INTRODUCTION

There is sun and ray relationship between stimulus and reaction in living human being; as every sensory input in terms of information is reacted accordingly. To react is a fundamental phenomenon which proves existence of life associated with sequence of bio-chemical changes as desired by living organism to perform a concentrated volitional effort.

Dictionary meaning of the reaction is "reverse movement", but physiologically it means action in response to stimulation of a nerve or muscle (44). The present era is the era of high speed, which demands quick reactions.

Reaction time is the time taken to react to a stimulus, it differs from reflex in being a voluntary response to stimulus after it is consciously perceived. Reaction time is there for longer than the reflex time (87).

Human kind lives and acts in time. One can easily recognize the major time trends of the growth and aging and the periodic changes in the environment, which is very likely to affect our day-to-day living pattern and social behavior. All physiological and psychological functions change with some degree of periodicity. The central nervous system illustrates the interweaving of different rhythms with periods that range from fraction of a second to a year or longer (22).

Human behavior emerges from two factors, the interaction of the responses that people have and the stimuli that impinge on them. Behaviors are commonly observed as lying along a continuum reflecting the relative influence of these two factors in their causation. According to the concept of Harold Pashlar (2001), most human
behavior seem to lie in between these two extremes (31). Posner Jonede's (1980-1981) concept of exogenous and automatic control suggests that attention control lies outside the organism, in the stimuli impinging on it. If the appropriate stimulus arises, the response corresponding to that, stimuli will occur. (62,38).

According to Parasuraman (1998) tradition that began during World War II in the United Kingdom had given the phrase "attention and performance". Research during this tradition has sought to illuminate basic questions about the architecture of the human mind by examining the human performance in relatively simple tasks. Although some topics that once occupied attention and performance, are no longer studied very intensively (e.g., choice reaction time and matching), the core issue of attention and mechanisms, limits and control have probably undergone more intensive study in the past five years than in any comparable period of time in the past. There has also been a great increase in efforts to relate attentional mechanisms characterized at a functional level to brain activity and neural circuits. (59). Research study by J.D. Pathak (1971) had shown that agility of younger age diminishes as years pass. The old persons are there for unable to participate in the most of the activities of modern life as they fails to keep pace with others and are left far behind. The present age of accelerated speed demands quick responses. (34).

Why to study 'Time' of reaction?

Time factor plays pivotal role in life. Concept of life style has kept on changing from time to time as well as from generation to generation. It is apparent that the speed of the life has been greatly accelerated due to many factors the principal element behind this phenomenon is unclear, uncertain and unknown.
One life span seems to be very short to achieve the desired goals. This might have influenced the working pattern of a person into accelerated manner.

Further, there are definite pathways through which sensations are carried from external peripheral world, as a result of disturbances. In turn they are well processed in most precise manner in specific areas of the complex cerebral cortex, which gives responsive feed back in the form of motor action. These events involve definite time to be completed.

In research studies reaction time measures have been commonly used to assess the level of alertness of the individual (40).

The question is how much time normally being consumed by an individual required to react to various stimuli?

Warshal's (1977) work on TM and reaction time has reported that changes in premotor time accounted for the changes in total reaction time. Premotor time is the time from the onset of the stimulus to the time of the nerve impulse reacting the muscle responsible for the reaction. This central component includes the time involved in processing the impulse in the brain, spinal cord, nerves, and synapses (88).

It is commonly stated that the person is slow or fast in physical task as well as performing mental functions. But the concept is just based on mere experience or as perceived by a person, however science just can not stand simply on accepted experiences and speculations, but it has to be well supported by scientific experimental proof based on very accurate recording device.

Reaction time depends on several factors, so there can be no single, universal reaction time value (96).
Therefore, the aim of this study is to record normal visual and auditory reaction time in different individuals in different age groups, in normal conditions of existence and also in the condition of exposure to routine stress experienced daily.

**Why to study Visual and Auditory Reaction Time (VRT & ART)?**

To answer this question most satisfactorily, one has to go himself back to the Stone Age. In that prehistoric era a person had not yet gained full meaning of external world around him. But he gradually learned to understand various sensation to help him to survive.

The degree of alertness in a situation is often judged by the speed with which one responds to that situation. In research studies reaction time measures have been commonly used to assess the level of alertness of the individual (40).

