

CHAPTER XXIII

ON CONDITIONAL REACTIONS OF HIGHER ORDERS AND PSYCHIATRY

In the dog two conditions were found to produce pathological disturbances by functional interference, namely, an unusually acute clashing of the excitatory and inhibitory processes, and the influence of strong and extraordinary stimuli. In man precisely similar conditions constitute the usual causes of nervous and psychic disturbances. (394)

I. P. PAVLOV

The fact that the maximum disturbance in the central nervous activity does not appear immediately on administration of the causative stimulus, but after one or more days has been observed in many animals. (394)

I. P. PAVLOV

Psychiatrists will readily understand the structurally false to facts and harmful implications of the term 'inhibition' on the *neurological* level, when they consider that often 'pain', 'fright', and different 'prohibitions' and 'inhibitions' on the psycho-logical level result in nervous processes which are not *passive, eliminated factors*, but remain what they were originally—exciting semantic factors 'repressed' on human levels—and become very active and potent causative factors in many 'mental' and physical ailments.

If the *non-el* point of view and language are seriously applied, there seems to be no escape from the conclusion that the future physician, on perfectly scientific, structural, physico-chemical, and colloidal grounds, will never attempt to divide the 'physical' from the 'mental', and different nervous processes now called 'inhibition' will come prominently to the fore as active, to be taken care of and *never* to be disregarded.

That the mechanism of conditional reactions in animals bears an astonishing resemblance to the mechanism of 'mental' ills in humans, because of the relative unconditionality of both, is exemplified practically throughout the whole work of Pavlov, although he did not point out this particular connection. As soon as this is understood, we shall find that some of the experiments of Doctor Zavadzki, made in Pavlov's laboratory *twenty-five years ago*, disclose a neurological mechanism which underlies practically all psychotherapy, and which, therefore, appears very important and to deserve special discussion.

I do not know the percentage of the successful application of psychotherapy of any scientific-school, or of extra-medical cults, because the many cases of failure are very seldom recorded. We usually forget, or do not realize, that the successful cases teach us, structurally, *less* than the failures, because there is always an infinity of ways in which we can account for a positive result, which is structurally entirely invali-

dated as such by a single failure, if the possibility of it is not foreseen by the structural flexibility of the general method.

From what I gather (though I may be mistaken) of every hundred patients who seek relief in psychotherapy, fifty fail completely. The remaining fifty can, perhaps, be divided into two groups; the first one of, say, ten, who become entirely relieved; the other remaining forty, who improve in different degrees. The analysis in the present work may, perhaps, explain why the percentage of failures is so high. It seems that no school of psychotherapists has analysed 'mental' ills from the general *non-el* structural and semantic point of view; and, although the physicians struggle in every case to abolish the relative unconditionality of the reactions, their methods are neither neurological, nor physiological, nor fundamental enough.

The language used in these scientific theories includes such terms as 'conscious', 'unconscious', 'repression', 'inhibition', 'transfer', 'complex'. There seems no doubt that some such terms cover a few of the facts we know from experience and observation, and that they may be structurally correct on the psychological level. The nervous mechanism involved, although discovered twenty-five years ago, has not generally attracted the attention of physicians, and the postulated theories, lacking neurological foundations, are often called 'far-fetched speculations', a fact which is ultimately harmful to the whole psychotherapeutic and semantic hygiene movement.

The 'psychologists' and the psychiatrists are very much divided as to the role 'introspection' plays. This is due to the confusion of the orders of abstractions. Animals may 'feel', may 'suffer', but they cannot *describe*. Humans differ in this respect; the given person may feel pain, the pain is very *objective* to the given individual, and it is *not words (objective level)*; but we can describe it, this description being valid on the *descriptive level*, a higher order abstraction than the objective level (which is un-speakable for the given individual). If we *ascribe* this process to others, this is no longer a description but an inference, or a still higher order abstraction, which statements have to be verified by averaging. Scientifically (1933), psycho-logics are impossible without the *description* of internal processes, and, therefore, some 'introspection', so that the United States Behaviourism becomes a very naive discipline. The Behaviourists mean well, methodologically, without realizing fully what scientific methodology is. They completely condemn 'introspection', yet they continually use it. Consciousness of abstracting solves the riddles of pro- or anti-behaviouristic attitudes, because, when we are fully

conscious of abstracting, we should never confuse description with inference, neurologically processes of different order.

Any discipline, to be a 'science', must start with the lowest abstractions available; which means descriptions of some objective, *un-speakable* level. In *human* psycho-logics, 'introspection' is the only *possible descriptive level*, all other methods being inferential.

The experiments of Doctor Zavadzki were conducted to investigate the mechanism of the so-called 'delayed reflexes'. Speaking roughly, in experiments in which the interval between the conditional stimulus and the reinforcement by food or acid is short, say, one to five seconds, the salivary secretion follows nearly immediately after the application of the conditional stimulus. If the delay between the two is longer, say, several minutes, the appearance of salivary secretions is also delayed, the length of this delay being proportional to the length of the interval between the two stimuli.

