

Electrosensitivity: A Case for Caution with Precaution

G James Rubin
(g.rubin@iop.kcl.ac.uk)

King's College London, Institute of Psychiatry

What is Electrosensitivity?

Electrosensitivity is a medically unexplained condition in which sufferers report experiencing adverse symptoms such as headaches, nausea or fatigue which are seemingly triggered by the presence of weak electromagnetic fields (EMF) such as those produced by mobile phones, computers or domestic appliances. The condition is controversial as there is no generally accepted mechanism to explain how these fields could cause short-term symptoms.

The condition is also remarkably diverse. Numerous surveys have asked electrosensitivity sufferers to describe their illness (e.g.¹⁻⁴). These have consistently shown that there is no one discrete cluster of symptoms that typifies it. Instead, regardless of what symptom is asked about, electrosensitivity sufferers as a group tend to experience more of it than people without the condition^{1-3;5}. A wide diversity also exists in the types of electrical devices that are reported as triggering these symptoms. While more commonly reported triggers include mobile phones, mobile phone base stations and powerlines², not everyone is affected by the same thing and a wide range of different triggers have been reported². The speed with which symptoms come and go also differs dramatically between sufferers: while most say that they experience symptoms within only a few minutes of exposure, a minority report that it can take days before symptoms start to appear².

What Can Provocation Studies Tell Us?

The wide diversity in symptoms, triggers and symptom latencies makes electrosensitivity difficult to study. However, a large body of research has now been done, with a particular emphasis on “provocation studies.” These are designed to test the basic theory underlying electrosensitivity: that it is exposure to EMF that causes sufferers to feel ill. In a 2005 review paper, my colleagues and I discussed 31 previous provocation studies, all of which followed the same basic pattern⁶. Individuals who reported having electrosensitivity were typically exposed to two conditions, one involving genuine EMF and another consisting of a sham condition in which no EMF was present. In every study, the participant's task was to say how severe their symptoms were after each condition or whether they could tell which condition was which. These studies were all either single- or double-blind. Of the 31 studies we reviewed, only seven found any indication that EMF had an effect on the volunteers. Of these seven, two subsequently could not be replicated even by the original research teams, three appeared to have errors in the way they had analysed their data, and the final two gave conflicting results. Since we conducted our review, at least ten more provocation studies have been published, taking the number of electrosensitive volunteers who have been tested in this way to over a thousand. These more recent additions have supported the general conclusion of our review paper: that overall, people with electrosensitivity do not seem to react to EMF any more than they react to a sham condition.

Inevitably, there has been some debate as to the merits of this type of research. For example, some have suggested that because people with electrosensitivity will naturally be anxious when placed in a laboratory test involving exposure to EMF, they will therefore experience symptoms of anxiety in both the real and sham conditions, making the test results difficult to interpret. Yet because any anxiety-related effects will occur in both conditions, if the presence of EMF has any effect then it should still be detected over and above this. Others have suggested that because people with severe forms of electrosensitivity are often unwilling to take part in these studies, it is unfair to assume that the “less sensitive” volunteers who do take part will be able to detect a difference between the experimental conditions. Again, this argument is flawed. Although it is true that many severely

affected sufferers do not want to take part in these studies, those people who do take part typically report getting clear-cut symptoms when exposed to, say, mobile phone signals in their everyday life. There is no reason why their sensitivity should be impossible to detect under double-blind conditions.

This does not mean that provocation studies are perfect, however. Two problems in particular stand out. First, although provocation studies are good at telling us about the possible causes of short-term symptoms, what about the minority of sufferers who say that their symptoms take days to develop? Experimental studies are not ideally suited for that group. Second, what if most people who say that they have electrosensitivity are mistaken, with only a small minority being genuinely sensitive? In that case, studies which test the overall effects of EMF on a group of volunteers who report electrosensitivity may be less effective than studies which repeatedly test single volunteers. To date, most provocation studies have taken the former approach, although some have taken the individual testing route without so far producing any conclusive evidence of electrosensitivity⁶.

Is There a Psychological Explanation?

