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Psychiatry in the new millennium

Of all the medical specialities, psychiatry seems the most resistant to change in the face of rapidly evolving technology. Yet psychiatry could become the speciality most revolutionised by advanced technology in the new millennium. If the following predictions for psychiatry in the next 1000 years appear difficult to believe, imagine what might have been the reaction of those living in 999 to being told what would happen by 1999. Back then the profession of medicine as we understand it did not even exist, neither did there appear to be any institutions devoted to the care of the mentally ill. Indeed, in 1000 years' time from now, we might yet return to a similar situation in both these respects!

What the future holds

Service delivery

The first major change we are likely to see is in service delivery, in particular how patients gain access to, and receive intervention from, clinics as the price of computer-mediated communication continues to fall dramatically. For example, already there are dozens of websites on the Internet where therapy via e-mail is available. For a fee extracted from your credit card number, therapists situated all over the world will regularly correspond with you about your problems (Murphy & Mitchell, 1998).

The advantage of e-mail therapy is that if you are frustrated with British psychiatry you could at the click of a mouse, obtain the opinion of a therapist working in Australia or California. If you require rather specialised services, say you want a lesbian therapist, one can be more easily found on the World Wide Web than through the phone directory. For the obsessional or hysterical, it will be possible to obtain several opinions at once and choose the advice you feel most affinity for. E-mail suicide notes have already been sent.

One Canadian e-mail therapy company point out that an advantage of Internet therapy is it is impossible to be sexually abused by your therapist, and they argue this is one reason so many people are turning to cybertherapy (Murphy & Mitchell, 1998). There is also an obvious advantage of not having to suffer the stigma of visiting your local community psychiatric clinic.

In the new millennium the general adult consultant psychiatrist will be alerted by patients of problems via e-mail and will respond to many queries that way. Attached files containing treatment advice packages for standard problems like chronic worry or relapsing schizophrenia will be a regular feature of the e-mails you receive from

your doctor. The disadvantage of e-mail contact will be the heightened possibility of eluding the appearance and behaviour aspects of mental state examination, but in the future video links will help bypass this problem.

Self-help

New technology will also hasten the move towards self-treatment. Computer-assisted programs using an educational and cognitive-behavioural approach will become more widely available. Some are already distributed commercially for not just desktop computers (White & Jones, 2000) but palmtop portable electronic diaries, so it will be possible to consult and receive assistance for a panic attack wherever you are at the time (Newman *et al*, 1997). In the future the software will monitor your progress and tailor homework behavioural exercises accordingly.

Computers, being the tool we will use on a minute to minute basis whether at work or at play, will also have enhanced abilities to monitor our own mental states (Davidson, 1999). Already many people spend more time interacting with computers than with other humans. Monitors embedded in mice and cameras in screens will enable computers to measure our anxiety levels and gather psychophysiological information about our bodies and minds.

The Georgia Institute of Technology in the USA already has an electronic system that can correctly identify the emotions linked to various facial expressions at recognition rate of 98% (Davidson, 1999). Robert Shiavi, Professor of Biomechanical Engineering at Vanderbilt University in the USA, uses voice stress analysis techniques to correctly identify those with suicidal intent – with a 70% success rate.

Computers eventually will automatically advise on impending emotional problems from analysing the information it has gathered on you, including your tiredness from measuring your accuracy rate while working on your keyboard, and your irritation from finger pressure on the keys. So the electronics will suggest it is time for a break, or a phone call to your partner, you must be missing him or her because of the catecholamine constituents in your sweat deposited on the mouse. The computer might even automatically place the call for you, before you can object.

Massachusetts Institute of Technology programmers have already devised computer systems that detect frustration in users upset with software glitches, and then automatically send interactive empathy messages to their terminal, which have been shown to significantly calm computer users (Davidson, 1999). In the future your hard



disk will detect upset and reflexively play your favourite Chopin to keep you on an even keel.

Supervision

Online monitoring of your physiology will enable managers in the future to know what kind of work you enjoy doing, and transmit more of this type to your terminal. NHS administrators will better know which consultants are in fact sticking to their timetable by the activity coming from their desktops. Cure and relapse rates for each doctor, nurse and therapist's patient-load will be automatically fed back to staff and management, so star practitioners can be easily identified, as well as those who will be automatically sent for more retraining and continual professional development. Hospital and physician league tables updated hourly will be available on the Internet.

The kind of clinical problem you most enjoy, or are best at, will be detected via your computer, which will adjust the patient referral system to divert those patients you are best suited to treating into your waiting list.

As our homes become more intelligent, as well as workplaces, it will be possible for your bathroom to give you instant feedback on your health by measuring the changing constituency of body fluids, while the rest of the house monitors the gaseous constituents of your breath. In the future this information will be automatically piped to your local health centre. So your doctor could know of a heightened chance of impending relapse into psychosis because of altered levels of dopamine breakdown products in your urine, even before you are aware of any change in your mental state. Adherence will be monitored by your toilet and sink checking if correct levels of medication remain in your body fluids.

