

Stacy
Eltiti

Do mobile phone signals harm our health?

A small number of people believe that their health is affected by the radiation emitted by mobile phones and their base stations. As yet, there is no scientific evidence that their symptoms are actually caused by exposure to radiation. Dr Stacy Eltiti describes a study she and her colleagues at the University of Essex carried out to see if these sensitive individuals would report symptoms when exposed to typical mobile phone base station signals.

The problem

Some people report symptoms such as headaches, memory difficulties, and cold and flu-like symptoms which they believe are caused by exposure to mobile phone radiation. We refer to these people as *sensitive individuals*. Mobile phones use radio waves, a form of electromagnetic radiation, to communicate with the nearest base station – see Box 1. If sensitive individuals are truly affected by the radiation, it is because the radiation produces a varying electromagnetic field which interacts in some way with them.

The World Health Organisation has labelled this condition Idiopathic Environmental Intolerance with attribution to Electromagnetic Fields (IEI-EMF). *Idiopathic* describes a disease with no known cause.

Box 1

Mobile phone radiation

A mobile phone system uses radio waves to carry signals between the handset and the base station.



Jason Stitt/Bigstockphoto

The radiation is most intense close to the mobile phone's aerial, and to the base station. It gets weaker as it spreads out, but the intensity also depends on how the signal is affected by objects in the environment.

The radiation from your mobile phone is strongest when you are making a call, and when you are at a distance from the nearest base station.

Free Articles, 24 May 2007

Wi-Fi Fears Are "Unfounded"

Scientists have said that fears about the safety of wi-fi are unfounded. Evidence points to wi-fi transmissions being well below any likely threshold for human effects.

ITBusiness, 23 Jan 2006

University bans Wi-Fi

A Canadian university has ruled against Wi-Fi on the campus because administrators are worried about possible hazards to student health.

New Zealand Herald, 23 April 2007

Concern about Wi-Fi health danger spreads to NZ from British schools

A British furore over wireless internet technology - Wi-Fi - use in schools is raising similar concerns here.

Wi-Fi continues to be controversial.

The research design

We wanted to know whether sensitive individuals could tell when they were exposed to mobile phone radiation, and also whether they would report poorer levels of well-being. This required a carefully-designed experiment.

We invited two groups of people, sensitive individuals and control individuals (who did not report symptoms) to the University of Essex for four separate sessions. It was essential to have control individuals with which to compare the sensitive individuals, to see if they really did respond differently.

numbers of participants		
	sensitive	control
open provocation test	56	120
double blind test	44	114

One at a time, they sat in our specially constructed laboratory which is surrounded by metal which screens any electromagnetic radiation coming from outside. Inside the lab, we can expose people to two types of mobile phone base station radiation (see Box 1):

- GSM (global system for mobile communication) used by second generation mobile phones;
- UMTS (universal mobile telecommunication system), used by the new third generation mobile phones.

While in the lab, individuals could watch a Blue Planet video. We could also give them simple tasks, such as mental arithmetic, and tests of memory and concentration. They reported their level of well-being together with any symptoms they experienced, such as anxiety, tension, arousal (agitation), relaxation, discomfort and fatigue. At the same time, physiological measurements were taken continuously: blood volume pulse, heart rate and skin conductance.



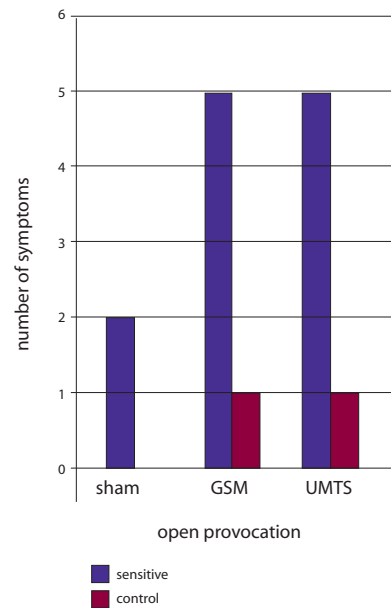
S.Eitrit

A participant in the test; sensors on her fingers record her heart rate etc, and she is recording her own sensations.

Session 1: Open provocation test

Session 1 was different from the other three. It was designed to gain background information against which to compare the later tests.

In this test, both the participants and the experimenters knew when the base station was on or off, and when it was on they knew whether it was emitting GSM or UMTS signals. A test of this sort is called an *open provocation test*; it is open because everyone knows the conditions. In this test, each exposure lasted 15 minutes.



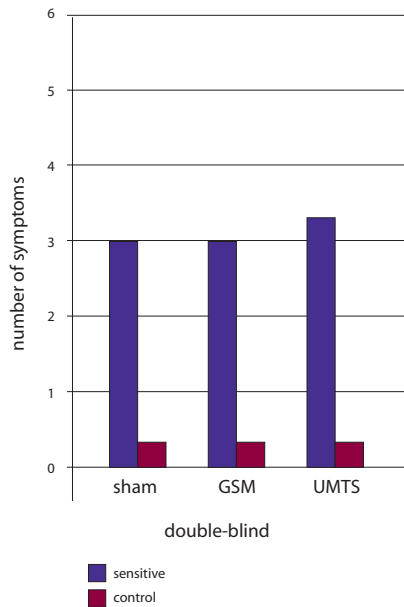
Graph 1: Results of the open provocation test.

