

IMPACT OF AGING (ELDERLY GROUP) ON TIME PERCEPTION , A COMPARATIVE STUDY BETWEEN YOUNG AND ELDERLY SUBJECT

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Key words: Two minute (120 seconds) time perception test, elderly and young group. Time, perception

NSS: National service scheme ,

Abstract:

Back ground: One side the researchers in Physics are trying to find out the true nature of time ,from where it come and when it will end .On the other hand neuro physiologist and neuro psychologists are trying to search out how brain and mind can perceive time. An old age belief "time flew as we age" is tried to validate by many scientists. It means that time pass rapidly in elderly people. Though it appears that we do not have any sense organ to perceive time as we have sense organs for i.e. touch ,taste, smell , ...And our temporal perception is a product of function of cerebrum . Illusive nature of time is very well discussed in psychology ,philosophy and metaphysics . It is understood from the studies from chrono biology that there is a internal clock in our brain to regulate circadian rhythms by getting information from suprachiasmatic nucleus of hypothalamus by receiving light information retina. The cerebrum try to synchronize the internal clock with human made external clocks. In this study we have tried to study the impact of aging on time perception by two minute (120 seconds) time perception test and compared the results similar test conducted among the healthy young volunteers and other scientists.

Method: The data were collected from subject attended various NSS camp set ups organized by

NSS unit AMCMET medical college Ahmedabad . The subjects were divided into two groups 1 N1: group consisting young group was medical students of mean age 19.17 sd 8.54 and 2 N2: elderly group was residents of elderly houses mean age 66.9 sd 8.38 Instrument required: smart phone stop watch function to calculate two minutes. Instrument required: smart phone stop watch function to calculate two minutes.

Result: Mean seconds perceived during two minute perception test was statistically lower significantly amongst elderly group compared by youngster group. There was a significant distortion of time perception observed amongst elderly group

Conclusion:

The study concluded the fact that time perception is distorted among elderly people. Though the reliable test is awaiting for time perception more researches are required to generate the new valid tests to assess the time perception. How does the time perception matters? Time perception, chronometric capacity and its alteration with aging is a challenging research topic in physiology and medicine. The results are this study are to be dealt with caution due to methodological limitations .Though it is worth to mention that Temporal perception is essential when detecting rapidly presented stimulus information i.e. driving in traffic .Altered time perception among elderly is an issue while driving a moped or a car. As in driving in traffic, the time perception is essential for safer driving from safety of individual and general population point of view.

To understand temporal illusions a cross-multi disciplinary approach is required to develop valid tests for time perception .It further needed to develop new methods and

combined with techniques employing electrophysiology, EEG, fMRI with the hope that the time illusions will light the way to understanding general outstanding questions of time perception. Faster “internal-clock” in the older need to further documented with other neuropsychological tools to measure time perception and to study temporal perception with aging. These tests are potentially a useful tool to measure subjective perception of time. They also corroborate the hypothesis of a change in subjective time perception with aging and studies done by other scientists.

Introduction:

Throughout the life whatever behavior is conducted by human organism, the time dimension is always there just like space dimension. Life on earth is shaped by multiple environmental cycles. Prokaryotes to humans – internal timekeepers (so called circadian clocks/rhythms) have evolved that anticipate these daily events for fine-tune physiology to the varying demands of activity and rest i.e. The day and night. Circadian rhythms are almost omnipresent and cover all aspects of biology from behavior down to cell cycle control and chromatin modulation. In mammals, a master clock in the suprachiasmatic nuclei (SCN) of the hypothalamus is synchronised to geophysical time via visual photoreceptive systems in the retina. From the SCN, time information is transmitted to numerous peripheral clocks located throughout the body. Yet there is no known specific sensory receptor for time. So how do we have temporal perception? How the brain keeps track of time?. The brain's internal clock is commonly compared to the function of an imagery pacemaker that emits pulses at some mean rate, which then leads to the experience of subjective time.

Time is an integral part of our daily life. The time is always there, omnipresent and immaterial. But what is time? Well it's just a construct of our brain and mind. It doesn't really exist without our brain and mind. Each person would perceive the flow of time. The generalized and specialized sensory receptors give rise to various perception but, there is no specific receptor for time. But the time always present with us. Without a timepiece, or even conscious awareness, people perceive the passage of time.