In these experiments there were two phases: the one in which the conditional stimulus has apparently no effect; the other in which the conditional stimulus becomes effective. The investigation was continued to discover what becomes of the excitation due to the conditional stimulus during its apparent inactivity.

New experiments finally disclosed an astonishing mechanism. A tactile stimulation was used for three minutes as a conditional stimulus for acid, and reinforced, as usual, by the application of acid, and a stable, delayed conditional reaction was obtained. But when a perfectly neutral stimulus, say, the sound of a metronome or a noiselessly rotating object, never connected with any alimentary stimulation, was superimposed upon the original conditional stimulus, immediately a copious secretion of saliva, together with the motor reactions peculiar to a given stimulus, were obtained.

*We see that the excitatory process in the nervous system existed all the time in a concealed, non-manifest form and was released by an extra and neutral stimulus.*¹

Similar experiments show clearly that the structure and function of the central nervous system is such that some stimulations can be concealed and become macroscopically seemingly inactive, giving no obvious manifestation or response, yet preserving their active exciting characteristics which, by proper treatment, can be released at will. In physics, we have a similar phenomenon in the case of 'frozen' light, galvanic and storage batteries, pear-shaped drops of glass resulting from melting, which explode when the end is broken off, and many others, although probably the sub-microscopic mechanisms are different.

It does not take much explanation to see that the nervous mechanism revealed in the experiments of Doctor Zavadzki accounts on human levels for a great many 'mental' manifestations, including 'recall', 'unconscious', 'repression', 'complexes'. , and allowing a further generalization, that a slight nervous disturbance of 'recall', in the sense of negative unconditionality, may be closely connected with a pathological semantic 'complex'.

Another experiment has close connection with the problems of the human 'unconscious', 'repressions', and 'complexes'. The positive conditional reactions were usually obtained by combining under certain conditions a formerly neutral stimulus with food or with a mild defense reaction to acid. If the neutral stimulus is not reinforced, it loses its significance for the organism, no secretion is obtained, and it becomes from this point of view a negative stimulus. If, with a given animal, a negative reaction is established, it can, under certain conditions, be transformed into a positive one by reinforcement. In the experiment we are describing, a dog was used, with a well-established negative alimentary reaction to the beats of the metronome at the rate of sixty beats per minute, while the rate of one hundred and twenty beats per minute was used as a positive stimulus. Both reactions were constant and precise. The process of transformation from negative to positive went slowly; after the seventeenth application with reinforcement, a small secretion of saliva was obtained; after the twenty-seventh reinforcement, the secretions of saliva were already considerable. No definite disturbances in other positive reactions were observed except for a tendency to the equalization of strong and weak conditional stimuli.

But the secretory reaction to the transformed stimulus of sixty beats did not remain constant, in spite of reinforcement; it diminished, and after the thirtieth application fell to zero. It was noticed, further, that immediately after the application of the metronome at the rate of sixty beats per minute, practically all the older positive reactions disappeared. After further experimenting, some of the positive effects of the metronome at sixty returned, but its negative or depressing effect on the positive reactions persisted. In all cases where the metronome at sixty was not used, all the positive conditional reactions maintained their strength, except that the weaker stimuli had an inclination to produce lesser effects toward the end of the experiment. Although the metronome at sixty or one hundred and twenty produced salivary secretions in varying quantities when used alone, whenever the metronome was used there followed a disturbance of all conditional reactions, varying from complete extinction to a diminution of secretions. The formerly positive stimulus

of one hundred and twenty beats of the metronome produced greater disturbances than the formerly negative of sixty. Further experimentation disclosed that the disturbance of the cortex was profound, and that it could not withstand any kind of stronger stimuli without producing completely negative results. It became, also, obvious that the maximum disturbance in the central nervous activity in animals (and in man) does not appear immediately after the application of the injurious factor but after a delay.

Since other auditory stimuli acted during these experiments, Pavlov concludes that 'the disturbance must be regarded as a result of a strictly localized interference in the acoustic analyser, a chronic functional lesion of some circumscribed part, the stimulation of which produces an immediate effect upon the function of the whole cortex, and finally leads to a protracted pathological state', and, that 'it is obvious that the localized disturbance of the acoustic analyser is again the result of a clash between excitation and inhibition', which this particular nervous system finds difficult to adjust.²

These experiments were conducted upon a dog which had served in the laboratory for a long time and belonged to the type which has a very negatively excitable nervous system. Experiments on dogs with very positively excitable nervous systems, although different in details, led to similar general results; namely, that a clashing of the two antagonistic nervous processes led, usually, to a more or less protracted disturbance of the function of the cortex, in the form of a lasting predominance of one of the processes.³

Experimenting on the conditional reactions in animals, such as a dog, by inducing pathological states of the nervous system, gives us, in a *simplified form*, a means to understand the mechanism which underlies some of the human 'mental' illnesses, provided we realize the fundamental fact that these experiments on dogs correspond, in their simpler form, to 'mental' ills, and not to 'mental' health, in man. The above experiments would be impossible with a healthy person; yet they depict exactly what happens in the case of 'mentally' ill. The experiments started with a healthy animal, and they ended with a pathological case. If similar experiments were undertaken with a healthy person, no pathological results would follow, owing to the larger conditionality of reactions.; but similar pathological results are produced in humans by different means, the confusion of orders of abstractions being a standard semantic mechanism to bring about the 'clash' between the positive and negative excitations which the nervous system of man cannot resolve so easily.

