The Development of Mind

(The Synergistic Integration Theory of Consciousness)

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Abstract

With a mind, we are conscious of existing and conscious of a world in which we are existing. The present article seeks to explain the mind in terms of the world it is conscious of, which means starting exploring this world from an introspective point of view and basing the explanation on absolute facts. The first task is to distinguish introspectively perceived facts from assumptions and notions which are not perceived directly. We may observe a man walk behind a screen. From the introspective point of view he has ceased to exist as soon as he disappears behind the screen. That he may exist behind the screen we do not observe directly. He does so only from an assumptive point of view., which must be regarded as an illusiion.

From a strictly introspective point of view all assumptions are illusions. Our mind is full of illusions.

The article proceeds by describing the assumptions we make from babyhood on, and how we by steps accept the assumptions to be real. For example, accepting that an image of a person looking like myself actually is a real person like myself, not just an indifferent image.

The final assumption we make is that the image of a real world really is real, not an illusion. We make this assumption on the basis of the consistency with which it appears and the apparent high probability that this consistency will prevail. Part of this consistency is the success of scientific findings.

We assume our mind has to do with our brain, and it seems likely that the trillions of neurons and the connections between them somehow will be able to explain the presence of a mind. Sensory signals enter the brain and flow into various regions of the brain and into groups of neurons. From these groups the signals are traveling further via neuron interconnections to other groups and eventually to groups controlling muscle cells or other executive cells. The action is very similar to that of manmade robots that do vacuum cleaning or cutting grass, or to a doorbell mechanisms which produce a sound when

somebody pushhes a button.

The article pays attention to one particular sensory experience, the perception of depth. All living creatures have a pair of eyes. The signals from the two eyes flow into two separate regions in the brain. To the mind they present two sets of images, but they are not perceived as separate images. They have been combined into one image having a three-dimensional depth quality. The best explanation of this phenomenon is that the two regions have been combined by synergy of the two regions. In a stereoviewer, when two sets of flat, two-dimensional images are presented to the eyes, they also result in the perception of three-dimensional depth.. This perception may be regarded to be an illusion, From the introspective point of view, it is not..

Synergistic integration points to a basic property of the brain. Related regions of the brain can integrate synergistically to create illusions, including illusions of conscious perception.

All animals having a pair of eyes must be able to perceive the same illusion of depth. That is why they have two eyes,. And that is how it is possible for birds to fly at great speeds through woods full of trees, branches and twigs without colliding with them. This they can do by the doorbell mechanism, without actually being more conscious of what they see than what the sensors of a robot vacuum cleaner detect.

When we think, we actually think in terms of words, words being stored in groups of neurons no basically different from neuron groups storing sound or visual images. It is the conclusion of this article that thinking was developed in the same way as the brain developed the ability to process other sensory inputs by using the same brain infrastructure. Behind the conscious perception of thoughts lies the phenomenon of synergistic integration of related groups of words, leaving no hard problem of explaining the illusion of a consciousness. It is this synergy that lies behind the conscious perception of thoughts alluded to in the article on The Nature of Conciousness (Reichborn-Kjennerud 2016).

In short, the mind, seen from the point of view of real life, is a brain construct, an illusion developed in the brain by progressively, sequencially programmed neurons, occasionally integrated synergistically to higher levels. But from the introspective point of view, in the way you perceive it, the mind is not an illusion. It appears as a real thing, like the depth in the stereoviewer, which you perhaps think of as an illusion. In general, brain constructs must be distinguished from the conscious perception of them.

The Development of Mind

With a mind, we are conscious of existing and conscious of a world in which we are existing.
This world contains many uncertainties, and the nature of the mind is one of them. To

explore the mind it is necessary to begin the exploration with certainties, on absolute truths.

The Question of Truth

What is truth? Absolute truth? Statements about which there can be no doubt being true?

It must be observations which are obvious, in the original meaning of the word obvious, something being perceived in front of your eyes, like the color green as perceived with your eyes. Or perceived feelings, like feeling hot or happy, hearing thunder or music, of which there is no doubt.
But not observations which are not obvious, like preconceived notions, hearsay evidence or constructs like electromagnetic waves.

As you perhaps know, scientists, after much study using various scientific methods, have come up with a theory that the color green is the manifestation of electro-magnetic waves of a certain wavelength reflected from bare surfaces which affect particular retinal cells in your eye and in turn generate respective nerve signals to the visual center of your brain and eventually cause a sensation of green in your mind.

Such a theory is supposed to give a scientific explanation of seeing the color green, and in a measure it does, but it actually fails to explain the final appearance of green in your mind. The waves themselves are not green. The retinal cells are not green. Nor are the nerve signals transmitted to your brain. There are no green neurons inside your brain. The quality of green is something you just experience. You cannot know or prove that the vision of green in the mind of another person is the same as yours. His vision of a green object might be what you experience as yellow. You cannot show or explain the color to a color-blind person. The final test of a scientific theory, verification of the results by peers, is impossible.

Give a color-blind person two tablets, one blue and one green, and tell him they have different colors. Will he believe you? Will he believe what he cannot see for himself? Do you expect him to respect your assertion that you are actually showing him two different colors?

Now, he tells you that he has seen an angel. Do you believe him?
Do you in turn respect his assertion?

