



Tachysensia while Shading in the Sphere

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Abstract

The Alice in Wonderland syndrome is a syndrome in which people perceive themselves or their surroundings as changing in a hallucinatory way. The phenomenon is not considered a separate disease, but usually occurs as a symptom accompanying a migraine attack or as a precursor to an epileptic seizure in the form of an aura with pronounced visual perception disturbances. The term "Alice in Wonderland syndrome" was named after the children's book Alice in Wonderland by Lewis Carroll and coined by John Todd as a possible, but not essential, accompanying symptom of migraine and epilepsy. Alice in Wonderland syndrome leads to changes in the perception of one's own environment. These changes include both micropsia and macropsia as well as altered auditory perception, altered tactile sensations, and altered perception of time. The syndrome is particularly common in children. The attacks are often shorter and can be completely painless, but accompanying symptoms such as nausea, vomiting, light sensitivity, and sound sensitivity are more pronounced. This can lead to neurological deficits, causing the affected child to start hallucinating. They may perceive their body as larger or smaller or start to see "fantastic images". A few patients described tachysensia accompanying with Alice in Wonderland misperceptions. We describe a case of 24 years-old man from the US, who retrospectively described tachysensia during an episode while shading a sphere with a pencil during a high-school exam with age 14.

Introduction

AIWS is not a standalone disease but a neurological symptom group known for profound, temporary distortions of sensory perception. Core symptoms include perceptual distortions, distance illusions, body schema disturbances and in rare instances tachysensia. Episodes typically last a few minutes to half an hour and can be triggered by various factors such as migraines, epilepsy, infections, or drug use. Treatment focuses on managing the underlying neurological condition, such as migraine prophylaxis. Tachysensia is a rare phenomenon, often referred to as "Fast Feeling." It describes a temporary distortion of perception in which time and movements feel extremely accelerated. Core symptoms are time distortion, where time seems to be running in fast forward or extreme slow motion. Movement distortions like simple hand movements may appear overly fast or aggressive. Sounds may

be greatly amplified, loud, muffled, or distant. Episodes typically last only briefly, often around 10 to 15 minutes. Subjectively, the heartbeat may feel accelerated. It is considered closely related to Alice in Wonderland syndrome and is rarely found in this condition. The aim is to inform physicians and pediatricians about this rare condition in Alice in Wonderland patients.

Case Report

The perceptions of one serious episode was described as following: It was difficult to recall the event in extreme detail because it was 10 years ago, retrospectively. Currently, the patient experiences the episodes anywhere from 1-2 times annually. The symptoms/perceptions of episodes include the "fast feeling" motion associated with movement of my body, amplified audio, increased speed of audio, time distortions, and increased sensitivity

to physical touch. The most unique and fascinating episode that have had occurred at age 14 in high school. His first class of the day, 2-D art, began at 7:30 A.M., and on this particular day he had an exam. The first task of the exam was to shade in a sphere with a graphite pencil. As he started the exam, he began to experience audio distortions, which always signals the onset of an episode for him. It is worth noting that the environment had parallels to the environment I usually experience episodes, which is at night right before he felt asleep. He did not recall any monumental events or triggers that happened previous to the exam. The room was somewhat dimly lit. The lights overhead were conventional US school lighting with multiple long rods inserted in a rectangular overhead fixture. He suspect that not all of the rods were on, meaning the lights were running at 50% luminosity. The only audio in the room was background noise either attributed to the lights or air conditioning. The audio was similar to a low humming noise, often associated with inducing meditative states. The classroom was relatively quiet because there was no talking during an exam, and it was early in the morning, perhaps signaling an increased content of theta waves in his brain. He started shading in the sphere with the pencil and became completely encompassed in the audio feedback and physical sensation produced from moving the pencil back and forth on the piece of paper. As he began the exam, he started hearing audio distortion, which signaled the onset of an episode. Everything became louder and on a feedback loop, almost like it was echoing. He could hear distant sounds very loudly. It felt like an extreme heightening of my sense of hearing. He started shading in the sphere with a graphite pencil and the audio and physical sensation produced from moving the pencil back and forth on the piece of paper became almost euphoric. He became completely fixated on the audio. It sounded like he had hooked my pencil and paper up to a speaker that was blaring right in his ear. Also, the physical sensation produced from the friction of moving my pencil back and forth on the piece of paper was extremely attractive. The best he can describe the physical sensation is that of a tingling feeling. His sense of touch was heightened. The combination of audio and physical senses provided a euphoric experience. In his mind he had been shading this sphere for 2-3 minutes and decided to check the clock, as all anxious test-takers do, and to his surprise 15 minutes had passed. He did not understand how my subjective perception of time and the objective reality of time were in such a disconnect. In retrospect, it almost seemed like a trance-like state. He decided to check the clock because I was taking a timed exam and was still on the first question of the exam. Perhaps my realization that he needed to check the clock was an indicator that my episode was coming to an end, and thus he regained better awareness of my environment outside of my pencil and paper. He thought I had been shading this sphere for 2-3 minutes and the clock indicated that 15 minutes had passed from the start of the exam (Exam started at 7:30 and the clock read 7:45). When he realized that my perception of time was in a complete disconnect with the reality of time he was in complete disbelief. This realization provided a moment of shock that people often

