Technology Addiction

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Contents:

Understanding Technology Addiction

The Information Generation (iGen) is the first generation to spend their entire adolescence in the age of the smartphone and social media. Born after 1995, they are more unhappy, more mentally fragile and leading more sheltered lives than previous generations. They are probably the safest generation ever, but according to Professor Jean Twenge from San Diego State University, they are maturing at a slower rate than previous ones. They are less likely to have a driver's licence, to work in a paying job, to go out on dates, to drink alcohol or to go out without their parents.

At the same time smartphones became common, teenage mental health issues started to appear. Depression among teens has climbed 60% in just five years, with rates of self-harm rising in girls. Overall, teen suicides have doubled in the last decade.

This sudden change in teen behaviour has resulted in teenagers feeling lonely or left out, or that they can't do anything right, or that their life isn't useful – all symptoms of depression.

Today's teens are burdened by a lack of fulfilment. Many have the sense that they are missing out on something. Slowly, they are realising that being on the phone all the time is not the best way to live after all. They are finding out that virtual relationships are not the same as real relationships and excessive screen-time has led to a spike in depression, self-harm and suicide.

Digital platforms affect the ability of individuals to pay attention and absorb information and it is important to understand what effect technology is having on cognition and understanding. For example, our children's ability to employ their creative imaginations are being inhibited and constrained by technology. Particularly, abstract thinking is being stymied.

The way in which we think about things is split into two parts – abstract and concrete. The more distant an object or event is from a person, the more abstract their thoughts are about it, whereas the opposite is true for concrete thoughts, which are specific. For example, when booking a holiday, people first consider the idea of going on holiday as a general concept, because at that early stage, they are further away from the date of travel. As the date of the holiday gets closer, they start considering more concrete thoughts, like flight times, hotel bookings, car hire and a planned itinerary.

Abstract thinking is an important skill and any deficit in an individual's ability to think abstractedly would be a backward evolutionary step because the ability to *understand* is a vital part of human development and reasoning.

Psychologists at Hungary's Eötvös Loránd University claim the use of smartphones and tablets is literally rewiring the brains of children, making them less able to see the bigger picture.

People automatically process the bigger picture before paying attention to the details, but this process is being reversed because the child's attention is focussed only on what is on the screen rather than it's relevance to what is happening in the rest of the world. The ability to focus on the bigger picture helps us to see the world in a more meaningful and coherent way. If we understand the bigger picture, the small details will be less likely to confuse us.

Children's brains are more malleable than those of adults and significant early exposure to screens is bound to have long-term impacts, so the researchers tested 40 children by getting them to spot whether a particular shape appeared on a screen in either large scale or small scale. They found that the children who habitually used smart devices appeared to process the details first, demonstrating more detail-focussed attention styles – unlike children with little device exposure.

Just six minutes of playing a consecutive task 'balloon-shooting' game was enough to induce a detail-focused attentional style. In contrast, children who played a non-digital 'whack-a-mole' game showed the typical bigger picture focus.

This behaviour is contrary to the norm – people usually focus on the big picture *before* zooming in on specific details.

To explore whether smart devices were indeed responsible for these differences, the team conducted a second test involving 62 pre-schoolers to see if playing an on-screen game changed attention styles in the short-term. This atypical attentional style in screen user children is not necessarily bad, but it is different. It might be that children of the future may well be more detail-oriented scientific thinkers, and less social and artistic people.

The full findings of the study are published in the journal *Computers in Human Behaviour*.

Away from social media, children now spend more than an hour a day watching films and TV programmes on devices may also increase the risk that toddlers will have emotional and behavioural issues, including hyperactivity, poor concentration, short attention span, forging friendships and trouble connecting with other children.

We already know that devices are reducing the time children spend playing and interacting with other children and that this impacts their social and emotional development. Certainly, patterns of electronic media use by children are rapidly changing with a growing number of studies showing that many 4-year-olds now regularly use smartphones and tablets. The use of devices by preschool-age children has tripled between just 2013 and 2017.

Five year-olds spend considerably more time on screens than is healthy. High levels of screen use, especially film and TV programme viewing, can lead to psychosocial problems. Although children's screen use patterns might not seem problematic when considering use on a daily level, they do have risks in the long term.

A study of 699 children in Finland monitored their screen habits via a questionnaire to parents about their offspring's time spent using electronic media, including watching

television and playing games on computer, console, smartphone or tablet, at 18 months and five years.

At age five, each child was assessed for emotional and behavioural issues including short attention span, hyperactivity, and difficulties making and keeping friends. Looking at the emotional and behavioural assessments, the team found that extended use of electronic media at age 18 months was associated with a 59% increase in the risk of developing peer relationship problems by the age of five. At age five, lengthy consumption of television programmes was found to increase the risk of attention and concentration difficulties, hyperactivity and impulsivity, and other emotional and behavioural problems.

The full findings of the study were published in the journal *BMJ Open*.

As smart devices continue to integrate with daily life, the debate over whether laptops, tablets and phones should be allowed in the classroom is becoming increasingly relevant.While some argue that laptops aid students in note taking and comprehension, many psychologists are concerned that they are just another unwelcome distraction. Researchers have found that students who used laptops or tablets in the classroom performed less well than those who did not.

Unrestricted use of devices may affect students in different ways – without taking into consideration the temptation of checking social media or even doing homework for another class! Equally worrying is that teachers may even change their own behaviour by interacting in a different way, albeit at an unconscious level, with students who are using devices.

It is well known and understood that the physical act of writing things down assists in establishing memory and I fail to see why schools are allowing this tried and tested system to be sidelined in favour of something that is not yet tried and tested, or indeed anywhere near as effective! The feel of pen on paper, the skills involved in forming words and letters and the visual acuity involved in actually writing things down, all help memory retention.

There is no doubt increasing reliance on modern technology is affecting memory. Devices may take many of the stresses and strains out of modern life but long-term there may be a price to pay for this convenience. Remember, in terms of human development, there's no such thing as a free lunch! A paper co-authored by University College London neuroscientist Sam Gilbert and Dr Evan Risko, professor of cognitive psychology at the University of Waterloo warn of cognitive offloading, meaning that if you rely on computers to store information, the chances are, you won't devote brain space to remembering it.

Another study found that museum-goers given digital cameras remembered objects they had photographed less well than other exhibits, which goes some way to proving the point we are inadvertently allowing our brains to become lazy. We know that drivers who rely on their GPS remember less about what they had seen along the way – and struggle to retrace the route when asked to drive it again without the aid of the sat-nav. Volunteers given general knowledge tests were more likely to doubt their instincts and 'pass' on a question if they were told they would be able to look up the answers online afterwards.

The long-term consequences of living in a modern, hi-tech environment in which we constantly 'offload cognition' are unknown, although we are now beginning to see and understand the effects.

In the classroom, some teachers are noticing that technology is making children less able to remember skills such as basic maths and appear to be less able to remember times

tables. Dr Kirsty Goodwin, from Sydney, Australia has noted that children who rely heavily on gadgets have shorter attention spans and impaired language skills. Children are increasingly downloading information to their devices instead of relying on – and thus developing – their memory.

Even our smartphones, as enormously convenient as they are and providing instant access to unlimited information, photos, music, TV programmes, eBooks, Internet and so on, may be harming our cognitive abilities. In my twenties, I could remember at least half a dozen phone numbers – the only one I can remember now is my own. Offloading demands onto computers must have an impact at a neurological level on our abilities in both the short and long-term as our brains become more cognitively reliant on technology.

Headmaster Gregg Davies runs the £18,000-a-year independent Shiplake College in Henley-on-Thames and has introduced a complete ban on mobile phones between the hours of 8.15am and 5.45pm, including beak times and lunch hours. Anyone caught using a phone during this period is handed a detention. He claims the rule has freed youngsters from the stresses of social media and has allowed them to concentrate on their studies – suddenly, a huge distraction has been removed.

Admittedly, the announcement was at first greeted with a certain amount of disbelief, not to mention dismay, but students are happier now that they've been relieved of the burden of constantly checking social media accounts and worrying about what others might be saying about them. Staff were also concerned that online boasting might make some students feel dissatisfied with their own lives, a common and recurring problem amongst the young. Posting only the highlights of otherwise ordinary lives can lead to young people feeling left out and worried that their lives aren't as exciting as their peers. And then there's the problem of online bullying – anonymous, thanks to Twitter.

One reason for the new rule was that teachers had expressed concern that children's communication skills were suffering because they were spending less time talking to each other, but sixth formers in particular have shown improvements in the ability to engage in discussion and debate about more important issues. The improvement has been noticeable. Free time is now more likely to be spent playing sport or engaging in normal face-to-face conversation – as a result, student wellbeing has improved. Students now spend more time outside, interacting with their peers and enjoying the opportunities being in the fresh air presents.

Teachers also lead by example and restrict their own mobile use to the office. Although the school still encourages the use of tablets and laptops as a teaching aid, the benefits brought about by the changes have also been welcomed by parents. Most telling was that once the initial shock had worn off, the children didn't miss their devices. They quickly got used to planning where to meet up in advance rather than texting 'where are you?' The ability to plan ahead is a vital part of development.

A study published by the London School of Economics found that a ban on phones helped classroom performance, finding that after schools outlawed mobiles, test scores of pupils aged 16 improved by 6.4%.

Researchers at Murdoch University in Perth, Australia, led by Lecturer Dr Margaret Merga, found that the more electronic devices children have access to, the less likely they are to read. The study involved almost 1,000 Australian school students and looked into how often they read real books, and how often they read from devices. A surprisingly large number preferred a paperback to an iPad.

Devices that allow children to multitask between reading and surfing the Internet provide distractions that make it more difficult to fully concentrate and comprehend what is in front of them. Published in the journal *Computers and Education,* the research found that access to a greater range of devices meant that children's reading frequency was reduced.

