analysis this means that at first the increasing hunger drive did not lead to a correspondingly great increase in the food need-push. Only, finally, when the hunger became really strong, did the rat's food need-push catch up in strength with his hunger drive.

Notice, next, that for these table-explorers during the last days of the hunger trials (the period to which this diagram corresponds) the food-can to the left of the diagram is depicted as both perceived and valenced whereas the water-bottle to the right is depicted as perceived but not valenced. The valence of the food-can (see connecting arrow) is conceived as derived from the value for food-cans in the personality structure. Since, however, under these conditions there is no value for water-bottles in the personality structure, there is also no valence for the perceived water-bottle in the cognitive map. The perceptions of both food-can and water-bottle are derived from the perceptual readiness in the personality structure.

It is to be noted that the valences in the cognitive map also may not be as strong as the corresponding values in the personality structure. For

---

<sup>4</sup>The need-pushes are, I believe, closely related to, though not, I believe, quite identical with, what others have called appetites and aversions as contrasted with drives. Further, I might suggest that the Behaving Self is perhaps my old "schematic sowbug" dusted off. See E. C. Tolman. Prediction of vicarious trial and error by means of the schematic sowbug. *Psychol. Rev.*, 1939, 46, 318-336.

<sup>5</sup>C. P. Richter. Animal behavior and internal drives. *Quart. Rev. Biol.*, 1927, 2, 307-343.

example, a given man may, at a given time, have a strong value for steaks, but any particular instance of steak which gets into his cognitive map may not be a very good sample. In such a case, the valence upon this instance of steak would be relatively speaking less than the general value for steaks in the personality structure.

Also, it is to be noted that I have introduced an electric grid at the entrance to the maze, not because one was actually used in the Spence and Lippitt or the Christie experiments, but simply to show how the diagram could also take care of negative values and resultant negative valences.

Finally, let us return for a moment to the perceptual readinesses and the resultant perceptions. The actual perceptual contents of a given cognitive map will, of course, be determined not only by the perceptual readinesses in the personality structure but also in large part and mainly by the nature of the stimulus configuration—SSSS—actually presented, plus the purely autochthonous factors governing perception—such factors as well defined boundaries, close grouping of items, similarities of items, etc., etc., that is, the factors which the Gestalt workers on perception have so brilliantly demonstrated.

But by now you must all be restive and wondering what all this about personality structures and cognitive maps in rats relative to water-bottles, food-cans and mazes has to offer for the supposed topic of this paper—“The Social Learning of Men,” that is, the learning of men relative to such entities as fathers, jobs, rivals, wives. My answer is that the acquisition or non-acquisition of cognitive maps and personality structures by men relative to their social environments obeys basically the same laws as do the learning or non-learning of cognitive maps and personality structures by rats. That which is learned or acquired by either rat or man is first a cognitive map and, secondly, new or modified drives, beliefs, values and perceptual readinesses. What, then, are the laws for these two sets of learning?

First, as to cognitive maps. The determining conditions underlying the acquisition of a cognitive map are, I assert: one, the laws of frequency, recency, and emphasis; two, the autochthonous factors which govern perception; and three, the perceptual readiness factors resulting from drives, beliefs, and values already operating at that moment in the personality structure.

Thus, a rat or a man explores a given physical or social maze and builds up, as steered by the perception-controlling autochthonous and motivational factors, a cognitive map of this maze and of the locations within it of such and such specific goal-objects and means-objects. The acquisition of the particular map depends on the actual stimulus configuration presented by the environment, on the frequency and recency with which this stimulus configuration has been explored, on how emphatic its various features are, and finally on the individual's perceptual readinesses

for such features—as these perceptual readinesses are determined autochthonously from the nature of the stimulus configuration and motivationally from the contents of the personality structure at the moment.

This is all there is to it. Obviously for me the learning of such a map is not the acquisition of stimulus-response connections, either as a result of stimulus-response contiguities (as Guthrie would hold) or as a result of stimulus-response reinforcements (as Hull would assert). For, as we have seen, the rat can learn (and, if the rat, then obviously the man) where the water or, say the whiskey, is, even when he is not thirsty and even when he makes quite different movements on each trial in getting to it and even though no drinking (that is, no reinforcement) takes place during such trials.

