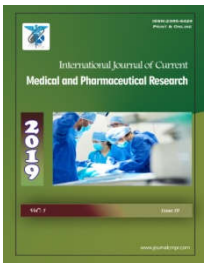
INTERNATIONAL JOURNAL OF CURRENT MEDICAL AND PHARMACEUTICAL RESEARCH
ISSN: 2395-6429, Impact Factor: 4.656
Available Online at www.journalcmpr.com
Volume 5; Issue 10(A); October 2019; Page No. 4616-4622
DOI: http://dx.doi.org/10.24327/23956429.ijcmpr201910757



Research Article

PERCEPTION, PERCEPTIVE DISORDER AND ITS CURRENT ASPECT IN PHARMA MEDICINE

Suhas H. Lahane

Currently working as Research Associate in F&D, ATRA Research Lab. Aurangabad

ARTICLE INFO

Article History:
Received 06th July, 2019
Received in revised form 14th August, 2019
Accepted 23rd September, 2019
Published online 28th October, 2019

Key words:
Perception, Abnormal perception, Brain, Neuromodulator, Neuro-stimulating devices.

ABSTRACT

Perception in psychiatry can be defined as the analysis of sensory information within the brain, integration within the brain with or without effect of prior knowledge and to give response to surroundings. As we go through our day, we are surrounded by the rich stimuli of modern life and we rely heavily on our sight to inform us of where we are placed within this world. Various theory's have been proposed to explain, what is perception. Perception results from complex interactions among sensory and cognitive processes across hierarchical levels in the brain. It is mandatory to understand brain, its structure, what is CNS and basically what is mean by perception. Central nervous system and its response is more important in case of perception. Alteration in stimuli or response results in abnormal perception, maybe in visual, odour, haptic, tactile etc. Main cause is unknown still but abnormal perception observed in various diseases like Schizophrenia, Parkinson's diseases, amblyopia, Hallucination, delusion, mania, Psychosis, Autism spectrum disorder (ASD) etc. Various cure are available that could not completey cure the disease but reduces the symptoms.

INTRODUCTION

Perception can be demarcated as our recognition and interpretation of sensory information. Perception also includes how we respond/reply to the information. We can deliberate of perception as a process where we take in sensory information from our environment and use that information in order to intermingle with our environment. Perception in psychiatry can be defined as the investigation of sensory information inside the brain. When we go through our day, we are encircled by the rich stimuli of contemporary life and we rely heavily on our sight to inform us of where we are placed within this world. Through perception we obtain a portrayal of our environments and what they mean.

Debate has been ongoing for many years on exactly what role sensory visual information plays within perception and how important our memories and past experiences are in this process.

Perception consequences from intricate interactions among sensory and cognitive processes across hierarchical levels in the brain. Intermodulation (IM) components, used in frequency labeling neuroimaging designs, have arisen as a auspicious direct measure of such neural interactions[1].

Various drugs (Medication), technical aspect, counselling, music therapies, Neurostimulating devices are discovered to treat various types of abnormal perception and diseases.

Brain, its working

The parallel-interconnected information processing at the core of intuitive cognition mimics the connectivity of the nervous system. Neurons, the primary cells in the nervous system, form connections with many other neurons. Those that tend to fire at the same time become more strongly connected to each other. Eventually they form networks that can process together different features of an object, or different objects that tend to be associated with each other. This parallel-interactive connectivity of the brain accounts for its plasticity, or its ability to become automatically molded by experience. This in turn explains many of the characteristics of unconscious intelligence and intuition**.** At the most elementary level, all mental functioning necessarily depends on neurons and their parallel-interactive connections [2].

