THE PLACE OF ATTENTION IN THE NEUROPSYCHOLOGICAL SEQUENCE OF: REFLEXES; AWARENESS; ATTENTION AND PERCEPTION: FEELINGS AND EMOTIONS; REASON AND LOGIC

by J. R. Harte, M. D.

A. Historical Background

As animals have evolved from simple to complex organisms one can see the evolution of specialized components, and also an increase in the number and variety of these specialized components. This general pattern holds true for humans. As evolution has progressed patterns of neural organization have evolved that allow for a progressively more complex (e.g. abstract) evaluation of the environment. These more complex patterns of neural organization involve more components (e.g. more nerve cells) and also more synapses or junctions where information gathered via various sensory receptors can be stored in memory and integrated with information from other sources.

The human brain has over ten billion nerve cells and over sixty billion glial and other supporting cells. There is an advantage in having so many neurons -- it allows for more synapses. Neurons in the mature adult may have five to ten thousand end buttons where synapses may relay impulses to other cells. This same neuron has a dendritic system that may receive impulses from an equal number of end buttons from other cells.

The nerve cells of animals are organized in hierarchies. At the simplest level one would see a simple reflex arc. At the highest level one would see the abstract thought of man that involves many cells and systems integrated in a complex manner and depending on lower levels of function to provide components of information.

The following is an attempt to explain how the systems may be organized in a sequential level, and also how malfunction at complex levels of mental organization may occur.

B. Apparent Functional Sequences in Information Build-up

From a neuropsychological point of view attention can be looked upon as a level of consciousness and also as a step in the sequence of neural mechanisms that eventually lead to reasoning. Attention is a level of function that is basic to higher levels of mental functioning. Attention, however, is only a part of an integrated sequential operation that is involved in information processing. Other parts of the sequence are:

1.) Automatic Reflex Response

In this sequence the first step is: "automatic reflex response" to sensory stimuli. This automatic reflex response occurs without conscious awareness or conscious attention. Many such automatic reflex responses occur every minute in our daily life without conscious effort, awareness, attention, or planning. Such things as balance, the movements of walking; breathing; postural reflexes; scratching a spot that itches; turning the head and eyes to a stimulus source; and many movements of expression of feeling are examples of an automatic reflex response. Patterns that at one point in development may require attention may become automatic at a later point in development and then may require little or no attention.

2.) Awareness

The second step in the sequence is some level of "awareness" of a stimulus source, or an awareness that the automatic reflex response is unsatisfactory to meet the demands or the disturbances caused by a stimulus source. This awareness may provide the motivation for focusing attention.

3.) Attention - Focusing to Build up Images or Percepts

The third step in the sequence of neural mechanisms has a number of sub-steps or phases. The first phase is to focus on or give "attention" to the stimuli brought into some level of awareness. The second phase is to attend to and build up the stimuli into images or percepts. The third phase is to scan one's brain for relevant memories and associations that aid in building up the images or percepts to an optimal level.

4.) Feelings or Emotion

The fourth step in the sequence is to have primitive or prelogical associations brought into awareness, consciousness and attention. These imprints from the past often may not involve conscious memory of definite visual images or of sound sequences, but do involve feelings or emotion. It is as though before the child has the ability to think, reason, and remember in a logical and abstract way he does have the capacity to judge and evaluate stimuli and situations according to the feelings or emotions these stimuli and situations evoke in him. Thus in scanning the brain at a most primitive level for memories or associations to input, one is apt to bring out feelings or emotions associated in some way with the present stimulus or situation. Feelings or emotions are apt to be in terms of good (comfort, security, pleasure, warmth, etc.); bad (pain, discomfort, unpleasantness, sadness, frustration, etc.); neutral feelings; and various combinations and elaborations of the above types of feelings which may cause fear, rage, anxiety, anger, hostility, etc.

Organisms may inherit certain types of primitive learning on a genetic basis. Fear of loud noises is almost universal in the animal kingdom.

Feelings may be related to patterns of neural organization of the limbic system and the inner connections of limbic system with other neural systems.

5.) Reasoning and Logic

The fifth step in the sequence of levels of mental functioning that leads to reasoning is the mental process of abstract classification or reasoning itself. In this mental process it appears that higher level associations and memories are brought into conscious awareness, attended to, further developed, and integrated. By repeated scanning of the environment or memory, various relevant associations may be brought into conscious awareness. The host may attempt to integrate these new bits of information into the psychological schemes he is in the process of developing. If contradictions arise in these developing psychological schemes, the host may then be faced with the demand to resolve these contradictions in a logical way even if one has to break down existing schemes of knowledge. (In small children, psychotics, and some neurotics there may not be an inner demand to resolve these contradictions.)

