

## Survey and Analysis of the probable reasons for Prevalence of Déjà vu among various humane categories

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**Abstract**— Déjà vu is the phenomenon of having the strong sensation that an event or experience currently being experienced has already been experienced in the past. Déjà vu is a feeling of familiarity, and déjà vécu (the feeling of having "already lived through" something) is a feeling of recollection. There exists two types of Déjà vu: the pathological type of déjà vu usually associated with epilepsy and the non-pathological which is a characteristic of healthy people.

We suspect that such situations arise in every person's life. In order to explore this experience and discover more, we decided to work on this area. We studied how brain works and conducted a survey to find out views of different people regarding the same and related it with science to reach to a concrete result by analyzing and interpreting the feedbacks we received from our survey.

Our interpretation was based on different categories (like age, gender, religious belief, etc.). Through our research we tried to find out the reasons for this phenomenon. We also tried to categorize people responses based on different traits.

**Keywords**— Neuroscience; Déjà vu; Déjà vesu; Graphical Analysis; Simple Random Sampling; Estimation.

### 1. Human Brain

The human brain, main organ of the human centralnervous system, is located in the head and protected by the skull. Its general structure as the brains of other mammals, but with a more evolved cerebral cortex. The size of the human brain is mainly composed of the cerebral cortex, especially the frontal lobes, associated with executive functions such as self-control, planning, reasoning, abstract thoughts, etc.

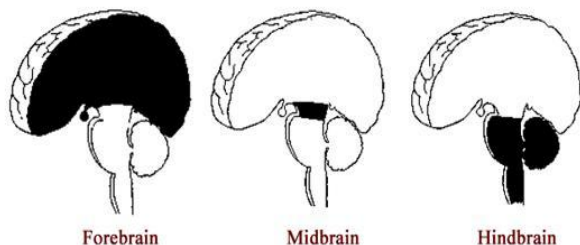


Fig.1:Human brain (Source: www.mybrainnotes.com)

Each part of the brain works together, but has its own special properties. The human brain consists of three basic units:

- The forebrain,
- The midbrain, and
- The hindbrain.

The hindbrain consists of the top portion of the spinal cord, the brain stem, and a creased ball of tissue, the cerebellum. It supervises the important body functions such as respiration and heart rate. The cerebellum is involved in learned rote movements and coordinates movement. When you play the guitar strings or hit a squash ball you are triggering the cerebellum. The topmost section of the brainstem is the midbrain that controls a few reflex movements and it is part of the circuit that involves in the control of movements of eye and other voluntary movements. The largest and most highly developed part of the human brain is the Forebrain. It consists of the cerebrum and the structures hidden beneath it. The cerebrum lies at the topmost part of the brain and is the initiator of intellectual activities. It holds our memories, allows us to plan, enables us to imagine and think.

In spite of being protected by the thick bones of skull, suspended in cerebrospinal fluid, and obscured from the bloodstream by blood-brain barrier, the human brain is vulnerable to damage and disease. The most common type of physical damages include closed head injuries such as a blow to the head or other trauma, poisoning by a number of neurotoxins, such as alcohol, or a stroke. Infection of the brain is rare due to the protective blood-to brain and blood-to cerebral fluid barriers. Two types of tumors malignant and benign can originate at the brain.

Brain cells can be classified into two types: neurons and neuroglia. Neurons, also called nerve cells, perform all of the communication and computing within the brain. Sensory neurons enters the brain through peripheral nervous system. They carry information about the condition of the body and its surroundings.

Brain's gray matter is mainly composed of interneurons, which are responsible for integrating and computing information carried by sensory neurons to the brain. Interneurons direct signals to motor neurons, which in turn carry them to muscles and glands.

Neurons consist of three parts (see figure 2). The cell body (13) consists of the nucleus, where most of the

molecules that the neuron needs are manufactured. Dendrites (14) body like the branches of a shrub and accept notes from other nerve cells. Signals then travel from the dendrites past the cell body and journey off the cell body down an axon (15) to another neuron, a muscle cell, or cells in some other organ. The neuron is usually surrounded by many support cells. Some types of cells wrap around the axon to form an insulating sheath (16). This sheath may have a fatty molecule called myelin, which provides protection for the axon and helps nerve signals travel faster and farther.

Neuroglia, or glial cells, functions as the supporter cells of the brain; they support and protect the neurons. The brain has four types of glial cells: astrocytes, oligodendrocytes, microglia, and ependymal cells.

