

HEALTH AND STRESS

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TECHNOSTRESS DUE TO INFORMATION OVERLOAD

Key Words: technophobe, technophile, "come a cropper", Y2K hysteria, "millenchoy", cyberterrorism, VODS, EM, RSI and ergonomics, liability for workers at home, internet addictions, "data smog"

Hans Selye, who coined the term "stress" as it is currently used, demonstrated that it could cause different disorders during various phases of his General Adaptation Syndrome. He referred to these as "Diseases of Adaptation", although in retrospect, "Diseases of Maladaptation" might have been more appropriate.

Technostress was coined in 1984 by Craig Brod, a Silicon Valley psychiatrist who was impressed with the steady increase in stress related disorders resulting from the activities in this fast paced and hectic community. He defined it as "a modern disease of adaptation caused by an inability to cope with the new computer technologies in a healthy manner" in his book *Technostress: The Human Cost of the Computer Revolution*. Technostress could result from either difficulties in dealing with computer technologies, or conversely, an unusual attraction to them.

Technostress was primarily related to technophobia, or a fear of new and constantly upgraded computerized software and hardware devices, as well as computers themselves. Such technophobes were easily irritated and frequently felt frustrated or depressed when forced to engage in computer activities which they usually strenuously tried to avoid. They tended to become very anxious if they were pressured to use a computer at work, school, or even at home. In addition, they often complained of physical symptoms such as headache, muscle tension, eyestrain, and rapid heart rate.

Since then, Technostress has increasingly tended to stem more from a preoccupation with computer related activities. The escalating explosion of interest in the Internet has spawned a new breed of technophiles who literally love and thrive on what their computers can provide, and gravitate to them whenever an opportunity arises. This is especially true for Internet junkies caught up in the world wide web much like flies trapped in the web of a spider. Some may suffer from a fetish or fixation reminiscent of obsessive-compulsive disorder, as they feel the need to read, and respond to their e-mail messages every hour or so, even when nothing important is expected. A few even have cravings that satisfy the criteria for an addiction disorder. When cut off from computers, some Internet addicts have withdrawal symptoms similar to others addicted to gambling or shopping.

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*The Newsletter of
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Technophobia Seven Thousand Years Ago

Most attempts to change things are usually met with some resistance, especially if they pose a threat to the establishment or vested interests. Even when innovations promise to make life much easier or safer, there are always some who doubt that they will necessarily lead to long term progress. There is nothing new about this. In *Phaedrus*, which Plato wrote in 360 B.C., he relates Socrates' story of the ancient Egyptian deity Theuth, who had allegedly invented many arts, including "arithmetic calculation, geometry and astronomy and draughts, but his great discovery was the use of letters." According to legend, thousands of years previously. Theus offered these as gifts to Thamus, the ruler of all Egypt, so that every subject could benefit from them.

Theus explained to him that of all his inventions, letters were the most valuable, since they would "make the Egyptians wiser and give them better memories; it is a remedy both for the memory and for the wit." Thamus replied: "Oh most ingenious Theuth, the parent or inventor of an art is not always the best judge of the utility or inutility of his own inventions to the users of them."

"And in this instance, you who are the father of letters, from a paternal love of your own children have been led to attribute to them a quality which they cannot have; for this discovery of yours will create forgetfulness in the learners' souls, because they will not use their memories; they will trust to the external written characters and not remember of themselves. The specific which you have discovered is an aid not to memory, but to reminiscence, and you give your disciples not truth, but only the semblance of truth; they will be hearers of many things and will have learned nothing; they will appear to be omniscient and will generally know nothing; they will be tiresome company, having the show of wisdom without the reality. "As a result, the gift of letters was rejected. Instead, educated Egyptians subsequently learned to write in a derivative of cuneiform known as hieroglyphics. These were pictures rather than letters representing spoken sounds or words.