You may say his experience was a dream, a hallucination, a lie, or whatever, but you can never be absolutely certain, because you cannot look into his mind. Only he can perceive the images of his own mind.
Nor you or any scientist can look into his mind and see what he sees.

But you yourself can be certain of seeing two different colors. Even if you were the only person on earth seeing the colors you could not doubt it yourself.
The color-blind scientists would establish the fact that creatures react differently under the influence of different wavelengths of electro-magnetic waves. They would be puzzled by your report on subjective sensations of different colors. But they would have no idea of what it looked like.
They would measure the wavelengths of reflected light from various colored tablets and probably be amazed at how you, without the use of instruments, were able to tell the correct wavelength reflected from the tablets. But they would remain ignorant of the visual quality of color.

Colors are experienced only in your mind, by introspection. That gives you an idea of the importance of introspection. By introspection, and only by introspection, do you perceive in your mind the quality of something being green. To yourself, this fact cannot be disputed. And no instruments are required, no scientific education is needed, no theory is involved. The perception of green is inside your mind and cannot be observed by others outside or inside of your brain. It is not in your brain. It is in your mind.

Color is just one example of what you perceive in your mind. The vision of the whole world, what you smell, taste, feel, not the least *think,* is perceived in your mind and cannot be experienced by anybody but yourself.

And now, here is literally the moment of truth. Take the color green. Whichever is the more real? What comes closest to "truth"? The scientific concept of green as light of a certain wavelength, or the conscious perception of green in your mind?

Your own perception, of course. The color green as you see it in your own mind exists with certainty. Electromagnetic waves is a theoretical construct and are something scientists have told you to assume to exist. As a matter of fact, the electro-magnetic waves per se supposedly emanating from the tablets are not at all visible to your eye.

In general, it is those things you have an immediate perception of in your mind that constitutes reality and must be considered the absolute truth. A scientific theory, or whatever more or less probable statement people present to you, is something you just *assume* to be true. You may have experienced a realistic dream, and dismissed it as such, but the experience was *real.* If you believe that the events in the dream did not actually happen, that is something that you *assume* because you were not awake at the time you yourself could have verified that the events did not take place. Based on what you have learned about the world and the probabilities of what will prevail, you *assume* you were sound asleep, and that the outside world was rolling on as usual.
But the dream was real enough, and that is what you actually experienced *introspectively*.

The quality of color, the taste of chocolate, or whatever you perceive in your mind, is nothing you assume. It is the true reality you actually perceive, in contrast to things you assume to be true. So in general, in order to sort out the important facts of life, one must distinguish between an *introspective* point of view and an *assumptive* point of view.

As an illustration, imagine seeing a man walking in front of you, at left disappearing behind a screen, and then reappearing at the right of the screen. You probably take it for granted that the man is walking behind the screen, and that it is the same man appearing to the right. But you do that from an *assumptive* point of view. From an *introspective* point of view, when the man disappears behind the screen, he *ceases to exist*, and when he seems to reappear, it is actually the appearance of a brand new image.

It is very important to realize that in terms of perceiving the world there are two points of view, the introspective point and the assumptive point, and that there is a difference between the two. Only the perception from the introspective point is absolutely true, whereas the corresponding assumptive perception is not necessarily true.

Be aware that it can be hard to see things from an introspective point of view, hampered as it is by the burden of previously acquired experience and assumptions.

In the example of the man and the screen just given, one might think the assumptive perception of a man walking behind the screen is the only one worthy of consideration, that looking at the man as ceasing to exist is a waste of time.

It isn't. More than one scenario is possible from the assumptive point of view.
Imagine the man entering the screen from the left having an identical twin brother standing behind the screen. When the former went behind the screen at left, he sat down, and it was his twin brother who then started walking and appearing to the right of the screen.

In this example there were two assumptive perceptions possible, neither one necessarily true, one excluding the other. In contrast there was and could only be one introspective perception: An image of one man disappearing, and a little later of a similar man appearing. This perception is indisputably true. One truth was the fact that the man disappeared out of view. Another truth that an identical-looking man then coming into view. Anything else was conjecture. What happened behind the screen, if anything happened at all, can be one of several possible scenarios, with varying degrees of probability. As we shall see later, the degree of probability is the all-important criterion of an assumptive truth.

The Introspective *Point of View*

The French philosopher René Descartes tried to establish a philosophy based on the introspective point of view. He started out by trying to ignore everything he had been told or read, and then logically deduct a philosophy of life from basic perceptions, like his famous statement: *Cogito, ergo sum,* I think, therefore I am. This statement, he said, was self-evident. And self-evidence, he declared, must be the criterion of basic axioms from which to deduct basic truths.

Unfortunately, he was unable to ignore the law of causality, which he had obviously been taught and nonetheless found self-evident. Normally, one will find that there is a cause for every effect one observes. Such findings are part of everyday observations. But to say that one a priori always will find a cause for every effect, is an assumption, and belongs to the realm of assumptive observations. One cannot exclude the possibility that there exists an effect with no cause, and certainly not that the assumed cause is the correct one.

