

Synaesthesia and creativity: A research at neurological level

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Mistakes and Creativity

There have been recent studies about the relationship between creativity and bipolar disorder (in essence, manic-depressive disorders), following the Kraepelin's work that posits the hypothesis that the mania could cause changes in the thought processes that lead to creativity. In addition, in this case, we find that the volatile excitation that accompanies the illness could cancel, temporarily, the inhibiting processes therefore facilitating linguistic expressions.

The research that followed Kraepelin hypothesis has tried to demonstrate a positive connection between bipolar disorder and creativity.

On the one hand, Jamison discovered that the physiological and psychological states of creative individuals (particularly poets) were very similar to those experienced during manic periods. Conversely, Richards confirmed that manic-depressive sufferers show higher levels of creativity than the control subject group (non-psychiatric patients and patients not diagnosed with affective disorders or schizophrenia). Andreassen too, when comparing participants of the Iowa Writers Workshops and their families with control subjects outside the artistic domain, found that there is a much higher ratio of affective disorder in writers than within the control subjects. Jamison also has discovered a high level of affective bipolar disorder in a sample of creative people, particularly poets.

The above examples are enough to show us, to some degree, that there is a connection between creativity and some types of mental illness.

The following examples concretely show this connection since they have been undertaken in the neurological field, where the results were more revealing.

Example 1

Let us first consider the case that Mark Lythgoe stumbled upon while researching creativity: a forty-year-old worker of limited creativity, became an individual of boundless creativity after suffering a stroke. The cause of this strange phenomenon was that the stroke blocked the part of the brain that guided the inhibiting processes: his brain allowed entry to all the stimuli from the world around him, whether relevant or irrelevant, which are normally inhibited.

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By perceiving many more stimuli at a time, his attention control was less, which enabled him to establish many more relations than previously able with much more rigid controls.

Possessing so much more information about the world, he could draw upon many more ideas to relate in novel ways.

Example 2

The relation between Tourette syndrome and creativity as discovered by researches at Exeter University.

Here, Paul Howard-Jones is developing interesting research about creativity at the neurological level; more precisely, he is trying to determine how the brain works at the moment when creativity occurs.

To this end, he has selected volunteers who are presented with a series of three words and asked to compose a story. During this exercise their brain functioning is analyzed by a nuclear magnetic resonance. By using this method, it has been observed that certain parts of the brain are activated when the subject is trying to be creative, but not otherwise. What is more important is that this is a big step in the study of creativity at a neurological level.

Nickolas van Bloss, a subject with Tourette syndrome showed surprising results after participating in this experiment. His brain does not work as that of normal people; the areas of the brain that activate during the period of creativity are continuously active in his brain. There is a continual flow of creativity that corresponds with the constant flow of energy provoked by Tourette syndrome.

The common factor among the Mark Lythgoe and Nickolas van Bloss cases is that Nick is also unable to filter the outside stimulus since those with Tourette syndrome cannot filter the world due to a latent low-inhibition associated with the illness.

Differences and similarities with Synaesthesia

The research in the field of creativity and mistake that studies the creativity in cases of brain failure are very interesting because they seem to show that the areas of the brain activated by creativity and those that are constantly activated, as in the given examples seem to be the same; importantly, it also appears to be the same area in which feedback is produced in cases of synaesthesia.

But we will see that there is a fundamental difference between this area that that of synaesthesia: the above examples are rare cases, associated with mental illnesses or brain failure that affects a small percentage of the population. We can say that these are

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'abnormal' cases that could consolidate the myth that only a few people, the geniuses, are creative.

Synaesthesia, on the contrary is present in the majority of humans (in different degrees) and in fact constitutes a fundamental human capacity, that could even be at the base of human capacity like language.

Synaesthesia

Definition: during synaesthesia, the perception of a sensorial stimulus unites with an apparently subjective experience of another perception without external reference. There is a stimulus, conceptual or perceptual that evokes or shoots an additional sensation and this added sensation is experienced with the original stimulus.

[As when hearing a certain sound, induces the visualisation of a certain colour]

How is synaesthesia produced?

This question is not yet resolved in a definite way, but the latest research points out that synaesthesia could be caused by "an intense feedback activity in the circuits that connects the associated areas multimodal and monomodal. Activity that would normally be inhibited in non-synaesthetic's [...] the areas associated with the cortex, receive connections from mono-modal sensorial areas, allowing in this way, a multisensorial integration of stimulus. It is thought that, although reciprocal connections (bi-directional) exist among the mono-sensorial areas and their associated multi-sensorial areas, the flow of information is fundamentally mono-directional (mono-modal-multimodal) in a way that the associative areas are activated by the sensorial ones, but not the other way around.

According to this theory, a synaesthetic person would have certain paths activated in the mono-modal-multimodal direction, which could generate the activation of other areas in "backward" way.

This hypothesis could explain the simultaneous activation of the different sensorial areas in synaesthetics as observed in tomography studies with positron emissions.