In neural tissue, the axon of one neuron and the dendrite of another are separated by small gaps called synapses. When an axon fires, neurotransmitter molecules rapidly diffuse across the synapse and bind to receptors on the opposing neuron's dendrite. This initiates a wave of electrochemical excitation that travels along the dendrite to the opposing neuron's cell body. In turn, this generates a weak electrical current in the extracellular fluid outside the dendritic membrane. The currents in the extracellular fluid from different cells add together. When summed, they can greatly enhance the possibility that other neurons in the neighborhood will also fire.[3]

Corresponding author:* **Suhas H. Lahane
Currently working as Research Associate in F&D, ATRA Research Lab. Aurangabad

Neuromodulators

Neuromodulators work by modifying neural firing to encourage behaviors that support survival and well-being. They are released in response to signals from the limbic system, the group of brain structures largely responsible for innate seeking and avoidance behaviors and for emotional responses. Some neuromodulators such as dopamine and acetylcholine (sometimes called nonspecific neuromodulators or neurotransmitters) are released throughout large regions of the brain. Others are deployed more strategically in both the brain and body at the behest of the emotional and motivation system. Oxytocin, for example, is released in more specific regions of the brain and body during childbirth, sexuality, and bonding[4] . The process of meaning making is governed by local synaptic connections at many different interactive levels in reciprocal interaction with the emotional/motivational system and its neuromodulators, which guide intentionality[2].

Clinical studies of brain-damaged patients support the view that the brain does not function like a top-down processor. If it did, damage to its central processing unit should have a drastic effect on general intelligence. Yet localized damage to higher brain areas tends to cause specific rather than general defects in all-over intelligent functioning. General intelligence decays in a gradual, or a "graceful" way, with generalized brain cell loss, as may occur with aging[5].

Perception and Complexity in the Brain

The brain must filter out unimportant incoming sensory information at the same time that it intensifies what is important. Freeman became interested in what perception, rather than sensory recording alone, might mean at the neural level, as captured by the electroencephalogram (EEG). He initially studied olfaction in small, awake mammals such as cats and rabbits to learn, as the title of one of his books puts it, How Brains Make Up Their Minds[3].

A model has shown below how percept form, may be influence of prior knowledge or knowledge exert effect after percept has been formed[6]. Fig. 1 Show that percept forming process.

We review how perception, timing and action can be understood[7].

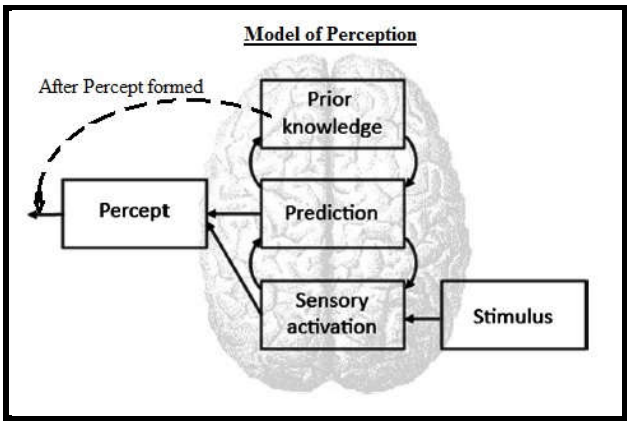


Fig 1 Model of perception and working

Perception can be explained on the basis of multisensory processing and Each sense modality provides a unique window onto the external world. In some instances, the senses provide information on modality specific features of an environmental stimulus. For example, color is specific to vision, while pitch is specific to audition. In other instances, however, the different senses provide information on shared features of a stimulus that are not specific to a particular modality. When watching a percussionist, for example, the location and timing of drum beats is perceptible by both the visual and auditory systems, and if the drummer is playing very intensely, by the somatosensory system as well. Unisensory signals encoded by the peripheral sense organs therefore contain unique information on modality-specific stimulus features and redundant information on shared stimulus features. The unisensory information streams converge in the central nervous system where they are compared, combined, and integrated to form a coherent and biologically meaningful internal representation of the external world.