Descartes assumed that the idea of a perfect being must itself be caused by a perfect being and hence prove the existence of that perfect being, namely God. Surprisingly he found this self-evident. But in essence his conclusion is no more evident than that the idea of a square circle proves the existence of a square circle. A mere constellation of words is just that, a mere constellation of words. While each word may represent a real object, the constellation of them may not necessarily represent anything. The word *perfect* means an absence of faults, which requires no divine insight to establish, and the word *being* is something or other conceived to exist. The word constellation *perfect being,* or the idea behind it, is a product of man, not of some "perfect being".

A feeling of self-evidence can turn out to be illusive. What was thought to be self-evident may on closer scrutiny not be so evident after all, even altogether wrong.
A better criterion than self-evidence is obviousness, in the etymological meaning of obvious, something seen plainly in front of you.

Anyway, the act of thinking and the perception of it is not a *proof* of existence; it is a *manifestation* of existence. Introspectively, perception is the very fabric of existence:
I perceive an awareness of myself and of a surrounding, and I realize that there exists a self and a set of perceptions of that surrounding. This is nothing but a simple observed fact, maybe the only real fact. You perceive relations between elements of the perceived surrounding. The perception itself is real enough, but the observed relations do not necessarily stay that way and represent truths.

I do not regard this one fact as a some kind of self-evident truth upon which to build a school of thought. I don't think that is possible. I use it as a starting point for understanding the world I am born into. For exploring the perceived surroundings, for finding some kind of order in the observed relations. And doing so with no preconceived conceptions, like a baby opening his eyes for the first time, trying to make sense of all the impressions striking his mind.

The Introspective *World*

In the beginning the baby probably sees an inhomogeneous mass of coloured dots and areas, at the same time as the lenses of his eyes contract and distract randomly, focusing and defocusing at random on elements of the confusing mass. Elements coming into focus will look sharper. Elements and measures of lens contraction will soon self-organize to form focusable images, and the baby will start to actively focus on those images, move his eyes and turn his head to observe other focusable images.

It is at such a point that I start the exploration, putting myself in the intellectual state of a baby, trying hard to ignore everything I have read or been told, trying hard to avoid assumptive interpretations.

To look at the world introspectively means examining a number of trivial aspects of perceiving. Trivial because these aspects are so familiar and straightforward in the context of how we have learned to see the world. From an introspective point of view however, they are interesting and make for important examination.

Like the baby I must first start out having no sense of space and matter. It is a world of images and of a variety of perceptions. The world is spiritual. In exists only in my mind. My mind is the world.

One of the first things I notice is that I have the capability of manipulating or moving some, but not all of the images I perceive, namely the objects that are parts of what is termed my body. And that I can control how images come into view by turning my head or shifting my eyes. Furthermore, by moving my body parts I can also affect, by the act of touching or pushing, the position of what are termed foreign objects. The latter are not perceived as parts of my body, since I cannot by what is termed will power control them in the same way as I do my body parts. These observations may sound trivial, but they constitute true observations of life.

The deaf-and-blind probably have similar experiences. They have feelings of moving body parts and perception of tactile pressure and temperature. Perceiving objects by touching them give different results. Touching objects that results in a new perceived feeling, are body parts. Touching objects that do not, are foreign objects.

At this point there is no doubt that I possess a free will. I may later be convinced that free will is an illusion, but only after I have established an assumptive view of the nature of the world. But as of now free will is an observed, introspective fact.

After having learnt to focus on images and having sorted them out, I perceive them as

having attained a three-dimensional spatial appearance. But it is too early to conclude that the world I am observing really is three-dimensional. There are reasons to believe this may be an illusion. Stereographs looked at in a stereoscope give the same three-dimensional effect, but consist of two flat, one-dimensional pictures. So do holograms.

I perceive space mainly because I have two eyes. I cannot tell whether the world being presented to my eyes consists of one single three-dimensional world or two separate, synchronized two-dimensional ones, presented separately to each eye.

The three-dimensional effect a one-eyed person perceives, and the one you retain when you close one eye, is due to previous training and the fact that the world seen makes appropriate changes according to head position, perceived distance, image size of objects and focusing the eye lens.

At this point I can look at three-dimensionality as an illusion, and consider the world being perception-wise two-dimensional, but space-wise zero-dimensional. That is, the world exists only in my mind, with no spatial dimensions. When I close my eyes, it is not difficult to feel a zero-dimensionality of the world.

I have not as yet assumed there are any other minds than my own, although I perceive images that look like my own mirror-image, termed persons. At this point I cannot rule out that there are minds other than my own. But if there are more of them, each one will see a world of her/his own, not necessarily the same world visible to me.

If so, a multitude of worlds can exist simultaneously and independently. If many worlds exist simultaneously, there is the possibility that you may one day wake up and find yourself in a different world. You cannot rule it out. You may open a door and see a different world. You may shut the door and open it again, only to find a third world. You may see someone looking like your conception of St. Peter and believe you are in Heaven. Introspectively, you cannot rule out the possibility that there is a Heaven. But the probability that there is a Heaven? That is another matter. You may chose to rule out this possibility on the basis of probability, and quite a few of you probably will. Others will not.

The bottom line is this: From an introspective point of view you cannot rule out anything. But you can make assumptions based on the coherence and consistency of your introspective perceptions, attach probabilities to them, and on that basis rule things out.