Although many schools now encourage children to work on their laptops and tablets in class, there is now evidence suggesting this practice does not support their numeracy and literacy skills. Perhaps the rush to embrace the technology of a *Star Trek* universe, together with the modern thinking that children prefer to read on screens, is mistaken. Unless we really want to breed a generation of simpletons hobbled by the inability to communicate and interact properly, all schools should carefully reconsider this policy before it's too late.

Outside school, parents who allow their toddlers and babies to spend more than an hour a day playing on phones, tablets and computers may be causing their children to be sleep deprived. Sleep plays a key role in children's development and it could affect their later emotional health, social development and academic achievement – every hour youngsters spend using devices, costs them an average 15 minutes sleep.

According to findings published in the journal *PLOS* ONE, screen time has a 'significant impact' on a child's development. According to scientists at University of Alberta, toddlers who use screens for more than two hours a day are seven times more likely to develop ADHD. Canadian researchers found that adolescents who spent more than seven hours per day on screen media were 40% less likely to achieve high academic performance.

It has long been thought that smartphones and other gadgets used before bed can cause restless nights because their light causes melatonin suppression a chemical which controls the body clock, and that exposure to a mobile phone's blue light before bedtime will disrupt sleep.

Leading Oxford University neuroscientist Professor Russell Foster thinks that this 'blue light' is 'extremely unlikely' to affect sleep because the light is not strong enough. Based on the data available and a study from Harvard University, you need a lot of light for a long duration to disrupt the circadian rhythm – the 24-hour internal clock that cycles between sleepiness and alertness and is tuned to light and dark.

The real problem might just be that it's the amount of time people spend on their phones that acts as a stimulant that keeps us awake. 'Dark modes' and screen filters might be misleading, leaving users believing it is OK to use the devices late into the night. It might be that just having the phone by the bed is enough of a distraction to keep you awake.

Blaming the type of light instead of the amount of use means that kids that have these settings on their phones will continue using them at all hours of the night. According to published data showing the effect of light on the human clock, the problem is more likely that kids are simply staying awake longer.

Researchers in the UK conducted a survey of 715 families. They discovered that 51% of children aged six to 11 months and 92% of children aged 25 to 36 months play on devices every day, the average time spent daily being 25 minutes. That equates to six minutes loss of sleep. With older children, aged from 8 to 18, the average was found to be 44.5 hours per week! *Common Sense Media* claims that some teens are glued to their screens for as much as nine hours a day. What on earth are parents thinking? Researchers did warn however, that parents taking part in the study might not always have answered entirely truthfully.

The link between screen use and lack of sleep is difficult to define, but it is thought to be partly because children get over-stimulated, and possibly because parents of toddlers who already sleep less are more likely to let their children play with touchscreens just to keep them occupied. The more time children spend on screen time, the less likely they are to spend time on more important activities such as homework. Children who spend two to four hours a day using digital devices are 23% less likely to finish their homework to a satisfactory standard. Every additional screen hour further reduces the chance homework will be completed.

On balance, earlier research showed that babies who frequently use touchscreens more quickly achieve motor-skill milestones, such as picking up toys, grasping objects with finger and thumb, and transferring objects from one hand to another. So instead of stopping touchscreen use altogether, it might be better to ration it – and of course its content – in a way that would maximise the benefits and minimise any negative consequences.

An additional warning comes from a leading psychologist specialising in child health education, Dr. Aric Sigman. Dr. Sigman warns that very young children can develop an addiction to electronic devices known as 'Screen Dependency Disorder' or SDD. Dr. Sigman's recommendation is that children should not play with tablets or smartphones before they reach the age of two. Even then, they should have screen time limited to an hour a day until they are at least five.

Writing in the journal of the *International Child Neurology Association*, he cited evidence showing that excessive exposure to computer screens very early in life alters the structure of the brain. For children who are genetically predisposed to developing dependent habits, this can create patterns that will stay with them for the rest of their lives. Babies and toddlers are most at risk, but the possibility of long-term damage exists into late teens and even early 20s. Just as most people who drink won't become alcoholics, most children who spend time on screens won't become addicted. Even so, early and excessive exposure is more likely to result in adulthood dependency. With this in mind, parents and doctors should follow a 'principle of precaution' and limit exposure.

People with SDD become preoccupied, withdrawn, and lie about how much time they spend on devices and even display withdrawal symptoms if they're unable to use them. These are the same behaviours found in alcohol, drug and gambling addiction.

SDD is a rapidly emerging neurological public health issue, yet it is unfashionable to talk about it because people are reluctant to admit the dangers. A report by Ofcom published in 2016 reported that on average, British three and four-year-olds spend two hours a day staring at screens and then stare at TV for another two hours. Children aged five to 15 spend four hours a day staring at computers and tablets, plus two hours of TV. A 2016 study of 248 children aged five to 17, whose brains were regularly scanned over a three year period, found significant changes to brain tissue density in children who spent long periods playing video games.

Dr Sigman's view is that SDD is not just a social or cultural issue, it's a medical issue, and there is a large body of evidence to support this view. The Australian government has announced that children below the age of two should not be exposed to screens at all. Britain has no such guidelines, although England's chief medical officer, Dame Sally Davies, has urged parents to set their own 'age-specific maximum times' to reduce potential damage. Sadly, this warning has not received the publicity it merits.

Smart phones and tablets are now in every home and some children play with them before they learn how to talk. Scientists are concerned that this could put very young children at risk of delayed speech development as they grow. The bottom line is that parents should not allow their children anywhere near a screen until they are at least 18 months old, and for the following reasons…

Researchers from the University of Toronto studied the effects on communication of handheld devices in very young children. This is important work because this generation is the first in human history to have access to these devices from birth. The team studied nearly 900 children aged between six months and two years. According to the parents, 20% of children used handheld devices for an average of 28 minutes per day.

Using a screening test for language delay, the researchers found that the more handheld screen time the child was exposed to the more likely it was to have delays in expressive speech development. The concern is that for every 30-minute increase in handheld screen time, researchers found a 49% increase in the risk of expressive language delay. However, no link was found between handheld device screen time and delays in the development of other communication skills such as body language and social interaction.

The researchers believe their findings support a recent policy recommendation by the American Academy of Paediatrics to discourage any type of screen media use by children younger than 18 months.

Meanwhile in South Korea, Scientists at Chonnam National University Hospital, Seoul, are concerned that children who use their smart phones excessively could be damaging their eyesight. Specifically, they are at greater risk of temporary convergent strabismus – more commonly known as going 'cross-eyed.' The condition – which causes the eyes to focus inwards – has rarely been diagnosed in South Korea, but it is now becoming increasingly common. The number of children studied was only small – but the 12 who were examined were aged between 7 and 16 and used their phones for between four and eight hours a day.

The children held their phones between eight and 12 inches from their faces and this proximity caused eyestrain. Medics were able to reverse the symptoms in nine of the children by banning mobile phone use for a period of two months.

In an age when everyone has twenty-four hour access to email and the Internet, it seems that technologies designed to help employees are actually doing more harm than good.

It's not just kids who are addicted to technology – parents are just as guilty. Parent's use of mobile technology around young children can cause tension, conflict and negative interaction in parent/child relationships.

Parents are thought to use smartphones and tablets for at least three hours every day. More than that, parents are finding themselves inhabiting two places at once – looking after their children while at the same time trying to catch up on work emails and social media. Modern technology has blurred the line between work, home and social life and some parents are struggling to find a healthy balance – indeed, some are blissfully unaware of the harm they are doing to their own children.

There is a popular assumption that it is parents who complain about their kids being glued to their devices, but a recent survey has found a staggering 34% of children believe their parents are more addicted. The survey was carried out by Jenny Radesky M.D., a child behaviour expert and paediatrician at the University of Michigan C.S. Mott Children's Hospital in conjunction with colleagues from Boston Medical Centre.

The study asked 35 mothers, fathers and grandmothers about their mobile technology use and discovered that each participant consistently experienced internal battles between multitasking mobile technology use, work and children. Many of the participants felt they were suffering from information overload and emotional tension that disrupted family routines such as meal times. One mother said it felt like 'the whole world is in your lap.' Other parents explained it had a trickle-down effect – whatever they were reading on their device determined how they responded to their children.

Parents also said their children would crave more attention when they (the parents) were heavily involved with their mobile devices, which prompted negative behaviour such as snapping at their children. Further, the mothers, fathers and grandmothers also said that mobile technology provided an escape from the boredom and stress of parenting and the demands of running a home. Another mother said that being connected after a long day is a reminder that she had a life beyond her kids.

Technology allows us the ability to work from home and makes it easier to communicate with other family members, giving us a more concise view of their lives without the need to converse face to face or on the telephone – although an actual conversation is much less time consuming than texting or typing on a screen.

It is important for parents to feel relevant at work as well as other parts of their lives but parents should not necessarily be available to their work or to their children all the time. What is important – and needed – is a sense of balance. It's healthier for children to have some independence, but the problems start when parents get overloaded and exhausted from being pulled in too many different directions at once.

It is up to parents to put some simple rules into practice. And here they are…

It is important to set boundaries which will help to avoid web activity that increases stress levels. There's a time and a place for everything – there must be times when technology is put aside.

Leading by example and practicing what you preach is vital – maybe you should cut down on your own use. Don't use your own phone at the dinner table either and if your child is using their mobile at night, it's time to take it off them.

Try to eliminate answering stressful emails, text messages or reading online news in the presence your children – or at least cut down. Stress communicates to children and they will react to your own negative emotions. Leaving problems until it's appropriate to deal with them means that you will be more able to think about them more clearly.

You definitely should not allow yourself to be distracted by technology when your child is trying to talk to you! It's OK to make rules about technology use, especially when it is for your child's protection. So never use your mobile in the car, not even when you're stopped at traffic lights!

