

RIGHT TO QUIET SOCIETY  
for Soundscape Awareness and Protection

# NOISE LETTER

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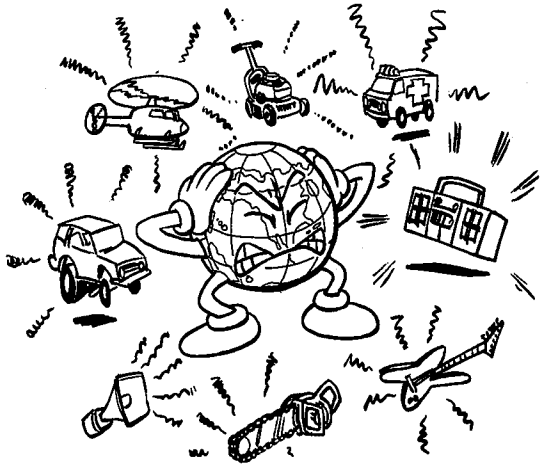
Spring 2016

## Why silence is so good for your brain

**In a loud and distracting world, finding pockets of stillness can benefit your brain and body. Here are four science-backed reasons why.**

- By Carolyn Gregoire, Senior Writer, The Huffington Post

Making time for silence can make you feel less stressed, more focussed and more creative, according to science. We live in a loud and distracting world, where silence is increasingly difficult to come by - and that may be negatively affecting our health. In fact, a 2011 World Health Organization report called noise pollution a "modern plague", concluding that, "There is overwhelming evidence that exposure to environmental noise has adverse effects on the health of the population."



### Noise hurts!

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We're constantly filling our ears with music, TV and radio news, podcasts and, of course, the multitude of sounds that we create nonstop in our own heads. Think about it: how many moments each day do you spend in total silence? The answer is probably very few. As our internal and external environments become louder and louder, more people are beginning to seek out silence, whether through a practice of sitting quietly for 10 minutes every morning or heading off to a 10-day silent retreat. Inspired to go find some peace and quiet? Here are four science-backed ways that silence is good for your brain - and how making time for it can make you feel less stressed, more focussed and more creative.

#### 1. Silence relieves stress and tension.

Florence Nightingale, the 19<sup>th</sup> century British nurse and social activist, once wrote that, "Unnecessary noise is the most cruel absence of care that can be inflicted on sick or well." Nightingale argued that needless sounds could cause distress, sleep loss and alarm for recovering patients. It turns out that noise pollution has been found to lead to high blood pressure and heart attacks, as well as impairing hearing and overall health. Loud noises raise stress levels by activating the brain's amygdala and causing the release of the stress hormone cortisol, according to research.

An unpublished 2004 paper by environmental psychologist Dr. Craig Zimring suggests that higher noise levels in neonatal intensive care units led to elevated blood pressure, increased heart rates and disrupted patient sleep patterns. Just as too much noise can cause stress and tension, research has found that silence has the opposite effect, releasing tension in the brain and body. A 2006 study published in the journal *Heart* found two minutes of silence to be more relaxing than listening to "relaxing" music, based on changes in blood pressure and blood circulation in the brain.

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### **21<sup>st</sup> ANNUAL INTERNATIONAL NOISE AWARENESS DAY - Wednesday, April 27, 2016**

On this day we urge everybody to observe **one minute of silence** at 2:15 p.m. (your local time) and listen to your surroundings, for heightened soundscape awareness! Should you wish to receive leaflets to distribute where you live, please contact us as soon as possible. Alternatively, our yellow leaflet and some other items are posted on our website to download and copy or print. Please inform us of your activities and thank you very much for your support.

## 2. Silence replenishes our mental resources.

In our everyday lives, sensory input is being thrown at us from every angle. When we can finally get away from these sonic disruptions, our brains' attention centres have the opportunity to restore themselves. The ceaseless attentional demands of modern life put a significant burden on the prefrontal cortex of the brain, which is involved in high-order thinking, decision-making and problem-solving. As a result, our attentional resources become drained. When those attention resources are depleted, we become distracted and mentally fatigued, and may struggle to focus, solve problems and come up with new ideas. But according to attention restoration theory, the brain can restore its finite cognitive resources when we're in environments with lower levels of sensory input than usual. In silence - for instance, the quiet stillness you find when walking alone in nature - the brain can let down its sensory guard, so to speak.