If you have asked yourself the question "Who am I", you should at this point know who you are. You are simply a person perceiving a world, your own world. Perhaps all by yourself. You once happened to come into being, and you cannot know how or if that being ends. From an introspective point of view, there is no certain death.

As we have seen, together with perceiving a world goes perceiving a body. The body has a

face. I can see the face in a mirror. It is as difficult to escape my body as it is to escape my shadow. A fact of life I have to accept. Thoughts enter my mind. And I have some basic needs. I can feel hunger, and I have to stuff myself with food. And there are various waste products I have to rid myself of.

In this my world I observe that there are creatures similar in appearance to myself, moving about. Do they have a mind of their own? Or are they too just images, being only a little more complex than images of stationary objects like trees or rocks?
Lifelike, but life-less images like the projected characters on a stereoscopic movie screen, originating from an unknown, life-less type of film reel? I cannot know for certain, of course. But I do know that for some of these creatures, considered family members, friends or enemies, I perceive a variety of feelings of various degrees. I care for them or detest them, relate to them or quarrel with them. I usually treat them as if they had a mind of their own. So maybe it is time to assume they actually *do* have a mind of their own.

If I chose to do so, that will constitute a *major assumption*. The persons perceived are now considered more than just images and exist as people from *an assumptive point of view*.

That such creatures have a mind of their own implies that I assume they exist the way I myself do, looking out into a universe similar to my own, in which I appear as an image to them in the same way they appear as images to me. We basically see the world in the same way, although we may interpret things differently and make different assumptions. *There are many different assumptive points of view.*

When they say something looks green, I don't know if they actually see the same color as I do. What they perceive as green, may correspond to yellow in my mind. As a matter of fact, color-blind people cannot see the difference between what I perceive as two quite different colors. There is still room for *an introspective point of view*.

I also chose to make another major assumption. The world I perceive is so consistent and the assumptions I make seem true with such high probability that I find it worthwhile to assume that there is a real world out there which is three-dimensional and exists independent of myself.

Among other phenomena we perceive in this universe of ours is a sense of time. Events occur sequentially. What we see right now fades into what we call memory as soon as a new event or change of perception occurs. The events are stored in memory and can be recalled, more or less vividly and more or less accurately.

Unless we dream, time stands still during sleep or unconsciousness. Introspectively, there is no basic difference between a state of dreaming and the state of being awake.

Dreams can be very realistic, and they are part of our life and experience. But when we regard dreams as not being part of a "real" world it is only because the wake state is many orders of magnitude more vivid and consistent, and we assume that we are lying sleeping in our beds in a state of "dreaming", rather than acting out our dreams in a real universe.

From the introspective view there is no death, except that we occasionally see other people become lifeless and declared dead. That we ourselves is going to die is an assumption, albeit one of a certain high probability. But you will never really know, because if you die, you will, actually by definition, not be able to perceive that you are dead. (Fortunately).

The act of thinking is another interesting object of perception. By will power we can recall bits and events from memory and configure them in new ways and combinations that can have meaning, giving new insights or forming basis for some action. And to form assumptions. As mentioned earlier, we can also form combinations that have no meaning and are pure nonsense. Unfortunately, that happens too often.

Thoughts are expressed verbally or written down in books. We listen to what people say and we read books, and a lot of what we think we know about the world we've learned from these sources. But we must never forget that thoughts acquired this way are not our own thoughts based on our own primary perceptions. Every thought must be judged and evaluated in terms of probability and consistency with what we already know.

Years ago thunder and lightening was adequately explained as being caused by a god named Thor or Donar banging his hammer, sparks flying. Nobody, of course, had ever seen Thor or his hammer, but they believed it nonetheless.
Believing something is unconsciously assuming something.
I think we all agree that the explanation we have today for thunder and lightning is much more satisfying, being consistent with the much larger body of knowledge we have. In general, as we learn more, old explanations are abandoned and replaced by new ones.

Books contain thoughts and statements written down by people. And thoughts, as we have seen, can be erroneous or misleading. We cannot claim or trust books as sources of truth. You may consider it a sacrilege to include the Bible or the Koran among such books.
But firstly, we don't know for certain if the bible we have in our hands is a true copy and a true translation of the original biblical texts.
Secondly, such biblical texts have been written by men, whose trustworthiness you don't know. The only thing you can assert, but not prove, is that these men tried to serve as Gods intermediaries and got their knowledge from God or Allah. But that is an assumption, and you can't prove it.
Thirdly, the Bible contain many statements known to be untrue and contradictory. As a matter of fact, religious sects and denominations disagree among themselves on the correct interpretation and understanding of the Bible.

But again, you may have this introspective feeling of conviction, and consider the Bible a source of truths, at least some truths. If so, remember that it is the conviction which appears true, not the Bible.

What we are doing in this article is to turn your attention to your inner self and help you sort out your own perceptions and eventually make your own conclusions.
The idea is to attempt to correlate and interpret all the perceptions that enter our mind in order to arrive at a comprehensible world view that can serve the purpose of enlightening us or attaining a useful end. We start doing that already as babies, more or less successfully. Later we do it in a more deliberate and intelligent fashion. Finally, we do so in a meticulous, systematic manner employing techniques and instruments we call scientific.
Unfortunately, results obtained by scientific methods require that they be testable and verifiable by anybody. For example, no scientific instrument can detect how I perceive the color green, and my perception of green is therefore not testable or verifiable, although it is still part of reality as far as I am concerned.
It is not likely that such an instrument will ever be made. Scientific methods are therefore not applicable to everything we perceive. We have to supplement scientific methods with introspection.
But such introspection must be carried out with the same detached and careful attitude as true scientific inquiries are, and if the results of this introspection cannot satisfy the rigid scientific demands for testability and verifiability, they should hopefully be recognizable and agreeable by a consensus of peers.