Finally, it's never a good idea to share information and especially pictures of your children online. The reasons for this should be obvious.

A good safety measure is to tape over the web cam on your children's computer, tablet or smartphone – you never know when your child's device is being hacked!

Above all, try to remember that there's a time and a place for everything a time for work and a time for play – and there's a time for putting one's family first.

Ours is the first generation in human history that has had to deal with always being connected, through phones, laptops and tablets. Companies who expect their employees to check their emails outside working hours are not only getting free overtime but are also responsible for creating extra stress and exhaustion which can adversely effect family life.

People who check work emails after they've left the office and as soon as they wake up underestimate the damaging effects it has on their health and their relationships. So-called 'flexible work boundaries' drive up stress levels and push workers to become insular and less social.

University employees surveyed by Virginia Tech University all had levels of anxiety that could be damaging to their health, but few realised how severe that damage was, and none of them understood that it also left their partners incredibly stressed. Competing demands of work triggers feelings of anxiety which can spill over into their personal lives. Too often 'flexible work boundaries' turn into 'work without boundaries' and some bosses assume staff will just cope with it.

Worryingly, employees don't have to engage in actual work during non-work time for the effect to be seen.

A study of 132 people by psychologists at the University of Hamburg found during times employees were away from work but were expected to be contactable, they had higher levels of the stress hormone cortisol. Even when they were not required to be physically available at the office, the spike happened.

Employees who worked in the evenings and at weekends were more likely to complain of insomnia, headaches, fatigue, anxiety and stomach problems as well as muscular problems and cardiovascular issues.

A timely study carried out by Leigh University, Pennsylvania, Virginia Tech and Colorado State University found that increasing numbers of workers are experiencing burnout because of their inability to disconnect from the office. Having to stay alert and switched-on without any time or opportunity to unwind is now recognised as damaging to both mental and physical health.

Using data from 297 working adults, the study looked at the role of organisational expectation and its connection to out of hours emailing and stress. The researchers found that out of hours emailing caused levels of stress comparable to having a high workload, being in conflict at work, a poor working environment, and deadline pressure. In effect, employers were effectively being ‘energy thieves’ (my words, not theirs.)

Other studies have shown that employees must be allowed to detach both mentally and physically from work to recover enough to be ready and fresh for the next day. With this in mind, it might be that companies who expect employees to be chained to the office via the Internet also risk a fall in productivity. Unfortunately, the expectation that employees should be permanently on call seems to be the new normal.

Regardless of whether or not employees actually read emails, being permanently on call leaves them unable to detach from work and thus ‘anticipatory stress' takes hold. The effect on workers’ ability to give their families, and especially their children, the time and attention they deserve is bound to be eroded. In an article published in the journal *Frontiers in Human Science,* BioBeats CEO David Plans claimed that taking work home is 'killing people.’

More than half of City workers suffer high levels of stress as they try to balance office and home life and deal with the habit of always being available to do work and staying connected to the office has been linked to high stress levels and cardiovascular disease. The study used wrist monitors to measure the heart rates of workers, finding that spikes in stress occur when people interrupt their home time for work. Preliminary results from the study of 550 staff from the London offices of the French bank BNP Paribas found that stress levels remained dangerously high until 8.30pm and some people's stress levels remained high until midnight or 1.00am.

Scientists are not the only ones interested in the effects of always being hooked up to the office – health insurance companies are also taking a keen interest, and for obvious reasons. Don't be surprised if premiums start to go up in the near future.

With this in mind, France has passed laws that forbids employees checking their work emails at weekends! Vive la France!

The new age of digital information technology may herald another evolutionary step in human development – but it's not one that's necessarily to our advantage.

When I was a boy, if I wanted to find out anything, I had to go to the library. That exercise required a certain degree of planning. I had to take into consideration how long it would take me to walk there and what time I would have to leave to be back in time for tea. I would have to engage my conscious brain when crossing a busy road and consider the efficiency of taking a short cut across the farmer's field – muddy in winter and dangerous in summer because he was said to keep a large bull in there. Once at the library I would have to find the relevant shelves and gaze at the spines of dozens of books to find the ones I was looking for, then search for the relevant pages before sitting down to laboriously copy with pen and paper the information I needed. All this required a degree of forward planning as well as coordinated motor skills and feats of manual dexterity that exercised various different parts of my developing brain.

When I grew older and started touring, to find the venue where I was to perform that evening, I would have to consult a map and plan a route, making decisions in advance as to which roads to drive down while at the same time making a note of landmarks – a church, a major road junction – all of which would help me to find theatres and concert halls.

Occasionally I would be frustrated by an unexpected one-way street or road closure, which forced my brain, with its appalling sense of direction, to work overtime. Sometimes, I would have to stop and ask for directions, which would have to be memorised and carefully stored in my short-term memory. Once I had been to a venue, finding it again, even months later, presented much less of a challenge because I had learned to remember the way.

But things are very different now. I rely on my Sat-Nav for almost everything. I used it the first time I went to do a show at the Civic Theatre in Rotherham. I have been there I think six times now, but would be pushed to find it without the assistance of the eternally patient lady who exists only in the electronic circuits of this brain-numbing device. There's something else I have noticed too. I am forgetting information that I have looked up on Google, and it appears I'm not the only one!

When faced with a question, 36% of people will now automatically Google the answer without trying to work out themselves what the answer might be. This can't be doing the brain's connections, vital for establishing memory, any good. Worse, it appears that a

quarter of people immediately forget the information they have just Googled.

A study involving 6,000 international consumers aged 16 and over, was conducted by digital security firm Kaspersky Lab. The study revealed that 36% of people admitted to Googling information before trying to recall the answer on their own, with the percentage rising to 40% for those over the age of 45. It is eminently possible that the ease of information retrieval is making people lazy. It might also be that some people may be impatient to get the correct answer as quickly as possible. Whatever the reason, nearly 25% of the people surveyed in the study admitted they forget online answers they had Googled. Again, the figure was higher for those over 45.

These findings could have important and far-reaching implications for our long-term memories. What if we were inadvertently breeding a generation of people who will not be able to function as efficiently as they once could? Is our ability to think for ourselves being eroded? Is gleaning our information from the Internet making people think they are smarter than they really are? What could be the long-term ramifications for human evolution? Having instant access to all the world's knowledge is one thing, but letting this access reduce your own personal knowledge is another.

In a series of experiments, published by one of the world's leading authorities, the American Psychological Association, scientists discovered that people who searched for information on the Internet believed they were more knowledgeable than they really were. This was confirmed when the group competed against a control group in general knowledge subjects unrelated to the online searches.

The researchers were surprised that participants who had searched for information on the Internet displayed an inflated opinion of their own knowledge even when they couldn't find the information they were looking for! They also considered their brains to be more active than the volunteers in the control group. However… 24% admitted they would forget the online answer once they had used it and this figure rose to 27% among over 45's. The researchers discovered that 12% assumed the information would always be out there somewhere so there was little point in trying to memorise it!

Actively recalling information is a very efficient way to strengthen memories and our brains strengthen memories each time we recall them. Our brains also have the ability to not only assimilate, but also discard and forget irrelevant information. We do this on a nightly basis when we sleep. While we are dreaming, our brain acts as a sorting house of information, collating that which is important and discarding the irrelevant.

Repeatedly looking up the same information on the Internet does not serve to create long-term memories.

In 2013, Harvard University researchers carried out a similar study. They were surprised to discover that participants were more likely to recall information if they believed it had been erased from the computer, whilst those who believed it was still stored were more forgetful, even when they were explicitly requested to keep the information in mind.

In another experiment, students were asked to answer trivia questions both with and without the assistance of Google. They were then asked to rate their own intelligence. Perhaps unsurprisingly, those who accessed the Internet for their answers had a significantly higher view of their own genius compared with individuals who correctly answered the questions having relied solely on their own knowledge.

The belief that the ability to use the Internet becomes part of your own cognitive

intelligence is a dangerous misconception. Rather than sharing information with others, people are more likely to save it electronically. This stymies conversation and communication. We simply don't have, and cannot have, the same kind of interaction with the Cloud as we do with our fellow human beings. Further, there is a distinct possibility that important information will be excluded from our biological memories.

Remember what I said about going to the library and driving to venues involving lots of other skills? Writing things down, creating pictorial representations, or even reading them aloud helps us to remember because it involves more than just one activity. Memories of sights and sounds and smells, even of physical activity or environment, all collude to reinforce one's memories, especially of important information. Moreover, the process of talking to someone else about a problem or an answer makes memories more robust.

Even talking to yourself out loud (because that too stimulates different areas of the brain) helps with memory retention. People who talk to themselves may get funny looks, but you can always pretend you're talking to someone. Even better… try actually talking to someone. It's much more efficient and interesting than texting because you also benefit from the infections of the words being spoken – and enjoy the real passion and meaning of the spoken word! People who read out loud to themselves or to others are more likely to remember the information than those who read in silence.

Researchers at Montreal University recruited 44 undergraduates to read words on a screen. They were instructed to first read the words in their heads, then read silently while moving their lips, then read out loud while looking at the screen, and finally reading the words aloud to somebody else. The researchers found the best results came when participants addressed someone else. Talking aloud to themselves came a close second.

Professor Victor Boucher, who ran the experiments, said "articulating without making a sound creates a sensorimotor link that increases our ability to remember… if it is related to the functionality of speech, we remember even more." So, increasing the number of skills involved in the exercise helps establish more robust memory. Just like going to the library, because the associated multi-sensory information combines to make the memory stronger. The more skills involved in creating the memory, the more likely it is to be retained. This research was published in the journal *Consciousness and Cognition.*

Other research published in *Nature Communications* shows that using Satnavs actually switches off the regions of the brain we use for navigation. But switching back to using real maps will activate them again – navigation exercises the brain in a way that simply does not happen when we are simply following instructions.