### 1.1 Studying Brain

There are some methods for studying the brain used in other animals that are not fit for use in humans and vice versa; it is simpler to acquire individual brain cells acquired from other animals, for research. It is also feasible to utilize specific methods in other animals like putting electrodes into their brain or deactivating specific parts of the brain to inspect the impact on behavior – techniques that are not feasible to be used in human beings. Nonetheless, only human beings can retort to complicated verbal directives or be put to use in the study of principle brain operations such as language and variant complicated cognitive tasks, yet reports from humans and other animals, can be of reciprocal use. Medical imaging technologies such as functional neuroimaging and EEG recordings are important techniques in studying the brain. The full functional knowledge of the human brain is an existing test for neuroscience.

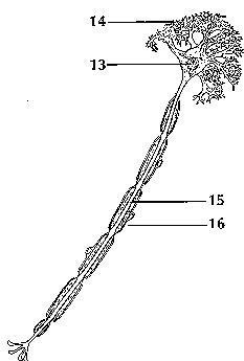


Fig.2: Structure of Neuron  
(Source:www.psychologydiscussion.net)

## 2. Déjà vu

Déjà vu (French), literally "already seen", is the phenomenon of having the strong sensation that an event or

experience being experienced at present has already been experienced in the past.

It reports the captivating and peculiar encounter where you sense that something is very well known but you also realize that this feeling shouldn't be as powerful as it is. For example, you might be driving to office when you all of a sudden feel like you have been in this exact situation before. Naturally, thou have been in the circumstance before – you have driven to office numerous times – yet the sensation is so strong and so connected to at that moment, that you know it shouldn't feel as formidable as it does. Déjà vu experiences are frequently narrated in books and movies, since they make humans feel like they have somehow seen into the future. They are uncommon but stylish occurrence that can really tell us a lot about how our minds, especially our memories, work.

Déjà vu is experienced by young people the most. However, depending on how old you are, you may still have to wait a while until you encounter your first déjà vu.

There are two main categories in which research in Déjà vu is carried out: observational studies and experimental studies. Under observational studies, researchers compute characteristics of the déjà vu experience (who has it, how often it happens, when it happens, etc.) and check for arrangements and bonds in the results. Observational studies show that young people have more déjà vu experiences than older people.

Under experimental studies, researchers attempt to trigger déjà vu experiences in people (one of the bizzarest ways that this has been done is by splashing warm water into peoples' ears!). The purpose behind many experimental studies is that if we can pinpoint what causes déjà vu, we might be able to comprehend more about the thought processes that give rise to it.

Experimental studies of déjà vu sounds fashionable, but they are in fact really difficult to do. We realize from large amount of tests that have been conducted in the last decade that it is actually fairly simple to get people to say they have had déjà vu in an experiment. We many times can't be certain though, whether people really did have déjà vu or whether they are just saying so. The trouble is that people who are performing tests usually want to give the experimenter the "right" answer.

## 3. Related Terms

### 3.1 Jamais vu

Jamais vu (French, meaning "never seen"). It is the phenomenon of facing a situation that one individual recognizes in some fashion, but that nonetheless seems very unfamiliar.

It is often considered as the opposite of déjà vu, it involves a sense of eeriness and the observer's impression of watching the scene for the first time, despite rationally

knowing that he or she has been in the set of circumstances before. Jamais vu is sometimes related with certain types of aphasia, amnesia, and epilepsy.

Jamais vu is most frequently experienced when a person momentarily does not recognize a word or, less commonly, a person or place that she or he knows. This can be achieved by anyone by constantly writing or saying a specific word out loud. After a few seconds one will often, regardless of knowing that it is a real word, feel as if "there's no way it is an actual word".

The phenomenon is often amassed with déjà vu and presque vu, or tip of the tongue. Theoretically, a jamais vu feeling in a sufferer of an incoherent disorder or intoxication could result in an irrational description of it, such as in the Capgras delusion, in which the patient takes an individual known by him or her for a false double or impostor. If the false double is himself, the clinical setting would be the same as the one described as depersonalization; hence, jamais vu of oneself or of the very "reality of reality" are termed depersonalization and derealization, respectively.

### 3.2 Presque vu

Presque vu (French term for "almost seen"—a fancy-pants -way of saying "brain fart" or "having a senior moment"). It is a French neologism that refers to the tip-of-the-tongue phenomenon (TOT).

TOT is the event of failing to retrieve a word from memory, merged with limited recollection and the feeling that retrieval is imminent. The name of the phenomenon came from the saying, "It's on the tip of my tongue." The tip of the tongue phenomenon reveals that lexical access occurs in stages.