Clear understanding of multisensory perception requires several key terms be differentiated from each other. Multisensory processing is an umbrella term that refers to any neural or behavioral phenomenon associated with two or more sensory modalities. Multisensory integration is a multisensory process in which information on shared stimulus features from two or more sensory modalities is combined to produce a fused neural or behavioral response that is significantly different from its component (i.e., unisensory) inputs. Importantly, not all multisensory processes involve fusion or integration of unisensory information. Cross-modal matching, for example, is a non-integrative multisensory process in which shared features from different sensory modalities are compared to estimate their equivalence. The unisensory features being compared may be temporal in nature (e.g., time of onset or duration), spatial in nature (e.g., spatial location or spatial frequency), or related to identity (e.g., matching lip movements to an auditory syllable) [8].

Multisensory processing in the CNS not only provides a richer, more complete perceptual gestalt, it also serves different adaptive functions at various life stages. audiovisual combination plays an important role in speech acquisition. At prime of life, the perceptual synthesis resulting from integration of sensory information across modalities confers diverse perceptual advantages, including faster response times, more precise discrimination thresholds and more sensitive detection thresholds [8].

Visual Perception: [9]

Processing Visual Information in the Brain

There are two processes associated with vision which are dependent on the directional flow of information; top-down processing and bottom-up processing.

Numerous/countless theories of visual perception have been anticipated within psychology.

Some fall very much within the bottom-up processing viewpoint where all the information required for perception comes from the visual sensory input. In contrast, others favour a top-down processing viewpoint, that prior knowledge and past experience is the key to accurate perception of the world around us. Fig. 2 shows Top-Down, Bottom-Up processing for perception.

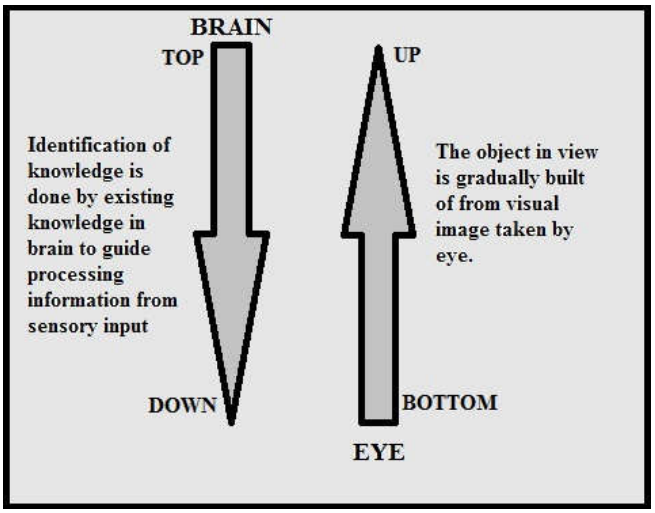


Fig 2 TOP-DOWN, BOTTOM-UP Perception processing
Perception Theory - Direct Realism: [10]

James Gibson was a one of chief psychologist in the theory of Direct realism. Put simply the realist view is that we perceive objects as they really are in the world. This is a bottom-up approach to perception in that our senses are able to provide us with accurate direct information from the external world. Gibson's approach to perception is an ecological one. He claimed the visual information we take in from our environment is so rich that cognitive processing and internal representations to make sense of that information are not required. Gibson worked with aeroplane pilots in World War II. He concluded that a pilot's point of focus on a runway remained stationary as they flew towards it. However, the areas and landscapes around this point flowed outwards as the pilots got closer to landing.

It is from this work Gibson created the term 'Optical flow' and he believed its principles gave the pilots he worked with more detailed information regarding their distance from the runway and their speed 10.

Optical Flow Patterns

Our heads are rarely stationary and neither are our eyes, therefore our world is almost always in motion. If this movement flows outward from a centre point of focus we are moving towards this point. However, if movement flows inward towards a centre point we are moving away from it.