Previous research found that taxi drivers who rely on learning the rat-runs and avenues of London by heart in 'The Knowledge' have enlarged brains. Researchers at University College London (UCL) led by Dr Hugo Spiers studied how 24 volunteers navigated a computer simulation of Soho in central London while their brains were being scanned. The two brain areas they were focusing on were the hippocampus, involved in memory, and the pre-frontal cortex.

The study found that when the volunteers tried to find their way using their brain instead of their Satnav, there were 'spikes' of activity in both the hippocampus and the pre-frontal cortex when the volunteers entered new streets. This activity increased even further when faced with a complex maze of streets. In contrast, when the volunteers followed instructions – a situation comparable to following a Satnav or phone app – the brain showed no additional activity. Entering a complex junction, for example where several streets meet, would enhance activity in the hippocampus. Conversely, a dead-end would

drive down its activity. So, navigating a mass of streets in a busy city puts high demands on the hippocampus and prefrontal cortex.

The results of the study fit in with models in which the hippocampus simulates possible future journeys, while the prefrontal cortex helps to plan which ones will get us to our destination. However, when we have technology telling us which way to go, these parts of the brain don't respond to the street network – the brain switches off its interest in the streets around us.

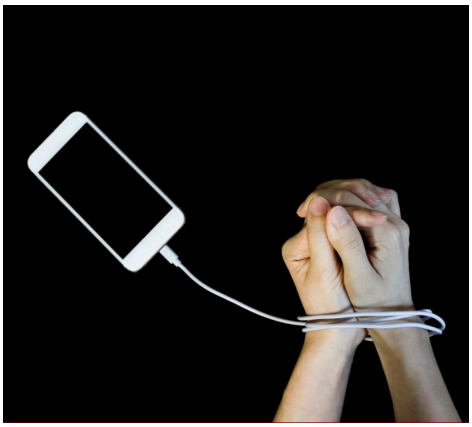
Previous research by UCL showed that the hippocampi of London cab drivers expands as their knowledge of streets increases. The current study suggests drivers who habitually follow Satnav directions do not engage their hippocampus, thus limiting learning of the street network.

So if you want to improve your spatial and navigation skills, then you should avoid using the Satnav, but if you just want to get to your destination with as little worry or effort as possible, then there is no reason not to use it… unless of course it leads you into a field or a cul-de-sac, as one day, it inevitably will. In addition, putting your faith in high-tech navigation aids could harm your brain and even increase the risk of developing Alzheimers.

Over thousands of years, humans have developed an acute sense of their surroundings. This is being lost as Satnavs take over. By relying on Google Maps, Satnavs and other gadgets, people are neglecting their sense of direction – they may even be preventing their brain – particularly the hippocampus which deals with learning and memory – from building the resilience it requires later in life. As we become more and more dependent on electronic gadgets to find our way, we may be allowing ourselves to also become cut off from the natural world. Worse, we may lose our connection with the natural world and the unique and beautiful rewards that it offers.

There may be more serious disadvantages to using navigation apps and devices. The parts of the brain responsible for navigation need exercise and if they don’t get it they will literally shrink. It is quite possible that in people who fall victim to Alzheimer's disease, which typically manifests itself first as disorientation, their hippocampus has already shrunk from lack of use, or has considerably less resilience for coping with the onslaught of the disease.

Smartphone Addiction



In the first decades of the 21st century, we find ourselves living through one of those evolutionary jolts that happen from time to time, like the discovery of tools, iron smelting and later, the internal combustion engine. Instant access to knowledge and communication is more than just something new, it is an inevitable leap that will change humanity – the question is… how, and by how much?

Do smartphones make us anti-social, or do they fulfil a desire for more personal contact? Are we addicted to smartphones, or to social interaction? Maybe we should be looking at smart technology through an evolutionary lens, after all, these devices do tap into one of our basic needs.

We are a uniquely social species and we seek meaning and a sense of identity through our interactions with others. Our use of smart devices and our dependence on the technology might just stem from our natural desire to connect with other people. Conversely, our social needs and rewards might also be being hijacked to produce an unhealthy feeding frenzy of hyper-social monitoring.

The frequency and scale at which phones are used might be putting the brain's reward system into overdrive. In post-industrial societies where food is both abundant and readily available, our cravings for fat and sugar formed by distant evolutionary pressures can easily lead to obesity, diabetes, and heart disease.

None of this however, explains the loneliness and anxiety many users experience. The most likely explanation may be the absence of face-to-face interaction and the lack of visible body language – after all, words only half of real communication, and words on a screen, far less.

A report published in December 2017 revealed that on average, we compulsively reach for our smartphones 4,000 times a year and unlock them 28 times a day for no particular reason. Some people will check their phones more than 60 times a day and 40% of Millennials check their phone every 20 minutes. The average American clicks, taps, or swipes their screen more than 2,600 times every day – some as many as 5,400 times a day!

Of course, simply being aware of this behaviour can help phone addicts understand that something must be done about it. Parents and teachers also must be made aware of how

important this is. There are now more active mobile accounts than there are people on the planet – that's more than 7.8 billion. Of those, it's youngsters who are becoming more dependent on them. With the average age for a child to get their first phone now just 10, young people are becoming more and more reliant on their smartphones.

Without realising it, we have all become addicted to technology. You'd be hard-pressed to find a public area without someone looking at their smartphone, and it seems that social etiquette is a thing of the past when it comes to smartphone use. Teenagers have become so glued to their smartphones and tablets that astonishingly, they are far less interested drugs or alcohol than the previous generation.

When we talk about the younger generation, we're really talking about anyone who can't imagine what life was like without computers, mobile phones and instant access to all the world's information. The habit starts early and the trend has been building over the last decade. Experts believe that technology is providing young people with a similar kick to drugs because like drugs, it comes complete with highs and lows. Teenagers playing games on their devices experience the same kind of highs and lows as taking drugs, but without the need to commit crime to get their fix. In addition, there is also the peer driven effect that interactive media has as a moral re-enforcer.

In the United States, according to the 2019 annual *Monitoring the Future* study, teens' use of drugs, alcohol and tobacco has declined significantly and addiction rates are at their lowest as far fewer teens report using any illicit drug (other than marijuana) than at any time since 1991. The proportion of US secondary school students who use illicit drugs fell significantly between 2015 and 2016.

All anti-drug campaigns in the West have failed miserably and this has led researchers to believe that phones are now giving teenagers so much stimulation they are less likely to seek out drugs or alcohol. Nora Volkow, the director of the *US National Institute on Drug Abuse* studied the relationship between the decline in drug use and the rise of technology.

Smartphone dependence has similar effects on the brain to some of those seen in opioid addiction. Researchers studying college students' use of technology found a number of worrying trends among those who excessively rely on their devices – and warn the behaviour is very much like that of substance abuse. The behavioural addiction of smartphone use forms neurological connections in the brain in similar ways to opioid addiction.

Dr Nicholas Kardaras, a leading psychotherapist, addictions specialist and senior clinical consultant at the Dunes East Hampton, one of the world's top rehabilitation units, says that screen time is digital heroin for children – especially for those under the age of ten. Dr Kardaras claims it's harder to get someone over a digital addiction than it is to get them off crystal meth!

I suspect that this is perhaps a small exaggeration, because given a choice, I would far rather my kids were at home glued to their devices than selling their souls on the streets for substances that will eventually kill them. Unlike illegal drugs, smart screens are everywhere and in the long run, they're also an awful lot cheaper. Nonetheless, it is children who are particularly at risk from screen addiction because the pre-frontal cortex, the centre of our personality, doesn't finish developing until their early twenties.

A study conducted by research staff at Indiana University asked teenagers who didn't usually play video games, to play them for a fortnight. In that short space of time, before and after brain images showed changes in the frontal cortex that mirrored substance

addiction. Interestingly, Apple boss Steve Jobs gave his own kids a very low-tech childhood. Maybe there was a reason for that.

Worryingly, the Tech giants are purposefully employing tactics to get us hooked on their apps by using techniques common in the gambling industry to get us addicted to checking our social media. Programmers call the phenomena 'brain hacking' and the methods are affecting children's ability to focus on anything else. The intention is to get you using the app for as long as possible. For example, activity notifications on sites such as such as Facebook and Instagram are designed to excite the brain's pleasure centres in much the same way as slot machines. Building the number of LIKES on Facebook and checking how many followers you have on Instagram is just as addictive as getting three of a kind.

Kids continually check their social media – more than is reasonable – in the hope of seeing good news or exciting gossip. This behaviour and the feelings and emotions it excites is exactly the same as waiting for a win on a slot machine and an easy way of forming a habit. The more people do it, the more advertising they are likely to view, which means more revenue for the companies. Tech companies seem to be competing with each other in a race to monopolise our attention and keep us hooked.

According to a UK Ofcom report, people check their smartphones an average every 12 minutes. If you take your smartphone to bed with you, you might have a problem! Even experts who understand the psychology behind smartphone addiction find it difficult to be separated from their phones because companies like Snapchat, Twitter, and TikTok have used well-understood psychological techniques to rewire our brains. Every single time you refresh an App, a new item appears at the top. In psychological terms this is known as a 'positive intermittent reinforcement.'

The refresh button is like a Las Vegas slot machine. Every time you click on Facebook, or Snapchat, or Twitter, or TikTok, you're unconsciously thinking there might be something interesting or exciting for you, so you continue to scroll down. This is not accidental, the system is purposely designed that way.

So are these features being designed to improve our lives – or to grab our money? Are companies deliberately embedding these designs in their products? It could explain why apps allow users to gather rewards over time and why sites like Snapchat and Instagram are the most popular messaging services for teenagers. Next time you get a positive notification, stop for a moment and ask yourself how it makes you feel.