If the overall results of more than 40 experiments suggest that it is not EMF that is responsible for causing the symptoms of electrosensitivity, could another mechanism provide a better explanation? A psychological process referred to as classical conditioning may provide part of the answer. According to this theory, electrosensitivity may begin when an individual, for whatever reason, experiences a negative symptom while also using a mobile phone (or any other electrical device). There is good evidence that if individuals are pre-warned that a substance may be hazardous to health, and then coincidentally experience symptoms at the same time as being in the vicinity of that substance, they often mistakenly associate the presence of the symptom with the presence of the substance⁷. So in the case of electrosensitivity, given the constant media reporting of the health issues surrounding mobile phones and the advice from the UK Department of Health that we should be cautious about using our mobiles, it becomes perfectly rationale for someone to believe that a headache experienced after making a mobile phone call might be related to the mobile itself, rather than to stress, poor sleep, a minor illness or any of the other multitude of things that can cause headaches. Once this initial tentative attribution has been made, the next time a mobile needs to be used the person will be slightly more anxious about using it and may expect another headache to occur. Much evidence from the psychological literature suggests that both of these factors can create a self-fulfilling prophecy, generating a “nocebo” effect in which psychological processes trigger genuine physical symptoms⁸. Should this occur and a nocebo headache develops, it is likely that this will reinforce the person’s belief that it is the mobile phone which is causing the headache. A vicious circle of anxiety, expectations and symptoms can then develop, eventually leading to a belief that one is sensitive to mobile phones and perhaps to other electrical devices as well. This phenomenon has been demonstrated several times before, both in the laboratory, where healthy volunteers can be ‘conditioned’ into developing symptoms when exposed to a harmless chemical smell⁹ and in the real world, for example where cancer patients come to experience nausea when exposed to harmless stimuli that they associate with chemotherapy sessions¹⁰.

In the case of electrosensitivity, evidence that psychological processes may underlie the condition can be found in several places. For a start it can be found in the provocation studies themselves. These consistently show that the type of physical symptoms that people with electrosensitivity experience can be triggered just as readily by a sham exposure as by an EMF exposure^{6,11-13}, suggesting that the nocebo effect is a sufficient explanation for the real-world symptoms experienced by people with electrosensitivity. Evidence can also be found in experiments with healthy volunteers which show that exposure to fake electrical currents or fields can trigger headaches¹⁴ and in studies in the community which show that worry about ‘electrosmog’ has a good correlation with the presence of symptoms, even though adequately measured exposure to ‘electrosmog’ does not¹⁵⁻¹⁷, all of which suggests that concern about EMF is important in the initial attribution of symptoms to electrical devices. Evidence can also be found in studies which have looked at the psychological profiles of electrosensitivity sufferers, which have shown elevations in various factors which are believed to increase the risk of psychosomatic symptoms occurring¹⁸⁻²⁰. Finally, evidence can be found, albeit to a lesser extent, in

those studies which have demonstrated that psychological and behavioural therapies can be effective as treatments for electrosensitivity²¹.

What are the Implications for the Precautionary Principle?

If electrosensitivity is not caused by the presence of EMF, but is instead more related to concern about EMF, what implications does this have for any suggestion that we should apply a more robust form of the precautionary principle with respect to mobile phones, wifi, powerlines and so on? We know from past experience that promoting precaution to the public is often viewed as a sign of danger: people often assume that there is 'no smoke without fire' and studies have consistently shown that providing people with precautionary advice about mobile phones has increased anxiety levels and made mobiles appear more threatening²²⁻²⁴. In addition, the type of alarmist media reporting that often accompanies precautionary recommendations has also been experimentally shown to increase the chances that someone will mistakenly attribute physical symptoms to a device or substance⁷. So because precautionary advice exacerbates precisely those psychological variables that may help to trigger electrosensitivity in the first place, it is entirely plausible that increasing the level of precautionary advice that is given out about mobile phones, wifi and related technologies will increase, not decrease, the number of people who come to believe that exposure to those technologies is making them ill. As with all health-related interventions, the precautionary principle is not without its side-effects and these must be taken into account when deciding whether or not to apply it.

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