Thamus may have been correct. The Chinese developed the abacus for addition and subtraction, (in my day we had slide rules), but kids can now solve all sorts of mathematical problems instantly, accurately, and effortlessly with an electronic calculator. Thus, there is no compelling need to master arithmetic. Similarly, why learn spelling, syntax, synonyms, or proper grammar if almost every word processor program can immediately and flawlessly correct errors and deficiencies in these areas. Many educators are concerned that although such enhancements may make life easier, they discourage exercising your mind, and could have adverse long term effects which would hardly be considered as progress.

Individuals who are opposed to new technologies or major improvements in existing equipment are often described in a deprecatory and derisive manner as "Luddites". This usually conjures up an image of some disorderly gang of ignorant obstructionists with an irrational fear of progress who automatically rebel against any type of technological advance. The origin of this term is an interesting story that deserves some clarification.

Ned Ludd And The Industrial Revolution

According to the *Oxford English Dictionary*, in 1779, a "lunatic" named Ned Ludd broke into a house and "in a fit of insane rage" destroyed two new frames that had been introduced to facilitate the manufacture of stockings. *The Dictionary of Historical Allusion* states that the Luddite riots were "a series of outbreaks in the manufacturing districts of England, especially around Nottingham, in 1811 as a protest against the introduction of machinery into the factories. The rioters, or rather conspirators, for their proceedings were kept secret, used to assemble at night, break into a factory, destroy the machinery, and then disperse, as a rule unmolested. They took their name from an idiot lad, named Ludd, who thirty years previously had gone about in the district breaking stocking frames."

Ned Ludd was framed. Neither of these depictions of him as demented or the description of what he did appears to be correct. According to the most accurate contemporary account, an apprentice cropper named Ned Ludd had accidentally broken two large shearing frames at a factory in Nottingham around this time. This was allegedly due to his clumsiness in using this new equipment rather than any deliberate desire to inflict damage. However, there were many others who were motivated to break these new frames whenever it was possible to do so without being caught. Most had trained long and hard to master the craft of cropping, received good wages, and were well respected in their communities. They recognized that the frames and other new products represented a severe threat to their livelihood and were determined to destroy them.

Whenever a factory owner subsequently found an expensive piece of machinery that had mysteriously been broken, the damage was attributed to Ned Ludd, and his fame spread. Decades later, as things got worse, rebellious gangs adopted his name and made it synonymous with vandalism and a violent rejection of any type of new wool working technology. This eventually culminated in what came to be called the "Luddite" riots.

Wool work was a major source of income in western England in the 18th century, and much of the processing was done by specialists who worked in their small homes. After women had spun the wool, it was collected for further work by weavers, many of whom also worked at home. Others travelled around with their own looms or rented a loom from a master weaver. In the next stage, the nap of the material was cropped, or sheared, using a huge pair of hand shears that could weigh over 50 pounds. It took a great deal of strength, experience and expertise to utilize them effectively. The large wooden frame broken by Ned Ludd made it easy to hold these very heavy shears in balance and anyone could now use them to trim rough layers of threads from woven cloth.

Although croppers and shearers represented only about 5 percent of the workforce in the wool industry, they were highly paid and had tremendous power, because their proficiency or lack of it could increase or reduce by 20 per cent the projected value of the cloth. These elite croppers were extremely militant in protecting their craft and income. Each cropper was allowed only one apprentice in order to restrict competition in the form of any oversupply of skilled workers, and the trade was usually passed on to a family member. Their forbears had been just as powerful and protective. Gig mills, where the nap of the wool was raised before shearing a woven garment, were outlawed by Edward VI in 1552 because of pressure from earlier shearers concerned about being able to compete with them.

The huge shearing frames of the 18th century were a new invention that were not covered by the the gig mill ban. Their owners claimed they could cut the cost of wool dressing by two-thirds, since anyone could now do a good job without special shears or training. Due to the high cost of these frames, croppers were now being forced to work in factories for drastically reduced wages, while the price of food and cost of living continued to rise. In 1812, Napoleon ruled Europe, British troops were at war in North America, and the English economy was in turmoil.