There is already a substantial body of research that points to devices weakening human relationships. Of course, the effect might be an unforeseen and unintended side effect of a highly competitive industry. Either way, the mere presence of a mobile phone is a distraction even if it's not ringing or pinging text messages – not only to you, but also to the person you're talking to or messaging, so in effect, your own addiction is also fuelling your friend's addiction!

The evidence that mobiles are distracting has been piling up in recent years. Distraction is linked to unhappiness, anxiety and depression. Scientists led by Associate Professor Jun-ichiro Kawahara at Hokkaido University in Japan discovered that a mobile phone is distracting, even if it's not turned on, and even if it's not your own!

In Professor Kawahara's experiment, 40 undergraduate volunteers were split into two groups and asked to carry out electronic tests designed to gauge their attention spans. One group was asked to do the tests with an Apple iPhone placed next to their computer monitor, while the others did the tests with an old-fashioned paper notebook placed next

to the monitor. The test was relatively simple and involved participants searching for a particular character amid a jumble of other characters on the monitor screen. The researchers simply measured how long it took to find the target character.

The Hokkaido University findings proved that it's harder to concentrate when a mobile is present, even if it's turned off. Participants with the mobile phone present took longer to find the character and the effect was markedly greater with people who were less regular users of mobile phones.

Another finding is that the unpredictability of listening to only one half of a phone conversation also distracts people, and other studies have found that even just placing a mobile phone in view exerts a measurable negative impact on the quality of face-to-face communication. Even just holding a mobile phone makes you less likely to get a fair hearing from others. One study found that holding a phone in your hand when you are talking has been found to reduce the amount of empathy shown to you by the person you're talking to.

We have now reached the stage where devices and gadgets are not only an integral part of our lives, they are beginning to rule our lives. Smartphones are affecting social behaviour in many more ways than we yet fully recognise, let alone understand. There is growing evidence that they are the cause of communication breakdown between parents and children. At present, there is no solution other than a modicum of self-control. Maybe it's time we started educating our children that a smart phone is a luxury and not a necessity, something to be used sparingly, like caviar – not jam.

In a study at the University of Rutgers, researchers conducted an in-class experiment where students divided their attention between phones and lectures and found that using electronic devices during a lecture can shave 5% off undergraduates' marks in their end of term exams.

Published in the journal *Educational Psychology*, 118 cognitive psychology students took part in an experiment where phones, tablets and laptops were allowed in one-half of the lectures and banned in the other half. Students were taught the same class material by the same instructor over roughly the same amount of time.

Using a phone in class affected their long-term comprehension and retention of class material and impairing their exam performance and final results. Teachers should inform students about the damaging effect of distraction on retention – not only for themselves, but for the whole class.

If someone is forced to segment their attention between two tasks, they're less likely to be able to recall vital information later on and people who use their phones a lot are often multitasking, which gives the mind less time to relax, and dedicates less effort to each individual task. People perform better when they are focused on one thing at a time. You simply can't use your phone while doing something else properly – anyone who thinks they can is fooling themselves.

Smartphones and tablets have been banned in all French schools for pupils under the age of 15. Under the new law, all connected devices must be left at home or remain switched off – even in break times – until the end of the day. A law passed in 2010 already banned smartphone use during class. The only exceptions are for use in specific lessons, extra-curricular activities outside normal lessons, or for disabled pupils. Nine out of 10 French teens aged 12 to 17 own a smartphone.

We have become slaves to our smartphones and it's become a normal part of life to be interrupted by the ping of notifications. Most of us remain blissfully unaware of just how much our lives are being controlled by the very gadgets that are – ironically – supposed to serve us! This unhealthy relationship is more than just a habit-forming – without realising it, our behaviour, thoughts, needs, desires and even our most basic beliefs are being manipulated by Big Tech.

Researchers say that smartphones trigger pathways in the brains that were once used to alert us to danger and it is becoming increasingly obvious the tech industry has tapped into this solely to increase profits. We are being hijacked by the same mechanisms that used to protect us for the most trivial pieces of information.

Some former employees from the world's biggest tech companies such as Facebook, Twitter (owned by Facebook) and Google are starting to come forward with information that by any stretch of the imagination is deeply disturbing.

In early January 2021, Twitter, Facebook, Instagram and others deleted the accounts of the President of the United States. Earlier, in mid October 2020, both Facebook and Twitter blocked news reports and comments that were detrimental to the Democratic Party and in particular to Joe Biden and his connections to Ukrainian oil and gas companies.

We have to ask if it is moral or corrupt that private companies like Twitter and Facebook practice censorship on such a massive scale. Most tech services are free – there's no charge for joining and setting up a page, but you have no say in how it works. The guy that runs it is not only rich, he is omnipotent. If you are a regular user, every part of your life is monitored and recorded – even your private needs and worries. And if you say one thing they don't like, they shut you up.

In 2017, Mark Zuckerberg rubber-stamped a change in the algorithm to focus more on left-leaning publications, meaning left-leaning sites would be favoured more than right-leaning sites. In 2020, The New York Post, one of America's top newspapers, was told by Twitter to delete six links to the Hunter Biden story which exposed Joe Biden's role in his son's Ukraine oil and gas deal. Twitter users who posted and shared links to the story also had their accounts blocked along with multiple Trump-linked accounts linked to it.

But Facebook and Google's influence goes much further than mere censorship. Sophisticated algorithms read our emails, study our comments, our spending, and also that of all our online contacts. This information is sold to the highest bidder. Big Tech insiders have revealed that information about us – what kind of films we like watching, what we've been searching for on Google, who our Facebook friends are… even information about our political beliefs and affiliations – and those of our friends.

Asa early as January 2020, Facebook acknowledged that social media can harm democracy.

Meanwhile, news stories and comments that Facebook and Google don't like are routinely blocked, while stories they do like are actively promoted. This creates an entirely false perspective of society's actual morals and views and creates social division, and this is exactly what happened in the run up to the US election in November 2020. More concerning is that this 'skewing' of the facts is creating a generation of addicted children who have an entirely false view of the world. Worse, it has harmed youngster's self-worth to such an extent their ability to engage with others may be permanently damaged beyond repair.

Our need to connect with others is part of the human condition and social media is supposed to make this connection more convenient. But social media is also addictive – so much so that many social media experts limit their own children's access to it. Some don't allow their children to use it at all.

Google and Facebook are free — they make billions of dollars from advertising. Make no mistake: WE are the product because it is WE who are being sold to the advertisers. The more you use social media, the more they know about you… your likes and dislikes, in fact any snippet of information can be targeted by advertisers who want to sell you something… or change the way you vote! They know about every piece of music you've ever listened to, every movie you've ever watched, everything you've ever bought online, where you've been, and who you were with at the time!

All that information means the tech companies can predict the kinds of things you're interested in — and they'll keep trying to sell you more. In fact, the detailed tracking of everyone, everywhere, is the tech companies' business model — their profits come from making sure advertisers are as successful as possible. The tech giants are the ultimate middle-man — they sell no actual products, they have no warehouses or delivery trucks, no stores on the high street — they just have your name and all your personal information.

For the tech companies, selling your personal information is not enough. We are only now becoming aware that they also want to change who you are – their real goal is the gradual, imperceptible change in your behaviour and perception.

Huge teams of psychologists work at tech companies. They are employed for one purpose and one purpose only – to manipulate your thoughts – and when it comes to children, social media has become the instrument of choice. Social media penetrates deep into the brain stem and manipulates the individual's sense of self-worth and identity.

We have evolved to care about what other people think about us – it's one of the things that helps us conform and 'fit-in' with the rest of society. Nowhere is this basic need more exploited than the LIKE button. Facebook's LIKE button, originally designed to 'spread positivity and love' has evolved into an instrument of hate. No one foresaw teenagers would get depressed if they weren't getting enough likes.

Like most Big Tech companies, Twitter has an entire department dedicated to understanding users. The LIKE button is there for a reason – it exists as an intentional design decision. Based on meticulous research, every feature and font is there to maximise the overall user experience and design decisions secretly influence users' feelings and behaviours.

Design decisions are made not only to improve users' experience, but also influence their behaviours. The LIKE button is one example. Chris Nodder, a user experience researcher and the author of *Evil by Design*, explains how designers must always ask the question 'How do we influence behaviour through the medium of software?'

There are many studies that show the 'LIKE button' on social media platforms has tangible effects on users' mental health, leading to negative social comparisons. It is well known that the LIKE button increases feelings of envy and depression and fuels two types of envy. Benign envy mostly concerns us comparing ourselves to other people and feeling jealous, while malicious envy results in not just jealousy, but also the desire to harm someone. Researchers found that 'the closer the relationship, the more a Facebook user will experience benign envy.'

A study involving 194 college-aged Facebook users in Germany found that 'the closer the relationship, the more a Facebook user will experience benign envy. These digital showrooms allow people to present the best version of themselves for everyone else to see. Often, people use the number of likes to judge others and themselves. That little heart-shaped button becomes a publicly quantifiable measure of social support.

Jack Dorsey, founder and CEO of Twitter, was reported to have questioned how the site 'incentivises people to want [the number of likes on their posts] to go up.'

While the heart-shaped button is seemingly only for expressing appreciation for the content of a social media post, researchers have determined that people use the button for many other reasons. One team of researchers found that users in the United States often chose to like something for bonding purposes rather than simply liking the content.

More recent research (2020) has shown that the LIKE button is not entirely harmless. While social networking sites are powerful tools for building relationships, certain social media features can adversely affect users. One study found that impersonal gestures such as the one-click LIKE communication might not promote user well-being.

