

# INCANDESCENT LIGHT THE HEALTHIER ALTERNATIVE?

*Since incandescent light really is a higher-quality light and so many people dislike fluorescents, why are we still being persuaded to use more and more fluorescent light and less and less incandescent?*

**Part 2 of 2**

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## Lighting at Home

The lighting advice given in home decorating books and magazines is usually very good, except on two accounts: uplighting and the so-called "energy savers". When the compact fluorescent (CFL) or "energy saver" was introduced in the late 1980s, lamp manufacturers enlisted the aid of energy authorities and producers, environmental authorities and organisations, and large companies such as IKEA to get as many people as possible to replace their top-quality incandescent bulbs with these ridiculously expensive class II CFLs—which initially cost over 30 times more (and, as with some of the top brands, still do). And so this very unfair and persistent campaign against the light bulb was launched and is still being kept up by a steady stream of ads, brochures, special offers, articles and websites that capitalise heavily on our growing concern for the environment and for our own personal economy.

Usually a few simple catch-phrases are used—often intermingled with useful lighting tips and information about other lamp types—and are repeated over and over again by so many different, seemingly independent, unconnected and reliable sources that one can easily get the impression that they are actually true. For example:

1. The first argument is that the CFL lasts 8, 10, 12 or 15 times longer than a standard 1,000-hour GLS (general lighting system) bulb. First of all, if you really need a long-life lamp at home, there are GLS lamps with thicker tungsten filaments that are also designed to last 10,000 hours (although at a slight reduction in output), so long life is not unique to CFLs. Secondly, a test by the Swedish Consumer Agency (2000–2001) revealed that surprisingly few "energy savers" really did function for as long as they claimed. Of one brand that was far from inexpensive and which promised 8,000 hours, not a single lamp lasted longer than 663 hours! And even though many of the pricier top-brand CFLs burned as long as stated or longer (but very much weaker), not all of them did. Of the most expensive lamp type meant to last 12,000 hours, half had gone out by 8,000 hours!

2. The CFL is also said to produce a light that "looks just like incandescent light". Although in recent years there really has been an improvement in some of the least efficient models, the (composite) light from most CFLs is still more of a pinkish white.

3. The third and main claim that has been chanted from the start is that the CFL gives "five times more light" and thereby "saves 80% energy" (not 80% of your total energy consumption, of course, but of the tiny part of it that light bulbs use). Since lamp manufacturers must be well aware that most CFLs actually *don't* give off five times more light, an "up to" was later inserted in this mantra (some replaced it with "four times more"), but by then the catch-phrase was already so well established that it is now often (mis)taken for a fact.

To see for yourself that CFLs don't give five times more light, you only need to compare, for example, a 60-watt GLS with the recommended 11- or 12-watt CFL that is meant to replace it, and it will be obvious that the latter is less bright. Even the manufacturers' own catalogues confirm that while a good 60-watt GLS gives 730 lumens (lm), the most efficient (and ugly) naked-tube CFL only gives 600 lumens at 11 watts. In globe- or bulb-shaped models (advertised as giving "four times more light"), the outer bulb further reduces the amount of light that gets through to only around 450–500 lm, according to the catalogues. And the abovementioned test revealed that although the three top-brand lamps really did give as much light as promised (in the beginning), most other brands did not. The worst lamps produced only 214 lumens!<sup>2</sup>

This test also confirmed that "energy savers", just like other FL (fluorescent) and HID (high-intensity discharge) lamps, lose output as they age, most of it during the first 2,000 hours.<sup>3</sup> After 8,000 hours, the light from some models was reduced by as much as 40%!<sup>4</sup>

This of course means that to get as much light as from a GLS, you need to buy a CFL that has a higher wattage than recommended. That way, if you save anything at all it is quite a bit less than what the manufacturers claim and, even then, this is only if you invest in one of the more expensive quality lamps—and are lucky enough to get one that really gives as much light as it says it will and does not lose too much luminance too quickly or expire before it has saved energy beyond what it cost you to buy it!