Luddites And NeoLuddites

The large shearing frames had rendered traditional cropping skills useless and obsolete. These workers had no other trade, hence the phrase "he came a cropper", which means to suffer disastrous ruin. The violent 1812 rebellions in Nottingham and Yorkshire were allegedly provoked by various improved knitting devices. However, these were no longer being singled out by the rioters. Any mechanized loom or piece of equipment that could be a potential threat was broken and there was often extensive damage to buildings as well.

They were originally called "the frame breakers of 1812", but factory owners surveying the damage would frequently find "King Ludd", "Emperor Ludd", "Ned Ludd", "Ludlam", or "Ludlum" scribbled on the walls. Workers also rallied at factories in disguises, demanding higher wages, improved working conditions, and better quality control of products. They often claimed they were following the orders of "General Ned Ludd", and as a result, became known as Luddites. Their demands were initially met by the owners until guards could be hired to protect property so that the benefits could be revoked. This precipitated the riots, one of which involved over 3,000 Luddites. It required 35,000 troops to control the situation and there were several deaths. The owners of this expensive equipment were desperately needed to protect the economy and were supported of the crown. Legislation was enacted to control and dissolve the Luddites. Punishments were harsh, and 14 of the ringleaders were hung.

Not all of these self-proclaimed Luddites were disgruntled workers threatened by loss of income. As Charlotte Bronte who wrote *Jane Eyre* noted, "the leaders were not members of the operative class: they were chiefly downcasts, bankrupts, men always in debt and often in drink - men who had nothing to lose." It was not just new technologies they were protesting, but rather the potential disruption of a relatively stable balance of power that threatened their continued existence. Their violent activities were primarily directed at property rather than people.

Today's Luddites are as distinct from the Luddite rioters as the rioters were from Ned Ludd. The technophobic concerns of these new Luddites (NeoLuddites) are quite different, as are their targets and agenda. They are not protesting all new technologies, but only those that might threaten the environment or our quality of life.. They also distrust and fear changes brought about by any new advance that might inevitably lead to a loss of identity and self-sufficiency, even if it were to make life easier and improve their standard of living. Unlike the Luddite rioters, they are not fighting because of potential loss of income but rather for their firm belief that certain new technologies will lead to the downfall and destruction of society in its present form.

Since they are unable to destroy the contemporary equivalents of shearing frames, their targets now tend to be human frames. They target individuals who develop or promote particular technologic advances with no apparent concerns about the likelihood of injuring innocent victims. Some who are violently opposed to any new technology go to extremes that make the term anarchist seem inadequate. The weapons and the battlefields they have chosen are also quite different.

Theodore Kaczynski, the Unabomber, is a good example. His lengthy Manifesto published in *The New York Times* expressed the NeoLuddite philosophy that reliance on technology hinders individual growth and development and leads to environmental disasters that will eventually destroy society. He believes that success should be achieved primarily through personal efforts and cooperation with others of a similar persuasion. From his small shack in the wilds of Montana, he was able to kill or injure 13 people between 1978 and 1995. One victim was the CEO of a company responsible for a major oil spill. The head of a timber lobbying group was killed by a letter bomb so powerful that it pushed nails out from the walls of neighboring offices. The Unabomber justified this violence by explaining it was the only way to alert the world to technology's dangers. A surprising number of people seem to share some of his views.

Y2K Cyberstress and Terrorism

A particular concern that was not included or even anticipated when Technostress was originally described is the growing potential problem posed by cyberspace technostress. A good illustration of this is provided by the recent worldwide Y2K hysteria. People panicked when stores rapidly ran out of bottled water, batteries, and other staples. Large supplies of gasoline, kerosene, dried fruits, canned goods and ammunition were stockpiled, and in one instance, a six month's supply of Spam. Air and rail transport were largely halted for an hour prior to and after 12 P.M. on December 31, 1999 because it had been claimed that planes would become disabled in flight and there would be numerous train derailments and crashes due to computer control failures.