Already prototype earrings that monitor pulse rate, rings and bracelets that measure skin conductance are available (Davidson, 1999). Yet the biggest change in future psychiatric thinking will be to focus on prevention rather than cure. Using statistical analysis of your genetic loading, computers will give you probabilities of deterioration in your mental state depending on the type of life event it can see upcoming in your electronic diary. It will even advise against the scheduling of certain types of occurrence too close together, and readjust its calculations of your genetic loading depending on the latest information on how your next of kin are faring.

Public and private sectors

Regionally collected data will allow the Department of Health to foresee where the emotional black spots are across the nation, and how these change from day to day. This will permit targeted interventions like specific Government policies to assist certain areas economically. After the broadcast news, as well as local weather reports we will be given bulletins of how different regions fared in terms of their averaged mental states, and projections for the next 24 hours, influencing where you might decide to spend your day.

Companies will use their urinals to routinely drug test employees, and you will be sent an automated e-mail warning from occupational health about your alcohol intake the previous night, before you even log on the next morning. But while the sale of cigarettes to the public as a whole will finally be criminalised, the discovery that nicotinic stimulation helps prevent some of the dementias, will lead to only the elderly being allowed to purchase cigars and cigarettes – only on production of a valid identity card stating the minimum age of 75 years for which smoking remains legal, and indeed, beneficial.

The future for human nature

The main prospect is that the very distinction between man and machine will break down. At the American Chemical Society annual meeting in 1999 researchers began reporting the earliest results of growing nerve cells on top of transistors and other microelectronic devices that can communicate with neurones and monitor their activity (Service, 1999). Researchers at George Washington University have been able to guide the growth of nerve cells so they connect with each other on a simple rectangular circuit, leading the way to creating neural circuits on actual microelectronics (Service, 1999).

It will soon be possible to grow nerve cell circuits tailored to our specification and implant them into malfunctioning brains. Already neural prostheses that artificially stimulate the nervous system to partially restore lost vision, hearing or movement are now available. Cochlear implants involving implanted electrodes to stimulate auditory nerves already provide rudimentary hearing to tens of thousands of deaf people, and similar implants to improve bladder control and restore hand grasping abilities in quadriplegics are beginning to be used. Electrodes implanted in retinas allow blind people to see simple shapes, rendering the possibility of brain implants ever nearer (Service, 1999).

These developments hasten the moment when man and machine merge, and artificial intelligence experts predict computers exceeding the memory capacity and computational power of the human brain will be available within 20 years (Kurzweil, 1999). This means that well before the year 2050 information will be fed directly into our brains via neural connections with machines, and the distinction between humans and machines will then be totally blurred.

This vision of the cyborg is not so fanciful – after all, many of us today benefit from the helping hand of hearing aids, contact lenses, hip replacements and pace-makers; all contribute to the merger between man and machine.

The current prediction is that humans will gradually co-evolve with machines via neural implants that enable us to upload our carbon-based neural circuitry into whatever kind of hardware machines are using in the late 21st century (Casti, 1999). At this point there will be no clear distinction between humans and computers and life expectancy will no longer be a term that pertains to intelligent beings. So humans will not exactly disappear; they will simply merge with machines (Moravec, 1998).



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New diseases

Before anyone jumps to the conclusion all these benefits of technology will make psychiatrists redundant, the accelerated progress, in terms of available treatments, will be accompanied by the continual arrival of new disorders. The very barrage of information about your own physiology and mental state machines will enable to feedback to us continually, will contribute to a rise in self-obsession and related disorders. Though perhaps the merger with machines might make it easier for us to understand our cognitive therapists.

The NHS will continue to be dismantled and privatised, leading to the continuing rise of private practice and voluntary counselling and psychotherapy. The weak regulation of these rival professions will allow major scandals to erupt in the future concerning poor training and practice. There will be mounting interest, as a result, in computer programs that appear to offer the insights and responses of psychodynamically-oriented therapists, but which never get bored, irritated, suffer from counter-transference, or forget anything you said, even in a session years ago.

As records become computerised, the stigma attached to psychiatric conditions will mean that an underground industry will develop where you might obtain treatment without any records being taken and so transmitted to your employer. In more artistic professions, like advertising, the realisation that some creativity is linked to forms of psychological problems, could lead to reduced stigmatization of mental illness. Indeed, doctors could come under pressure to falsely document emotional issues in the medical records of ambitious people in these occupations.

Changes in lifestyle will produce new problems as others are solved. The two main sources of future discontent will revolve around relationships and sleep–wake cycles.