## 3. In silence, we can tap into the brain's default mode network.

The default mode network of the brain is activated when we engage in what scientists refer to as "self-generated cognition", such as daydreaming, meditating, fantasizing about the future or just letting our minds wander. When the brain is idle and disengaged from external stimuli, we can finally tap into our inner stream of thoughts, emotions, memories and ideas. Engaging this network helps us to make meaning out of our experiences, empathize with others, be more creative and reflect on our own mental and emotional states.

In order to do this, it's necessary to break away from the distractions that keep us lingering on the shallow surfaces of the mind. Silence is one way of getting there. Default mode activity helps us think deeply and creatively. As Herman Melville once wrote, "All profound things and emotions of things are preceded and attended by silence."

## 4. Getting quiet can regenerate brain cells.

Silence can quite literally grow the brain. A 2013 study on mice, published in the journal *Brain, Structure, and Function*, involved comparing the effects of ambient noise, white noise, pup calls and silence on the rodents' brains. Although the researchers intended to use silence as a control in the study, they found that two hours of silence daily led to the development of new cells in the hippocampus, a key brain region associated with learning, memory and emotion.

While preliminary, the findings suggested that silence could be therapeutic for conditions like depression and Alzheimer's, which are associated with decreased rates of neuron regeneration in the hippocampus.

[http://www.huffingtonpost.com/entry/silence-brain-benefits\\_us\\_56d83967e4b0000de4037004](http://www.huffingtonpost.com/entry/silence-brain-benefits_us_56d83967e4b0000de4037004)

## Tunes for the road

### **Music-making highway eyed for Port Moody, British Columbia**

- By Eric Mackenzie, 24 hours, Jan. 12, 2016

A drive into Port Moody could one day include some musical accompaniment - and motorists wouldn't even have to turn up their radios. The city's Arts and Culture committee has proposed that a section of the Barnet Highway be turned into a "musical highway" that would vibrate a song into vehicles through grooves in the pavement. "It's kind of a unique idea," Councillor Rick Glumac, committee chair, told 24hours. "We are 'The City of the Arts' in Port Moody and we're always looking for innovative and different ways to promote the arts in our community. I think it would be a great way to welcome people."

Think of how a rumble strip on a road's shoulder or a centre line vibrates noise into a car when tires pass over it - a similar approach can be used to make a highway sing. Cutting grooves into the roadway at precise widths and intervals can create the effect of a melody humming through a vehicle when travelling at the right speed. City staff have highlighted a one-kilometre section of the Barnet Highway near Reed Point Marina as the most ideal spot, since the impacts of increased traffic noise in that location would be minimal. The committee's proposal also

suggests the initiative would encourage drivers to travel at the speed limit in order to hear the song as intended.

Musical roads have been constructed in various places around the world. North America's most famous one is in Lancaster, California, originally built for a Honda commercial to play the William Tell Overture. Officials in that community have previously noted how their musical highway has brought in a greater number of tourists, since travelers make a point of driving to Lancaster to experience the road.

There's already been some discussion about which song might be most appropriate for Port Moody. "Some committee members have suggested Life Is A Highway," said Glumac, referring to the well-known Tom Cochrane tune. "I think something that people can identify as being Canadian in some way would be a good song to choose." The proposal estimates a cost of \$50,000 to \$60,000 to complete the project - approximately the amount currently sitting in Port Moody's Art Work Reserve. Port Moody council will vote at its next meeting whether to look further into the idea.

*Editor's note:* All of Barnet Highway should be paved with "whisper asphalt". Then we could possibly hear the birds sing again, instead of the tires on the pavement.

## Loud car stereos get earful from top court

- By Nick Squires, London Daily Telegraph

ROME - Blaring loud music from a car stereo is now a crime in Italy, the country's highest court has ruled. The Supreme Court in Rome upheld a judgement by a lower court against a young man in Messina, Sicily, who was stopped by police for pumping out deafening music from his vehicle. He had installed what was described as a "monster stereo", equipped with three amplifiers, one of 1,500 watts and the other two of 200 watts.