experience when they realize something profound and get “that feeling” in his stomach. He had experienced many episodes prior to this, but never realized a time distortion to this effect. Usually, his description of time distortions during his episodes relates to the feeling that the world around him is moving slow and he is moving fast or the world around him is moving fast and he is moving slow, but he had never noticed the effect produced in my art class prior to or since this episode. He thought the effect was produced by my complete fixation on a task: shading in the sphere. That was the end of recollection of this episode. It is unclear if he was still experiencing residual or less profound symptoms once he checked the clock, like he usually do toward the end of his episodes. It is possible that my realization of the time distortion brought me out of the episode. I do not remember. What I recall most about this episode was the disconnect in time. His episodes began when he was young, probably 5-7 years old, and were much more frequent when he was younger. He could not put a number on the frequency of these episodes when he was a child, although he knew for a fact that the frequency of these episodes has decreased with time. Currently he experienced episodes anywhere from 1-2 times annually. Almost all of them occur at night when he was lying in bed alone. Audio distortions always indicate the onset of an episode for him. Everything sounds louder and amplified. It sounds like all the sounds in the patient’s environment are occurring right next to his ears. There is also an echo or reverb to the sounds. He often notice a “high pitched” ringing noise that is constant during his episodes. The tone of this ringing noise changes from higher and lower frequencies during an episode. He thought this constant ringing noise is related to any ambient noise in his environment, although he had no data to correlate the two other than a few anecdotal accounts of ambient noise being present at the time of an episode. Audio feels faster in relation to time, like audio waves are somehow being received faster than normal. His inner monologue becomes “louder” although this is hard to describe because his inner monologue is not producing physical audio waves in his external environment. He did not experience hallucinations such as people or things talking to him. All of his internal thoughts are his own, and they appear louder which creates a “heightened awareness” state. All of these symptoms occurred 100% of the time. During an episode his sense of touch seems heightened and almost “tingly.” Since most of his episodes occur in bed, he almost always found a surface to rub my hands or feet against during an episode because he enjoyed the sensation that the friction provides. Examples include rubbing his feet back and forth on my bed sheets and rubbing his hands against my face or hair. As mentioned in the art class example, the combination of audio and physical feedback he received during an episode was attractive. This occurs 100% of the time. During an episode the world around him felt noticeably faster or slower in relation to his physical body and his thoughts (this occurs 100% of the time). Oftentimes the movement of his body seems like it’s at 2 times the normal speed. Think of watching a video on 2x speed, that is how my physical body feels when he moved. He did not visually interpret his body moving at an increased speed, it was only a

feeling that his body is moving at an increased speed. He has experienced an extreme disconnect in his subjective perception of time and the objective reality of time as mentioned in the art class episode. Since that episode, he has tried to monitor time periodically during an episode and have not noticed the “art class effect” since. He believed that state was created by fixation on a task. Usually, he was not doing any tasks that capture 100% of his attention during an episode because he was lying in bed, scrolling on his phone, or awaiting sleep. Personally, the time distortions he experienced are the most interesting part of my episodes and a large reason why he want to research and learn more about what is happening inside his brain. He thought the art class effect may be related to the observer effect in physics: He do not think it is possible for him to experience the art class effect unless he was unaware that the effect was happening. This belief is based on his recent attempts to consciously track time during episodes and observing no major disconnect in his perception of time and the objective reality of time measured on a clock.