One estimate from the USA is that, on average, parents now spend 22 hours less a week with their children than they did 30 years ago. This is largely due to the fact two-parent families now work an average of almost 500 more hours a year than they did 30 years ago, mostly accounted for by the rapid increase in working hours among women (*The Economist*, 26 June 1999, p. 68). The pressure of ever greater competitiveness and efficiency to serve capitalism means we spend less time interacting with each other, even within families, ensuring we become socially de-skilled in the process, leading to increases in social strains, and producing yet more social avoidance as a result.

This partly explains the rise of demand for counselling and psychotherapy, the 20th century has produced a profession whose job it is to hear our confidences and absorb our ventilation, because there is no one else in our lives we can turn to for this kind of support any more.

A new society

If we have less time for each other, and given the human tendency of whenever we come up against a scarcity in

our environment to extend our frontiers, we will colonise the night to produce the 24-hour society. The temporal order by which we structure our day will be transformed unrecognisably very shortly.

At present, transport systems have to cope with peak capacity for 4–6 hours a day – but could operate more efficiently if loading was spread more equally throughout the day and night. If the working day was staggered over 16 hours, offices, shops and schools would have double the use they have now. We could get the same results as we do at present from half the buildings, which will have a dramatic impact on land use policy (Kreitzman, 1999). The idea of a building sitting empty and unused for the majority of a 24-hour period will appear anachronistic to our children.

Eventually, we will go beyond the 24-hour society and completely restructure our use of time. Day length could switch to 28 hours, allowing Mondays to be eliminated, as everyone hates Mondays. The working week would be four 10-hour shifts with a 56-hour weekend. Thursday might be a problem, being dark for most of the day, but this could be allocated for roadworks.

This transformation of time structure would mean half of society might never meet the other, as different sleep–wake cycles materialised; on top of the added social alienation this might produce, includes a possible rise in sleep disturbances. Research has already found that recently married men who work nights are six times more likely to separate or divorce than those who work days, while this rate is three times higher for women who work nights (Presser, 1999).

Comment

What trying to anticipate the future raises is the issue of whether, as a profession, psychiatry will even continue to exist, and what we can do to preserve its values in such a rapidly shifting world. Just as diseases have become obsolete, like smallpox, the specialities that treated them have faded from prominence. The uncertainty of the future focuses our attention on what is our core area of expertise. Changes in technology threaten to replace the need for human provision of certain services.

It might even be that to survive we have to adapt to an evolving human psyche by developing a completely different set of skills, including incorporating ergonomics into the MRCPsych curriculum. Many psychiatrists appear to believe the answer is to embrace new technology and incorporate it into our attempt to understand minds and brains.

The fundamental question that seems to arise is, while disorders may come and go and new solutions may help, will human suffering ever cease to exist in the future? For if there is a core element to our expertise, it is a special understanding of personal distress, which no other branch of medicine or any other profession has devoted itself to so completely, and in its purest form.

Oddly, this suggests that whatever the future may bring, we can only survive if we do not abandon our

roots in this ancient area of human experience. For we are in danger of being lured too completely away from the study and understanding of suffering through the attraction of shining new advances in technology, like brain scanning and gene therapy. Of course these developments have an important role in our fate. Our culture's perennial attempt to solely seek the solutions to human problems in technological advances is fundamentally flawed, because some of our difficulties will only ever be helped by personal changes.

References

- CASTI, J. L. (1999) Exit homo sapiens, stage left. *Nature*, **397**, 663–664.
- DAVIDSON, C. (1999) I know how you feel. *New Scientist*, **162**, 26–31.
- KREITZMAN, L. (1999) The 24-hour society. *Royal Society of Arts Journal*, **2**, 77–81.
- KURZWEIL, R. (1999) *The Age of Spiritual Machines: When Computers Exceed Human Intelligence*. New York: Viking.
- MORAVEC, H. (1998) *Robot: Mere Machine to Transcendent Mind*. Oxford: Oxford University Press.
- MURPHY, L. J. & MITCHELL, D. L. (1998) When writing helps to heal: e-mail as therapy. *British Journal of Guidance and Counselling*, **26**, 21–32.
- NEWMAN, M. G., KENNARDY, J., HERMAN, S., et al (1997) Comparison of a palmtop–computer-assisted brief cognitive–behavioral treatment to cognitive–behavioural treatment for panic disorder. *Journal of Consulting and Clinical Psychology*, **65**, 178–183.
- PRESSER, H. B. (1999) Toward a 24-hour economy. *Science*, **284**, 1778–1779.
- SERVICE, R. F. (1999) Neurons and silicon get intimate. *Science*, **284**, 578–579.
- WHITE, J. & JONES, R. (2000) Interactive treatment in primary care: can computers provide 'real' therapy? *Clinical Psychology Forum*, in press.

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