4. The heat from light bulbs is always pointed out as a problem. However, this is so only in countries, seasons and places that are already more than hot enough, requiring the excess heat to be ventilated away. In cooler climate zones, this can be an asset instead and help keep heating bills down,<sup>5</sup> thereby making the difference between using incandescent bulbs and CFLs even smaller.

5. To make the CFL seem environmentally friendly despite the uncomfortable fact that it contains mercury, the incandescent bulb is very unfairly and incorrectly made to seem like it causes more mercury pollution, even though it doesn't contain any in itself. This argument firstly assumes that the incandescent light bulb really does use so much more energy (which it doesn't) and, secondly, it assumes that that energy comes from mercury-polluting coal-fired power plants only!<sup>6</sup> Instead of trying to scapegoat the poor light bulb, would not a more logical solution be to stop using coal?

So why are so many energy authorities and producers so extremely eager for us to ruin the nice, relaxing atmospheres in our homes with potentially unhealthy CFLs that really don't save that much at all? Why do they want to do this, when light is something so essential to life and when incandescent light actually costs ridiculously little—usually only a measly few per cent of a household's total energy cost? (Most of that cost goes towards heating and cooling/heating water.)

If it's energy they want us to save, why are we constantly being encouraged to buy more and more unnecessary gadgets with which to pamper and amuse ourselves? Why not ask us to save on some of those instead? Or why not speed up the development of those alternative energy sources we've been promised for so long? Is it just manufacturers wanting to make a profit, and much ignorance on the part of everyone else who parrots their exaggerated claims without checking if they are true or not?

Or is there some other motive behind this well-coordinated and persistent campaign that seems to aim at having incandescent light removed from private use altogether—such as making it even more effective in creating an aura of glamour around certain products, people, places and events, the more rare it becomes?

### Direction and Distribution

Anders Liljefors, professor in architectural lighting at the Royal Institute of Technology, Stockholm, was the first to actually confirm my perception of incandescent light as being of a higher quality. To create good lighting environments, he suggests that we look at natural light for inspiration without having to copy it exactly. One of the reasons why the light on a cloudy day feels so dull and gloomy is not only that it is lower in luminance and cooler in colour, but also that it is evenly diffused in all directions—whereas sunlight brightens everything up and also creates shadow, movement and sharp contrasts between shadow and light.<sup>7</sup>

Fluorescent light often looks extra dull and uninviting when coming from a long tube (a very unnatural shape for a light source) that spreads the light evenly across the room, eliminating all natural shadows. But isn't it possible that shadow and darkness are just as important for optimal health as enough of the right kind of light?

When planning the lighting, it is very important to choose the right kind of light fittings (or luminaires, as they are meant to be called now) to get the effect that you want. To create more shadow and contrast, for instance, you need the lighting to be directional and luminaires that are designed for the purpose.

Instead of a linear luminaire with a plastic diffuser, or a globe light that scatters the light in all directions equally, directional lighting concentrates it in one direction (like a spotlight) or sometimes two (like many wall, table and floor lamps that let most of the light out underneath but also let some out through the top). The fewer, smaller and brighter the light sources and the narrower the beam angles, the sharper and more dramatic the effect. With more and bigger lamps which have wider beam angles and are placed closer together (so that the beams meet or overlap), the effect is both softer and brighter, more resembling the evenly lit room but still having a much more natural look and feel.<sup>8</sup> Concentrating the light also increases its brightness (in that direction) without the use of more electricity—especially if the lamp or luminaire has a polished aluminium reflector that projects the light outwards.

The direction of the beam is also important. Light falling diagonally downwards, like the daylight coming in through windows, accentuates structures and often looks more natural than light coming straight down from the ceiling.<sup>9</sup> Light coming from only the ceiling can also make a room feel quite gloomy. Try using more lights and place them lower, adapting their position, direction and luminance to the main activity/activities in the room. Here are some more tips:

- For places where you lie or sit down, such as bedrooms, bathrooms, living rooms, waiting rooms, schools,

offices, trains and buses, I suggest directional lights that are placed so that most of the light falls just below eye level when lying or sitting and are not too bright, unless you're reading or doing some specific task in that space.