The only visual effect he has noticed during an episode is a slight

“zooming out” of the world around me. This has only happened a handful of times. It was like his field of view was slightly increased, and he was viewing his environment from one step back. When this effect has happened, it was not very noticeable and rarely happens. He did not experience any visual hallucinations related to figures that do not exist or perceptions of his physical body being larger or smaller than they actually are. Almost all of his episodes happen at night when he was laying in bed in anticipation of falling asleep. He did not have any concrete data on what triggers my episodes, although he had a few proposals. One of which he had already mentioned was ambient or repetitive noise. Because audio distortion was the first effect he noticed in 100% of his episodes, He thought audio could serve as a trigger. He recalled laying in bed as a child and hearing a clock in his room during many episodes. Another trigger could be related to theta waves in his brain. Because his episodes occurred almost exclusively at night and early in the morning, he thought the episodes could be related to theta waves. Repetitive noise and theta waves were related to other altered states of consciousness such as meditative states. He was aware that meditative states can also produce altered time perceptions.



Figure 1: Fast Feeling, from: Psychology Today.

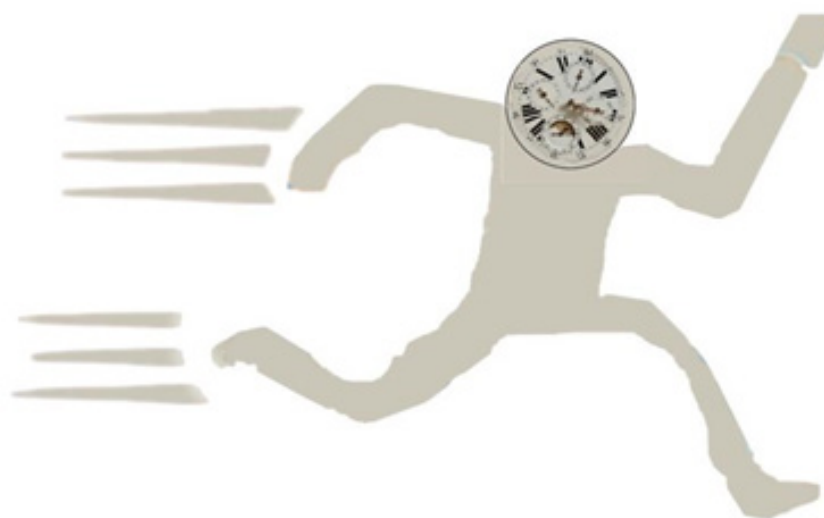


Figure 2: Tachysensia; the body seems to move faster than it actually occurs, from: Psychology Today.

He was happy to provide more information and answer any questions related to his health. He is a 24-year-old male, with a height of 6' 2" weighing roughly 185 pounds (1.88m, 84kg). He is physically healthy and enjoyed physical exercise roughly five times a week. He has been diagnosed with depression in the past (age 21), and these feelings of depression come and go in his life. He has been diagnosed with attention deficit hyperactivity disorder (ADHD), inattentive type, at around age 20. He was prescribed an amphetamine to help increase his focus and productivity. He drank alcohol socially. In the past, he has been recreationally consumed cannabis with the psychoactive compound THC. Currently he does not consume any drugs with psychoactive compounds. He has never consumed psychedelics. There is a high probability that the patient is autistic, although he has never been tested. The patient believed that his grandfather on his mother's side had Aspergers, although he was unsure what other diagnosis he may have had because he has never been present in patient's life. He has done a decent amount of research on potential causes of AIWS and below are accounts that he believed may be relevant. His understanding was that his father was infected by the coxsackie B virus in 2006 which led to simultaneous cases of meningitis and encephalitis. He was aware of potential asymptomatic cases of meningitis and encephalitis and am familiar with correlation to AIWS, although the patient has never been tested for antibodies to confirm my suspicion of an asymptomatic case. He had chickenpox when he was very young (toddler). This was a severe case that left scars on his body which are still visible today. He does not get regular migraines, although he is familiar with research linking vestibular migraines to AIWS. He has not been tested to see if he suffers from vestibular migraines. His understanding was that vestibular migraines are linked to changes in barometric pressure. He did recall a horrible case of sinus barotrauma during a flight roughly 5 years ago. He has a high tolerance for pain after two ACL reconstructions, and

the pain from this "migraine" was so severe that he thought he was going to die, which sounds dramatic but it is certainly how it felt. He was also extremely sensitive to light and sound. He had to wear sunglasses during football matches as a child, and his eyes were still very sensitive to sunlight. Loud sudden noises often caused him to blink.