We all have experience that we can go to sleep without an alarm and wake up at a predetermined time. Though the experiments have proved that subjective hour is longer than an actual hour (24 hour=25 hours).virtually everyone is aware of the passage of time, and can estimate its passage. Dr. Marc Wittmann at al interviewed 499 German and Austrian older subjects and reported that the all volunteers confessed that the last decade had passed quickly. There is not a simple linear translation of perceived time into actual time. But our temporal /elementary time experiences contain duration; non-simultaneity; order; past and present; change, including the passage of time. The estimate or perception of time is less efficient and deteriorated beyond 65 years of life but is hard to prove experimentally. With all limitation of technique in this study we have compared perception of time in young healthy subjects with elderly subjects and the results are discussed.

Material and method:

The data were collected from subject attended various NSS camp set ups organized by NSS unit AMCMET medical college Ahmedabad. The subjects were divided into two groups 1 N1: group consisting young group was medical students of mean age 19.17 sd 8.54 and 2 N2: elderly group was residents of elderly houses mean age 66.9 sd 8.38
Instrument required: smart phone stop watch function to calculate two minutes.

Before the test the volunteers were explained an understanding of time and the meaning of 1 second and two minutes(120 seconds). The subjects were asked to calculate mentally two minutes or one hundred and twenty seconds. The subjected were told to keep eyes closed to

avoid take clue from other sources of time elapse. Standard mobile clock with stop watch was used to measure two minutes. When the subject finished mental counting, the actual elapsed times were recorded. The mean mental time or "brain clock time" were measured among both the group the young students group N1 group and elderly group N2. Mean values of observed brain times were compared amongst both the groups.

Criteria for selection of subjects:

All subjects must fully conscious ,
No history of neurological disease .
No history use of drugs i.e. anxiolytics or sedative.
Must be cooperative to participate in study.

Otherwise excluded.

This study included 200 subjects, including 129 women. Two groups were formed according to age: Group N1 comprised 100 subjects, aged 17-21 years; the mean age . Group 2 comprised 100 subjects, aged the mean age

Statically tests:

Statistical analyses for comparisons between groups were performed with the student t test. All data were entered in a Microsoft excel program for the two age groups

Research Questions

Does time perception differ between youngsters and elderly?..

OBJECTIVE:

DESIGN:

Cross-sectional comparative study.

Conflict of interest: There is no conflict to interest to declare.

SETTING:

Data collected from camps organized by NSS Unit in AMCMET medical college at elderly houses in Ahmedabad

Subjects :200 adults 100 young and 100 elderly.

OBJECTIVE:

To study the Impact of aging on time perception as studied by 2 minute time perception test and compare result among young and elderly group

DESIGN:

Cross-sectional comparative study.

SETTING:

Data collected from camps organized by NSS Unit in AMCMET medical college in college and elderly houses in Ahmedabad

Subjects :200: 100 young and 100 elderly.

RESULTS and statistical test:

TEST RESULTS

P value and statistical significance:

The two-tailed P value is less than 0.0001

By conventional criteria, this difference is considered to be extremely statistically significant.

Confidence interval:

The mean of n1 young group minus n2 elderly group equals 24.0989653500

95% confidence interval of this difference: From 17.9550649813 to 30.2428657187

Intermediate values used in calculations:

t = 7.7351

df = 198

standard error of difference = 3.116

Table 1 : Result showing mean second perceived by young student and elderly during 120 second **perception test**

Group	n1 young group	n2 elderly group
Mean	108.44	84.34
SD	22.94	21.07
SEM	2.29	2.10
N	100	100

P< =0.001

Discussion:

With all limitation of method of assessment of study time perception , the study documented that there is significant distortion of time perception in elderly groups compared to youngster’s group. Time perception is faster in elderly and is projected by this study with the help of counting “ two minutes (120 seconds)perception test” . Vanessa Fernanda Moreira ,Ferreira Gabriel ,Pina Paiva et al carried out similar study and concluded that Mental calculations of 120 seconds were shortened by an average of 24.6% in elderly individuals compared to individuals young group and further suggested fastening of time perception amongst elderly. Elzbieta Szelag and et al in their study on Aged elderly and supported similarly temporal perception decline and offered new horizons for neuro rehabilitation in elderly population in context to temporal perception .