The Internet was filled with dire but plausible Y2K predictions that could have had cascading effects capable of crippling the economy. Banks were threatened by the possibility of large cash withdrawals by scared depositors, many of whom believed the hype that ATM machines wouldn't work or there would be errors in their accounts. The Federal Reserve delivered \$80 billion in cash in the quarter prior to Y2K compared to \$23 billion for this period in 1998. Some banks spent millions for backup generators and computer consultants, and many closed several hours early so that all transactions could be processed before midnight. Over \$100 billion was spent in the U.S. to prevent anticipated Y2K problems. In Japan, it was feared that runs on banks with limited cash would necessitate selling off billions of dollars of U.S. Government debt held as collateral. Interest rates here would then soar, and similar problems would have rapidly spread to other countries creating a domino effect.

Other disasters could have also crippled industries that are now almost completely reliant on sophisticated computer capabilities. A major problem could have been the timely delivery of fuel by trucks and trains which are constantly controlled by computers. A lack of gasoline would have wreaked havoc on commuters, delivery of food, products, mail, etc. But that's only the tip of the iceberg.

What would happen if there were deliberate attempts to disrupt or destroy computer systems? Cyberterrorism refers to the use of computing resources to intimidate, coerce, or inflict harm. One example is cyberstalking, which allows hackers to access your e-mail, all of your contact information, social security and credit card numbers, and jam your mail box with hundreds of daily e-mails from porn sites and other annoying vendors. This can be done from anywhere in the world where there is access to a computer and a telephone, and there is little you can do about it. Tracking hackers down is tricky, and who will do it? Even when caught there is often no significant punishment. Proof is difficult to obtain, most states have no laws that specifically cover this, jurisdiction may be hard to determine, there are few legal precedents, and many are juveniles. The damage they can inflict makes "millencholy" worries seem mild by comparison.

Even more serious is the disruption of key communications systems of industrial and governmental complex computer networks that has already occurred on several occasions. Our ability to create these is far outpaced by our ability to protect them. National defense has been threatened and the CIA Director described this type of terrorism as "the ultimate precision-guided weapon" in a report to Congress. A number of terrorist organizations in the Middle East already have the capability to invade and disrupt U.S. communications system. The President just allocated \$2 billion for this year's R&D efforts to beef up defenses, which is a 40 percent increase over the allocation for 1999.

We traditionally think of war as a physical assault on persons or property, but future conflicts will be conducted in cyberspace, not on any terrestrial battlefield. Mass destruction warfare is conducted by using costly chemical, biological, radiological and nuclear weaponry. Cyberterrorists use technologies that require only a few million dollars, but have the potential to do far more damage by crippling all electronic communications. Retaliation may be difficult since the perpetrator may be unknown. It could be a Neoluddite, other "hactivist", or a foreign power acting from a different country.

Types Of Technostress And Their Effects

Computer related fears are still a frequent cause of Technostress. One study showed that more than four out of five adults were anxious, hesitant or definitely resistant to relying on or using computerized technologies. Even though you may be able to zip along on your laptop and surf the web with ease, you may be a technophobe if your VCR still blinks 12:00 AM and you have difficulty taping future programs. Cyberphobia, a fear or inability to learn new Internet technologies is common in older workers who are afraid that they may lose their jobs if they are unable to keep up with changes in software and hardware that seem to pop up every other week. Reactions can range from passive resistance and refusal to comply, to deliberately making mistakes or finding other ways to sabotage systems and render them inoperative.

Electronic monitoring (EM) of employees is another cause of Technostress. EM has been defined as "the use of electronic instruments or devices such as audio, video, and computer systems to collect, analyze, and report individual or group actions or performance." Employee monitoring has always existed and is obviously necessary to identify abuses as well as reward superior performance. However, unlike customary direct visual observation, employees subjected to electronic monitoring may not know they are being watched and evaluated for such things as the number of keystroke entries made per minute, the amount of time it takes to answer a telephone inquiry for information, who they are communicating with by phone, fax, web site, or e-mail, or how frequently and for how long.

