

TEXTO 1

ULTRASONIC WAVES ARE EVERYWHERE. CAN YOU HEAR THEM?

There are horrible sounds all around us only a small group of people can hear. **They** almost always come from machines — sometimes intentionally, and sometimes by accident. **They**'re loud enough to be annoying and cause headaches in people sensitive to them, though it seems **they** aren't usually loud enough to cause permanent health issues. And scientists have no firm idea of how common these sounds are or how much damage, if any, **they**'re doing to society.

That's the upshot of more than a decade of research by Timothy Leighton, a professor of acoustics at the University of Southampton in England, into a class of sounds called "ultrasonics" or "ultrasound." He spoke about his work at the 175th meeting of the Acoustical Society of America (ASA) on May 9.

Ultrasonics are not well-defined, Leighton said in an interview with Live Science before his talk. In theory, he said, they're sounds that are too high-pitched for people to hear. But in practice, they're sounds that are right on the edge of hearing for infants, young people, some adult women and other groups with particularly acute hearing. And for those people, ultrasonics represent a growing problem that is not well studied or well understood, Leighton said.

"A number of people were coming to me, and they were saying, 'I feel ill in certain buildings,'" Leighton told Live Science. "No one else can hear it, and I've been to my doctor, and I've been to have my hearing checked. And everybody says it's in my mind; I'm making it up." Part of the problem, according to Leighton, is that very few researchers are studying this issue. "I think you'd be lucky to find even six people around the world working on this," Leighton said. "And that's, I think, why many sufferers ended up at my door."

That isn't to say that Leighton's work is outside the scientific mainstream; he was one of two co-chairs of an invited session on high-frequency sound at the ASA meeting and has received The Royal Society's Clifford Paterson Medal for separate research into underwater acoustics. But most acoustical researchers just aren't studying high-frequency sound in human spaces; when Live Science reached out to a number of acoustics experts outside Leighton's immediate circle of colleagues for comment on this article, the vast majority said they didn't have the knowledge to comment.

Leighton started his early work on ultrasonic waves by going to buildings where people reported having symptoms. **While** he couldn't hear the sounds, he recorded them using his microphones and consistently found ultrasonic frequencies. "These are places where you might have a footfall of 3 or 4 million people a year," he said. "So it dawned on me that we were putting ultrasound into public places where a minority but a large number of people are going to be affected."

And the effects aren't trivial. "If you're in the zone of an ultrasonic sound and you're one of the sensitive people, you'll get headaches, nausea, tinnitus and various other symptoms," Leighton said. "And once exposure stops, you recover. After about an hour, you get better."

The illness in response to ultrasonic exposure might sound spooky to the point of superstition or quack theory, and researchers don't understand quite why it happens. But it's backed up by decades' worth of consistent experiments by a number of different researchers.

Still, Leighton is one of a handful of experts on the subject, and he has no idea how many people are impacted by ultrasonics or how severe the effects are on a population scale.

The most famous supposedly ultrasonic event occurred when American diplomats in Cuba suffered a strange constellation of symptoms that officials initially attributed to some sort of ultrasonic weapon. And although the claim hasn't held up under scrutiny, that was perhaps not entirely nutty; the most severe symptoms of ultrasonic-wave exposure do include headaches, tinnitus and hearing loss similar to what the U.S. diplomats encountered in Cuba. Leighton, like most scientists, is skeptical that ultrasonic weapons were actually involved in that event.

FONTE: Adaptado de: R. Letzter. **Ultrasonic Waves are Everywhere. Can you hear them?** Disponível em: <https://www.livescience.com/62533-ultrasonic-ultrasound-health-hearing-tinnitus.html/>. Acesso em: 14 Ago. 2018.

TEXTO 2

THE DECLINE OF CHEMISTRY IN AUSTRALIAN UNIVERSITIES

Within the Australian tertiary sector, the number of university students studying chemistry has fallen over the last ten years. Student load data, in the form of equivalent full time student units (EFTSU), measuring the **change** in enrolments in chemistry courses over 15 years reveals a decline in chemistry student numbers from 2.3% of the total student population in 1989 down to 1.7% in 2003.

Within the cohort of science students the numbers of those studying chemistry has also fallen as a percentage of the whole. The number of students **undertaking** chemical sciences is now less than 20% of all science students. The EFTSU for chemistry has also decreased in whole numbers, in 2003 the EFTSU for chemistry was 6,885 down from a high of 8,633 in 1995. A continued decline in the number of students undertaking chemistry will have an effect on the number of students graduating in chemistry. As chemistry underpins many of the new and **emerging** sciences, a decline in the number of people exposed to chemistry will also affect the ability of people to participate in these new areas.

The declining number of chemistry students has caused much **change** in the way that chemistry is delivered in our universities. In Australia, there are 44 self-accrediting higher education institutions, of

which 33 have courses accredited by the Royal Australian Chemical Institute (RACI). Of this latter group only one third now has a discrete Department or School of Chemistry. The **remainder** deliver chemistry through multidisciplinary faculties comprised of schools of science, engineering, medicine etc.