Facebook has admitted that the site could be damaging to people's health if used in the wrong way. Facebook of course recommends that people use the platform in an active, rather than passive way, by communicating with friends, instead of just scrolling through their feed. According to Facebook, by interacting with people on Facebook, it can improve your well-being. Facebook went on to say that while there were some downsides to social media, there are potential benefits if it's used correctly. Former Facebook executive Chamath Palihapitiya however said Facebook 'destroyed how society works.'

Researchers in the US and Europe noticed that users who crave LIKES may have thinking patterns that are fundamentally similar to those of lab rats who learn by seeking reward.

They estimate platforms such as Facebook, Twitter and Instagram dominate the daily lives of more than four billion people for multiple hours each day. While some likened social media engagement to addiction, it has remained unclear why some are driven to engage obsessively with these platforms. Understanding this similarity may help uncover new ways to address problematic engagement with social media.

Social media engagement follows basic principles of reward-learning and addiction and could lead to an understanding of how social media addiction may be addressed. One US study analysed more than one million social media posts from 4,000 social media users on a variety of platforms.

One important discovery was that people tended to space their posts in a way that maximises the average number of LIKES they receive. Specifically, users tend to post more frequently in response to a high rate of LIKES and less frequently when they receive fewer LIKES. This behaviour closely matches reward-learning – behaviours that are driven and reinforced by the promise of reward. Specifically, the behaviour of social media users seeking to maximise their LIKES almost perfectly mirrored rats seeking to increase their food rewards in experiments involving, for example, pressing a lever to get food.

Researchers found that the participants posted more often when they received more LIKES. The study will be published in the journal *Nature Communications.*

According to this research, the LIKE button works as a 'mechanism to compare oneself with others.' The number of likes make social support quantifiable. It can then be easily viewed for making social comparisons, and this is very unhealthy.

Despite a massive increase in depression and anxiety in teenagers as a direct result of social media, using social media for three hours or more a day doubles the risk of teen mental health problems.

According to the UK Office for National Statistics, the number of women and girls between the ages of 10 and 24 who committed suicide has almost doubled since 2012 – and almost entirely due to social media use. Just like any other kind of addictive behaviour, the more stressed people are, the more they turn to their devices. A whole generation who never knew life before social media has been conditioned to turn to their digital pacifier whenever they feel uncertain or alone.

Depending where on the planet you are, if you Google ‘Climate Change’ the results vary wildly according to your location, because the algorithm feeds you what it thinks people in that area want to hear, regardless of truth.

Tech companies now choose to use the same algorithms to influence our political and moral beliefs. An MIT study found that on Twitter, fake news spreads six times faster than true news. Tech engineers have created a system that favours false information because it’s more exciting than the truth, and thus makes more money. The inconvenient truth is that each of Facebook’s 2.7 billion users gets their own customised version of the ‘facts.’ Over time, people acquire a false sense that everyone agrees with them because everyone in your newsfeed agrees with *you*. Once that happens, it’s a sure sign you’re being manipulated.

Facebook may be the greatest propaganda machine since Nazism. If you want to control the way a whole population thinks, there has never been an opportunity as effective and as powerful as Facebook, and disinformation is part of the persuasive power. Political persuasion in particular neatly fits the Facebook business model and it was ruthlessly exploited in the 2021 US election. The insiders say algorithms are now becoming so expert that we’re now absorbing propaganda instead of truth. Social media Is making it so we have less and less control over what we believe – that has to be a major concern – especially where children are concerned.

The best way to stay sane is to turn off all notifications and log-off social media altogether, except for family and close friends, and even then, impose limits.

Teenagers who are addicted to their smartphones are more likely to suffer from mental disorders such as depression and anxiety. A study carried out by the Korea University in Seoul have found an imbalance in the brain chemistry of young people addicted to smartphones and the internet.

In the study, the researchers took brain scans of 19 young people diagnosed with internet or smartphone addiction, and compared them to 19 young people who weren’t. The participants completed tests to measure the severity of their addiction The results showed that the addicted teenagers had much higher GABA levels, and lower Glx levels than the controls, and that the addicted teenagers showed significantly higher scores in depression, anxiety, insomnia severity and impulsivity than the controls.

However, the researchers did find that GABA levels decreased and Glx levels increased in addicted teens following a series of sessions of cognitive behavioural therapy, which

encourages patients to examine the things they think about and examine the things they do. CBT starts to break down a large problem into smaller more manageable pieces and then works to stop negative thought processes.

In the study, nine weekly CBT sessions decreased GABA to Glx ratios significantly. Hypnotherapy can achieve the same, but in a fraction of the time.

According to a study at the University of Pennsylvania looking at the link between time spent online and poor mental health, researchers found a correlation between high levels of Facebook, Instagram and other social media use, and a decrease in well-being. They also discovered increases in depression and loneliness.

The research team designed their experiment to include the three most popular platforms used by a group of 143 undergraduates. They collected usage data from iPhones for active apps, plus a week's worth of baseline social-media data. Each of the participants completed a survey to determine mood and well-being at the start of the study. They were then randomly assigned to a control group, which had users maintain their typical social-media behaviour, or to an experimental group that limited time on Facebook, Snapchat, and Instagram to ten minutes per platform per day. For the next three weeks, participants shared iPhone battery screenshots to give the researchers weekly tallies for each individual. With that data in hand, the researchers then looked at seven outcome measures including fear of missing out, anxiety, depression, and loneliness.

They found increased time spent on the social media sites was linked with worse outcomes in all categories. The study suggests that limiting social media use to approximately 30 minutes per day may lead to significant improvement in well-being.So using social media less than you normally would, leads to significant decreases in both depression and loneliness. The effects were particularly pronounced for those who were more depressed at the start of the study.

However… that doesn't mean that 18 to 22-year-olds should stop using social media altogether, because that would be an unachievable goal. The study shows that just limiting screen time can't hurt. The full findings of the study were published in the *Journal of Social and Clinical Psychology*.

Quite apart from Big Tech's manipulation of our minds and its disassembly of society, the digital generation have become susceptible to a new mental angst – phone separation anxiety.

It is entirely normal – and understandable – that children get stressed and start to panic if they're separated from their parents, and that parents experience the same kind of emotional shock if they lose sight of their children in a crowd. If you've ever lost sight of your child, even for a few moments, you will know exactly how that feels – the tightness in your chest, that sinking feeling in the pit of your stomach, the increased heart rate...

Today's youngsters are becoming so devoted to their smartphones they are exhibiting the same attachment behaviours usually reserved for the bond to their parents.

There are some telltale symptoms of phone separation anxiety – people start suddenly to feel insecure if they can't text or call their friends, and can even feel disconnected from their online identity.

If they can't access information, if they are unable to google answers to questions, if they can't get directions, they are more likely to start feeling frustrated, or inadequate, or both. People get annoyed if they can't accomplish simple tasks, such as arranging to meet or

make dinner reservations.

Some people experience ‘phantom vibration syndrome.’ This occurs when people who usually carry around their phones in their pockets feel as if they’re getting calls or texts when they aren’t. These withdrawal symptoms even have their own designation – Nomophobia, shorthand for ‘no mobile phone phobia.’

Researchers from the Hungarian Academy of Sciences and Eotvos Lorand University in Budapest conducted experiments on 87 smartphone owners aged between 18 and 26. Each participant sat in an empty room apart from a laptop on a desk, a chair, a cupboard and some everyday items including newspapers, a cuddly toy and a beanbag seat. Attached to heart monitors, they were given a simple computerised maths test that they could complete with assistance of the calculator on their phone.

Before being presented with a second set of questions, the participants were divided into four groups. The first group were told to switch off their mobiles but keep them close by. The second had them locked away in a cupboard, while the third group were given different smartphones to help them, and the fourth group were given calculators. After finishing the test, they were kept waiting for a few minutes, during which time, they were secretly filmed. They were then asked to complete a series of word games and a questionnaire about their attachment to their mobile.

Participants who were separated from their phones were more likely to display heartbeat patterns associated with Post Traumatic Stress Disorder. Furthermore, separated participants tried to gain proximity to their phone by approaching the cupboard containing their phone. During the short break, three quarters of those left without a mobile exhibited displacement behaviour, such as fidgeting and scratching – tell tale signs of stress. The presence of an unfamiliar substitute phone decreased the effects of separation from their own, similar to the calming effect of a stranger on children who are separated from a parent.

Following the experiment, questionnaire responses uncovered evidence that personal phones relieve tension and deliver feelings of confidence and security. The study was reported in the journal *Computers And Human Behaviour*.

Young people today are rarely without a mobile phone and can become over reliant on them. Where they may have once looked to their parents, older relatives or friends for comfort, reassurance, information and direction, the focus of their attention is now solely on their smartphone – all the world’s wisdom and information is in their pocket. Phones also encourage multi-tasking – already proved to affect concentration.

A recent survey found that 79% of smartphone owners have their phones at hand for all but two of their waking hours. Other research has found that young adults in the US spend an average of 5.2 hours on them every day while one in eight UK users show signs of addiction. Adults however do have a higher tolerance of separation from attachment figures and also from their phones, although women are reportedly 3.6 times more likely to experience nomophobia. They are also more likely to suffer depression as a result of being separated from it. More recent research found 18 to 24-year-olds are worst affected with 77% unable to stay away from their phone for more than a few minutes.

Worrying research from Korea University suggests that dependence on the technology could be affecting some teenagers' physical brains and that teenagers who are addicted to their smartphones are more likely to suffer from mental disorders, including depression and anxiety. Similar studies have shown people are so dependent on their smartphone that

they happily break social etiquette to use them. The sight of people talking on their phones in restaurants, at parties or on public transport is now commonplace.

People who are dependent on their phones tend to feel isolated, lonely, depressed, and anxious more than their peers.

