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Inner Speech During Silent Reading

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Humankind is able to read and write only for about 5,000 years (Alderson, 2005), while its ability to vocalize a sound and speak is much older. In the context of the evolution, 5,000 years are an infinitesimal period, during which none of new species or particular genes could be formed to be stable, transmit between generations and be present in every individual (Vilhauer, 2016). Human brain has to undergo some serious changes to make one be able to read. Therefore, reading process is connected with other, more ancient processes in human brain. That is why the overwhelming majority of people have the ability known as subvocalization – subconscious speech during reading (Filik & Barber, 2011). This concept is currently a highly controversial issue in neuropsychology. However, recent research findings and the years of cognitive processes investigation have proved that inner speech during reading is not a myth and that this process is closely connected with a cognitive process of speech and is intrinsic to human memory.

When an individual sees a word on a page, the brain analyzes visual information first, then connects it with the knowledge about the word (for instance, the word "cow" makes human brain recall an image of a cow, the sound it makes and the way the word sounds). For a couple of milliseconds, the cerebral cortex connects the information received with the visual and sound representation of this information, analyzes and compares it, and then a person can draw conclusions about what is read and associations it brings (Vilhauer, 2016). MRI allowed Trumpp, Traub, Pulvermüller, and Kiefer (2014) to conclude that the act of reading

involves 17 areas of brain, including the ones responsible for the visual and sound perception of the information.

The activation of visual areas of the cortex is obvious since eyesight is used during reading, and eyes are directly involved in the process of reading. On the other hand, subconscious activation of an acoustic area of the brain is closely connected with the way an individual learns to read, and happens after they gained an ability to speak, i.e. pronounce and vocalize information (Alderson, 2005). Gradually, there appears a strong reflex connection set between reading and speaking since a child first develops a habit of pronouncing the text aloud, then they whisper during reading, and then use inner speech. Movement of lips, tongue, and other speech organs only seems to break during reading (Alderson-Day & Fernyhough, 2015). In fact, they are in a constant hidden motion. The intensity of these micro-movements depends primarily on the level of development of reading skills and complexity of the text (Alderson, 2005).

The process of masked repetition of syllables, words and then complete sentences, which accompanies the process of learning to read, creates a semantic framework in a cortex, leading to automatic activation of acoustic perception in the brain (Alderson-Day & Fernyhough, 2015). Such a framework automatically streams a certain amount of verbal information provided in the form of acoustic (hearing) or articulation (muscle) codes, with a lateral observation of the location of information. This process is called the articulatory loop, which is a mechanism of controlling the order in which information is (Vilhauer, 2016). It was mentioned above that the more complicated the text is, the more important it is to track the exact order of the words for its understanding.

Sometimes, it is even necessary to read some parts of the text aloud in order to make acoustic perception sharper than it is during the silent reading. By its sharpening, an individual refers to the memory, and if subvocalization is suppressed, the working memory capacity is reduced (Alderson-Day & Fernyhough, 2015). However, the main purpose of the articulatory loop, and it was progressively related to its origin, is the necessity to master the speech. It was experimentally proved that adults who do not have the need to learn foreign languages have a disruption of the phonological loop, which is lack of ability to repeat (Vilhauer, 2016). Therefore, as an individual learns to speak, he/she develops a certain mechanism that activates even when superficially touched, as during the silent reading process.

The notion of inner speech during silent reading provokes heated discussions with two sides having opposite opinions. There is a cohort of researchers that are strongly against the idea that there is a subconscious reaction of speaking in the human brain during the silent reading. One of the main arguments of subvocalization opponents is people that have speech disorders. It is claimed that people who have speech disorders, for instance, stuttering, do not have the intrinsic voice due to the inability to speak correctly (Vilhauer, 2016). As opposed to their explanation, there is a strong evidence that people having speech disorders are more likely to develop inner speech when reading since creating an acoustic image of what is being read helps with overcoming the effect of the speech defect and “discharge” the brain by activating another cortex area (Alderson-Day & Fernyhough, 2015). Second counter opinion to subvocalization is dyslexia, which is a specific reading disorder. It is noted that inability to read also contributes to the inability to relate to sound effects of silent

reading. In order to confute the argument, one should mention one of the most effective means of teaching to read people with dyslexia is repetition (Filik & Barber, 2011). As was mentioned above, the repetition technique contributes to the formation of a close connection between speech and reading ability – subvocalization. The last argument is that inner speech during reading process has a negative effect that declines the silent reading rate. Such an outcome is related to the longer processing of the information in the human brain due to subvocalization (Filik & Barber, 2011). Indeed, an individual's rate of reading aloud and silently are different with load reading being slower than the silent one. However, the research proves that it is impossible to stop subvocalizing completely; the trace of this process remains in the human brain permanently.

In conclusion, it is worth mentioning that inner speech during silent reading is not a myth and can be easily explained by neuropsychology and the way people learn to speak and read. Despite strong opposition to this notion, current research proves its existence and effectiveness for the perception and understanding of the information read. Since the mankind learned to speak and hear prior to reading, it should not be a surprise that people hear a voice inside of their head during the silent reading.