

Scientific study of visual memorization versus auditory memorization



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From: Michael Freed, Research Scientist

It is hard to define whether visual or audio can be more memorable, it just depends on the circumstances and situation on the remembering process, but visual information is more easily remembered overall in opinion. Part of what makes the answer complex is that what we see often causes us to think and during the thinking process, it would generate the memory in brain as if it were heard or saw; so information presented might actually get stored twice: once in a visual message and once in an auditory message. There are other factors such as how motivated we are to remember that also can have a big effect, since we usually would remember an interesting scene in movie rather than the boring scene.

Our capacity to store is remarkable, This would be a complicated question involves what is meant by “remembered better”, so if I had to choose between the two alternatives I would say the simple answer is that visual information is remembered better. For lists of words, for example, I don't think there is much difference between visual and auditory modes of presentation. This is complicated because for auditory stimulus can help or enhance the visual imagery memorization; likewise, for visual stimulus presentations auditory memory can help, so it's not clear we get a very pure measure of each.

It also matters whether people are asked to recall what was remembered or just recognize a previously saw image. People are awesome in storing complex visual information and to recognize and discriminate new pictures at retention of days. However, people can also do well on remembering and

humming the tunes for years while they are only able to depict single notes of a scene they have been heard.

To simplify that, a natural visual scene is interconnected spatially whereas an auditory stimulus is interconnected serially. This leads to differences in our ability to recall the event and in the amount of information needed to recognize a visual or auditory event among a distracting environment. If one chooses to look at the amount of information stored, then it would be the case that our visual information would win because of the rich representation of the world our visual system gives us.

This reasoning underlies the value of using memory aids to remember speeches and the like.

It is important to keep in mind that in daily life what we remember is what we paid attention to. It is true that the competition of visual memory against auditory memorization plays a role, but our motivation plays a more significant key role. In fact, the source of information is often lost with time: we remember that George Washington was the first president but are unlikely to be able to recall whether this information is stored through our ears or eyes. There is a separate part in our brain to store the facts memory from our memory for an event. It is in the event memory that we have the clearest recollection of whether we got that from something we heard or read. It is helpful to have both pictures and spoken words to support memory since that gives us a richer internal representation which is a very powerful effect that works in both modalities is organization.

From: Daisy Mak, general doctor

Visual and auditory memory, and indeed all kinds of sensation can register in our memory, and the brain structures involved are a lot. Visual memory of course involves input from our eyes, which essentially involves retina, the optic nerve, and the connect leads all the way to our visual cortex, which is the occipital lobe. Connection will run from the occipital lobe again to structures which deals will our memory. Auditory memory of course involves input from our ears, which involves our tympanic membrane, the nerve cells in the cochlear, and then the auditory nerve, and the connection leads all the way to our auditory cortex, which is the temporal lobe. Connection will run from the temporal lobe again to structures which deal with our memory.

The brain structures which deal with our memory, the medial temporal lobe memory system which includes the hippocampus and the adjacent cortex:

- the basal ganglia
- the amygdala
- the cerebellum
- and of course our sensory cortex

Most common causes that would affect our memorization ability:

- Alzheimer's disease
- Stroke (technical term: vascular dementia)
- Alcoholism

- Parkinsonism

- Drug abuse

Less common causes affect our memorization ability:

- Nutrition deficiency, e. g. vitamin B6 (Wernicke's encephalopathy) or vitamin B12 deficiency (pernecious anemia)

- Abnormal hormones, e. g. thyroid problems, problems with our stress hormone (cortisol)

- Renal disease

- Liver disease

- HIV/AIDS

- Syphilis

- Brain trauma

- Brain tumour

- Degenerative diseases e. g. Huntington's disease, Pick's disease, frontotemporal dementia

Data and Result:

gender

age

Audio (s)

Visual (s)

female

16

37

31

female

18

37

29

female

17

42

29

female

18

56

32

male

18

42

62

male

17

81

60

female

50

74

55

male

50

39

44

female

74

62

38

female

17

104

74

female

17

48

56

male

18

45

36

male

44

64

45

male

13

38

36

male

35

45

29

female

30

52

33

Analysis:

Age Group

13-25 85 % Visual, 15 % Auditory

25-50 78 % Visual, 23 % Auditory

50+ 50 % visual, 50 % Auditory*

*due to the disfunctioning of certain organs when one becomes older, the concept of which part (visual or auditory) is better used for memory depends on which organ functions better. Thus, it is depended on the physical state of the person and not on which one is essentially more useful for memorization.

Gender

Male 80% percent Visual, 20 % Auditory

Female 70% visual, 30 % auditory

Visual vs audio

80% perform better in visual

20% perform better in audio

In this study, young adults and mature adults were shown a succession of object images and were told to remember as much as they could and match them back together after remembering them all. Probe object images were paired in three ways: objects that were same in colour but different in shape, the same shape but different in colour. Performance accuracy was remarkably high and quick for all conditions.

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As comparison, another study showed that auditory memory was markedly inferior. When subjects listened to sound clips (conversation, animal sounds, music, etc.) and then asked to distinguish the order from the clips, under all conditions performance was systematically inferior to visual-memory performance.

Conclusion- visual memory vs audio memory:

The majority of specialists within the fields of speech language pathology, child development, paediatrics, neurology and psychology agree the ability to attend to sound is a fundamental precursor to the acquisition of language. But for most of the common people like student, workers, clerk and general doctors believe that visual memorization work better since it is more dominant to take in messages from what we see.