- If you are reading or are working with your hands, make sure to get enough light right there over your reading/working space. The more precision the task requires and the older you are, the more light you need in order to see well. Even if a 40- or 60-watt bulb might be enough for a child or teenager, at 60 years of age you may need seven times as much light.<sup>10</sup> Since most desk and reading lamps don't take more than a 60- or 75-watt bulb (or a 20- or 35-watt low-voltage halogen), consider using several of them combined, or even one or two 150-watt mains voltage halogen floodlights of the type mentioned above.

- Uplighting is usually not a very good idea, first of all because it feels odd with light going in the "wrong" direction, so to speak, and secondly because it has to travel all the way up to the ceiling before some of it comes down in a very bleak, diffused and useless form. If you have a wall-mounted uplighter at home, try turning it upside down and see for yourself if it doesn't both look and feel better when the light is directed downwards instead. One of the few situations in which indirect lighting such as uplighting can be practical is when you want to avoid glare and reflection in television and computer screens,

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and the light source should then be placed closer to the ceiling in luminaires designed for the purpose. A more appealing alternative could be spotlights directed at the walls. Whether the light comes from desk, walls, ceiling or windows, the light source should not be seen in the screen—that's the most important thing.

- For areas that you just pass through or spend little time in, e.g., corridors, garages, etc., I suggest replacing any ceiling tubes with wall-washers (downlights placed close to the walls) or with wall sconces. These should be placed at medium height so that most of the light falls just below the eye level of those who are shortest. Also, the light should not be unnecessarily bright.

- Bright lights placed higher so as to illuminate larger areas I find appropriate mainly where/when you have to be physically active and at the same time have a need to see what you're doing, such as when cleaning, redecorating or building something.

With all aspects combined, you could say that the cooler, the brighter and more evenly distributed the light and the higher up it is placed or directed to, the more impersonal the effect. The warmer, the dimmer and the more concentrated the light and the lower down in the room it is placed or directed to, the more intimate and sophisticated the atmosphere. To see a beautiful example of the latter, check out the mainly incandescent and directional lighting in the TV series *The West Wing* (and its real-world counterpart).

It seems that during the last decade or so, awareness of how light can be used to create various moods and impressions has increased considerably. Unfortunately, though, it seems that this knowledge is often used to manipulate—when, instead, it could be applied on a larger scale to promote the well-being of everyone.

### Commercial Lighting

When the lighting in shops, restaurants and other commercial facilities is planned, there are certain guidelines issued by the lighting industry, besides the standard regulations concerning ergonomics and energy efficiency, that architects and lighting engineers are encouraged to follow.<sup>11</sup> These guidelines can be summed up thus:

- For supermarkets, drug stores, gas stations and other stores that you are compelled to visit often because they sell things you really need, guidelines recommend light that is mainly fluorescent, of medium quality, evenly distributed, cool-white and very bright (possibly supplemented by a few high-pressure sodium discharge lamps over the meat counter, as their extra-warm colour makes meat and salmon look more red). Very bright FL of poor or medium quality is also often used in discount stores to enhance the impression that one is really getting a bargain. And in sports, electronics and hardware stores and departments designed mainly to attract men (as if women might not shop there, too), the colour of both the light and the interior design is usually much cooler and brighter than in those that target women specifically.

- For smaller shops with personal service, medium-range fashion boutiques, department stores and shopping malls, where many things are displayed that you may want but don't really need, more appealing lighting solutions are recommended. These places generally have fewer, warmer, better-quality fluorescent lights that are placed higher and more inconspicuously in the ceiling, often in combination with halogen or good-quality HID spotlights. These spots are placed lower to accentuate areas such as the fashion, perfume and interior

decorating departments that are meant to seem glamorous but affordable, thereby encouraging the customer to buy a bit more than she or he had originally planned.

- For more exclusive shops, restaurants, etc., where it is taken for granted that you are willing and able to part with large amounts of money, guidelines recommend light that is warm, dim, mainly directional with high contrast and of top quality. So if you go to a jewellery store, a designer fashion boutique, an exclusive hotel or casino, a car showroom, a private clinic or spa, you are likely to find the lighting to be very soft, pleasant and inspiring. You'll notice more incandescent light, including romantic downlights and little dazzling halogen spots which, when placed to highlight certain products, make these appear even more exclusive and attractive than they really are. Theatres, museums and art galleries are also often very beautifully lit.