Marr's Perception Theory [11]

Marr (1982) attempted to address this by examining exactly how the brain is able to take information sensed by the eyes and turn it into accurate, internal representations of our surrounding world.

Perception Psychology and Illusions

Optical visual illusions are an area of great interest to visual researchers but also cannot be explained by Gibson's direct realism theory. In visual illusions we often see movement within patterns and two-dimensional images such as ripples or rotations that are not really there. The well-known 'Rotating Snakes' illusions is a good example of this. When prompted, Gibson's explanation, is that such illusions are artificial. They are not real-world images and not the type of stimulus we encounter on day to day basis. Therefore, they are not representative of how our visual system operates.

Constructive Perception

The leading opposing view of Gibson's visual perception is that of Gregory (1970). Gregory's view is termed a 'constructive' view of perception as it is a top-down processing theory based on construction of our world from past experiences alongside real-time visual information.

Gregory claims the visual information available to us is not always of a high enough quality and therefore the brain needs to fill in the gaps by using prior knowledge, memories and similar experiences to understand what is around us.

The information the brain uses to understand this visual input does not always match the reality of what we are actually seeing. This he says, is why we see visual illusions and other similar phenomena [12].

The fig. 3 ***Necker Cube*** is a good example. Upon looking at the cube, our brain concludes that what we are seeing could be a cube with a coloured side closest to us and the cube facing toward the right.

Equally, it could be a cube with a coloured side furthest away and the rest of cube coming towards us. Both of these are possible but our brain is unable to decide which one it is actually seeing.

It is claimed this is why the cube seems to switch perspectives from one view to the other as you continue to look at it.

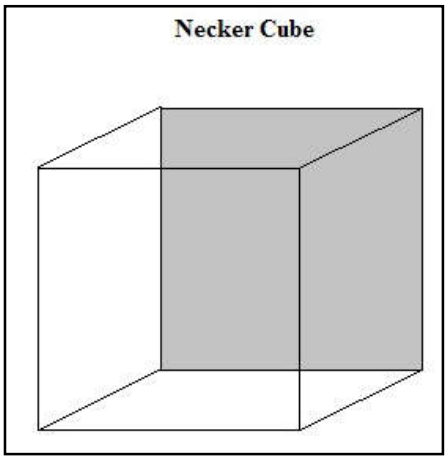


Fig 3 Necker Cube, Example of Perception, Illusion

Gaining an Understanding of Perception Theories in Psychology

The constructive theory of perception has been criticised for its inability to explain how, if our perception process is based on past experiences, people from different cultures and lifestyles still perceive the world in a similar way.

The direct theory of perception has been highlighted as being unable to account for visual illusions and areas of perception where prior knowledge is more likely to have had influence, such as some of the examples in the above video.

In conclusion it is likely our visual perception processes are the result of a hybrid of these two theories, using our memories, experiences and knowledge to aid understanding of visual information where required.

Perception inside psychology is not somewhat we can measure in a straight line and it is a complex wonder. We may never know for sure the answers to these questions. However, as we

evolve and learn more about our abilities and as science continues to develop, we are moving closer to a much subterranean level of understanding.

Memory/Remembrance Psychology: The Title role of Cognition and Emotion The study of memory in psychology is a rapidly advancing area of research. The interconnection of cognition, emotion and memory has been particularly insightful in moving this area forward.

Human Face Detection and Prosopagnosia: Do I know you? Face detection is something we do everyday without even thinking about it. For most of us it is automatic, but for those with prosopagnosia this ability is not there at all.

There is a long history in social psychology of empirical work in favour of the claim that social, cultural and motivational factors can directly influence visual perception [13]. Until relatively just, emotion was assumed to be autonomous (and usually studied separately) from perception and cognition – something that came after the stimulus was recognised. Rather than being separate or competing processes, however, emotion and perception interact to maximise the probability of correctly identifying a stimulus. In this way, a person's sentimental state is supposed to be a source of top-down penetration of visual perception [14].