Hopefully, with the breakdown of maladaptive existing schemes of mental organization the component parts can be reorganized in such a way so as to resolve

the contradictions. If schemes of reason, knowledge and logic are broken down and are not adequately rebuilt then one may have to depend on more primitive levels of perception or on earlier types of development; e.g. depend on types of perception or cognition based primarily on feelings or emotion. This would cause the organism to become more autistic.

C. Reason and Logic versus Feelings and Emotion - Faulty Organization

If in resolving the inevitable conflicts and contradictions of psychological schemes that occur in all of us, we consistently let our feelings and emotions and desires dominate and strongly influence our reasoning and logic we will have the emergence of autistic thought. (1) Autistic thought is subjective rather than objective. Autistic thought follows very primitive rules of reasoning and logic (primary process). (2) In autistic thought magical thinking is dominant; reality is altered or distorted to meet one's feelings, needs, wishes or desires; responsibility is ignored, avoided, or denied; and internal subjective psychological factors dominate over incoming stimuli in determining how complex percepts and concepts are built up. If autistic and subjective determinants of perception are dominant one may see not only thought but also perception distorted as in the production of visual and auditory hallucinations. In a psychotic adult one may see autistic thought distort concepts as these concepts are built up into delusional systems. (1)

Thus if one withdraws from and avoids the real world with its objective bits of information that are continually fed back to our sensory apparatus, we consciously or unconsciously limit and influence the type of reasoning and logic that will follow. If in seeking to avoid the conflicts and contradictions that are a part of life, we markedly restrict the information we take in, our perceptions will not be truly accurate or reliable. If as adults we allow our feelings and emotion to largely dominate and distort our reason to the point where our schemes or systems of knowledge and information are unrealistic, and we cannot or will not use corrective feedback, we are psychotic.

Thus how perceptions are built up from simple to complex, and the cognitive styles that become established depend on the interplay of the lower levels of neurophysiological function. These lower levels of function in turn depend on the interplay of environmental factors, biological factors, and time factors (e.g. the developmental sequence.) These lower levels of function provide the components for more complex (e.g. abstract) higher levels of function.

It would appear that emotions or feelings are basic to the development of reasoning and logic. Early in development we know our world through our feelings and associated images. Later in development our feelings and emotions provide the subjective part of our personal experience. Often we may not have a conscious memory of the early experiences that are determining factors in how we organize and perceive various environmental experiences in later life. Early infantile emotional perceptions or feeling tones that become established and consolidated as patterns would appear to have a strong influence over the development of later and more complex percepts, cognitive styles, and adaptive styles. Thus early feelings of security with trust in people versus feelings of insecurity, mistrust, and anxiety will influence the adaptive styles that follow. It is understandable why we may withdraw from, avoid, and mistrust things that repeatedly hurt us or cause us pain. Patterns of withdrawal from and avoidance of people favor the development of a greater dependency on internal, subjective, or autistic feedback in evaluating one's world.

D. Organization, Integration, and Stability

We function best whem our feelings and emotions are organized in such a way that

they support the more objective aspects of the systems of reason and logic that we build up. Feelings and emotions can give us the intuitive ability to perceive stimuli and situations at a level of awareness that is not fully conscious. Feelings and emotions may also cause us to misperceive in a like manner. Ideally one would continually assess, evaluate and re-evaluate incoming information (feedback) in the light of primitive perceptual schemes (emotional schemes or schemes based on feeling) and in the light of mature types of reasoning and logic. One could then become aware of the contradictions and conflicts that exist and resolve these on the basis of objective facts and corrective feedback.

It appears, however, that in order to have stability in any type of complex organization one needs to have a large percent of the component parts fairly well consolidated and durable so that the complex psychological structures built up from them will not crumble under mild stress. If the component parts are fragile or unstable then stress may cause the larger structure to crumple and become disorganized. Thus too much ambivalence, too many internal contradictions or too much inner uncertainty may be our psychological undoing at a time of stress.

The organizations and structures referred to in the above paragraph are not clear concrete structures, but are rather patterns of neural organization that underly our information processing mechanism - e.g. our patterns of personality organization.

Ref.

1. E. Bleuler, "Dementia Praecox or the Group of Schizophrenias", pp. 63-68, translated by J. Zinkin - published by Int. U. Press, N. Y., N. Y., 1950.

2. S. Freud, "An Outline of Psychoanalysis", Chapt. 4 - pub. by W. W. Norton, Inc., N. Y., N. Y.