If Your Pet Could Talk, She'd Beg You to Get These Things Out of Your Home

Both cats and dogs are highly sensitive to it, possibly even to the point of seizures, while we humans go merrily on our way without skipping a beat. To you it's normal, but if your pet could talk she'd beg you to oust them from your home.

Reviewed by Dr. Becker

STORY AT-A-GLANCE

- You probably already knew that dogs have super-sensitive hearing, but cats do, too, and as you fill your home with all kinds of technology, sounds we can’t hear are, for them, magnified to alarming degrees
- Ultrasound is essentially a human concept, but for dogs and cats, the higher frequencies we call ultrasound are just part of what they experience, only greatly intensified
- Sounds that annoy people, like a garbage truck, can be excruciating to your pets, but devices like smoke detectors may be emitting a high-pitched noise that you can’t hear but they can
- Healthy humans can hear very low-frequency sounds, measured in the number of vibrations in one second: 20 Hertz (Hz) to a high frequency of 20,000 Hz, but dogs can hear up to 45,000 Hz and cats up to 64,000 Hz
- Noise has the ability to disturb the endocrine rhythm of animals just like it can for humans, but it makes them more vulnerable to seizures, and, similarly, flickering lights can exceed the critical flicker fusion (CFF) threshold

Editor's Note: This article is a reprint. It was originally published May 31, 2018.

Remember learning in elementary school that dogs have super-tuned hearing that's much more sensitive than your own? Animal experts now know that cats, too, can be acutely sensitive to high-frequency sounds.

In today's world, things we absorb as a matter of course are amplified to sensitive animal ears, and they're forced to deal with them on a daily basis. In the past, there also weren't the scores of machines and devices that either emit or alert you with noises to scare, confuse and often deeply disturb the pets we love.

Only a matter of decades ago, technology as we know it today — at least to the degree we know it today — didn't exist. There were no personal computers, cell phones or SmartMeters, and no power lines, electric lighting, wireless routers or smoke detectors.

There weren't blaring TVs, radio and stereos, but there also weren't flickering light bulbs, particularly from LED bulbs, which introduce a completely separate set of issues. When it comes to your pets, noises connected to our technology may be an auditory cacophony that may include strobe-like effects. CNET.com says:

> *"Their senses are tuned differently than our own and may detect a cacophony of noise and strobe effects that we don't, particularly as we fill our homes with technology. You can fix a beeping smoke detector quickly by changing the battery, but it might also be emitting a constant high-pitched noise that only your dog can perceive."*[1]

An assistant professor of neurology at the University of Florida College of Veterinary Medicine, Dr. Sheila Carrera-Justiz says the world is a far different place for your pets than it is for the humans around them. The sound of the garbage truck, for instance, may be momentarily disturbing to you, but it may be excruciating to your animals.

To borrow an old song, everything you can hear, they can hear better. Aside from the excruciating noise made by the aforementioned smoke alarm, there are also noise frequencies connected to it that humans can't hear.

Ultrasound — You Can't Hear It but It's Driving Them Crazy

Dr. Katherine Houpt, an environmental factors expert at Cornell University's College of Veterinary Medicine, observes that many dogs are afraid of smoke alarms even when they don't seem to be making any noise. "So the dog is going crazy and the owner doesn't know why."[2]

Dangerous Decibels explains a little of how frequency and amplitude work for humans: Amplitude is measured in decibels (dBA) of sound pressure and measures how forceful the wave is. Zero dBA is the softest a human can hear; speaking voices are around 65 dBA, and a rock concert might reach about 120 dBA. Frequency, however:

> *"Is measured in the number of sound vibrations in one second. A healthy ear can hear sounds of very low frequency, 20 Hertz (Hz) or 20 cycles per second, to a very high frequency of 20,000 Hz. The lowest A key on the piano is 27 Hz. The middle C key on a piano creates a 262 Hertz tone. The highest key on the piano is 4186 Hz."*[3]

We call it ultrasound, but while electronics are designed to eliminate high-pitched sounds so humans can't hear them, your pets are literally "all ears." A dog's range of hearing is about twice as wide as that of the average human. You may have wondered without giving it much thought why your dog whimpered or ran away at seemingly odd times, and this may help explain it.

Of course, there have been some good things that have come from dogs having such sensitive ears, the most obvious one being high frequencies used as tools to keep them, and sometimes humans (think meter readers or the piano repairman), safe. Quora explains these types of sounds cut through ambient noise so they're more easily picked up by canines.