People coming across the tip-of-the-tongue phenomenon can often recall one or more features of the goal word, such as the first letter, its syllabic stress, and words similar in sound and/or meaning. Individuals report a feeling of being grabbed by the state, feeling something like mild agony while searching for the word, and a sense of relief when the word is found. While many aspects of the TOT state remain uncertain, there are two major competing explanations for its occurrence, the direct-access view and the inferential view. The direct-access view pose that the state occurs when memory strength is not capable to recall an item, but is strong enough to trigger the state. The view that we get form inference tells us that TOTs are not totally based on inaccessible, yet activated targets; rather arise when the rememberer try to piece together different clues about the word. Emotional-induced retrieval often cause more TOT experience than an emotionally neutral retrieval, such as asking where a famous icon was assassinated rather than simply asking the capital city of a state. Emotional TOT experience also has a longer retrieval time than non-

emotional TOT experience. The cause of this is not known but chances include using a different retrieval technique. The fluency at the time of retrieval, and strength of memory, when having an emotional TOT experience than a non-emotional TOT experience,

TOT states should be separated from FOK (feeling of knowing) states. FOK, in contrast, is the feeling that one will be able to recognize - from a list of items - an item that is currently inaccessible. There are still currently opposing articles of the separability of the process underlying these concepts. However, there is some evidence that TOTs and FOKs draw on different parts of the brain. TOTs are associated with the anterior cingulate, right dorsolateral prefrontal cortex, and right inferior cortex while FOKs are not.

An incidental tip-of-the-tongue position is normal for humans of all age groups. TOT turn out to be more recurrent as people mature. TOT is only a medical related state as and when it becomes constant enough to impede with education or day-t-day life. This problem is called anomie aphasia when obtained by brain damage, normally from a cranial injury, embolism, or dementia.

### 3.3 Déjà entendu

Déjà entendu, (literally "already heard") is the encounter of feeling confident about having already heard something, though the accurate details are not certain or were possibly imagined.

### 3.4 Hypnagogic jerks

Hypnagogic jerks allude to automatic bodily twitches, manoeuvre, or muscular thrusts that occur in course of the metamorphosis from awakesness to a sleeping state. Majority of the people are thought to encounter those just seconds before entering the first stage of nap. In some instances, hypnagogic jerks are also alluded to as "sleep twitches" or "sleep starts," but are occasionally cited as "hypnic jerks," which is an all embracing term indicating thrusts happening at any instance all over the night.

You may have experienced a hypnagogic jerk as you try to get asleep. You might go to bed feeling as if you're on the just about to sleep, and instantly your physique jolts involuntarily. There's not anything you can do regarding these jerks, but they generally abate rapidly and before you realize it, you're fully sleep.

Albeit if you're ignorant of these sensations, your companion may observe that you unanticipated twitch before falling asleep. Your companion may be startled by the unforeseen jolt, and worry that something more grave is happening. Although these sensations are not considered harmful, they are recurrently linked with continual variations in your nap schedule.

#### 4. Analysis and Interpretation

The survey was based on simple random sampling technique. The process of analyzing began by strategically framing questions for the survey. The surveys were taken both online (through Google forms) as well as offline through face to face interactions. The analysis has been done based on the categories age, gender, optimism, brain injury, profession, and stream.

##### 4.1 Gender

The survey was undertaken by 302 male participants and 141 female participants. The occurrence of Déjà vu in both male and female participants was found roughly the same. So it can be safely said that the feeling of Déjà vu is independent of what sex a person is. The possible reason could be that their brain has the same structure right from birth.