Researchers from mobile connectivity firm iPass surveyed more than 1,700 people in the US and Europe about their connectivity habits, preferences and expectations. The survey revealed some of the most inappropriate situations in which people have felt the need to check their phone.

7% of people admitted to using their phone during sex, 72% admitted using it while on the toilet and 11% even admitted using it during a funeral and 36% of people admitted checking their phone during a date. Nearly two thirds of people said they felt anxious when not connected to Wi-Fi, and many said they'd give up a range of items and activities in exchange for a connection.

61% said that Wi-Fi was impossible to give up, but 58% said they would rather give up sex than Wi-Fi, 42% would give up junk food, 41% would give up smoking, 33% would rather give up alcohol, and 31% would gladly give up drugs rather than lose their WiFi connection! A quarter of those surveyed said that they'd choose Wi-Fi over a bath or shower, and 19% said they'd choose Wi-Fi over human contact.

Everyone knows that it's dangerous to cross the road while you're looking at your smartphone, but 49% of people do it anyway. In the workplace, employees know that it's inappropriate to use their phones at work, but a great many of them can't help themselves. Half of employees admit to using their smartphones in meetings and 20% admitted to checking their phone at least once every 20 minutes at work. Another 25% said they check it every hour. While 70% of employees believe it's wrong to have their smartphones switched on during meetings, 53% have them switched on anyway. Although 80% of workers think it's wrong to check phones during meetings, 50% still do it.

When employees know it's inappropriate to have their smartphones out in a meeting, but still do it, and check them despite knowing it's bad form, that's when you know people are in denial about how big a problem smartphone addiction actually is. Some employees admit to spending up to an hour a day on their cell phones for personal reasons while at work. What does it tell you when your workers are doodling with their phones during a meeting? Employees who fiddle with their smartphones aren't giving the performance they are paid for. What is needed is a workplace smartphone policy.

It is too early to tell whether or not this attachment – now being experienced for the very first time by the younger generation – will continue into adulthood. As yet, there are no definite answers and we will have to wait at least another 10 to 20 years to discover the long-term effect on individuals, both emotionally and behaviourally. My guess is that theses changes will be more profound than we can at the present time imagine.

Compulsive users experience the same personal, social and workplace problems as those addicted to drugs, alcohol and gambling. Many also display signs that indicate depression, anxiety and even shyness. Symptoms include being unable to turn off or obsessively checking phones, constantly topping up the battery and taking phones to the bathroom. There is no doubt that people are forming attachments to their phones – they need them to be close and experience stress responses if they are separated from them. If you've ever lost your phone or had it stolen, you will know exactly how *that* feels!

Researchers at Binghamton University in New York believe such addictions will only worsen in future because smartphones have turned into providers of fast feedback, which leads to dopamine release and an increasing desire for immediate satisfaction.

Humanity has committed itself to an emerging and evolving digital culture and we have no idea how children born into a society and culture dominated by smart technology will develop in the future. Addiction will almost certainly increase as technology advances and developers find new ways to ensure user's long-term engagement. Elon Musk is presently investing millions of dollars in research into electronic brain implants. Maybe the age of the human cyborg is just around the corner.

Elon Musk's brain implants are likely to become a reality in the next twenty years. Any *Star Trek: The Next Generation* fan will recognise and be alarmed at where this may lead. In *Star Trek: TNG*, the Borg are the ultimate connected species, devoid of any individual thought or emotion, sharing their collective thoughts as a single mind.

Smartphones have already become surrogates for normal social interaction. They are special because not only are they expensive, the more expensive or latest phones are also status symbols. They are, of course, also mass information storage devices – names, numbers, personal photos, memories, music collections, social media lives – in fact everything that's important to youngsters. They are the perfect electronic substitute for emotional security.

How often have you heard youngsters claim 'my entire life is on that phone!' Worryingly, they're probably right!

The US National Institute of Health estimates children and adolescents spend an average of five to seven hours on screens during leisure time. Evidence is growing of the adverse effects this has on health. Screen-addicted children risk sleeplessness, obesity and falling victim to cyber-bullying. They also lose valuable social skills through a lack of face-to-face contact.

Worryingly, British children spend nearly five hours every day gawping at screens. Worse, very young children – some as young as two – are developing mental health problems because of smartphone and tablet use. The brains of toddlers and children under the age of 10 are still-developing and just an hour a day staring at a screen can be enough to make children more likely to be anxious or depressed. It could also be making them less curious, less able to finish tasks, less emotionally stable and affecting their self-control.

In 2016, Researchers at San Diego State University and University of Georgia analysed data provided by the parents of more than 40,000 US children aged two to 17 for a nationwide health survey. Their conclusion – time spent on smartphones is a serious but avoidable cause of mental health issues.

Half of mental health problems develop in adolescence, but although it's difficult to identify or change most causative factors linked to mental health issues in childhood, how children and adolescents spend their leisure time is easier to recognise and change. The bottom line is both parents and teachers must cut the amount of time children spend online or watching television.

The American Academy of Paediatrics strongly recommends screen time is limited to no more than one hour per day for children aged between two and five. It also suggests a similar limit – maybe two hours – should be applied to school-aged children and adolescents.

More and more children are 'screen stacking' – using several devices at once.

Researchers from the University of Leicester studied the screen habits of 816 girls in the UK aged 11 to 14, and found that more than two thirds of them used two or more screens together at weekends and a third said they used multiple screens in bed. Some of the girls admitted to using as many as four screens at one time. The researchers also identified links between greater screen use and lower levels of sleep and physical activity – as well as increased body mass index (BMI).

The study, published in *Acta Paediatrica,* was prior to the Covid pandemic, which has caused even more 'sedentary behaviour' associated with looking at a screen. In fact researchers believe that this behaviour has soared.

An April 2021 OnePoll survey of 1,000 UK parents of children aged between three and eight said their children had spent on average three hours and 53 minutes a day looking at a screen in the last 12 months, but 35% said their children spent more than 5 hours a day on their devices. Many parents have understandably been relying on more gadgets and screen time to keep their children occupied when working from home.

Increased sedentary behaviour is closely linked to type 2 diabetes, where the body either doesn't produce enough insulin, or the body's cells don't react to insulin. This quite apart from the mental and physical health of young people. The girls in the Leicester study used a variety of devices – smartphones and tablets, PCs, gaming consoles, music players and eReaders.

Screen use was self-reported by the participants, but their physical activity and sleep patterns was measured using accelerometers worn on girls' wrists 24 hours a day for a week. Those using one or more screens at weekends enjoyed lower levels of physical activity and girls using one to three screens after school had shorter sleep periods during the weekday. Data from the United States found even higher levels of multi-screen use in girls compared to that of boys.

Other research has discovered that one third of teenagers have not read a book in the past year. Instead, they are spending the time they used to use reading on social media. Declining reading rates among teenagers affect their performance at school as they lack the concentration needed to absorb the information in text books.

The *Monitoring the Future* study, which surveys approximately 50,000 students aged 13 to 18 every year in the US, found that adolescents spending more than seven hours a day on screens are twice as likely to have been diagnosed with anxiety or depression as those who only spent an hour. Even four hours is associated with lower psychological well-being.

Links between screen time and wellbeing are stronger among adolescents than young children, activities which are more strongly linked to low wellbeing than watching television and videos. Children under five years-old who are high users of social media are twice as likely to lose their temper – they are also 46% less able to calm down when excited. Among 14 to 17 year olds, over four in ten of those spending more than seven hours a day on screens did not finish tasks. Approximately one in eleven of 11 to 13 year-olds spending an hour on screens per day were not curious or interested in learning new things.

Social media platforms are here to stay, so society must work out how to use them in a way that limits damaging effects. Smartphones and their apps are growing more addictive,

but our ability to resist those addictions doesn't grow. Technology is better at hijacking your instincts than you are at controlling them.

So is there an answer to smartphone addiction? A good start to regaining control is to set aside certain times to check your phone. In France, it is now illegal for companies to bother their employees with emails and phone messages outside working hours or at weekends, allowing employees to disconnect. Reducing opportunities for social comparison may help, and consciously avoiding comparing your life to the way others portray their own online may also help to break this link. And if you're away from social media, you will be more likely to be involved in something more constructive, things that are more likely to make you feel better about yourself. A good way to start would be to limit the time you spend on these kind of sites to a maximum of 30 minutes per day, or better still, take a day off altogether!

One solution, growing in popularity, is to delete all your social networking accounts and thereby remove one source of compulsion.

The age of the smartphone has led to a generation of people with shorter attention spans as 'information overload' makes us bored more quickly. Rapid access to data, whether from social media or round-the-clock news is leading to increasingly 'narrow' peaks of collective attention.

Scientists at the Technical Universities of Denmark and Berlin, as well as the Max Planck Institute for Human Development and University College Cork, studied data on social media posts, online searches, book and movie sales as well as academic studies and found that our collective attention span – as demonstrated by peaks of interest in particular topics online, for example – has decreased as people are more rapidly made aware of something happening, they tend to lose interest more quickly. In addition, person to person and even group discussions appear to be increasingly fragmented.

Sociologists, psychologists and teachers have warned that 'fear of missing out' stemming from 24 hours a day social media and breaking news is responsible for an emerging crisis of concentration which is beginning to overwhelm our brain's capacity to focus on multiple items of interest. Another reason is almost certainly the fierce competition for novelty and our urge to find it, which in turn causes us to search more rapidly for it. This behaviour may have negative implications for an individual's ability to evaluate the information they consume.

Our collective attention span is narrowing and the effect is occurring not only on social media, but also in reading books and web searches.

The brain's capacity for attention has only so much capacity, but the cultural items competing for that attention have become more densely packed. Scientists studied Twitter data from 2013 to 2016. They also looked at books from Google Books going back 100 years, movie ticket sales going back 40 years, and citations of scientific publications from the last 25 years. They also gathered data from Google Trends (2010-2018), Reddit (2010-2015), and Wikipedia (2012-2017) and they found plenty of evidence of shorter bursts of collective attention given to each cultural item. When looking into the global daily top 50 hashtags on Twitter, they found that peaks of interest became increasingly steep and frequent.