Clearly, this indicates that there really is an awareness within the lighting and commercial community of the fact that the incandescent bulb has some unique and very desirable qualities, or they would not put so much effort into creating something as similar as possible to incandescent light, use it to sell the most expensive goods or let it flow in such profusion at Christmas-time to add to the "Christmas spirit" and, of course, to sales.

But although a majority seems to be sticking to these rules, there are

those who don't. Increasingly, supermarket owners, for example, seem to have realised that customers might want more pleasant lighting when buying groceries, too. Hopefully, more will follow. And since many foods are known to be affected by light—usually adversely once they are harvested—perhaps it might be good for the food, too, if the lights were less bright and of a better quality, not only where the food is sold but also where it is processed, packaged and stored.

### Lighting at Work

Even though attractive halogen light is becoming more widely used in work-

ing environments, there, too, incandescent light often seems to be reserved for those with the highest income and status. Even in the most beautifully lit shops, restaurants and hotels, etc., the lighting in staff and storage areas still tends to be the same cool, ugly and often unnecessarily bright FL so as to emphasise the constructed differences between customer and employee and between leisure and work.

But is this really necessary? Why are most of us not allowed to work and feel comfortable at the same time—and perhaps even get the job done better because of it, too, with less sick-leave, better concentration and fewer errors due to stress? Are employers afraid we will feel too relaxed and not work hard enough if we're not constantly kept in a keyed-up mode? Or is it that enjoyable lighting is to be granted to us only when we are willing to pay for the expensive goods and services that come with it?

### Recommendations for Offices

In studies on lighting conditions preferred in offices, Jennifer Veitch and Guy Newsham (2000), at the Institute for Research in Construction, National Research Council of Canada, found that most people would like to have windows, preferably with blinds or curtains, but they also wanted to have electric lighting and be able to adjust both the position and angle of the lighting and turn the lights on and off during the day. (Very reasonable wishes, aren't they?) Since the participants were very satisfied when allowed to adjust the lighting to

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suit their particular preference, and as most of them chose luminance levels consistent with current recommendations or lower, Veitch and Newsham recommend lighting solutions that are as flexible as possible, with dimmable lights, local switching and wiring that allows one to move things around.<sup>12,13</sup>

Giving each individual as much control over lighting conditions as possible sounds like a very good idea, since lighting requirements may vary considerably depending on a person's age and the type of activity. Too much light at the wrong time or in the wrong place can be just as irritating and uncomfortable as too little. Also, it seems there are big differences as to individual preferences. Even though more than half of those asked by Veitch and Newsham liked to work in a uniformly bright room, 17% preferred to have most of the light on the desk and the rest of the room more dimly lit and 7.5% liked an even darker room.<sup>14</sup>

One study by Kellner et al. (1997) also found that agoraphobic patients felt most comfortable with luminance levels that were much lower than those preferred by healthy controls.<sup>15</sup> Another study by Veitch and Newsham (1998) showed women to be somewhat more sensitive to bright light than men were.<sup>16</sup>

I would of course also like to see incandescent light included as an option, especially since so many seem to dislike FL. Unlike what many seem to think, it wouldn't have to cost very much more to have incandescent instead of fluorescent light at work, if you used the most effective halogen spotlights and floodlights and used only as much light as needed where and when it is needed.

FL tubes are equally bright all day and everywhere, and are not quite as efficient as is usually claimed. First of all, if they are powered by conventional ballasts, those ballasts use about 20% of the original installed effect. Secondly, most tubes as they age lose much of their output (which is then turned into heat), especially if not cleaned regularly. After three years in a relatively clean environment, the loss of light may be as much as 50%, even though the tubes still use the same amount of electricity. Plastic diffusers also steal some of the light and tend to make it too hot for the tubes to function optimally. The same goes for fixtures with four tubes.<sup>17</sup>

So let's say you have a standard class III tube that is said to give 50 lumens/watt. This sounds like a lot more than an incandescent bulb that gives about 14 lumens/watt, or a halogen that may give something like 22 lm/w, doesn't it? But then take away 20% right from the start, a bit more if you have a plastic diffuser, and then another 10-15% every year, and the difference is significantly smaller.