The Supreme Court ruled the loud music constituted "the disturbance of people's sleep". The court invoked Article 659 of the Italian penal code, which prohibits noise pollu-

tion that could disturb the public peace. Upholding a decision handed down by a court in Messina in 2014, it ordered the man, who has not been named, to pay a fine of 300 euros (\$450) as well as 1,000 euros (\$1,500) in legal costs. His car stereo will be confiscated.

Whether the new law will be respected in the rest of the country is a different matter. A law that bans speaking on mobile phones while driving is widely flouted. Under a new law, anyone smoking a cigarette in a car with a child or pregnant woman as a passenger can be fined up to 500 euros. Some drivers specialise in breaking both laws at once by driving, smoking and using their phones.

## Heathrow pays £1.8m for adobe huts to protect pupils' ears from aircraft noise

- By Gwyn Topham, Transport correspondent

Heathrow is to pay for building earthquake-proof shelters in local school playgrounds to protect children from the rumble of overhead aircraft noise. The £1.8m scheme follows the experience of a primary school in Hounslow that lies under one of the two main Heathrow flight paths. In April this year, it erected four of the "super-adobe" domes, originally designed for earthquake and emergency zones in Asia and Africa.

The striking white structures – made from coiled bags of earth with plaster walls – cut the noise of incoming aeroplanes by about 17 decibels. The original domes at Hounslow Heath infants school, where incoming planes pass 180 metres overhead every 90 seconds at peak times, can accommodate up to 30 young pupils. The airport is to pay 21 local schools for the cost of building the shelters to reduce noise for outdoor lessons or during break times. Heathrow said the scheme, under which each school will receive £85,000, was part of its commitment to exploring innovative solutions to reduce the impact of aircraft noise.

Kathryn Harper-Quinn, head-teacher of Hounslow Heath, said the school had been delighted with the adobe buildings and welcomed Heathrow's new scheme. Since 2005, the airport has provided some noise insulation for schools, although local councils have argued that the money has not gone far enough to provide ventilation as well as soundproofing, leaving teachers to choose between being too hot or too noisy in summer.

Matt Gorman, sustainability director at Heathrow, said: "We know that aircraft noise has an impact on local

communities. This innovative scheme has already proved a great success in providing pupils with noise respite, and we hope all 21 schools will enjoy the buildings as much as Hounslow Heath has."

The shelters were designed originally by the Iranian architect Nader Khalili as a potential low-tech, low-cost building, should man ever start building settlements on the moon. However, they were first used in large numbers for a refugee crisis after the 1990-91 Gulf war, before coming to Hounslow via other emergency zones in Africa and Asia. Julian Faulkner, who built the Hounslow Heath structures, had previously erected about 70 of the domes, which can withstand tremors of a magnitude up to 5.7, in regions of Nepal.

Aircraft noise has become an important factor in the political debate over the expansion of Heathrow: 750,000 local people are affected by the disturbance, according to European measures. The airport has set out a strategy to tackle aircraft noise, including quieter planes and operating procedures. Heathrow has also published its first league table of the noisiest airlines: Poland's LOT, Israel's El Al and Thai Airways are the worst offenders.

Plans submitted this year by Heathrow to the Davies commission, which is considering if and where airports in the south-east should be expanded, laid out options for up to three additional runways, potentially putting many new areas of west London under flight paths.

<http://www.theguardian.com/environment/2013/nov/08/heathrow-school-adobe-huts-protect-pupils-hearing>

## Horn-honking thwarts thieves

A Salmon Arm man didn't need a cellphone to call for help as he chased robbers from his home when a lower-tech method proved just as effective, and a lot noisier. Mounties say the man jumped in his car after midnight as he saw thieves drive off with an all-terrain vehicle from his yard. As he tailed a pickup truck and a trailer carrying his ATV, Staff Sgt. Scott West says the man repeatedly honked his horn,

hoping to wake neighbours who might call police. Officers arrived and traced the noisy victim who pointed out the suspect truck and its ill-gotten ATV, embedded in a snow bank after the rattled thieves lost control, crashed and ran off. Mounties had no trouble tracking and arresting them.