Areas ripe for introspective inquiries include art, music and religious convictions, areas not yet or perhaps ever suitable for scientific inquiry.

People with strong religious convictions may not agree with or be persuaded by the results of introspection by others. But they should recognize that God or Allah may have chosen to reveal the universe different to different people, and respect His decision to do that.
Besides, they are justified and in their full right to have their own understanding of the universe. You may have no religious convictions yourself, but you cannot dismiss the convictions or revelations of others without being able look into their minds, which you cannot.

The outer world as a three-dimensional material world existing independent of ourselves may be real, not an illusion. It certainly appears *as if* it is real, but as far as such an outer world is concerned, in analysing it, it really doesn't matter whether it is an illusion or not, as long as we keep in mind that there is a possibility that it *can* be an illusion.
It is a matter of practicality to view the world *as if* it is real and to see how far we can go. That means that we'll look for real world facts and try to explain all the phenomena we encounter in terms of these facts. That in turn means that we will as far as possible try to

avoid explanations that require the existence of unknown, not readily observable entities and assumptions with a low probability of being true..
That does not necessarily exclude the existence of a super-intelligent creator, only that we better postpone the consideration of there being such a creator until we have exhausted all other explanations and possibilities.

For now, it is not unreasonable to assume that the laws of the universe are such that the evolution of it follows from the laws in the logical and determinate manner of the falling chips of a domino set. Does it make us appear as robots? Maybe. But from the introspective viewpoint it certainly feels *as if* we aren't. And maybe that is an argument you can use as circumstantial evidence to yourself that the world as a material, three-dimensional world *is* indeed an illusion.

I cannot believe that honest, deeply religious people can object to scientists examining a world they believe to have been created by God or Allah, when these scientists do so in a meticulous, objective and testable manner. It would be a sacrilege only if the gods had something to hide, something that would be embarrassing for them to reveal and they had given an explicit ban on exploring the world..

If scientists find something that is in disagreement with certain religious scriptures they cannot conclude that the scriptures are right and that the world is created wrong. A map of a terrain cannot be more true than the terrain itself. If the scientists find a discrepancy for which there is absolute proof, it is more likely that there is an unfortunate flaw in the passed down scriptures. The gods will vouch for their own real creation rather than what it happens to say in those scriptures. This is just plain common sense.

We have seen from an introspective point of view how all the bewildering sensations we have seen before our inner eye and all the highly probable assumptions we have made of them draw a consistent picture of a real world. Scientists have found laws of this real world that make almost all observed phenomena understandable.

That makes it highly probable that we are dealing with a real material world. That will be our final major assumption.
But by an assumption being highly probable I don\t mean a probability of being absolutely true, in the sense mentioned at the beginning, but a probability of being able to hold up for an indefinite period of time. The introspective truths prevail.

The Assumptive Real World

It makes sense to examine our introspective view and inner perceived mind in terms of real world material laws. To see if our introspective point of view can be explained by highly probable assumptions from the assumptive point of view. The introspective point

of view then becomes a part of the assumptive point of view, in that the truths observed from the introspective point of view can be explained in terms of material laws from the real world. A holistic point of view if you like.

Such an examination naturally leads us to consider our brain. Its trillions of neuron cells and interconnections promise to account for our millions of introspectively stored assumptions and observed sensations, memories and thoughts.

As it turns out, the elements of our inner view of the world differ from the elements of the real world that have given rise to them. As an example, consider red light reflected from a surface. We see it before our inner eye as a bright red spot. In the real world it is neither bright nor red. It is a colorless electromagnetic wave emanating from the said surface having a certain intensity. When the wave enter cones and rods on the retina of our eyes, the wave is transformed to colorless chemical and electrical signals which are being transmitted to neuron cells further into our head.

We will for example need to be able to explain how neuron cells can create introspectively observed colours.

Light from a visual scene are being distributed to different regions in the brain according to various aspects of the scene, horizontal aspects, vertical aspects etc.
It is these aspects in synergistic combination that appears as the scene before our inner eye. The scene may be associated with stored memories of similar scenes.

If an aspect channel that mediates the vertical aspect of a scene is somehow prevented from functioning properly, a cat for example may not be able to sense a table leg and therefore collide with it.
If aspect channels that mediate all aspects of a scene is somehow prevented from functioning properly except for the color aspect, the person affected will be blind, but will still be able to name colors in the line of his gaze, having what is called blindsight, That's because a color aspect may still have an association with the *name* for the color.
Likewise this person may be able to navigate around obstacles due to associations with other aspects of his sight, like vertical aspects perhaps having associations with previous experiences of colliding with vertical objects.