Turn now to the personality structure. First, how are new drives acquired—or are they? Woodworth argued a good many years ago that mechanisms may become drives and Allport has coined the term “functional autonomy” for this process. Allport writes:

“The pursuit of literature, the development of good taste in clothes, the use of cosmetics, the acquiring of an automobile, strolls in the public park, or a winter in Miami, may first serve, let us say, the interests of sex. But every one of these instrumental activities may become an interest in itself, held for a life-time, long after the erotic motive has been laid away in lavender. People often find that they have lost allegiance to their original aims because of their deliberate preference for the many ways of achieving them.”<sup>8</sup>

In terms of my sort of diagram the acquisitions of these new drives for literature, cosmetics, etc., would have to be described as cases where what were originally mere means-object compartments (attached by channels or by a succession of channels to one or more of the basic drive-compartments) become sucked back into the inner drive system itself—so that they themselves become drive-compartments. These new drive-compartments would thereafter be in direct contact with the libido and would be able to derive energy directly from the latter. Whether or not this kind of process actually takes place I now find difficulty in deciding because, it seems to me, we have as yet no controlled evidence. I believe, however, that experiments, even ones with rats, could be designed which would throw light upon this matter.

Turn, next, to the belief channels. How does the rat or the child, from having learned one maze or a series of mazes, acquire general beliefs, such as: that “food-cans lead to food”; that “righthand turns lead to food-cans”; that “libraries lead to fathers”; that “kitchens lead to mothers?” Do the acquisitions of such beliefs obey the same simple laws of frequency, recency and emphasis which I have postulated for the acquisition of cognitive maps? My guess is “no.” The expectation of the position of a particular water-bottle in a particular maze can be learned,

<sup>8</sup> G. W. Allport. *Personality—A Psychological Interpretation*. New York: Henry Holt, 1937, p. 197.

as we saw, when the rat is not thirsty and when no need-reduction takes place. I believe, however, that reinforcement *is* probably important in the acquisition of beliefs, such as: that “water-bottles tend in general to be to the left” or that “fathers tend in general to be in libraries” or that “mothers tend in general to be in kitchens.” I suspect, in short (although this has not been demonstrated experimentally), that when the rat is thirsty and *is* reinforced by getting to water and drinking he is more likely to establish an enduring generalized belief that water-bottles will tend in new mazes also to be to the left than he will be as a result of mere latent learning in the first maze. And, similarly, I believe that the child, if punished by the father or rewarded by the mother, is more apt to acquire a belief that “male figures in general are in libraries” and that “female figures are in kitchens.” Insofar, then, as I am assuming the importance of reward or punishment in the establishment of transferable, relatively enduring beliefs, I am accepting, for this kind of learning, the Hullian principle of reinforcement. I am accepting it, however, not for the establishment of stimulus-response connections or “habs” but for the establishment of belief channels.

Finally—as to the acquisition of values and perceptual readiesses—it appears that values are merely the inevitable result of beliefs and do not have to be learned separately and that perceptual readiesses in their turn result in large part from values. However, as was suggested in discussing Christie’s rats it would appear that perceptual readiesses may also be set up under relatively satiated conditions and also that having once been achieved, these readiesses tend to remain. The detailed laws then which state just all the ways in which perceptual readiesses are established and are retained need, of course, a tremendous amount of further investigation.