Findings: The histogram, Graph 1, shows the results of the open provocation test. 'Sham' indicates when the base station was switched off. You can see that sensitive individuals reported more symptoms and poorer levels of well-being when they knew the radiation source was switched on. Control individuals declared far fewer symptoms – none at all when the source was switched off.

But does this mean that the sensitive individuals really were affected by the radiation? That was the question we set out to answer in the next test.

Sessions 2-4: Double blind test

The participants returned on three more occasions. Each session lasted 50 minutes. During one session, they were exposed to GSM radiation, during another to UMTS radiation, and during a third to no radiation. The order varied, and neither the participant nor the experimenter knew whether the radiation was on or off. A test like this is described as **double blind**. It was important that the experimenter did not know, because they might have given unintentional indications to the participant. As before, the participant sat in the screened laboratory, watching a video, performing simple tests and recording their symptoms.



Graph 2: Results of the double blind test.

Findings: Graph 2 shows the results. Although sensitive individuals still reported more symptoms than the control individuals, they reported the same level of health whether the radiation was on or off. The only difference was slightly raised levels of arousal during the UMTS compared to the sham condition. For control individuals, there was no difference in self-reported health when the radiation was on compared to off.

Mobile phone frequencies:
850, 900, 1800,
1900 MHz

Bluetooth: 2400 MHz

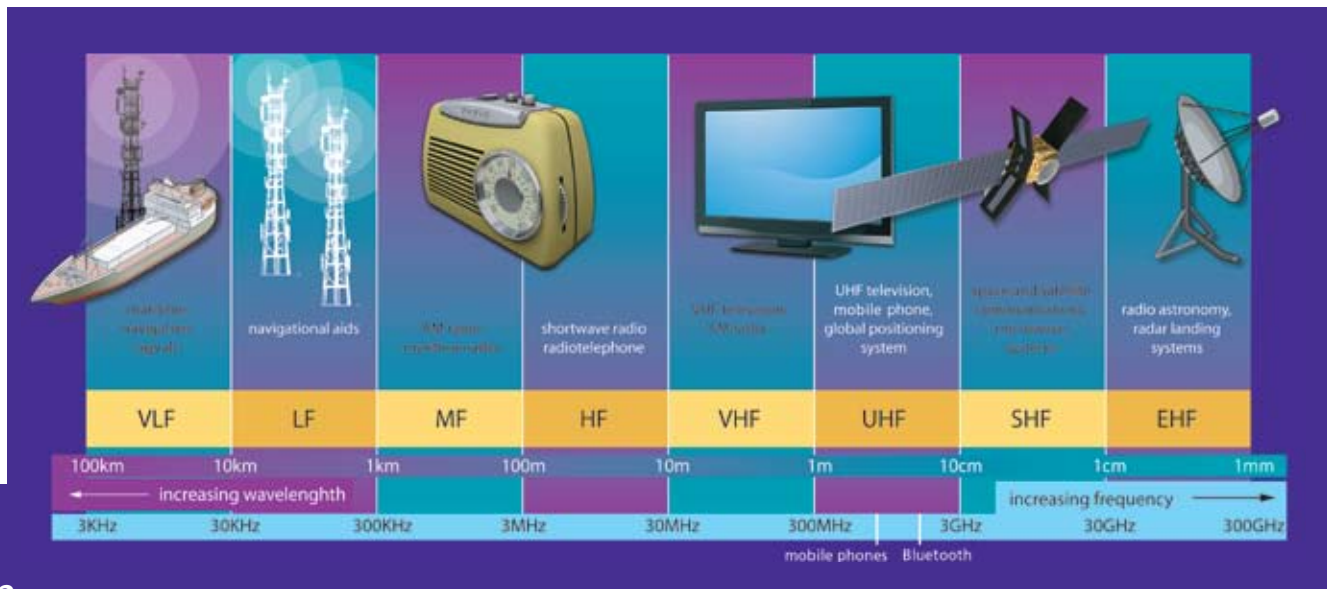
A third test

During their first visit to our lab, we conducted a quick test in which the participants were exposed to radiation three times for five minutes; at the end of each five minutes, they said whether they thought the radiation was on or off. This was another double blind test; neither the participant nor the experimenter knew whether the radiation was on or off. Participants were also asked to make a judgement as to whether the base station was on or off at the end of sessions 2, 3 and 4. We found that neither the sensitive nor the control participants were any better than chance at detecting when the base station was switched on.

Conclusions

Our study indicates that short-term exposure to mobile phone base station radiation does not affect the health and well-being of sensitive or control individuals. It is important to recognise the limitations of this study. Since we tested only short-term exposure to electromagnetic fields, we are unable to draw any conclusion about long-term health effects. Nor can we say whether people may be affected by other types of electromagnetic radiation – see Box 2.

Dr Stacy Eltiti was a research officer in the Department of Psychology at the University of Essex. She is now an Assistant Professor in Rosemead School of Psychology at Biola University, California.



Box 2 Radiation around us

There are many types of electromagnetic radiation to which we are exposed each day. Some of these come from technology. For example, radio waves used for broadcasting radio and TV programmes are all around us, and have been for decades. No-one has yet identified any health problems arising from this exposure. More recent developments include mobile phone signals, wi-fi (wireless broadband etc.), and Bluetooth. Each uses a different part of the electromagnetic spectrum.

Look here!

You can download the published report of Stacy Eltiti's work at www.ehponline.org/docs/2007/10286/10286.pdf

For more about mobile phones and how they work, see the article in Catalyst Vol 16 issue 1, available in our archive: www.sep.org.uk/catalyst