Computer monitoring can be done at any time, anywhere, even at homes or locations far away for some 20 million workers using company computers, cell phones, or cars. EM is a sensitive topic that involves balancing discipline and reward policies and their effects on productivity, against the individual's right to due process and privacy, as well as the impact of quality of workplace life on employee stress and health. It has become a delicate issue with numerous and complex legal ramifications.

Technostress also stems from fears that computer activities can have adverse physical as well as mental health effects. There are claims that video terminal radiation may cause infertility, miscarriage, cancer, and birth defects. Although there is little proof of this, people who do put in a full work day in front of video display terminals have reported a constellation of complaints called Video Operator Distress Syndrome (VODS), that include eye strain, neck and other musculoskeletal discomfort, as well as increased emotional stress.

Repetitive stress injuries (RSI) such as carpal tunnel syndrome from typing are a major concern because they have been escalating at an alarming rate. RSI is now the most costly workplace injury and accounts for one third of the \$60 billion in workers' compensation payments annually. Several years ago, the National Council on Compensation Insurance reported that RSI claims had increased almost 800 percent over the previous decade. A New York jury awarded \$6 million to three RSI claimants and also held the computer company liable because of its faulty keyboard design. With over 40 million computer operators, future costs could be staggering. OSHA recently ruled that companies might be liable for work related injuries that occurred at home, even if due to an defective staircase that had existed for years.

RSI was initially referred to as cumulative trauma injury, and subsequently repetitive motion injury. The cachet of stress may have contributed to its current name, but may be justified. One three year study of 500 computer workers in a telephone company revealed that almost 25 percent had complaints consistent with RSI. It also found that psychological stresses such as feelings of job insecurity and job strain were much higher in this RSI group compared to matched controls.

Although RSI is a physical injury, like many other disorders, it can be precipitated or aggravated by emotional stress. Ergonomic improvements can help lower its incidence. However, organizations might also be at increased risk if it were shown that an affected worker had been subjected to excessive job stress that management could and should have corrected.

Computerphilia And Technostress

While fear of computers can cause stress, so can obsessive-compulsive behaviors about their use. This source of Technostress has been rapidly increasing because of more "user friendly" hardware and software that lead to various forms of computer technology addiction. Younger individuals are often affected such as kids who become preoccupied with hand held PacMan and Nintendo video games. Finger injuries from repeated trauma are so common they are often referred to as "Nintendonitis". A few addicted to computer video games that feature rapidly flashing lights have had epileptic seizures.

Some cyberspace addictions are game and competition oriented. Adolescents may play hooky from school in order to master the next level of Donkey Kong or to engage in prolonged on-line competition. Others fulfill social needs, for middle aged housewives who spend \$500 a month in AOL chat rooms, and people addicted to cybersex conversations or visiting various porn sites. There are also those who are preoccupied with on-line auctions or stock trading, and can't tear themselves away from their finance programs and constant Internet monitoring of the prices of stocks they own. Compulsive checking of e-mail every hour or so is not uncommon in workaholics and others who are lonely.

Some 6 million U.S. junkies may be hooked because computers now allow them to satisfy various personal needs. What they fail to appreciate are the long term stressful consequences that can result, such as flunking out of school, losing your job, marital separation, and divorce. However, as in many addictions, it may be difficult to distinguish between a marked degree of enthusiasm that might be normal for some individuals, and what has become an obsessive preoccupation that clearly crosses the line.

People can often become fascinated and immersed in an activity or hobby. Some spend as much time as possible in such pursuits because they provide an outlet for learning, creativity, and self-expression they are unable to obtain elsewhere. This is not necessarily unhealthy or pathological unless it significantly interferes with routine daily demands or disrupts relationships with family or friends.