Finally, let me turn now to a couple of examples of specifically social learning in human beings. To do so, however, I must first point to another kind of belief in addition to the simple instrumental beliefs so far considered. This new kind of belief I shall call a “barrier belief.” It was, of course, Lewin and his students who first indicated the significance of barriers. And they also soon pointed out that there are really two kinds of barriers: one in which the barrier is cognized as merely something which stands in the way, and one in which the barrier is reacted to as something which not only obstructs but also threatens. The first sort gives rise, in Lewin’s terms, to “restraining forces” only. Such barriers have no negative values or valences, as such. Examples might be a heavy door to be pushed through by the rat or a long paper to be written by a psychologist, where neither rat nor psychologist are afraid of doors or of papers. For both types of case a barrier compartment in the personality structure would be depicted as surrounding the goal- or means-object compartment. But in the first type of case this barrier compartment would be connected—channelled—to an aggression or “persistence” drive-compartment, but not to the pain-avoidance compartment. The second sort of barrier would



be cognized as having negative value in itself. Examples would be electric grids *en route* to Purina dog chow or threatened parental punishment *en route* to candy. In these latter cases, there would be a belief channel which connected the barrier compartment in the personality structure to the pain-avoidance compartment. That is, the electric grids and the parental punishment would be believed to be pain inducing. Figure 2 presents my diagram for an extreme instance of this latter type of case.

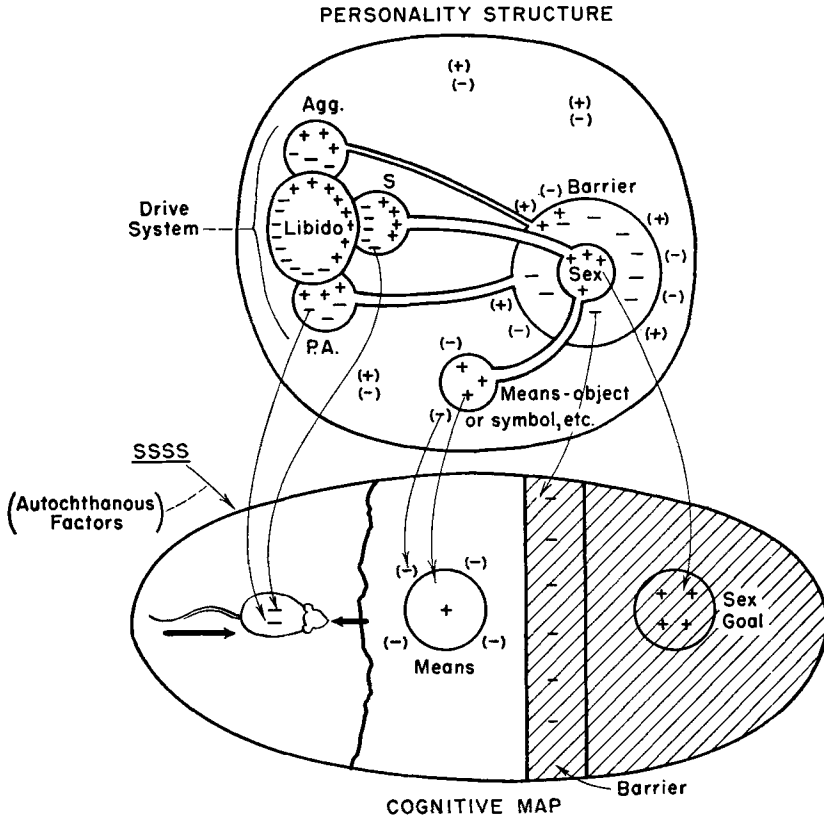


Fig. 2

The most significant feature about this diagram must now be noted. The perceptual readiness charges resulting from the negative value of the barrier are positive, whereas those resulting from the positively valued goal-object are negative. These two sets of perceptual readiness charges of opposite sign tend, insofar as they are equal in amount, to neutralize each other. And this results in what I shall call "perceptual blindness." This phenomenon of "perceptual blindness" explains, I believe, certain of the problems of personality maladjustment. I would even go so far as to suggest that practically all of the so-called Freudian mechanisms or

dynamisms—such as “regression,” “rationalization,” “reaction formation,” etc., have as a necessary and distinctive feature the fact that they arise out of perceptual blindness. That is, the patient has acquired somewhere along his development a strong belief that intercourse with a given type of goal-situation, say sex, will be blocked by punishment or pain. Nevertheless, the belief channels connecting the given type of goal or means compartment with the given positive drive remain. Thus the individual in his personality structure believes both that the given type of positive goal will relieve his drive and that severe pain will be meted out *en route*. Turning to the cognitive map below, this means that a given instance of a means-object will be perceived and positively valenced but that the given instance of the goal itself and of the barrier *en route* to this goal will be perceptually blotted out. I have represented this perceptual blotting out in the cognitive map by cross-hatching. This phenomenon of perceptual blindness and resultant perceptual blotting out is, I believe, what the personality psychologists have called repression.