We have a very straight forward structured and linear concept of time and time seems to speed up as we get older. The scientists have proposed “proportionality theory for time perception” . The theory uses pure mathematical model, holding that a year feels faster when you’re 40 (forty year of age) than when you’re 8(eight year of age) because it only constitutes one fortieth of your life rather than a whole one eighth of your life. Babies and toddlers have no concept of time. The awareness of time evolves during childhood as children’s attention and short-term memory capacities develop a process dependent on the gradual maturation of the prefrontal cortex. So time perception appears a learned experience. The author thinks that time perception evolves in context to learning 3D perception of space special perception/orientation

and persons (i.e. close contacts friends and relatives). To gauge the time required for a task, they must pay attention to it. They must also memorize a stream of time-data without losing concentration. So children suffering from attention-deficit hyperactivity disorder find it hard to gauge time correctly. Dr. Sylvie Droit-Volet, a psychology professor at Blaise Pascal University, in France, manipulated subjects' emotional state by showing them movies that excited fear or sadness. She then asked the subjects to estimate the duration of the visual stimulus. She found that time appears to pass more slowly when we are afraid. Here again the attention, memory and emotion play a part in our perception of time. Dr. David Eagleman at Baylor College of Medicine found that repeated stimuli appear briefer in duration than novel stimuli of equal duration. Due to aging, for old people it is difficult to perceive new stimuli as novel among the elderly compared to younger one.

According to one more model of time mechanics of brain, time as perceived by our brains (subjective time) is synchronized with the ticking of an our watch (objective time) for measuring time. The mechanism consists of an imagery pacemaker, continuously emitting pulses (ticking), which are stored in an accumulator. Subjective duration i.e. number of pulses that have accumulated (since the beginning of the stimulus). When the internal clock speeds up, the number of pulses increases, creating the impression that time is passing more slowly. When we stop paying attention to time, pulses are blocked and no longer reach the accumulator and pulses are not counted, and time appears shorter.

While in another striatal beat-frequency model, specialized neurons in dorsal striatum of basal ganglia act as oscillator cell. Each of these brain cells has up to 30,000 connections with a series of cells in the cortex oscillating at various frequencies. The neurons in the striatum can read time codes emitted by oscillator cells in the cortex. They come into action when oscillatory activity corresponds to previously detected patterns, stored in memory. Thus the estimates of time intervals originate in neuronal activity in basal ganglia. It has further stated that when we estimate the timing of a visual stimulus visual cortex is activated. Doing motor act, primary motor cortex is come into action and so auditory cortex estimate the length of a sound stimulus. Dopamine is the main neurotransmitter involved in time processing. Dopamine receptors agonists tend to speed up our perception of time, which passes more quickly. This is also the case for certain drugs, such as cocaine, which enhances the effect of dopamine. On the contrary, narcoleptics -dopamine antagonist make time passing more slowly and so in Parkinson' disease. Duration and integration of time is lengthened in schizophrenias. Suggesting defects in the brain's time keeping mechanisms. Relation between Type A behavior/personality and heart disease is well known and there is moderate correlation between the pace of life and the rate of death from heart disease.

Perception of time passage was accelerated in aging due to a lack of new experiences and reduction in dopamine neurotransmission amongst elderly group and need further documentation and studies.

Conclusion:

The study concluded the fact that time perception is distorted among elderly people. How does the time perception matters? Time perception, chronometric capacity and its alteration with aging is a challenging research topic in physiology and medicine. Though the reliable tests are awaiting for time perception. More researches are required generate the new valid tests to assess the time perception.

The results of this study are to be dealt with caution due to methodological limitations. Though it is worth to mention that Temporal perception is essential when detecting rapidly presented stimulus information i.e. driving in traffic. Altered time perception among elderly is an issue while driving a moped or car. As in driving in traffic, the time perception is essential for safer driving from safety of individual and general population point of view.

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Another area of interest in context to time perception is "can we slow down time passage?" Scientists have suggested constantly learning new ideas, subjects and skills is the method to slow down the time. So we recommend to remain life time a student to maintain normal time perception.

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