For those who might still prefer FL, warm-white HF-powered slim class-II tubes, which give up to 100 lm/w in the beginning and do not lose so much light as they age, may both save a lot of energy<sup>18</sup> and improve the quality of the light to a level that can at least be acceptable to work in if you're not too sensitive or choosy, especially when used in modern two-tube luminaires with deep parabolic reflectors. Warm-white metal halide lamps in recessed downlight fixtures is another energy-efficient and fairly attractive alternative.

### Industrial and Outdoor Lighting

Ever since FL and high-intensity discharge (HID) lamps were forced on the public on a massive scale in the 1950s and 1960s, there has been this "tradition" in lighting guidelines to recommend FL or HID lights of low quality for places where as much light as possible is

needed for the lowest possible cost and where quality is deemed of little or no importance, e.g., for factories, warehouses, power plants, mines, streets and highways, tunnels, garages, etc.—as if such places aren't usually unpleasant enough without the light adding to it! Even though better-quality lamps have been introduced during the last decade or so, these are most used indoors in commercial locations and situations.

The most common types of HID lamps are:

- **Mercury lamps.** These are high-pressure lamps (as opposed to ordinary FL tubes which are low-pressure mercury lamps) and produce a spooky blue-white light of poor quality and relatively low efficacy compared with other HID lamps. Why they are still used as streetlights is a mystery. In my opinion, they really ruin the nice atmosphere of old cities and villages, and certainly don't do anything for the more modern ones, either.

- **Metal halide lamps.** These are about twice as effective as the mercury lamps and contain other metallic elements besides the mercury that give them a bright white or silver-white light with moderate to "accurate" colour rendering. The best ones are often used in shops, convention halls and stadiums. They are also used in film and TV studios, replacing the previously used tungsten halogen lamps that were always appreciated for the way they made colours come alive but unfortunately also produced a lot of heat.

- **Low-pressure sodium (LPS) lamps.**

These are very bright orange, budget lights with zero colour rendering, since they only reproduce a single wavelength. They used to be, and in many places still are, used to illuminate tunnels, highways, etc. If prolonged exposure to monochromatic light of warm colour has the same effects on humans as on animals,<sup>19</sup> this is the light we should avoid staying in for too long and stop subjecting the nearby wildlife to in rural areas.

The most common excuses for using these LPS lamps are that they give up to four times more light per watt than the

mercury lamps, that colour rendering doesn't matter outdoors (I don't understand why it shouldn't), and that the eye cannot distinguish colours at low lighting levels. I disagree particularly with that last statement, since those levels at which the eye can no longer distinguish colours are so much lower than those created by LPS lights. Perhaps there may be a biological reason for these differences in opinion, since female eyes are usually better at distinguishing colours, whereas men instead have more rods in their eyes and see better in near darkness.<sup>20</sup>

My experience when driving on highways lit by LPS lamps is that the light is tiring on the eyes because it's so unnatural to see only a single colour for a lengthy time. There are safety implications, too, as you really don't see things as clearly in coloured light as in a white or warm-white light with good colour rendering capacity.

- **High-pressure sodium (HPS) lamps.** Standard HPS lamps have about the same output as metal halide lamps and produce a bright peach-coloured light of poor to moderate quality that I find acceptable along highways but which looks unnatural in cities, villages and suburbs. There are now HF-powered HPS lamps with improved colour rendering that produce a more attractive and fairly incandescent-like light, but since they are slightly less effective than other HPS lamps and require specially designed luminaires, they are usually reserved for lighting picturesque tourist areas at night and places where the more affluent and influential work or reside.

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Sometimes they are used in shops, but indoors the slightly peachy-white colour does not look quite as good as it does outdoors.

If quality had a higher priority and we had an energy system that could support it, we could of course replace all of the above with halogen floodlights and thereby get a bright, warm-white, crystal-clear light that does not become weaker or change colour as it ages. These are now usually only used at building sites or in the odd parking lot. Some people also have them as outdoor lighting at home, which I think is a very good idea, especially if used with IR detectors that turn them on only when needed. That way, you save energy without having to compromise on quality.