But, however we name it, the important question is: what are the dynamics in such a case? Before answering, we must first consider in more detail what happens in the more normal case in which there is not perceptual blindness. In such an ordinary case when the individual gets to the positively valenced means-object his need-push is partly discharged. But he then proceeds because of his remaining need-push to go on to the goal itself and here, his need push is completely discharged. Also, he performs the consummatory response with this goal-object and this response brings it about, through physiological processes, that his drive is reduced. And such drive reduction results in little or no further need-push coming down from the drive-compartment. The behavior in question then ceases.

Contrast now the case of perceptual blindness. In the latter, the individual approaches the means-object as before and gets a partial discharge of his need-push. However, he not only cannot go on to the final goal because of the negative valence from the barrier but also because he is blind to it (i.e., the goal and the barrier are both perceptually blotted out in his cognitive map). Therefore, his drive as such does not get reduced and his need-push quickly builds up again. Thus, he obtains temporary relief only. His need-push disappears for a brief time but his unreduced drive soon causes it to reappear, whereupon he once again seeks the same type of means-object. This process tends to happen over and over again; and it represents, I believe, what in clinical parlance has been called a neurotic, or non-satiable, need.

A further point to be noted is that what thus may happen relative to a means-object when a negative barrier blots out a goal, may also happen under these same conditions relative to “similars,” “symbols,” or “associates” of a goal. Human thinking processes (i.e., belief-channelings) are such that channels get set up connecting not only goals to appropriate instrumental means-objects but also connecting goals to mere similars,

symbols or associates. And, as a result of such associational beliefs, these similars, symbols, and associates may also take on positive values. Hence, if the goal is perceptually blotted out by a type of negative barrier, instances of similars, symbols, or associates which occur in the cognitive map may also receive positive valences and be gone to in a neurotic non-satiabile fashion.<sup>7</sup>

The important questions for the matter of learning are now: (1) What are the conditions under which beliefs in these negative, painful types of barrier get acquired and (2) what are the ways in which such beliefs can be unlearned, if they become no longer valid?

(1) As to their acquisition. A belief in a negative type of barrier is acquired like any other belief. That is, the type of goal has been gone towards and the parents or the culture or the mere physical circumstances have induced or threatened pain *en route*. And, the more frequent and the stronger this actual or threatened pain, the stronger and more rigid the belief will grow that there is a negative barrier surrounding this type of goal. It is the oft-repeated or the very traumatic punishment which will acquire enough negative value to equal the positive value of the goal and thus cause a neutralization of the positive and negative perceptual readiness charges and eventuate in perceptual blindness.

(2) How, then, can such beliefs in negative barriers ever get unlearned? They cannot get unlearned if they remain valid; if, that is, the environment still continues actually to present strong pain *en route* to the goal. A possible unlearning can occur only if such intervening pain will no longer be meted out. In such cases, however, the subject is usually unable to discover this by himself because he is still perceptually blind both to the goal and to the feared barrier. He can't proceed in any given instance toward the goal and discover that a painful barrier is no longer there—because he does not perceive the goal, which he wants, nor the barrier, which he fears. Both are perceptually blotted out. In such cases the only solution would seem to lie in some kind of therapy. I am therefore hazarding the guess that what all brands of psychotherapy really do is to use one technique or another for bringing the nature of the goal and of the feared barrier up again into the perceptually available part of the cognitive map. This makes it possible for the patient to try again going all the way to the goal and to discover that the barrier is no longer existent or, at any rate, no longer painful.