Some signs that your Internet activities might be abnormal include:

- A preoccupation with computer enhancements and on-line services and often thinking about them, especially when far away from any computer.
- Feeling the need to spend more time on the computer to achieve a sense of satisfaction.
- Difficulty in being able to reduce your on-line time and feeling anxious or irritable if you are forced or successful in doing this.
- Using the computer to escape or to relieve feelings of anxiety, guilt, or depression.
- Lying to family members or friends about how often and how long you stay on-line.
- Realizing that you may be damaging an important relationship, career, or educational opportunity because of your on-line habits.
- Spending too much money for on-line fees but nevertheless not being able to stop.
- Feeling withdrawal symptoms such as depression, moodiness, anxiety, or irritability when you know there will be no Internet access for a prolonged period of time.

In addition to its emotional, financial, and social damage, computerphilia can also have significant adverse health effects. These can include a general decrease in physical activity as well as an increase in musculoskeletal and visual complaints, especially when not enough attention is paid to ergonomic concerns. Sleep deprivation is not uncommon for those who stay up late or set the alarm clock to wake up an hour early in order to surf the web. A severe or even mild but chronic sleep debt can be associated with lowered immune system resistance to infections, accelerated aging, as well as cardiovascular and gastrointestinal complaints.

Family and friends are frequently the first to recognize that the situation is serious but attempts to intervene are usually met with denial and resistance. As indicated in a previous Newsletter, there are a variety of resources available to obtain assistance. COLA (Center For On-line Addiction) and other web sites and chat rooms can provide useful tips but also increase on-line time.

Technostress From Information Overload Due To The Deluge of Data

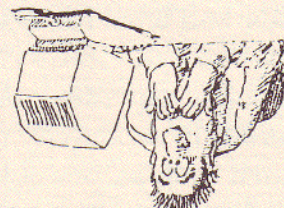
Too much change in too short a period of time produces severe stress because of the need to continually cope and adapt to new situations. The Holmes-Rahe scale, the oldest validated measure of stress, is based on the strong correlation between the severity and frequency of life change events and risk for future illness. Alvin Toffler's 1970 *Future Shock* predicted that changes necessitated by the constant need to learn new information would put a severe strain on people and organizations. Computers and the Internet barely existed at the time and have unleashed a method of accessing a flood of information that nobody could ever have anticipated. Scientific and social changes are now taking place at such accelerated rates that it is impossible to keep up to date.. Products touted as revolutionary when initially introduced often become obsolete within a year. Other rapid technological transitions and transformations must also be mastered in order to stay current and competitive. The German term for being overwhelmed by this deluge of repeated and new stimuli is *Reitzüberflutung*.

According to the November 13, 1987 issue of *The New York Times*, more new information had been produced within the past three decades than in the last five millennia. A weekday edition of this newspaper contained more information than the average person in seventeenth-century England would have been exposed to in a lifetime. In the U.S., 9,000 periodicals were being published annually, almost 1,000 books were printed every week, and information in technical publications appeared at the rate of 20,000.000 words every 24 hours. It would be necessary to read 1,000 words a minute, 8 hours every day, for 6 weeks, to simply scan one day's output, at which time you would have fallen 5.5 years behind in your reading assignment. Things have gotten much worse since then. The Library of Congress now receives over thirty-one thousand new items every day, of which only seven thousand merit being included in their permanent collection. Organizing and filing this flood of new information is a Herculean task for their librarians. However, that's a piece of cake compared to trying to keep up with the more than ten times as many pages that are being added to the Web every 24 hours.

Our proficiency at generating information has far exceeded our abilities to find, analyze, understand it, evaluate its accuracy, and whether it is the latest available. An survey of over 1300 managers recently reported that Internet activities had caused increased stress, poor health, disruption of personal relationships in more than two thirds, as well as a lack of job satisfaction in almost eighty per cent because of "information anxiety". Major complaints were being overwhelmed by the tens of thousands of articles that could be retrieved on a single topic, not knowing where to find certain important information or even if it existed and uncertainty about its validity. Some scientists claim that because of this "data smog", it might take less time to do an experiment than to determine whether or not it had been performed previously by another researcher in some other country. Help may be on the way from services such as the Scout Report and the Internet Resources Newsletter, so stay tuned!

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