> *"Humans use high-frequency sounds to deter dogs from approaching, to distract dogs from misbehaving and to call them. Personal dog deterrents rely on blasting a loud, high-frequency sound to confuse, startle and irritate a dog.*

> *These sounds cause no permanent hearing damage and once the dog is out of range, he will settle down. In some scenarios, it's important for an owner to signal to a dog using a sound that is distinctive. Dog whistles are extremely high frequency, in some cases, they are higher than 23,000 Hz and are inaudible to human ears."*[4]

Feline Audiogenic Reflex Seizures

While it's completely different for dogs, who can hear sounds up to 45,000 Hz, cats can hear up to 64,000 Hz, a sensitivity that can even cause feline audiogenic reflex seizures. According to a study on the epileptic episodes, without treatment for the cats:

> *"Many owners reported a slow decline in their cat's health, becoming less responsive, not jumping, becoming uncoordinated or weak in the pelvic limbs and exhibiting dramatic weight loss. These signs were exclusively reported in cats experiencing seizures for (more than) [two] years, with owners stating these signs affected their cat's (quality of life)."*[5]

The study noted more than a dozen high-pitched sounds (some you wouldn't think of in those terms) commonly heard in households and associated, to lesser or greater degrees, with epileptic problems experienced by 96 cats for at least a year. Depending on circumstances, avoiding the noises eliminated seizures in 72 of the cats:

- Crinkling of tin foil, paper or plastic bags
- The sound created by a dog scratching its neck and jangling its collar
- A metal spoon dropping into a ceramic feeding bowl
- Tapping of glass, coins or keys
- Computer keyboard tapping or mouse clicking
- The clicking of an owner's tongue
- The short, sharp scream of a young child
- A mobile phone ring or digital alarm
- Running water

It's impossible to say what cats and dogs hear at any given moment, but Jeremy G. Turner, Ph.D. from the department of pharmacology at Southern Illinois University's School of Medicine conducted research[6] in 2005 on how noise affects lab animals.

One of his most troubling discoveries was that noise has the ability to disturb the **endocrine rhythm** of animals just like it can for humans, but it makes them more vulnerable to seizures. The sound "signature" of different electronic devices varies widely, but according to CNet.com, some of the worst ones are also the ones most difficult to control. Further:

> *"We recorded the sound signature of each component in our sample media room by itself: Two of the clearest ultrasound signatures came from the LED bulb in a table lamp and the 42-inch LCD TV on the wall. Turning on one component at a time shows that a PAR 30 LED lamp bulb added significantly to a room's ultrasonic signatures, but turning on the 42-inch LCD TV — even with nothing playing on it — added the most."*[7]

Flickering Lights — We Might Not See It, but Maybe They Can

As of 2014, 40% of the $26 billion market share of LED (light-emitting diodes) in the U.S. began taking over residential as well as architectural and outdoor applications, according to Zion Market Research,[8] which reports that this type of lighting is 10 times more efficient than incandescent lighting, with brightness and lifespan of the product also exceeding that of fluorescent lighting.

For pets, though, it comes at a price, because whether or not a human can see one particular flaw in this type of lighting, they come with the problem of flickering, on and off incessantly, whether they're set on dim or full brightness, like a constant disco ball that never stops, added to the high-pitched whine. If your animals could talk, they might call it a double whammy of sensory overload. Captive birds are especially sensitive to the negative emotional effects of synthetic lighting.

One expert says the flickering of LED lights is what you get with cheap parts; CNet.com notes that LED bulbs are direct current devices running on alternating current (AC) power that needs to be converted before it feeds the LEDs into the bulbs, and that's where the problem likely begins.

Something called the critical flicker fusion (CFF) threshold — the frequency a light needs to emit to be considered a steady light source — can be as low as 24 Hz or flickers per second. To the human eye, it's a "fluid" transition when watching, for instance, online video. Dogs see it differently, however, having, again, a more sensitive CFF of 80 flickers per second, or 80 Hz, which is why most dogs usually busy themselves with something else rather than plopping down in front of the TV.

The effect these types of flickering lights have on dogs and cats is, as yet, unknown, but researchers have uncovered some interesting data, especially since Richard Inger, Ph.D. from the University of Exeter says it affects other animals. A study[9] that took place at Sacramento City College in California and Southwick's Zoo in Mendon, Massachusetts, showed that the humanly indiscernible light show might incite fear in animals.

There's a rating site called LEDBenchmark.com[10] that lists ratings of the flicker of many LED lights, with lower numbers in both flicker percent and flicker index being the most desirable to minimize the problem, aside from switching to non-LED lighting. As technologies progress, there's not much likelihood that we can set aside all the "bells and whistles" that make our households run more smoothly, either now or in the foreseeable future.

But with every new innovation, new construction or refurbishment on homes and businesses, it makes sense to consider the impact certain aspects of it are having on your pets. Things you can do to reduce the electronic pollution in your home include:

- Switch devices off at the plug or actually unplug them, which also saves on phantom power draw
- Dedicate one room in your house as a "quiet room," with no electronics, wireless routers or LED lights
- Place home media equipment in a closet or garage to isolate ultrasound, as well as the whine and buzzing noises, which may be heard clearly by your pet
- Shop for LED lights with low flicker ratings or switch to other sources of lighting (including incandescent)

Sources and References

[1, 2, 7] CNET.com November 23, 2021

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[10] LED Benchmark FAQ - Flicker in LED Lighting (Archived)