Another energy-saving option that is now starting to gain a foothold in the market is the use of solar-powered streetlights. Unfortunately, this technology so far only allows for the use of cool-white FL and orange LPS lamps, and, if one is willing to pay more, the better-quality warm-white HPS lamps that require special ballasts.<sup>21</sup> It still seems like a huge step in the right direction, though, and hopefully the quality of the light will eventually be improved, too.

Another problem with outdoor lighting is what some call "night sky pollution", which prevents many of us from seeing the stars due to the excess light from unnecessarily bright night-time illumination of streets, buildings, billboards, convenience stores, etc. According to an excellent article by Alex Wilson,<sup>22</sup> light pollution may also pose more or less serious threats to certain animals and trees, besides causing a huge waste of electricity and money and often being counterproductive when it comes to safety and crime prevention. What dark-sky advocates recommend is to: control glare by requiring luminaires that are shielded to direct light downwards; limit the height of luminaires relative to the property boundary, thus preventing light trespass onto adjoining properties; require downwards directed top-lighting for advertising signs that are externally illuminated; and prohibit certain types of advertising lights, such as searchlights and laser lights.<sup>23</sup>

### Car Headlights

Unfortunately, it seems that the top-quality halogen light in car headlights is being phased out, too, with more and more of the new cars produced now coming equipped with fluorescent xenon light from micro metal halide lamps. These produce a very bright and cold violet-silver-white light that is meant to improve driver visibility and traffic safety, but which I find very glaring and distracting when meeting it on the road due to the unnatural colour that keeps shifting as it approaches.

### Lighting, Hypersensitivity and Hyperactivity

From around seventh grade I was starting to become consciously aware of feeling tense, restless, unfocused and uncomfortable under the cool, harsh light in school classrooms, on subway trains, in streets etc., and being able to relax, concentrate and feel comfortable only in the much softer light at home or in other people's homes—i.e., in incandescent light, although at the time I did not know the technical difference. And I am not alone in reacting like that. This is how another sensitive person describes it:

"Fluorescent lights drive me batty. In school I used to get into trouble on purpose so I could get sent out into the hall. The lighting in the hallways was not fluorescent. I would drag my entire school desk out into the hall. I would act up and do just about anything to get

away from those damned lights. I could actually do the work once I got out of the classroom."<sup>24</sup>

So what is it, then, that causes FL to have this effect on some people? Flicker (and sometimes disturbing noise) is something many people seem to be aware of consciously. But apart from that and the unnatural colour and discontinuous spectrum, the radiowave, X-ray and possible mercury vapour emissions already mentioned, it may also be that it is too bright for that person, especially if it shines from above the head—because this, in my experience, tends to activate the whole body. When sitting down in class or at work, you want your body to be relaxed and your mind to be alert—not the other way around, right? Besides using only incandescent light—which really can help put you into a state of relaxed concentration—it may also help if most of the light is concentrated on the work area or the teacher or whatever one is meant to focus on, and if the rest of the room is dark enough and, ideally, quiet enough not to scatter your attention. That is why they light theatres, concert halls and cinemas that way.

As a naturally sensitive person myself, I also feel that FL is a dead light that actually steals energy from the body and that it may turn one's subtle energy centres off, thereby inhibiting the flow of bio-energy (also known as *chi*, *prāna*, etc.) needed for staying healthy and functioning optimally.

On the other hand, incandescent light—possibly because fire is a living element just as earth, water and air are—seems instead to assist the energy flow, facilitate the connection with one's inner self, and even open centres that previously have been turned off—especially the heart centre which, at least in sensitive individuals, appears to need some form of firelight to blossom.

Perhaps this is the reason why anthroposophical architects—who generally seem to be more aware than usual of what is healthy, beautiful and supportive for both consciousness and life, and mainly use energy-creating things like natural materials, flowing water and colour-washed walls—also tend to prefer using incandescent light (or sometimes even candlelight), especially in health clinics and schools.