This is, of course, an extremely shot-gun account as to the nature of neurotic maladjustments and their cure. I do believe, however, that what I have been saying makes some sense. And, in any event, it constitutes all

---

<sup>7</sup> Previously, I have interpreted all these set-ups in which means-objects, similars, symbols, etc., are gone to and not the goal itself as involving "equivalence beliefs." (See E. C. Tolman. There is more than one kind of learning. *Psychol. Rev.*, 1949, 56, 144-155.) I consider now, however, that such cases are better designated as but partial approaches to such substitutes for a goal because a belief in a negative barrier around the goal makes for perceptual blindness for both the goal and for the barrier.

that my system now has to offer about that type of social learning which is known as clinical improvement.

Finally, we have time to consider briefly only one further variety of social learning—namely, the kind known as “identification with an in-group.” The diagram in the next figure represents such a case. This diagram is, alas, rather complicated. But without trying to follow it in too much detail, let me indicate the argument it seeks to present. Consider

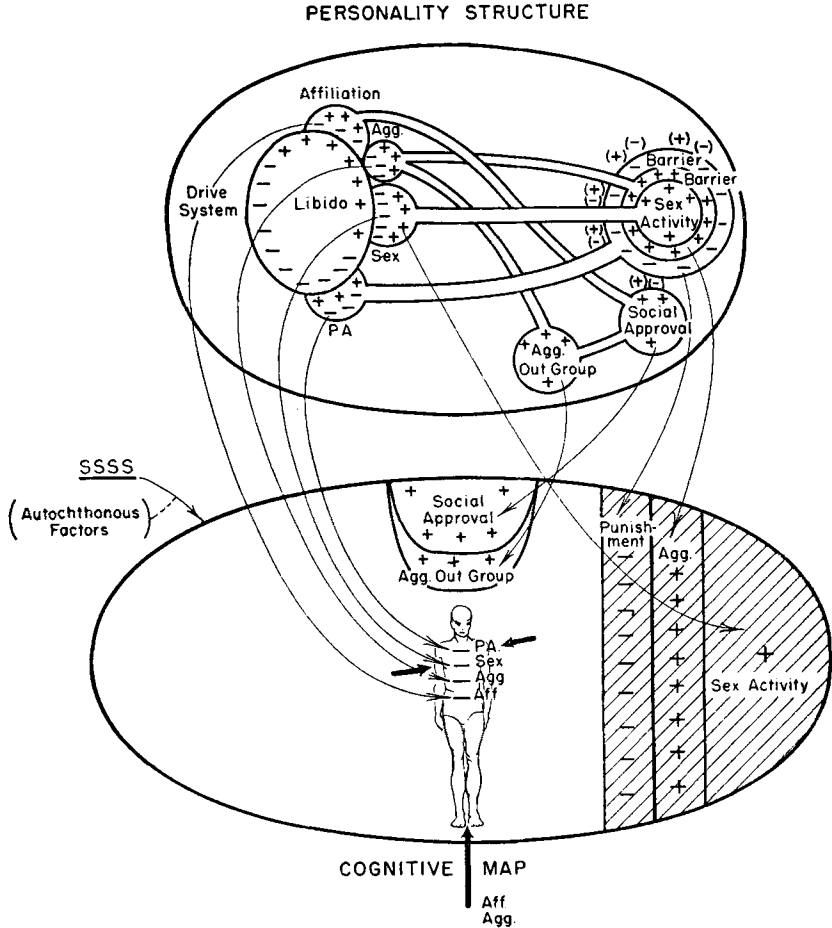


Fig. 3

again the case of an individual for whom some type of positive goal, say some type of sex activity, is blocked by a barrier. The barrier in this case is believed in as one imposed by the in-group and this barrier is shown in the personality structure as channelled primarily to aggression. The individual believes that to attack the barrier will both relieve aggression

and get him to the desired sex activity. But such attacking activities are especially punished by the in-group. I have represented therefore another barrier in the personality structure as surrounding the first. This second barrier indicates that attacking the in-group will be punished. That is, this second barrier is shown as having a strong belief channel connecting it to the pain-avoidance drive. It is to be noted, further, that practically all cultures, however much they may punish aggression against the in-group, permit and even sanction aggression against out-groups. Such aggression against out-groups will have, therefore, positive value as a type of means-object to the goal-object of social approval which latter will have positive value because it is channelled to some such social drive as affiliation. All these beliefs which connect goals, means, and barriers, to drives will have been learned, like all other beliefs, according to the laws of recency of reinforcement, frequency of reinforcement, and intensity of reinforcement.