Table 1: Occurrence of Déjà with gender classification

Déjà vu	Male	Female
Yes	258	119
No	44	22

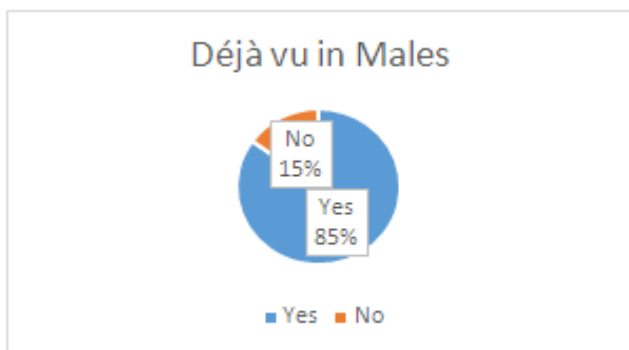


Fig.3: Occurrence of Déjà vu in male

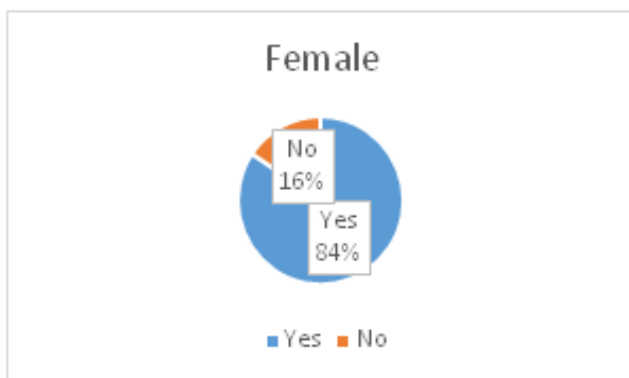


Fig.4: Occurrence of Déjà vu in female

##### 4.2 Brain Injury

The total number of participants 211 has had brain injury and 232 have not. The occurrence of Déjà vu is found more prevalent in the participants who have had brain injury (91%) than those who haven't (84%). The increased frequency of Déjà vu in people with head injury can be attributed to pathological disorder called epilepsy.

Table 2: Classification of brain injury

Déjà vu	Injured	Not Injured
Yes	193	194
No	18	38

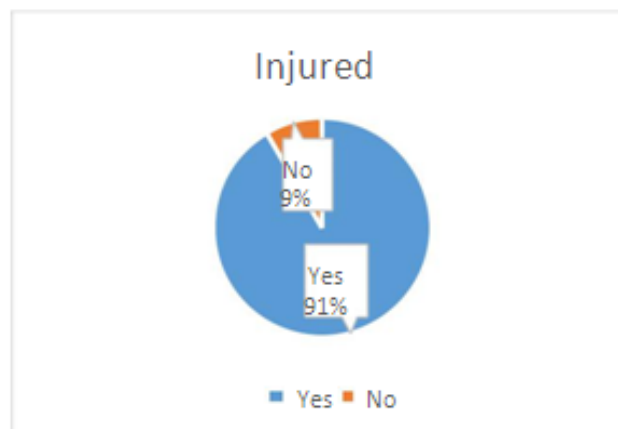


Fig.5: Occurrence of Déjà vu in people with brain injury

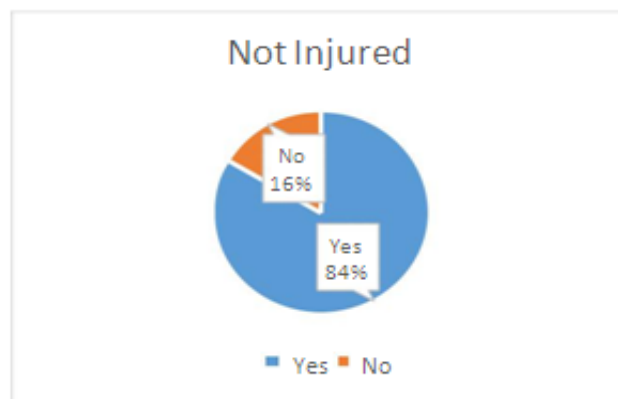


Fig.6: Occurrence of Déjà vu in people without brain injury

##### 4.3 Optimism

Out of the 443 participants 300 said that they are optimist while 143 were pessimist. It was found that the occurrence of Déjà vu is higher in pessimist (90%) than in optimist (86%). The probable reason could be that the

pessimist people suffer from emotions like nervousness, anxiety, depression.