- The Vancouver Sun, Jan. 27, 2016

## Music in the brain

### **For the first time, scientists identify a neural population highly selective for music.**

- By Anne Trafton, MIT News Office

Scientists have long wondered if the human brain contains neural mechanisms specific to music perception. Now, for the first time, Massachusetts Institute of Technology (MIT) neuroscientists have identified a neural population in the human auditory cortex that responds selectively to sounds that people typically categorize as music, but not to speech or other environmental sounds. "It has been the subject of widespread speculation," says Josh McDermott, the Frederick A. and Carole J. Middleton Assistant Professor of Neuroscience in the Department of Brain and Cognitive Sciences at MIT. "One of the core debates surrounding music is to what extent it has dedicated mechanisms in the brain and to what extent it piggybacks off of mechanisms that primarily serve other functions."

The finding was enabled by a new method designed to identify neural populations from functional magnetic resonance imaging (fMRI) data. Using this method, the researchers identified six neural populations with different functions, including the music-selective population and another set of neurons that responds selectively to speech. "The music result is notable because people had not been able to clearly see highly selective responses to music before," says Sam Norman-Haignere, a postdoc at MIT's McGovern Institute for Brain Research.

"Our findings are hard to reconcile with the idea that music piggybacks entirely on neural machinery that is optimized for other functions, because the neural responses we see are highly specific to music," says Nancy Kanwisher, the Walter A. Rosenblith Professor of Cognitive Neuroscience at MIT and a member of MIT's McGovern Institute for Brain Research. Norman-Haignere is the lead author of a paper describing the findings in the Dec. 16 online edition of *Neuron*. McDermott and Kanwisher are the paper's senior authors.

#### Mapping responses to sound

For this study, the researchers scanned the brains of 10 human subjects listening to 165 natural sounds, including different types of speech and music, as well as everyday sounds such as footsteps, a car engine starting, and a telephone ringing. The brain's auditory system has proven difficult to map, in part because of the coarse spatial resolution of fMRI, which measures blood flow as an index of neural activity. In fMRI, "voxels" — the smallest unit of measurement — reflect the response of hundreds of thousands or millions of neurons. "As a result, when you measure raw voxel responses you're measuring something that reflects a mixture of underlying neural responses," Norman-Haignere says.

To tease apart these responses, the researchers used a

technique that models each voxel as a mixture of multiple underlying neural responses. Using this method, they identified six neural populations, each with a unique response pattern to the sounds in the experiment, that best explained the data. "What we found is we could explain a lot of the response variation across tens of thousands of voxels with just six response patterns," Norman-Haignere says. One population responded most to music, another to speech, and the other four to different acoustic properties such as pitch and frequency.

The key to this advance is the researchers' new approach to analyzing fMRI data, says Josef Rauschecker, a professor of physiology and biophysics at Georgetown University. "The whole field is interested in finding specialized areas like those that have been found in the visual cortex, but the problem is the voxel is just not small enough. You have hundreds of thousands of neurons in a voxel, and how do you separate the information they're encoding? This is a study of the highest caliber of data analysis," says Rauschecker, who was not part of the research team.

#### Layers of sound processing

The four acoustically responsive neural populations overlap with regions of "primary" auditory cortex, which performs the first stage of cortical processing of sound. Speech and music-selective neural populations lie beyond this primary region. "We think this provides evidence that there's a hierarchy of processing where there are responses to relatively simple acoustic dimensions in this primary auditory area. That's followed by a second stage of processing that represents more abstract properties of sound related to speech and music," Norman-Haignere says.

The researchers believe there may be other brain regions involved in processing music, including its emotional components. "It's inappropriate at this point to conclude that this is the seat of music in the brain," McDermott says. "This is where you see most of the responses within the auditory cortex, but there's a lot of the brain that we didn't even look at."

Kanwisher also notes that "the existence of music-selective responses in the brain does not imply that the responses reflect an innate brain system. An important question for the future will be how this system arises in development: how early it is found in infancy or childhood, and how dependent it is on experience?" The researchers are now investigating whether the music-selective population identified in this study contains sub-populations of neurons that respond to different aspects of music, including rhythm, melody, and beat. They also hope to study how musical experience and training might affect this neural population.

<http://news.mit.edu/2015/neural-population-music-brain-1216>

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**Noisy beaches in Israel:** A reliable ear-witness reported that while visiting Israel in 2010 there was amplified music played during most of the day on the beaches of Tel Aviv, quite possibly also in Eilat at the Red Sea.