Heads of Chemistry Departments/Sections throughout Australia were sent a questionnaire as part of this study. The RACI received 20 responses, although not every question was answered by each respondent. The majority of Chemistry Heads (n=17/19) indicated that their chemistry courses had recently undergone significant and in some cases innovative **changes** in response to a range of internal and external factors. Generally they believed that these **changes** had been beneficial and would continue. **Changes** include introduction of new and diversified subject areas to appeal to students, more service teaching and the introduction of specialist degrees to enable more vocational outcomes.

The opinion of university students of chemistry was gathered through a survey of all university chemistry departments. The questionnaire contained a number of sections, including issues affecting student engagement, future career aspirations and expectations of the workforce. In relation to the non-academic aspects of their studies, 10 per cent or less of the 1,196 responding students stated that lack of future career prospects, outside work commitments, personal issues, or current financial constraints would affect their ability to continue their chemistry studies. A larger proportion (27.6%) of students suggested that they were only studying chemistry because it was required of them. However, some students within the focus groups suggested that although they were required to undertake chemistry at first year level, they really enjoyed it due to the engaging nature of their first year lecturers. With regard to lecturers, 80% of responding student agreed with the statement 'Having an approachable lecturer is important to me'. This result emphasises the importance of building relationships with students particularly in the early years of their degree, as this may be the time that they make decisions about future areas of study.

If the decline in chemistry student numbers is to be stemmed then students need to understand the career pathways for chemists as well as being supported through their studies by highly qualified staff. They also need access to quality materials, equipment and physical facilities that will allow them to become highly skilled graduates. The state of chemistry laboratories is deemed by some of the respondents as being quite poor, with first year laboratories often being most in need of upgrading. It is not only the state of the laboratories, but also, in some cases lack available funding in order to purchase state of the art equipment, which hampers the ability of universities to train students to the highest possible level.

FONTE: Adaptado de: The Royal Australian Chemical Institute. **The Future of Chemistry Study: Supply and Demand of Chemists.** Disponível em: <https://www.raci.org.au/document/item/1786>. Acesso em: 14 Ago. 2018.

QUESTÕES

As questões de 1 a 5 referem-se ao TEXTO 1:

1) Analise as afirmativas abaixo e assinale a seguir.

I. As quatro ocorrências de *they*, destacadas no 1º parágrafo, referem-se a *sounds*.

II. *While*, destacado no 6º parágrafo, pode ser substituído por *unless*, sem prejuízo de significado ao parágrafo.

III. *Still*, destacado no 9º parágrafo, pode ser substituído por *whereas*, sem prejuízo de significado ao parágrafo.

(A) Apenas I está correta.

(B) Apenas II está correta.

(C) I e III estão corretas.

(D) II e III estão corretas.

2) De acordo com o pesquisador, por que é difícil precisar a definição do ultrassom?

3) Em relação ao trabalho de Timothy Leighton, muitos pesquisadores

(A) dizem não haver relevância no que por ele é proposto.

(B) não se interessam em comparecer às palestras proferidas por ele.

(C) questionam o investimento de recursos nesse tipo de trabalho.

(D) relatam não ter conhecimento suficiente sobre o assunto.

4) Segundo as informações constantes no texto, pessoas sensíveis ao ultrassom NÃO apresentam

(A) desmemoriamiento.

(B) enjoo.

(C) perda auditiva.

(D) zumbido.

5) Por que o ocorrido com os diplomatas americanos em Cuba foi associado ao ultrassom?

As questões de 6 a 10 referem-se ao TEXTO 2:

6) O que poderá ocorrer como consequência da redução contínua do número de estudantes de Química nas instituições de ensino superior australianas?

7) As mudanças ocorridas nos cursos de Química na Austrália

- (A) aconteceram em decorrência da pressão de órgãos governamentais.
- (B) envolveram a contratação de novos especialistas na área.
- (C) foram consideradas benéficas por chefes de departamento.
- (D) não despertaram o interesse da maioria dos estudantes.

8) A pesquisa realizada junto aos estudantes de Química ressaltou a importância de/da

- (A) aulas de reforço.
- (B) influência dos pais.
- (C) professores acessíveis.
- (D) remuneração futura.

9) De acordo com o 6º parágrafo, quais ações são necessárias para que o número de estudantes de Química pare de cair?

10) Analise as afirmativas abaixo e assinale a seguir.

- I. *undertaking* e *emerging*, destacados no 2º parágrafo, podem, ambos, ser substituídos por *studying*, sem prejuízo de significado ao parágrafo.
- II. *remainder*, destacado no 3º parágrafo, refere-se a universidades.
- III. As duas ocorrências de *change* e as três de *changes*, destacadas ao longo do texto, podem ser substituídas, respectivamente, por *alteration* e *alterations*, sem prejuízo de significado.

- (A) Todas estão corretas.
- (B) Apenas I e II estão corretas.
- (C) Apenas I e III estão corretas.
- (D) Apenas II e III estão corretas.

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