Every scene observed from real life produce corresponding aspects of that scene in various regions of our brain. These regions have associations or connections to other regions of the brain which can recognize groups of aspects as objects, like for instance an orange. A group like that has connections to related groups giving the object a name, or the auditory sound of the name, or the experience, in the case of an orange, of eating an orange, plus a number of other related groups. As a matter of fact, scientists have used fMRI to measure activities in the brain when subjects have been told to think of various words, and they have found that a word may cause associated neuron groups all over

the brain to activate, as many as 50.000 to 80.000 for each word.
Reference:
https://www.theguardian.com/science/2016/apr/27/brain-atlas-showing-how-words-are-organised-neuroscience (depress the Ctrl key and point cursor to link)

This fact may, incidentally, relate to a persons level of intelligence and/or imagination. The more groups being activated the more chances there are for coming up with a new idea, vision or understanding. *When an idea group has been activated, signals will flow to, or crawl, in parallel, all interconnected groups, and one of them may sufficiently match the idea in question and by synergistic integration become conscious (eureka)*.

In observing a room, consisting of a number of objects, there is a corresponding number of groups of aspects in the brain. As we turn sitting in a swivel chair and looking straight ahead, we observe a new set of objects and stimulate a corresponding new set of groups. But somehow the position of the objects, the scenery, seems fixed while we feel we are moving in relation to the scene. It could have been the other way around: The objects might have been seen as moving, while were sitting still gazing ahead. The brain picks the scene as a reference by which we, not the scene, seem to be moving. When you are dizzy, the world may seem to whir around.
Sometimes the brain gets tricked, as when we sit on a train looking out the window at another train next to our train. When one of the trains moves slowly it is not always easy to tell whether it is our train moving or the other train. It depends on which train the brain is using as a reference.
Likewise, when working on a roof slanting at 45 degrees, it can happen that the brain is using the roof as a ground reference, and upon looking up, the chimney may seem to hover overhead, looking like it is about to fall on your head. (I've had an experience like that).
Such references do change by virtue of which interconnected neuron groups the present observing group acts in synergy with. Looking at Schröder's reversible staircase, it can synergistically integrate with a stored vision of an actual staircase or it can synergistically integrate with a stored vision of having seen a staircase from underneath. A Necker Cube may integrate with the vision of a geometric constellation of straight lines, with a cube seen from the top, or a cube seen from the bottom.

In nature, when we see a large object coming tumbling toward us, the inner vision of it represented by a pertinent group of neurons, will have connections to other groups which will make us step aside to avoid being hit. When a driver suddenly is facing an obstacle in front of his car, he will immediately hit the brakes. For years he has been applying the brakes when circumstances have forced him to slow down. The reaction has become automatic or instinctive. As it is for a pianist to hit the correct key when playing a piece he has been practicing for years.
A fly will do the same thing. When somebody is trying to catch it, some of its eyes will detect an unusual image, and an electrical/chemical signal will stimulate a vibration of its

wings and make it escape.
The general mechanism involved can be called the doorbell mechanism. When you hit a button an electrical circuit will be closed, and an electric current will flow through a coil and make the bell sound. The mechanism could alternatively be called a vacuum cleaner robot mechanism or a grass cutting robot mechanism. Such a robot can move around collecting dust/cutting grass and avoid hitting obstacles. This type of action is automatic. No decision making is involved, no independent will power is required.
Nor any consciousness.

Many of our reactions are doorbell actions. As we have seen, sensory inputs flow into our eyes and from other senses and activate pertinent primary groups of neurons which in turn have connections to other groups in other regions throughout the brain, the signals flowing forward like the current in the doorbell circuit and causing various actions.

The primary groups mirror the outer world, and by further connections to other groups act as a representation of the real world by which it makes it possible for a creature to navigate around the nature and provisionally react to the various objects out there.
A bird is able to fly at high speed into the woods and avoid collisions with twigs and branches. It sees all objects sharply and reacts accordingly. This would be impossible without having in its brain the same representation of the real world as humans do, with connections to appropriate motor neuron groups. To put it another way, it would be impossible to navigate in the world without perceiving the world realistically one way or the other, consciousness or no consciousness. The birds view of the world as it flies about is void of consciousness since its brain does not have the brain resources needed to consciously reflect on what it sees. Its brain operates more or less like a doorbell mechanism, as has the brain of all creatures been operating for millions of years, including dinosaurs.

From our introspective point of view we thought of colors as having an independent real existence, a qualia we were conscious of. From an assumptive point of view the color is but a part of the representation of the real world, seen by birds as well as by humans. An input part that our brain is wired to react to, giving as it does, important information necessary for our ability to survive. To this end color is inevitably observable, without the necessity of having the group of neurons involved being able to generate any type of consciousness to make it observable. Thus, there is really no hard problem to face as far as explaining qualia are concerned. That is, from the assumptive point of view, which we now have chosen to accept as being able to represent the real world, a world of scientific facts and findings.

Thinking and Consciousness

Now we can ponder the resources needed to reflect on what we see and feel, which

supposedly have conscious aspects.
When we take an introspective look at our experience of thinking we find that we do so in terms of *words*. Words that represent objects and concepts.
Thinking is not possible without words. Words in turn wouldn't exist without speaking a language. Language wouldn't exist without talking, and talking requires the ability to utter articulate sounds.
Our ability to think started with the onset of our being able to murmur articulate sounds. And the human brain had become large enough to contain the extra neuron groups and interconnections required to handle the words. And the existing brain infrastructure was able to process the additional signal flow without requiring novel brain mechanisms like a putative consciousness process.