It has been a mystery for student to find out which way is better for them to memorize stuff in textbook. People tried to get into those memorization class to obtain the skill of memorize a mass number of things efficiently. Visual memory has been widely studied in recent years, specifically, visual memory as it relates to verbal working memory. Kirsten Butcher (2006) conducted an experiment examining the how text with diagrams can help to reinforce mental model development and inference. The study asked participants to learn about the heart and circulatory system. One group was given text and the other two groups were given text with diagrams of differing complexity. The groups that received diagrams both displayed perform better. The simplest diagram created the more idea for normal people who do not studies biology to figure out the whole idea effectively, that proves visual

learning also depends on whether the source is word or picture, the simplest the context or information, the better to remember the visual information.

As we grow older and being sterilize by the education system of asking us to read more, we would shift to expand the visual memory part in our brain, and would omitted the importance of auditory memory too. If we carefully observe that actually the combination of visual and audio memorization works the best and images and sound going through to the brain together, they combine the information and strengthen the info context which can avoid the memory stored not to fade quickly. But if we really want to distinguish which type works better, then it is believed is the visual memory from the result shown above. This is because majority of us have adapted to visual memory more than audio memory, as we used to read more than to listen for recording down information as there is a reflex telling you that the audio memory usually does last long. This would naturally enhance rapid growing of the visual part in our brain and leads to a dominant use of mostly visual memorization.

It is known that children in young age can learn effectively, it was assumed that playing music reading stories and showing them animation could definitely stimulate their brain potential in all kind of development. In that age it is believed that baby would have the same visual memory and audio memory, since they are not being sterilized nor have specific side of brain heavily mature grow. From that it is believed that the most the dominant user of visual memorization is not born but trained.

Conclusion- gender/age:

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The concept of visual and auditory information and its effect on diverse groups of people has been long discussed. There has been an immense amount of debate that analyzed which age group, gender, or culture utilizes which technique to an advantage for memorization. People's culture, wherein people of diverse ancestry exhibit diverse physical statures, can also give an idea of which memorization approach is more imperative to meet with the standards of the person. For instance, if a certain culture of people is known to be more prone to a certain disease or mutations that disrupts the efficiency of an organ (such as the eyes), it is immaculately unproblematic to comprehend that the other supplementary organ would be more beneficial to the person's usage. It is evidently possible to apply the same concept with which gender or age group utilizes which organ to better memorize information fed to them. For example, if people of the male sex have an inferior organs due to a sickness more common to this gender, than they would rely immensely on the other organ instead.

Indeed, the conception of age group follows that unchanged approach. However, for the reason that the ageing of a person may reduce the ability to retain short-term memory in general, it is difficult to judge which sense (auditory or visual) aids in the person's memory. This concept of a person's problem in short-term memory, as well as other cognitive functions, such as episodic semantic memory, fit into the category of age-related memory impairment (AMI). This is also known as age-associated memory impairment (AAMI). Thus, in comparing between which age group is better at remembering short-term memory (auditory or visual, in general), the younger age group would be able to prevail over the older age group,

exceeding the age of 50 years old. Indeed, it has been investigated and determined that children and numerous people that are in adolescence remember better in terms of visual information. This is because, especially for children, they are experiencing and attaining imperative information about the surroundings through the use of their eyes. Furthermore, because elementary (and Kindergarten) school suggests leaning more on the visual side, children learn to develop their visual skills better than their auditory skills. At an early age, children read picture books and draw paintings and crafts. This sense of wonder and imagination which is prominent in children is greatly encouraged by vivid, illuminating colours. It is possible that with the growing of age, a sense of auditory information is improved due to the enhanced sense of concentration. Auditory learners are able to intake instructions better and information from lectures. The main reliability of visual sensors to provide memorization of short-term may still be evoked, but the ability of auditory information is better improved with age.

Although it is not fully proven, it is highly believed that males are more visual-spatial than females. Therefore, it is believed that males utilize their visual sense in order to proceed in memorization and that female either proceed with auditory senses or emergent visual senses. This concept can be looked at the historic means of survival where males would hunt-gather, and needed to attain abilities in map reading, navigation, and killing animals for food and shelter.

In retrospect, the idea of visual and auditory information and which gender, age group, and culture relies more on which is a considerable and

unanswered field. However, this provides the notion for research and discovery.

Discussion:

We hypothesized that visual learning of information would produce higher test scores compare to audio learning. Our results indicate that overall, visual learning resulted in significantly higher scores in both than the audio task for most of the case. Thus, our statistical results support part of our hypothesis and give credence to the use of visual learning over auditory learning.

Our study mostly included high school age students, and neglected the grown up adult and old aged people which could limit the effectiveness of these results, due to the fact that younger children's learning strategies are still being shaped, this would affect the result obtained. Further research could be developed to study the differences in visual and auditory learning styles in varying culture and races of people. Our sample size was also limited due to the availability of participants, but we believe that a broader study would yield the same results. Our use of random assignment, protocol, and consistency of gender of experimenters all helped to reduce extraneous variables and make it more general.

On the other hand, attention and behaviour towards the experiment in visual tasks with reported of anxiety and depressive would seriously affect working memory function, as well as the ability to concentrate, leading to a lower level of academic performance on the task. Therefore it is needed to provide a relaxing environment for participant when they are doing the task.
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In conclusion, our study supports the theory that visual learning leads to greater recall on memory performance tests than auditory learning. While visual learning is not the only method of learning information, it has become, through past research, the most prominent and effective style of information retention.

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