Look below, now, at the cognitive map. The behaving self contains: a need-push, sex; a need-push, aggression; a need-push, pain avoidance; and a need-push, affiliation. All these four need-pushes, acting together with the plus valence on the given prohibited sex activity, the plus valence on the barrier next to the sex goal, the plus valence on the region of aggression against the out-group and on the resultant region of social approval together with the negative valence on the barrier nearest the behaving self will result in a final strong vector pointing towards the region of aggression against the out-group. About the only need-push which will not be neutralized is that for sex. Yet, because of the combination of plus and minus perceptual readiness charges in the personality structure, there will tend to be perceptual blindness in the cognitive map both for the original sex goal and for the barriers on the way to it. Furthermore, although I have not put this in the diagram because the latter is already too complicated, there will be some expressions of sex which *will* be sanctioned by the in-group. Hence, if these other expressions are discovered, *all* of the individual's need-pushes can be discharged. Therefore, this mechanism of identification with the group is likely to be an extremely persisting one. In fact, it is, as we sadly know, practically ubiquitous.

And there is one very great defect in its use. This mechanism of identification with the in-group becomes extremely dangerous, if the out-group happens to be powerful enough and close enough at hand to retaliate. Then both groups may destroy one another. This mutual destruction may take place either between two opposing sub-groups within one nation or between two rival nations. The only ways of preventing such dangerous outcomes, which seem to have been suggested so far, are: (1) that the aggressions against the in-group could be turned not against out-groups but against the intransigencies of nature; (2) that they can be used up in constructive work; (3) that they can be dissipated in games and sports; and (4) that they can be used up in mild non-retaliated releases against the in-group itself. (This latter hypothesis seems to underlie much of the

philosophy of modern child raising.) But to what extent any or all of these proposals are really possible or feasible requires much more controlled experimental knowledge, both psychological and sociological, than we now have. Yet this is the area in which we *must* have knowledge (and soon) if the world as we know it is to survive.

By way of conclusion, let me summarize:

(1) I have tried to add certain new features to the Lewin model, such as: drive-compartments, belief channels, goal compartments, goal-object and means-object values, perceptual readinesses, the Behaving Self, need-pushes, and the phenomenon of perceptual blindness with resultant perceptual blotting out.

(2) I have tried to suggest how this expanded model could take care not only of Christie's rats but also of two varieties of social learning, namely, (a) the social learning of the clinical patient in the therapeutic session, and (b) the almost equally complicated social learning involved in the mechanism of identification with an in-group.

Two important questions I have not answered are:

(1) What would be operational ways for defining and measuring the assumed intervening variables of drives, beliefs, values, perceptual readinesses, etc.; and

(2) What justification is there for using topological force, and electric charge concepts? I would like in just a few words to give my answer to this latter question. My defense of the legitimacy of such concepts differs, perhaps, from Lewin's although I am not altogether sure of this. In any event, what I hold is that all I am really doing is to put in diagrams notions as to how my assumed intervening variables (most of which you also accept in your own words, if not in mine) are interrelated. That is, I have described these interrelations by a combination of geometrical, push-pull and electromagnetic languages. My justification for using such languages is, in part, simply because I myself happen to think more easily in visual and kinaesthetic terms than I do in words but, in part, because I believe that many of the relationships involved can be more adequately treated by geometry and by pushes and pulls and electric charges than by words. Space relations and electrical charges and forces are in one sense, of course, physics. But in another sense they are just languages borrowed from physics. And it is in this mere language sense that I claim to use them here. If, however, some of you have been able to follow my words but not my diagrams, it will have been an equally legitimate and perhaps more happy outcome.

*One final remark.* I cannot close without taking this occasion to proclaim again my basic indebtedness and, I believe, the basic indebtedness of all workers in the combined field of motivation and learning to Kurt Lewin. His was the genius and the pioneering.