Distance perception during self-movement: The perception of distance in open fields was extensively studied with standing observers. However, it is a fact that we and the world around us are in continuous relative movement, and that our perceptual experience is shaped by the intricate interactions between our senses and the perception of our self-motion [15].

The perception of the space surrounding us is one of the most relevant problems for our brain to resolve on every moment, this is so because that information is critical for our correct interaction with the environment. In this process, vision tends to dominate spatial judgments, since it provides highly detailed spatial information, influencing our space perception and distance estimation, based on other senses like hearing or touch [16].

Odor perception

Freeman realized that another process, odor perception, is likely to intervene between olfactory stimulation and the behavioral response it evokes. The olfactory system is especially well-suited to study perception because only three synapses separate it from the emotional and memory centers of the limbic system Freeman and coworkers set out to under-stand the complex neural events that correspond to odor perception [3,17].

Haptic Perception

Our sense of touch connects us physically with the external world. Haptic perception, or somesthesis, refers to our ability to apprehend information through touch. Not only do objects in the world touch us but also we explore our environment actively with our hands, fingers, and bodies

The passive aspect of haptic perception is often called tactile perception, and it refers to sensations gleaned from being touched by items in the outside world. Mechanoreceptors and thermoreceptors in the skin (e.g., cutaneous inputs) contribute largely to this tactile aspect of haptic perception. However, haptic perception also includes active touch and the sensations that result from the stimulation of receptors in muscles, tendons, and joints. Haptic perception begins with the mechanical stimulation of the skin. Tactile information travels from cutaneous receptors to the afferent somatosensory pathways, the spinal cord and thalamus, and the brain. It is first collected and grouped by peripheral receptors in the skin, joints, and muscles. Haptic perception involves more than static touch. It arises from active exploration of objects and their surfaces by the hands and body. Thus, in addition to cutaneous information (tactile perception), proprioceptive, kinesthetic, and thermal information contribute to haptic perception . Light touch refers to the sensation of near-threshold tactile stimulation. Nerve fibers carrying light touch information are part of both the medial lemnescal system and the spinothalamic system. Vibration activates most of the mechanoreceptors. Furthermore, it is easily manipulated experimentally and produces robust changes in cortical activity [18].

Tactile perception

Emotional memories associated with tactile perception are also important for attachment formation in infancy, defined in rodent studies as seeking proximity to and maintaining contact with the dam when threatened. [19,20,21]. neonatal PQQ treatment prevents the development of abnormal social behavior, aberrant development or function of nervous system regions related to emotional processing [19].

Some of the related perceptive disorder as given below

Visual Hallucintion (seeing or hearing things that aren't there):
It becomes strong from the prior sections that given the multiple avenues of top-down penetration into visual processing, accurate perception requires striking a balance between the weighting assigned to our predictions versus that assigned to incoming sensory input. Visual hallucinations illustrate the consequences of an imbalance in this system[22].To be adaptive, the relative influence of top-down versus bottom-up sensory input must be flexible and context-sensitive[23]. An evolving theme in neuropsychiatry is that inequalities in this system cause undue reliance on either top-down or on incoming sensory information, contributing to a range of symptoms. Phenomenological enquiry in conditions that manifest visual hallucinations, including schizophrenia, psychosis, Parkinson's disease and dementia with Lewy bodies, suggests that the content of hallucinatory percepts can be furnished by circumstantial links drawn from the environment or by autobiographical memories. For example, identifiable faces or objects can be construed from ambiguous scenery as is the case with pareidolic hallucinations[24] and hallucinations of familiar people or pets are commonly reported [25].

Transitory psychotic disorder: People with this illness have a sudden, small period of psychotic behavior, often in response to a very stressful occasion, such as a death in the family. Retrieval is often fast -- usually less than a month.