Discussion and Conclusion

The Alice in Wonderland syndrome is a syndrome in which people perceive themselves or their surroundings as changing in a hallucinatory way [1-3]. The phenomenon is not considered a separate disease, but usually occurs as a symptom accompanying a migraine attack or as a precursor to an epileptic seizure in the form of an aura with pronounced visual perceptual disturbances [1,4,5]. The Alice in Wonderland syndrome can also be caused by the Epstein-Barr virus, drugs, tumors, dementia and coronavirus infection [6-11]. The term "Alice in Wonderland syndrome" was named after the children's book *Alice in Wonderland* by Lewis Carroll and coined by John Todd as a possible, but not essential, accompanying symptom of migraine and epilepsy [2]. Carroll himself suffered from migraines, and it is believed that his experiences with the condition served as inspiration for the hallucination-like effects described in his work [2]. Furthermore, Carroll's narrative has been discussed as a description of a trip after consuming consciousness-altering drugs [12]. In one of the most famous sequences in the book, Alice changes her size by taking bites from different sides of a mushroom. However, there is no evidence of drug use by Lewis Carroll.

The Alice in Wonderland syndrome leads to changes in the perception of one's own environment [13,14]. These changes include both micropsia and macropsia, as well as altered auditory perception, altered tactile sensations, and altered perception of time [15,16]. The syndrome is particularly common in children [15]. The

attacks are often shorter and can be completely painless, but the accompanying symptoms such as nausea, vomiting, light and sound sensitivity are more pronounced. This can lead to neurological deficits, causing the affected child to start hallucinating. They may perceive their body as larger or smaller or start to see “fantastic images”. The changes in perception can significantly impair affected individuals, causing them to lose their orientation and “not find their way”. In extreme cases, falls and other accidents can occur. The perceptual disturbances can lead to the Alice in Wonderland syndrome being mistaken for other mental disorders or misinterpreted as “madness”. The focus is on treating the underlying condition, such as symptomatic treatment of migraine. Tachysensia, also known as “fast feeling”, is a rare phenomenon where there is a temporary distortion of time and sound perception. Those affected feel that movements, sounds, and time itself are playing out at a much faster pace than they actually are. Typical symptoms and course of events include rapid perception. Simple actions (such as typing or walking) or the environment may appear to be running in an extreme “fast-forward” or time-lapse mode. An altered hearing is recognized, sounds are often perceived as greatly amplified, echoing, or muffled, similar to hearing underwater. Episodes usually last very briefly, often between 2 and 20 minutes. The phenomenon is often accompanied by an accelerated heartbeat, inner restlessness, or the mistaken perception that one’s own body movements are being carried out at a rapid pace. The exact causes are still unknown, but neurological theories link it to migraine and the Alice in Wonderland syndrome. Origin and affected brain regions are the cerebral cortex, where the actual misinterpretation occurs. The symptoms are similar to those of a migraine aura. Altered electrical voltages and ion shifts, calcium and potassium, spread in a wave-like manner over the nerve cells of the cerebral cortex. The thalamus as a central filter for sensory impressions, transmits these faulty signals to the somatosensory cortex. This leads to sensory overload. Temporal lobe and insular cortex seem also be involved. Scientific explanations associate the disorder with the temporal lobe, as it is heavily involved in auditory processing, auditory perception, and the emotional evaluation of stimuli. Since the symptoms are often associated with epileptic activities or migraines, the origin is strongly located in the electrophysiology of the brain.

In conclusion, we present a case of Alice in Wonderland syndrome and the extreme rare association of tachysensia, audio-, visual- and time distortions in a male patient.

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