The experiments of Pavlov disclose, also, a fact which, on human levels, introduces serious complications; namely, that some animals have highly excitable nervous systems, and that some have less excitable ones. Experiments conducted on some individuals produce one effect; similar experiments performed on individuals with different nervous systems produce different results. In some instances, the nervous systems are so sturdy that no disturbances appear at all.

To anticipate a little: it appears that under the present linguistic, educational, social, economic, conditions, nearly all of us suffer from nervous and semantic disturbances, produced by copying animals in our nervous responses. This last condition occurs because the larger conditionality of human responses has not been taken into consideration; its mechanism is unknown, and we do our best to teach and enforce the animalistic responses. As yet, we have had no physiological and simple methods by which to train in this larger conditionality. This is a simple explanation of our failure. Only a few of us have such sturdy nervous systems that they do not become semantically disturbed in any marked degree, and these are exceptions. Obviously, even an attempt to build a general theory dealing with these semantic problems may be useful, for the very mistakes made may serve others as an incentive for further enquiries in a field which is practically unexplored and extremely large.

In the formulation of the present general theory, theoretical considerations suggested necessary neurological mechanisms; yet the standard books on physiology and neurology did not give enough data. In the recent work of Pavlov, I found sufficient experiments and data to illustrate the neurological mechanisms which underlie the present theory. It seems likely that the work of Pavlov and the experiments described, together with the theoretical issues raised in the present system, will be of value to psycho-logicians and psychiatrists, provided that they pay attention to the semantic non-confusion of orders of abstractions, without which it is practically impossible to translate experiments dealing with nervous responses of animals to the human levels and escape verbal fallacies. The language of the structure, as introduced in the present work, is essential in this respect; in fact, the present writer could not have carried out his analysis without it.

Pavlov also suggests some applications to human pathological cases which are recognized as such, the average person being assumed 'normal'. The present work is an independent theoretical enquiry, and the results are much more general, as they show that the general neurological mechanism allows an almost universal misuse of our nervous systems, because of the disregard of structural, linguistic, and semantic issues.

In several chapters, Pavlov discusses a large number of experiments dealing with functionally induced pathological states of the nervous system, and suggests, also, some therapeutic measures. He concludes: 'This . . . and other observations suggest that a gradual development of internal inhibition in the cortex should be used for re-establishment of the balance of normal conditions in cases of an unbalanced nervous system . . . I do not know whether similar therapeutic measures . . . are applied in human neurotherapy.'⁴

The above remark is vitally important; it is not only a result of a lifetime of scientific work, but it expresses a principle which is used, *without being formulated explicitly*, all through psychotherapy. In the present volume, this principle is not only formulated in physiological terms, but is also made the foundation of a physiological method for its semantic application. This method is found in the training and development of the consciousness of abstracting (see Part VII), which, when applied, not only restores nervous balance as empirically shown, but also gives powerful *preventive semantic means* if used in early education.

Further consequences and conclusions are given in Part VII. At this point, we shall merely state that the above explanations also show why a theory of *universal agreement*, in the broadest sense; namely, agreement with one's self, eliminating internal 'conflict', and with others, eliminating family, social, and international conflicts., is neurologically not only possible, but also a necessary semantic consequence of using the human nervous system in its structurally appropriate way.

It is well known that the use of the terms 'positive' and 'negative' is optional; but the opposing character of the issues involved is not optional, because these are experimental and structural. In former days, we not only made our selection, and called some issues positive and some negative, but we naturally had and have some semantic responses connected with them. Thus something 'positive' implied certainty, 'reality', 'truth', 'absolute'. ; something 'negative' implied the negation of these.

In 1933, it appears likely that we shall have to revise *in toto* these semantic orientations, which obviously we have been practicing since the days of savagery. What are the facts ? Curiously enough:

1) The electricity which lights our lamps or runs our dynamos, we call, in the old language, 'negative' electricity.

2) The numbers which are the foundation of the most important complex numbers in mathematics are formally based on negative numbers.

3) The foundation of so-called 'human mentality' is the 'negative' reaction.

4) Because words are never the things we speak about, the sole link between languages and the objective world being structural, the only 'positive' facts about this world are of the old 'negative' character.

5) Finally, the main difficulty of the *A*-system can be found in the positive 'is' of identity, involving us in false to fact evaluation and semantic disturbances; on the other hand, a \bar{A} -system is based on the complete elimination of identity formulated as a negative premise of the 'this *is not* this' type (see Part VII).

At present, only in *technical* mathematics can people behave semantically like 'gentlemen'. They analyse and agree; no quarrels are possible. Linguistic and semantic researches show that the structure of all languages can, and *must*, be made similar to empirical structures; and then, also, the rest of humans can, and probably will, behave in a less silly and futile way than they have done in the past and are doing in the present.