When our ancestors were hungry and expressed a need to find something to eat, maybe they murmured "ood", which later became *food*. When the type of food became important, they uttered "oot", which later became *fruit*. When type of fruit became important, they snuffled "inge", which became *orange*, and so on. Their vocabulary was steadily increasing, their words occupying groups of neurons with neural connections to groups representing the visual sight of the item, the audible pronunciation of the word, and the motor groups capable of pronouncing the words for the various perceived items. An *orange* being a concrete item, *food* being en abstract item, abstract items having neural connections to a number of associate concrete items. Soon there would emerge words for higher levels of abstractions. The similarity of shapes of apples, oranges, lemons, etc. would produce words like *round* and *sirkel***.**

Also at this stage, there would be no need for the neurons involved to generate any type of consciousness to make the words perceivable. The new groups of neurons representing the words would not differ substantially from the original groups representing sensory perceptions, and signals between them would still flow by way of the doorbell mechanism. That is, when a certain group of neurons were stimulated, signals would flow and spread out to associated groups of neurons, who in turn would forward signals to more remote groups further out. As we have seen, up to 80.000 groups.

Between these groups there can be the phenomenon of *synergistic integration* which creates higher level entities and makes them consciously perceptible.
An important example of an epiphenomenal synergistic integration is the vision of depth in a stereoscopic viewer. You place two flat, two-dimensional cards onto the viewer, adjust the card, and, voila, you experience a wondrous appearance of a scene in three-dimensional depth.
There are actually just two flat images on your retina stimulating two separate regions in your brain, one for each eye. Yet what you see is one three-dimensional image, perceiving a depth that are not present in the two brain regions. Remarkably the two regions are *synergistically integrated* to result in a perception of depth. Perhaps with other regions related to other aspects of depth vision, like the extra steps to walk for an object further

away, like the increasing size on your retina as you approach the object and the change in eye lens focusing.

This phenomenon points to a remarkable property of the brain: *Related regions of the brain can by synergistic integration produce perceptions of higher level entities that have qualities not present in the constituent brain regions.*
This property may explain the emergence of higher order thinking as well as making them consciously perceivable.
And in the process producing the illusion of there being an independent process of consciousness. Incidentally, this is the *Synergistic Integration Theory of Consciousness.* Arguments against the existence of an independent consciousness process can be found in the paper *The Nature of Consciousness* (Reichborn-Kjennerud (2016). It is unlikely that single ion-transmitting neurons or even local groups of neurons, *serving only transit functions for the flow of signals*, are capable of generating some sort of a consciousness applicable to a large complex of signal flow interplay.

Thinking consciously of yourself as "I", integrates synergistically regions in your brain related to your given name, parts of your body, the reflections of your face in a mirror, the personal experiences of your life and so on. Maybe *more* than 80.000 neuron groups.

Integration by synergy can make you conscious of seeing an orange, combining aspects like the smell of an orange, being round, containing vitamin C, pronounced "fruit", and spelled "fruit" and a large number of other regions in your brain related to an orange. Up to an 80.000?

Another example of synergistic integration is the perception the color *yellow*, being synergistically an integration of red and green brain regions and of groups related to yellow objects.

In the act of thinking, signal flows in regions of your brain storing concepts and associations related to the subject in question will integrate synergistically to give you an illusion of consciousness and consciously thinking about the subject.

There may be no limit to how far neural signals may flow, how they feed back to produce new flows, how they by associations to fear or other excitable regions get amplified to produce renewed flows of signals. Again, all by the mechanism of the automatic the grass cutting robot.

Much of what you do is not conscious. You have learned to play the piano without reading notes or attending to your fingers, to bicycle without losing your balance etc.
You may not be aware that you are actually acting out of unconscious feelings of envy, jealousy, greed, arrogance etc. These associated regions in your brain may affect your thinking subconsciously and determine the final result of a decision you have to make, for

which you also have had to come up with rational justifications for your choice. When you finally become conscious of your decision, with its implications, you may not know exactly at what point in your more or less conscious deliberations you actually made the decision, but you will have a conscious perception and illusion that it was made of your own free will. Free will or not, your decision was yours, a product of your brains contents and its workings. Not a product of any superstructure called "will", which by itself is just a word construct of the brain.

As far as illusions are concerned, it is not as if you are being fooled in any way.
Don't forget that the perception of depth in the stereoviewer was real enough despite being considered an illusion.

Conclusion

Like Decartes we have tried to arrive at a true understanding of the world we find ourselves inhabiting. But in contrast to Decartes we don't consider self-evidence a correct criterion of true knowledge. We base our understanding on the perceptions we observe directly with our senses. We are trying to distinguish these observations from assumed relations between the observations. In so doing we distinguish between an introspective point of view and an assumptive point of view respectively. We stick to the introspective point of view, but chose to adopt certain assumptions made from the assumptive point of view when the probability is high that the assumptions will last and serve as a useful hypothesis for making sense of all the observations we make from the introspective point of view.

Acceptable assumptions include various notions developed through applications of scientific methods. They are acceptable because they explain otherwise inexplicable phenomena in a comprehensive manner and because the explanations can be tested in a reproducible manner.