The adaptation of man to his environment and to the society of his fellow men requires the constant processing of information from the environment and from the individuals within the environment. Any form of activity constitutes an interactive process wherein any kind of movement or action produces change; the detection of such change via sensory system permits the regulation and control of subsequent actions. Much of consciousness even in absence of significant sensory inputs seems to sensory imagery.

We think in terms of visual and auditory imagery and imagery involving the other senses. Although in analytic study of sensory process there is often a tendency to consider them as independent dimensions, our perception of the environment and our reaction to it depends in fact upon many complex interactions of the individual sensory modalities (28).
According to the Yogic / Vedic philosophy, every living human being has been benefited by well developed **panch gyanendriya and panch karmendriya**, through which a person gains the knowledge of the external world and reacts accordingly (80). The five basic senses are visual, auditory, olfactory, taste and touch, among these five senses visual and auditory senses play a major role in the protective mechanism to help survive in all the situations. While olfactory, taste and touch senses have a limited role to play in human beings compare to animals. Alertness to these visual and auditory senses developed faster as compared to other senses.

Studies by De Casper and Fifer (1980) has explained that within a few days of birth, a baby shows attentive preference for listening to a tap recording of his/her mother's reading voice as compared to another voice (5).

Throughout the entire life, these two sensory inputs play major role in justifying the situation and enable the individual to react as demanded.

In this perception visual and auditory reactions talk much about person's mental functioning, psychological understanding, social behavior and physiological reactions in response to a particular stimulus.

The age in which we all are currently floating is the electronic age. It is very likely that in due course of time one may achieve the capability to react faster. There may be changes in bio-rhythm in terms of acceleration.

Such minute changes may not be seen by open eyes, but can be experienced and if these reactionary changes are recorded and studied, it may be helpful in understanding the development of man in evolutionary adjustment. There are many situations and professions
eg. flying an aircraft, driving an automobile, competitive exams, top level sport events, high skilled work etc. demand high degree of specification, in which no human error is pardoned. Quick reaction time is essential to perform factory task as well as during automobile driving (93).

There is a ray of hope penetrating through a person, which can reveal his individuality by simply knowing his visual and auditory reaction time. At the same time there is feeling that biological clock has deep concern with external changes in relation to the passage of time.

Astrophysical analysis has provided evidences that the universe is expanding with a definite speed, human being a part of this vast universe; the effect of expansion is very likely to affect him. Following similar pattern of the expansion, which is referred as biological development, finally ends in total non existence in physical form of the body. The co-relation between these two known phenomenon may exist, which can be reflected in motor activity in human being. In true sense it is an interesting story of perceptive power via sensation resulted in reactions. In health and disease, this observation can be of great help to assert a person's capability to react to simple visual and auditory stimuli, and gives glimpse of complex functions of cerebral cortex. Above all there is scanty information available regarding visual and auditory reaction time in human being, which calls for the search to find out the normal range of reaction time in a person, in different conditions of life.

The information made available may be proven excellent guiding tool in deciding a subject to be a slow, fast or normal. Because it hints about the complexity of the neuronal circuit, integrated functions of cerebral cortex and ultimate motor activity in response to stimuli and evolutionary improvement in responding sensory input in the form of motor action, the "REACTION".
Truly expressed by Maclean, (1990) that in thinking neurophysiologically, we need to recognize that any and all functions are distributed in space and time, there is no focal point where either perception and motor command are provided a common datum. There is no central station where all attributes involved in seeing, listening, reading or speaking are concentrated or where all the attributes of some perceived object are located.

The nervous system traffics in ionic and molecular events that are remote from the outside world. The spatial, temporal and characteristic feature of outside world as represented in central nervous system, are vastly and radically different from what we think, we understand of the physical universe (49).

The aim and objective of this project is to study,

a) Normal range of visual and auditory reaction time in human being in various age groups.

b) During different phases of female reproductive life.

- During pregnancy
- After parturition
- During lactation

c) During extremes of environmental temperature - seasonal variation.

d) Diurnal variation.

e) Before and after light physical exercise.

f) Before and after the physical and mental relaxation.
It is axiomatic that human beings are individuals. It is not known however whether the magnitude of individuality differs with the time of years. If standards and normal ranges are to be most useful, it is of utmost important to inquire the visual and auditory reaction time of physiological variability.