"In the majority of people the activity in the feedback routes are somehow inhibited, but not so in synaesthetic's"

This is important because originally it was thought that synaesthesia could be produced by hyper connectivity, that is to say, a high level of connectivity; but Ramachandan and Hubbard demonstrated that synaesthesia could happen within a normal number of connections "and it was because there existed a disequilibrium in the balance of chemical substances that course through the key sensorial regions. This causes a crossed activity that produces an inhibition of the activity in the adjacent areas. A chemical imbalance that minimises this inhibition would cause the activity in one area to awaken the activity in a

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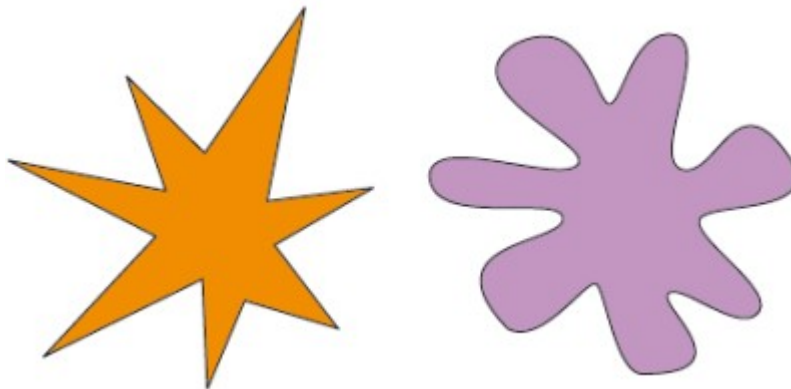
neighbouring one.

Also, this crossed activity could occur between distant areas, bringing about uncommon forms of synaesthesia.

Synaesthesia and language:

“The language expressions that we use in the codification of stimulus originated from items that we perceptually identify, take their contents from the areas associated with perception”

The origin of language could be explained by taking into consideration a synaesthetic pattern common to all humans (independently of the language they use). This is the association 'eye-ear', basically, the fact that we have to associate the waves produced by



sound with the shapes of objects.

This theory of Ramachandran's, is demonstrated by a very simple experiment: different persons were given (this) two figures and told that one was called 'buba' and the other 'kiki', they were asked to identify which was which. Ninety eight per cent of the people assigned kiki to the first figure and buba to the second. Which supports, not only the theory that language could have originated from our synaesthetic capacity but also that to a lesser or greater degree we are all synaesthetic.

Neurologically speaking it is possible that this association occurs in the angular circumvolution, since it has been proven that people with damaged angular circumvolution could not relate these figures with their name following the habitual pattern. In Ramachendran words "We humans have an innate predisposition to associate sounds with visual forms", this quality could have vested a decisive importance to the launch of a common vocabulary among hominids. Furthermore, the cerebral areas that process the visual appearances of objects, letters, numbers, and those that deal with the sound of words could activate one another.

Another two types of neuronal connections support this theory, in the first place, the

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sensorial areas that process the visual forms and sounds in the posterior side of the brain could cross-activate the motor areas of the previous area.

Synaesthesia, metaphor and creativity:

Language was the first consequence of metaphoric capacity in humans, and as previously seen, it is associated with synaesthesia. But language was only the first case; metaphor is also the basis for art, as well as of science.

But, how are synaesthesia and metaphors related? And synaesthesia and creativity?

To be able to answer these questions we must first answer what is creativity.

The answer to this question has been made more difficult by the mystification of the term, that seems to want us to believe that creative ideas emerge from nowhere in an unknown almost divine process. However, we can solve this problem if we define creativity in a different way. Since nothing can emerge from a vacuum we must understand that every work or creative idea is always preceded by a previous cultural-historical scheme; it is the fruit of a cultural inheritance, a lived experience. As Margaret Boden affirms, "maybe new thoughts are not completely new, since their seeds in representations that already exist in our minds".

The roots of our culture, all of our knowledge and our experiences, exist in every creative idea.

Once we give a provisional definition to creativity we can move on to relate it to synaesthesia; so defined this relationship becomes clear. If as we state above, being creative consists in having, the propensity to make connections in different conceptual kingdoms and synaesthesia is characteristic of exactly that, then the link between the two seems obvious. Nevertheless, to go deeper, according to Ramachandran and Hubbard, "synaesthesia in creative people multiplies its frequency among the general population, one of the faculties that a great number of creative people have in common is their capacity to use metaphor.

As synaesthesia has within the formation of arbitrary links between independent sensorial entities as numbers and colours, the metaphor relates conceptual dominions foreign among themselves".

The metaphor, and I think this is the key, as already stated by Lakoff, "behaves as a capacity of our conceptual system and not as a characteristic of the language". In this way, metaphors reveal new relations previously existing in reality and it is because of this that they contain cognitive content.

That is to say, understanding metaphors as a product of our experience, because of the cognitive processes, they can not be considered arbitrary, but as a way to know the reality

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around us. Therefore, as Uribe affirms " it is common to find many metaphorical expressions that emerge from the perception process. Synaesthesia, for example, is the result of the way in which we perceive the different objects and the qualities of reality, of the similitude's and differences that we observe in it, and the assignation of the qualities that we develop. Generally, synaesthesia is the expression of the corporal experience confronted with abstracts concepts".

Neurologically speaking, if the interconnections are related to the cerebral parts that process or represent summarised concepts we could explain the link between synaesthesia and creativity.

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