## Do quiet areas afford greater health-related quality of life than noisy areas?

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Abstract:

People typically choose to live in quiet areas in order to safeguard their health and wellbeing. However, the benefits of living in quiet areas are relatively understudied

compared to the burdens associated with living in noisy areas. Additionally, research is increasingly focussing on the relationship between the human response to noise and measures of health and wellbeing, complementing traditional dose-response approaches, and further elucidating the impact of noise and health by incorporating human factors as mediators and moderators. To further explore the benefits of living in quiet areas, we compared the results of health-related quality of life (HRQOL) questionnaire datasets collected from households in localities differentiated by their soundscapes and population density: noisy city, quiet city, quiet rural, and noisy rural. The dose-response relationships between noise annoyance and HRQOL measures indicated an inverse relationship between the two. Additionally, quiet areas were found to have higher mean HRQOL domain scores than noisy areas. This research further supports the protection of quiet locales and ongoing noise abatement in noisy areas.

<http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3709317/>

## Film fan wants ban on eating popcorn in cinemas

- By Charlotte Court

A film fan wants to BAN the sale of popcorn in cinemas because he claims the noise of it being eaten is ruining movies. Mike Shotton first became frustrated with the rustling and chewing when he watched Robin Hood Prince Of Thieves back in the 1990s. But it was a trip to see the much-anticipated new Star Wars film that tipped the 39-year-old over the edge. He is now calling on cinema chains and even the Government to bring in a blanket ban on popcorn at the movies.

Mike, a self-employed author, said: "The noise is something that's always bothered me, ever since I was a little kid. "I'm the kind of person that if I hear something in the background, I focus on it until that's all I can hear. But it was the popcorn noise ruining Star Wars that really did it for me. I was really looking forward to that film. I knew there would be a lot of kids there but I also thought it would be full of true fans wanting to watch the movie in peace. I couldn't believe the amount of noise during the film - it completely ruined it for me."

Mike's argument to ban popcorn has been met with agreement from some - gaining 106 signatures since its set up - but he's also encountered resistance. A counter petition was set up calling on people to "stop Mike Shotton and others from trying to get popcorn banned". That petition explained that "popcorn is an essential part of the cinema experience" and described Mike and others like him as "killjoys".

However, Mike, from Newcastle, faced his foe head on and challenged the counter petition organiser to a signature duel - an unofficial agreement, which means the petition with the least signatures by a certain date must

cease and desist with all publicity. Fortunately for Mike, he emerged victorious. He said: "When I saw the counter petition, I contacted its organiser and we both agreed to share both petitions to see who could get the most signatures by last Monday. "Whichever one got the least signatures would have to stop publicising their petition. In the end I had 106 and my adversary had 92."

So Mike's petition remains and he now plans to start a hard campaign calling for a UK-wide ban of popcorn in all cinemas. His petition explains the reasons for his desire to ban the popular product, citing that despite cinema chains bombarding theatre goers with reminders to be quiet, they then "sell the loudest food known to man". Mike said: "It's like letting off bangers in a library. It makes no sense." His petition also claims that the "bucket of cooked grain" stinks. He said: "Next time you're around some, give it a sniff, you'll be stunned. "In brief, it's loud, it smells, it tastes of nothing and shares a consistency with weakened polystyrene."

Now that the path has been cleared for him to publicise his petition as much as he wants, Mike is planning to take it to the next level. He said: "My main point is about the noise it causes. I'm looking for a ruling to say it is a noise pollution problem. "My next plan is to start a further petition which, if it gathers enough signatures, will mean it has to be debated by the Government in the Houses of Parliament. I'm also planning to campaign outside cinemas and give people leaflets explaining the petition and trying to encourage them not to buy popcorn when they go into the cinema."

<http://www.mirror.co.uk/news/weird-news/you-wont-able-eat-popcorn-7179205>

## The deepest, darkest place on earth is eerily noisy

- By Nathaniel Scharping

If you're looking for some peace and quiet, you certainly won't find it at the bottom of the ocean. Scientists from the NOAA have released audio recordings taken from the Mariana Trench, the deepest part of the ocean. Even here, sounds from humans, animals and even the earth itself eerily echo in the dark.