Table 3: Classification of Optimist and Pessimist

Déjà vu	Optimist	Pessimist
Yes	258	130
No	42	13

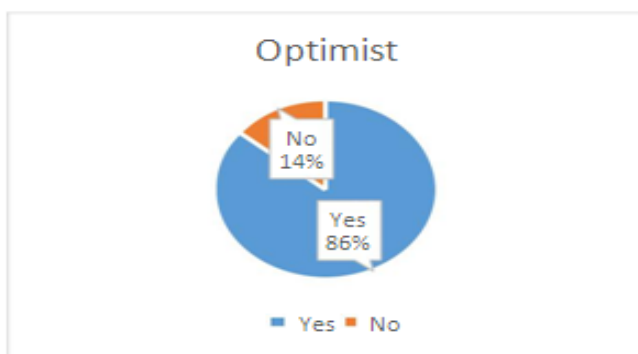


Fig.7: Déjà vu in Optimists

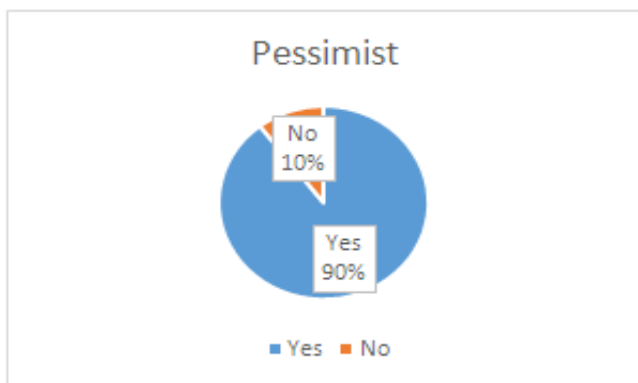


Fig.8: Déjà vu in Pessimists

#### 4.4 Streams

We had 211 participants belonging to science stream, 100 to arts and 65 to commerce. The percentage of participants who have encountered Déjà vu are almost same across all streams. People generally choose their streams after 10 standard. Until that point in their life they had generally studied similar subjects. Since most of the occurrence of Déjà vu are reported before this age, participants from different stream show almost the same percentage of Déjà vu traits.

Table 4: Déjà vu participants from various streams

Déjà vu	Science	Commerce	Arts
Yes	182	56	53
No	29	9	12

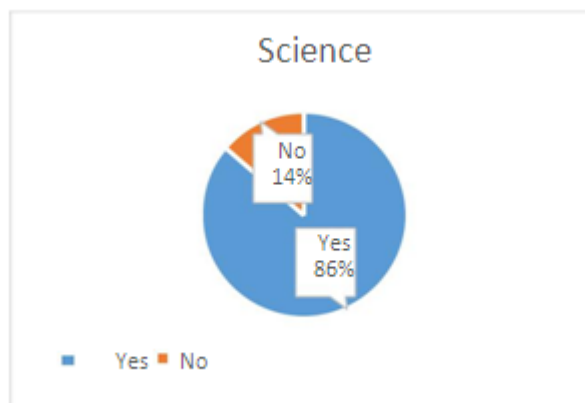


Fig.9: Déjà vu in people from science stream

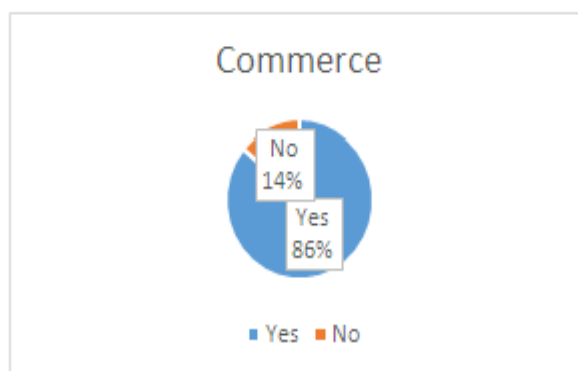


Fig.10: Déjà vu in people from commerce stream

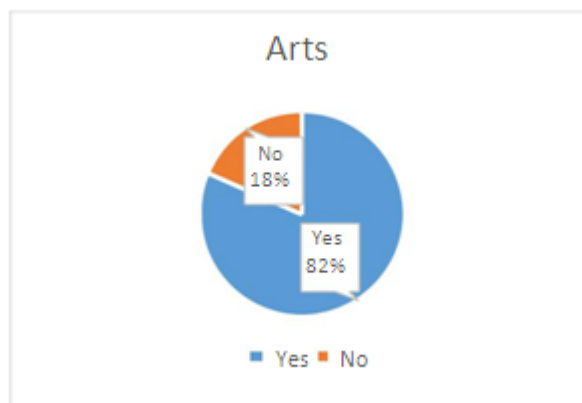


Fig.11: Déjà vu in people from arts stream

## 5. Conclusion

In the first part of the paper we described about parts of the human brain and its working. Then we introduced Déjà vu and its related terms. The last section of the paper deals with the analysis and interpretation of the survey conducted by us. We found out that 85% people experience Déjà vu and thus is a common experience of everyone's life. We categorized our surveyees on the basis of gender, stream, whether the person ever had a brain

injury and optimism and found that factors such as gender and stream doesn't affect the occurrence of the phenomenon of Déjà vu. On the other hand brain injury has a profound effect on the occurrence of Déjà vu.

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