Delusional disorder : The vital symptom is having a delusion (a false, fixed belief) concerning a real-life circumstances that could be true but isn't, such as being followed, being plotted against, or having a disease. The delusion lasts for at least 1 month.

Delusions (believing things that aren't true)

These are false beliefs that don't go away after even after they've been shown to be false. For illustration, an individual

who is certain his or her food is poisoned, even if someone has shown them that the food is fine, has a delusion.

Other possible symptoms of psychotic illnesses include

Jumbled or confused speech, Disorderly thinking, Strange, possibly unsafe behavior, Slowed or unusual movements, Loss of interest in personal hygiene, Loss of interest in activities, Problems at school or work and with relationships, Cold, detached manner with the inability to express emotion, Mood swings or other mood symptoms, such as depression or mania [26].

Schizopherenia

Facial emotion perception is an important domain of social cognition [27] and impairment in perceiving facial emotion contributes to problems in interpersonal relationships, social isolation, the development of paranoid symptoms and violence, and a poor quality of life among patients with schizophrenia [28]. Since the early days of schizophrenia research, it has been reported that patients perceive the world in a different phenomenological way than healthy controls [29,30,31]. We have earlier stated that contextual modulation [32] and complex motion perception[33] are integral in schizophrenia patients, and here we report that patients perceive visual illusions in a similar way to controls [34,35].

Parkinson's disease or Multiple System Atrophy- Pain Perception

Multiple system atrophy is an orphan neurodegenerative disorder, characterized by the variable association of parkinsonism, autonomic failure, cerebellar and corticospinal symptoms [36]

Patients with Parkinson's disease or Multiple System Atrophy often experience painful sensations. The few studies investigating pain mechanisms in Multiple System Atrophy patients have reported contradictory results. In our study, we equated pain thresholds in Multiple System Atrophy and Parkinson's disease patients and healthy controls and evaluated the effect of L-DOPA on pain thresholds. Multiple System Atrophy patients had an intensification in pain perception related to Parkinson's disease patients and healthy controls.[37]

Autism spectrum disorder (ASD)

Autism Abnormalities in tactile perception and response, such as sensory defensiveness, are core features spectrum disorder (ASD) and may be associated with impaired communication skills. Pyrroloquinoline quinone (PQQ) is an vital nutrient with significant roles in central nervous system development and function through modulation of glutamatergic N-methyl-Daspartate receptor (NMDAR) activity.

In addition, PQQ inverted hyperactivity in emotional systems as demonstrated by c-Fos expression pattern following elevated-platform stress. These data suggest that PQQ may be a promising candidate therapeutic drug for neurodevelopmental disorders such as ASD. Sensory processing dysfunction is a characteristic feature of neurodevelopmental disorders such as autism spectrum disorder (ASD) [38,39,19].

Astereognosia

Tactile object recognition can be defective if primary sensory perception is impaired. Astereognosis is defined as the general inability to recognize objects by touch in the absence of vision.

Tactile Agnosia

In contrast to astereognosis, tactile agnosia is the inability to recognize objects by touch despite adequate primary somatosensory functions, intellectual ability, attentional capacity, and linguistic skill. Although patients with tactile agnosia cannot recognize objects by touch, they can often draw an accurate picture of an unrecognized tactually perceived object or match it to another object [18].

Cure/Medication to abnormal perception

Continued exposure to exceedingly rhythmic music marks brain dynamics and perception

Rhythmic stimulation is a influential device to improve temporal prediction and analyzing of the auditory signal. However, for long duration of stimulation, the rhythmic and repetitive aspects of music have often been associated to a trance state. The idea that rhythmic presentation of sensory stimuli facilitates perception might be limited to short streams, while long, highly regular, repetitive and strongly engaging streams may have an opposite perceptual impact [40].