Try for yourself and see how you feel and function under different types of light. If you, too, feel more or less turned off by FL but still have to spend much time in it, for example at school or at work, even adding as little as one single incandescent lamp placed fairly low and close to the body may be enough to keep the heart centre open and give a little energy.

And although it seems that some studies (by Mayron et al., 1974; Ott, 1976; Wolfarth and Sam, 1982) could have indicated a positive effect of "full-spectrum" fluorescent light (FSFL) on hyperactivity in children, these were not all conducted perfectly, according to the review by McColl and Veitch. Other, better-controlled studies (Ferguson and Munson, 1987; Norris, 1979; Schulman, 1989) have not managed to find clear, replicable effects from using FSFL compared with other FL lights, so the matter is still subject to some controversy.<sup>25</sup>

Personally I find class-I (FSFL) tubes easier to bear than poorer-quality ones, if they are of a warm-white instead of a blue-white colour. But even if "full-spectrum", I still cannot relax and concentrate in it as I can with incandescent light and natural daylight. This might possibly be due to the fact that all types of FL seem to increase beta activity in the brain, according to a study by Küller and Wetterberg (1993) that compared the effect of both dim

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and bright class-II FL and class-I FSFL. They found that beta brainwaves increased during the afternoon under all lighting conditions.<sup>26</sup>

There are, of course, numerous reasons for restlessness, difficulties in concentrating, etc., besides environmental factors like lighting, noise, chemicals, diet, and so on. Many adults who have been labelled with ADHD (attention deficit hyperactivity disorder) have come to the conclusion that their particular problems are due to having a gifted and spirited personality type, and/or having an atypical learning style such as being a visual-spatial or a tactile learner, and/or being a highly sensitive person (HSP) whose extremely delicate and finely tuned nervous system easily gets overwhelmed by external impressions, thereby making it hard for that person to concentrate. Or it may be that the material that one is required to focus on is just too boring, incomprehensible, untrue or irrelevant! (Anyone wishing to learn more about these alternative views on ADHD might find inspiration on the following websites: <http://borntoexplore.org/sitemap.htm>, <http://pages.prodigy.net/redstar01/index-1.htm>, and <http://www.hsper.com/>.)

### Lighting for the Youngest

When welcoming a new life into this world, I would as my first choice use only candlelight or, if not possible, very soft GLS. I would take care not to expose the baby to fluorescent light at all, and shield the baby if passing an FL light source was unavoidable.

And just as one might have figured this out simply by using empathy and common sense, a study shown on a *Nova* science programme on TV (spring 1998, I think) found that babies born prematurely fared much better when kept in conditions as close to womb-like as possible, with very dim light and whispering nurses who are not wearing perfume—so as not to overstimulate the babies and draw their atten-

tion outwards before they are ready. If this is not the practice in your hospital, I strongly recommend that you make sure it will be, soon, and that the dim lights used are incandescent and not fluorescent. This may be more important for these babies' chances than we can imagine.

### Lighting for your Pets

Since most animals seem to have even more delicate senses than humans do, is it not possible that they, too, are suffering immensely under FL without being able to tell us about it? Patrick Lindahl even suggests that animals may see flicker that we don't and may perceive an FL tube as if it were a strobe lamp.

With all the stress, abuse and indignities that we are already subjecting so many animals to, do we really need to torture them with bad lighting on top of it? If you yourself own or work in a place where animals are kept, why not try bright incandescent light and/or real daylight in the daytime and darkness or very soft incandescent light at night and see how the animals seem to feel?

### Making an Informed Choice

If you didn't already know much about light and lighting, it is my hope that you are now in a position to make a more informed choice. However, since there seems to be so much variation between individuals as to what type of lighting solutions are optimal, my final suggestion is that you try various types of lamps yourself and see what works best for you. If you don't mind using FL light, then it's probably okay for you. And if you belong to the minority who doesn't like electric light at all but prefers candlelight only, then that's probably just what you need.

So, if you just pay attention to how your body reacts under various types of lighting, I believe you each have your own best guide. ∞

### Endnotes

1. Bergvall, O., "De flesta har slocknat" ("Most have gone out"), *Råd & Rön* 7/01.
2. *ibid.*
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