Researchers sunk a specialized probe, called a hydrophone, almost 36,000 feet into the Challenger Deep at the Mariana Trench in an effort to establish a baseline for oceanic noise. They were expecting to capture nothing more than a vast, echoing silence, given the extreme remoteness of their testing site. Instead, over the course of 23 days, they were able to capture whale calls, ship propellers, earthquakes, and even the sound of a Category 4 typhoon passing by overhead. In the recording below, you can hear a baleen whale calling, followed by a magnitude 5 earthquake that occurred July 16, 2015.

Sound goes on and on

Sound waves travel around five times faster through water than through the air, and have to deal with fewer disturbances and obstacles. For this reason, sounds underwater can travel much further than sounds up above.

Whales are known to communicate over long distances using low-pitched grunts and moans, and they could likely be heard up to 1,000 miles away before the days of ship traffic and noise pollution in the oceans.

The prevalence of noise pollution today is one of the main reasons the NOAA scientists are conducting the study. The increasing din of human activity in the ocean, caused by ship propellers and sonar, has been linked to disruptions in whale and other marine wildlife behaviour. The researchers want to establish a baseline of sound in the ocean today in order to measure changes in the future. At the bottom of the Mariana Trench, researchers set up their hydrophone as far away from any disturbances as possible.

The researchers had to create a special probe capable of withstanding the crushing pressure seven miles below the surface. They then had to lower the titanium-covered ceramic probe with extreme caution, at a sedate 16 feet per second, to allow it to acclimatize to the harsh conditions. The researchers plan to return in 2017 to make more measurements and see if noise levels have increased.

[http://blogs.discovermagazine.com/d-brief/2016/03/04/mariana-trench-sound-ocean/#.Vtr\\_wdlrK9I](http://blogs.discovermagazine.com/d-brief/2016/03/04/mariana-trench-sound-ocean/#.Vtr_wdlrK9I)

## The sounds of eating may reduce how much you eat

Summary:

New doctor's orders: no earbuds, no music, and no watching TV while eating. Researchers have found that the noise your food makes while you're eating can have a significant effect on how much food you eat. Researchers at Brigham Young University (BYU) and Colorado State University (CSU) have found that the noise your food makes while you're eating can have a significant effect on how much food you eat.

The "Crunch Effect," as they call it, suggests you're likely to eat less if you're more conscious of the sound your food makes while you're eating. Therefore, watching loud TV or listening to loud music while eating can mask eating sounds that keep you in check. "For the most part, consumers and researchers have overlooked food sound as an important sensory cue in the eating experience," said study coauthor Gina Mohr, an assistant professor of marketing at CSU.

"Sound is typically labelled as the forgotten food sense," adds Ryan Elder, assistant professor of marketing at BYU's Marriott School of Management. "But if people are more focussed on the sound the food makes, it could reduce consumption." To be clear, the researchers are not talking about the sizzle of bacon, the crack of crème brûlée or popcorn popping. The effect comes from the sound of mastication: chewing, chomping, crunching.

Elder and Mohr carried out three separate experiments on the effect of that "food sound salience" and found,

even suggesting people think of eating-sounds (through an advertisement) can decrease consumption. The most fascinating experiment discovered people eat less when the sound of the food is more intense. In that study, participants wore headphones playing either loud or quiet noise while they ate snacks. Researchers found the louder noise masked the sound of chewing and subjects in that group ate more - 4 pretzels compared to 2.75 pretzels for the "quiet" group.

"When you mask the sound of consumption, like when you watch TV while eating, you take away one of those senses and it may cause you to eat more than you would normally," Elder said. "The effects may not seem huge - one less pretzel - but over the course of a week, month, or year, it could really add up." Elder and Mohr said the main takeaway for people should be the idea of mindfulness. In other words, being more mindful of not just the taste and physical appearance of food, but also of the sound it makes, can help in "nudging" consumers to eat less. So next time you eat, pull out your earbuds and tune into the sweet sounds of your food.

Journal Reference:

1. Ryan S. Elder, Gina S. Mohr. The crunch effect: Food sound salience as a consumption monitoring cue. *Food Quality and Preference*, 2016; 51: 39 DOI: 10.1016/j.foodqual.2016.02.015  
[www.sciencedaily.com/releases/2016/03/160315131902.htm](http://www.sciencedaily.com/releases/2016/03/160315131902.htm)