During the last decade, the scientific literature has clearly shown the power of music in modifying the neural activity: the endogenous rhythmic neural activity synchronizes with the rhythmic structure of music, a phenomenon often described as neural entrainment [41,42,43,44]. short duration of rhythmic stimulation seems to have a facilitatory effect on auditory processing including speech and these effects extend to visual perception [45].

Treatments with Neuro-stimulating devices

For more than two decades, neurostimulating devices have been used to interfere with and modulate neurophysiological processes within the brain. Central nervous-implanted neurostimulating devices (deep brain stimulation DBS) will have a greater impact on the patient's self-perception than “peripheral” implanted devices (implanted vagus nerve stimulation iVNS) and external devices (transcutaneous vagus nerve stimulation tVNS or transcutaneous electrical trigeminal nerve stimulation eTNS) [46].

Medicine Treatment:[47]

Most psychotic ailments are treated with a grouping of medications and psychotherapy, which is a type of psychotherapy.

Medication

The chief type of drug that doctors recommend/suggest to treat psychotic disorders are “antipsychotics.” Although these medicines aren’t a cure, they are effective in managing the most troubling symptoms of psychotic disorders, such as delusions, hallucinations, and thinking complications.

Older antipsychotics include

Chlorpromazine (Thorazine), Fluphenazine (Prolixin), Haloperidol (Haldol), Loxapine (Loxitane), Perphenazine (Trilafon), Thioridazine (Mellaril), Perphenazine (Trilafon), Thiothixene (Navane), Trifluoperazine (Stelazine)

The novel ones are called “second-generation,” or “atypical” antipsychotics. Examples of these medicines include:

Aripiprazole (Abilify), Asenapine (Saphris), Brexpiprazole (Rexulti), Cariprazine (Vraylar), Clozapine (Clozaril),

Iloperidone (Fanapt), Lurasidone (Latuda), Olanzapine (Zyprexa), Paliperidone (Invega), Paliperidone palmitate (Invega Sustenna, Invega Trinza), Quetiapine (Seroquel) Risperidone (Risperdal), Ziprasidone (Geodon), Aripiprazole lauroxil (Aristada), Asenapine (Saphris), Lurasidone (Latuda), Olanzapine (Zyprexa), Brexpiprazole (Rexulti), Cariprazine (Vraylar), Vilazodone Hydrochloride (Viibryd), Benzodizepine category drug such as Clonazepam (Klonopin), Dizepam

Mechanism of Action of Antipsychotics

These drugs affect on neuro-chemicals in the brain such as dopamine and serotonin. Some drugs act through enhancement of serotonergic activity in the CNS through selective inhibition of serotonin reuptake.

Side Effects of Antipsychotics

Weight increase/gain, Sexual complications, Lethargy, Dizziness, Restlessness, Dry mouth, Constipation, Nausea, Drowsiness, Blurred vision, Low blood pressure, Seizures, Low white blood cell count.

CONCLUSION

The review and study provides sufficient framework of information about processing and alteration in processing of brain and its impact on response given by sensory outputs and body parts.

Due to brains complex circular way and the intentionality that guides meaning making is more unified than conscious volition or intention. It automatically brings the body and all of its senses together with the mind in order to anticipate and pursue the organism's needs and goals. It is also more whole than conscious intent in the sense of automatically bringing all of the organism's knowledge and experience to bear on its purposes. The ability of the brain to reorganize into a novel state in response to small changes, a hallmark of chaotic self-organizing systems, accounts for many examples of intuition. Cognitive penetration into visual perception permits diverse sources of information to subsidize to the formulation of predictions that influence ongoing visual perception. Antipsychotic drugs are a key element in treating psychosis. The choice of drug depends on the individual patient's clinical needs. Atypical antipsychotics are increasingly selected as they are often better tolerated.

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How to cite this article:

Suhas H. Lahane (2019) ' Perception, Perceptive Disorder and its Current Aspect in Pharma Medicine', *International Journal of Current Medical and Pharmaceutical Research,* 05(10), pp 4616-4622.

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