But so far there has been no good scientific theory on what really is a *mind* and how it develops. From the introspective point of view we know that there is a mind. The question has been how it does relate to an assumptive outer world, in particular the physical brain.

It is interesting to note that all living creatures going back millions of years have had a *pair* of eyes. We know that you need two eyes to perceive depth and that to perceive depth is a requisite for navigating effortlessly in nature. We have seen that depth is an illusion requiring the synergistical integration of two regions in the brain, one for each eye. We can conclude that synergistical integration of brain regions is more or less common in the brains of all creatures and have given them illusory visions of the outer world, the so-called brain representation of the world. Sensory signals from the outer

world have flown into their brain regions and determined their actions, like sensor signals flowing into the circuitry of grass cutting robots and making them move about and cutting grass. No consciousness has been at play, because being conscious of something requires the ability to think about it, reflect on it, which in turn requires the presence of neuron groups representing words, a diversity of utterable sounds..

We have seen that thinking requires the presence in the brain of regions representing words, and that such regions cannot emerge without the vocal capability to utter words. Strange to think that this happened just a few thousands years ago, and that an initial muttering evolved to an explosion of civilizations, still rapidly developing. *So far* confined to the human race. (Dogs still left pathetically to barking).

The regions representing words arose from spoken words and were stored in the brain no differently from regions storing the sounds of thunder. Later they would arise from reading written symbols and be stored like other sensory visions. Thus, it is reasonable to assume that words are processed in the same way that the brain for millions of years has processed other sensory inputs and that this was mitigated by the existing infrastructure of the brain. Also, as in the case of perceiving depth or yellow color, adjacent or related regions in the brain have always been able to integrate synergistically to cause emergent epiphenomenal illusions of a higher level. Particularly, conscious types of perceptions, like feeling consciously the construct of a free will, the construct of an «I», or the notion of a consciousness per se.

Illusions are not something we are being tricked by. The depth experienced in the stereoscope was obviously an illusion, but the the observed depth was real enough.
We can deal comfortly with illusions. The colorfull flag you see waving in the wind is an illusion. In reality there is no color, only reflections of colorless electromagnetic waves. But there is a flag out there. You can take the flag in your hand and feel its texture.The representation in your brain of the real world is a collection of illusions, not much different from the real world. You know that, yet feel quite comfortable with the illusions The illusory representation in your brain is actually a remarkably good representation of the real world, even the colorful flag.

Colors don't exist in the real world. They are illusions arising from a synergistical integration of brain regions receiving signals from cones in the eye and of regions interconnected to objects related to colors. It would be very interesting to make fMRI scans of people alternately observing red, green and black images and to see what regions of the brain become affected. And yellow with respect to red and green.

The brain regions representing words integrate synergistically to give us notions and illusory perceptions of them, that is, illusions of consciousness. As one region after another is activated and accompanied by synergistically emergent consciousness, we experience this consciously as an act of thinking. In the process we invent new words,

new thoughts and new notions. .

Since receiving the gift of speaking, man has done a lot of thinking and filled his brain with all kinds of knowledge. It is this realm of thoughts, beliefs, assumptions, sensations, reminiscences, emotions, etc. that constitutes the *mind.* We are more or less conscious of having this realm and may think of it as a mental state independent of the material world. As such *mind* qualifies as an illusion.
The mind is physically made up of interconnected neurons. Some interconnections were innate, others were developed by sensing, learning and thinking. To call it a mind is a practical brain construct. What makes the mind unique is how a finite set of synaptic connections can effect such a complex organization as the realm it contains.

We have seen how instances of consciousness depends on synergistic integration of related, interconnected neuron groups. For computers or other devices to be conscious of anything or having a mind, similar widely interconnected functions must be present.
Such conditions are totally absent in todays supercomputers. But simulation of synaptic connections like neural networks is possible, and a suitably set of them properly organized as groups and interconnections, can theoretically make it possible to construct a machine with a humanlike mind. But in addition to sensory inputs, suitable bodily inputs must be provided, that is, signal sources simulating effects of human empathy as well as glands and corporal needs.

The notion of synergistical integration of neuron groups may have important bearing on the nature and perception of music. A variety of sounds is stored in neuron groups with widespread connections to other groups. Not just everyday sounds like clicks, thunder, plinks, and laughter, but voices of anguish, despair, happiness, anger or of posing questions, and the sounds of musical instruments, accents and tone of voice, intonation and tonemes. Synergy of these regions mediates the perception of melodies, harmonies, the execution and interpretation of music and the experience and understanding of music in general.
Synergistical integration of these sounds may be involved in perceiving the beauty of, say, Bachs *Air*.

The phenomenon of synergistic integration of related brain regions may of course have relevance to many other areas of inquiry.

Supplemental information on the brain and theories of the mind involving for instance REM-sleep, the hemispheres, etc. is referred to below. (Davidmann 1973-2006, 2011).

This article is subtitled the Synergistic Integration Theory of Consciousness which is an alternative say, to Integrated Information Theory or to Passive Frame Theory.

Note: Reichborn-Kjennerud, Gunnar (2016) The Nature of Consciousness
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Social Organisation Limited
ISBN 978-0-85192-055-9