

Jury's out on link between migraines, fluorescent tubes

By JOE SCHWARCZ, The Gazette February 1, 2009

Just about the only feature of compact fluorescent lights that everyone agrees on is that they do actually produce light. If anyone wants to contest this, I think I could design an experiment to prove beyond a shadow of a doubt that this is so.

But claims that the flickering of fluorescents can trigger migraines, or that the electromagnetic radiation they emit makes some people sick, present a more complex scenario for investigators. Why? Because symptoms of illness are determined by an intricate balance of physiological and psychological factors. Factor in biochemical individuality, and we obviously have a tough nut to crack.

Let's start with the claim that compact fluorescents can trigger migraines. Certainly flashing lights or stroboscopic effects can cause migraines in susceptible people. And fluorescent lights do "flicker." But can the human brain detect this flickering?

Old fashioned fluorescent tube lights flicker at a rate of 60 times a second, a perceptible frequency. But compact fluorescents use different electronics and flicker at a rate of more than 10,000 times a second, which is not detectable by the human eye. It therefore seems most unlikely that such flickering could be the cause of headaches. Compact fluorescents do, however, produce harsher light with a greater "blue" component than conventional bulbs, possibly a trigger for headaches.

But what if these headaches are not caused by the light's intensity or flickering, but rather by the electromagnetic fields generated by the bulbs? This brings up the thorny and controversial issue of "electrosensitivity."

People afflicted by this condition claim to suffer from weakness, muscle aches, joint pain, dizziness, headaches and concentration problems when exposed to electromagnetic radiation. Cellphones, cellphone towers, power lines, appliances, computers, television sets and compact fluorescent bulbs have all been blamed for triggering symptoms. Some who believe in the existence of this curious phenomenon even offer a rationale for the effect, usually explaining that our nervous system functions based on electrical impulses and that it is therefore susceptible to the effects of external electromagnetic fields. But we need more than such simple-minded notions to establish the existence of electrosensitivity.

Of two things we can be certain: People who claim to be electrosensitive do suffer, and all of the items listed above do produce electromagnetic fields.

But, of course, that does not prove the suffering is caused by the fields. Such proof requires evidence that can only be provided by proper controlled trials, not by anecdotes or by experiments that border on the childish. Inferring that the risk of electromagnetic radiation from a compact fluorescent can be determined by the degree of static generated as a radio is brought near it is sheer nonsense. Electromagnetic fields, as generated by any electrical equipment, can interfere with radio signals. Any student who has ever tinkered with electronics knows that.

Also meaningless are experiments that are not properly blinded.

Some researchers who are convinced that electromagnetic fields can be harmful suggest that electrosensitivity effects are caused by microsurgers in electric current as it flows through wiring ("dirty electricity"). They then claim that the problem can be eliminated by the use of a type of "microsurge filter." In one widely publicized study, such filters were installed in a school with the experimenters concluding that teachers were less frustrated, less tired and less irritable while the filters were in place. The filters, they say, improved general well-being, as determined by questionnaires.

But the placement of the filters was evident to anyone who cared to look, and the type of questions the teachers were asked made it obvious that there was some experiment under way to study health effects. Surely, the researchers would not be installing any device to make people sick, so it is not surprising that the teachers reported feeling better. They assumed that the black boxes must be doing some good. And, undoubtedly, there was discussion among the teachers about the "experiment."

I suspect that even a judge at a high school science fair would raise an eyebrow about the methodology employed in this study. It is also discomfiting to learn that the lead researcher publishes papers co-authored with the gentleman who markets the filter and uses the results of this highly questionable study as a sales pitch.

Of course, the proper way to carry out an investigation of electrosensitivity is with a double-blind protocol. Enlist subjects who feel that they are sensitive to electromagnetic fields, and expose them to such fields without the experimenters or the subjects knowing when the electronic equipment that generates the field is turned on. Then just ask the subjects to detect when they "feel" the field.

Since electromagnetic fields cannot be seen, such experiments are not difficult to carry out. And they have been carried out - at least 32 times.

Taken together, the results demonstrate that people who claim to be sickened by electromagnetic fields cannot detect the presence of fields.

The latest study, at the University of Essex in Britain, measured not only subjective feelings of well-being, but also objective parameters such as pulse, blood flow and skin conductance. No difference was found when the experiment was double-blind, but subjects who believed themselves to be electrosensitive reported lower levels of well-being when they were told that they were being exposed to electromagnetic fields.

Given the results of the double-blind, randomized trials, and the lack of a plausible physiological explanation for electrosensitivity, what can we say about the unfortunate people who are convinced that their well-being is compromised by various electrical phenomena? That they suffer. That much is for sure.

But more research is needed to try to learn what they are actually suffering from.

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