The study suggests that accelerating changes in popular content are driven by increasing production and consumption of electronic content. In 2013 a hashtag stayed in the top 50 for an average of 17.5 hours but gradually decreased to 11.9 hours by 2016.

Video Gaming Addiction

Addiction to violent video games has been blamed for some of the most violent crimes and ‘moral immaturity' that is the scourge of modern society, so much so that in 2020, the World Health Organisation decided to include gaming disorder in the 11th revision of the International Classification of Diseases.

Anders Breivik, responsible for the cold-blooded murder of 77 of his fellow Norwegians, is one of many people who turned to violence as a result, at least in part, of addiction to violent video games. Spending hours alone playing violent games such as World of Warcraft (or whatever it's called) Call of Duty (also a useful recruiting tool for the U.S. Military) and Grand Theft Auto, have been cited as factors in many of the high school shootings that blight America on a depressingly regular basis. Call of Duty allows players to take on the role of a bloodthirsty soldier in a number of violent scenarios, arming them with an arsenal of weapons including rifles, pistols and grenades. Grand Theft Auto promotes gun violence, revenge killings and prostitution.

Certainly, there are other factors that trigger these deadly acts – Breivik's actions were also motivated by his own extreme right wing politics and dysfunctional childhood – killers who went on their murderous rampages in the United States were nearly all loners who had become withdrawn and who set out to wreak revenge on a teacher or those of their own peer group who had rejected them. One cannot ignore the fact that their actions were encouraged by the gun culture which exists in America. Nonetheless, the offenders have two things in common. The first is that they are all male, and the second is that all habitually played violent video games.

However, researchers have discovered that it is not the violence portrayed in the game that's the real problem, but rather the amount of time spent playing the game that damages young minds. In other words, it's the exposure, not the content. This makes perfect sense as it is well known that the more you practice an activity, the more grey matter becomes allocated to that activity. Practice makes perfect!

This rule explains why musicians, athletes, artisans and a host of other professionals become adept in their chosen field. It follows that people exposed to violence in the long term will become inured to it. If all they do with their spare time, is play shoot 'em up video games hour after hour, day after day, as was the case with Breivik, then it stands to reason this is going to have a negative effect on their thought processes.

A study carried out by the University of Oxford examined the effects of different types of games and the time spent playing them on children's social and academic behaviour. They found that it was the time spent playing the games that could be linked with problem behaviour and that this was the significant factor rather than the types of games played. The researchers found that children who play video games for more than three hours a day were more likely to be hyperactive, become involved in fights and be disinterested in school. They were unable to establish a barrier between violent games and real-life aggression or poor academic performance. The study, published in the journal *Psychology of Popular Media Culture* found that low levels of play, less than an hour a day, might actually benefit behaviour.

Parents might assume that strategy and puzzle games may give their child an edge in the classroom, but the experts found that the sociability and grades of children who played these 'wholesome' games were no higher than those of their non-playing peers. The same can be said for the 'brain training' devices now popular with some adult self-improvement junkies.

The study found that no game-features typically encountered by children could be linked to negative behaviour. On the contrary, the researchers found that there were some behavioural benefits. For example, children who played video games with a cooperative and competitive element had significantly fewer emotional problems or problems with peers, while children who chose to play solitary games were found to do well academically and displayed fewer emotional problems. They were also unlikely to be involved in fights.

The researchers relied on teachers' assessments of behaviour of individual pupils at a school in the southeast of England. The teachers reported whether the 200 pupils in the study group were helpful, or whether they were rowdy or likely to fight as well as commenting on their academic performance. The assessments were matched with the responses to a questionnaire that asked each of the 12 and 13 year-old pupils in the study how long they played games each day and the type of games they preferred. The pupils were given a choice between solo, offline competitive team games, online cooperative and competitive games, combat and violence, puzzles and strategy, and games to do with sport and racing. (To ensure accuracy the pupils involved in the study were numbered so their personal identities were not revealed to the researchers.) The results of the study seem to confirm recommendations from the American Academy of Paediatrics, that parents should simply keep an eye on how much time their children are spending playing video games.

As far as very young children are concerned, watching on-screen violence is just as damaging as witnessing it in real-life. We already know that children who are exposed to domestic violence grow up thinking that behaviour is normal and in most cases, indulge in it themselves when they become adults, thereby perpetuating the cycle. There are also fears children could be left more vulnerable to grooming and abuse by being exposed to early sexualised behaviour as well as extreme brutality, often seen in video games in the upper age classifications.

But even watching fictional violence on TV can lead to more aggressive behaviour in children because the very young are unable to distinguish between real violence, as in news footage, and 'dramatic' violence portrayed in soaps, films and video games. Even the portrayal of anger by actors on screen can, and usually does, affect children of all ages.

Violent video games are now more realistic than ever – even more so than the graphic footage of horrific attacks from around the world now shown on nightly news bulletins and which are also available uncensored online.

The American Academy of Paediatrics has recommended that all children under six should be shielded from on-screen violence because they cannot distinguish between fantasy and reality – but this has to be a job for parents!

In many video games, the player is rewarded with points for shooting other humans! And yes, there really is something sick about a society that considers this a harmless and amusing pastime. Dr Dimitri Christakis, director of the Centre for Child Health, Behaviour and Development at Seattle Children's Research Institute claims that screen violence, particularly when it is real, but even if it's virtual, is traumatic for children regardless of their age. Children exposed to both real and virtual violence are more prone to having nightmares, increased anxiety and other types of sleep disturbance if they are witness to violence, so isn't it about time we started listening to and acting on the advice of the experts?

Of course, it is nigh on impossible to completely shield youngsters from the harsh reality of news of terrorist attacks and real wars, but children need reassurance after such events, This again, is a job for parents – and good parenting has to include being aware of sudden changes in their children's behaviour, such as unexplained aggression. Parents can do a lot to reassure their children that the world is actually full of good people and point them toward more positive stories.

There are literally hundreds of studies carried out with the participation of thousands of children that demonstrate a link between 'virtual violence' and real-world aggression. Conversely, there are benefits for children when they consume non-violent media with more positive themes. A study carried out as recently as 2013 showed positive social and educational screen time enhanced social and emotional behaviour in children. It's up to parents to encourage more of it.

In addition to violent behaviour, more than 2 hours a week spent playing video games will damage children's social skills. Children like playing video games and they can easily become immersed in them. Video gaming is also a great time killer – video games keep children occupied and stop them getting bored and boys, particularly prone to boredom, spend more time gaming than girls.

According to a study of 2,442 children aged between 7 and 11 carried out by a team of researchers at the Hospital del Mar and the Instituto Hospital del Mar de Investigaciones Médicas, any more than two hours a week and they run a very real risk of increasing the likelihood of getting into trouble at school or fighting with their friends because too much time spent gaming causes them to neglect their social skills.

Although gaming can result in improved brain connectivity and functionality – critical for learning and memory and based on the acquisition of new skills through practice, excessive time spent playing video games limits the scope for other pursuits, particularly team-building activities where a child can develop social skills such as sports and music. Researchers scanned the brains of 260 children in order to find out what changes, if any, were a result of their gaming. As well as measuring how much time they spent playing the games, they also investigated how well the children did at school and their disciplinary records.

Up to a point, gaming can help develop certain types of motor skill, improve reaction times and even get children higher achievement scores in school. The researchers found players of video games did have faster reaction times. Mental processing was typically 100 milliseconds faster than non-players, but this effect did not improve after playing for more than two hours a week, which the researchers called the ‘ceiling effect.’

The main effect of gaming on reaction time is more to do with acquiring new skills through practice. Children traditionally acquire motor skills through action – in the case of video games, the pressing of buttons and manipulation of a control column. But the acquisition of motor skills and improved reaction times is also found in children who learn to play musical instruments to a high standard or take tennis lessons. The major difference is that gaming is a solitary activity whereas music and sport are social activities.

Children gaming for more than nine hours per week showed significantly more behavioural problems than children who did not play video games. This might also have something to do with the fact that they got less sleep – sleep being crucial to healthy development – but more likely it’s down to a lack of interaction with their peer group, learning how to cooperate, how to work together, and about boundaries.

Despite tobacco and alcohol advertising being subject to age-appropriate restrictions, depictions of drinking and smoking in video games have been ignored by those supposedly responsible for classification. This oversight means that parents are often unaware of inappropriate content that could adversely influence teenagers.

Researchers from the UK Centre for Tobacco and Alcohol Studies at the University of Nottingham examined the content of the UK’s 32 best-selling video games of 2012 & 2013. They also analysed 'cut scenes' that had been uploaded to YouTube from the five most popular games. All the games studied had themes of stealth, action, adventure, shooter, survival, and horror and all involved avatars that looked and acted like real people. Portrayals of the use of alcohol and tobacco were present in nearly half of the most popular video games, with Grand Theft Auto V & VI containing the highest level of alcohol and smoking content, closely followed by Call of Duty: Black Ops II, Call of Duty: Modern Warfare 3, and Assassin's Creed III.

The research was published in the journal *Cyberpsychology, Behavior and Social Networking,* but surprisingly, this content was not reported by the official regulator, the Pan-European Games Information (PEGI) the system that is supposed to inform the Video Standards Council that in turn, is responsible for age ratings.

The researchers also conducted an online survey of 1,094 adolescents aged between 11 and 17 who played games that had alcohol and tobacco content. They found that adolescents who had played at least one of the games were twice as likely to have tried alcohol or cigarettes.

The lead researcher from the UK Centre for Tobacco and Alcohol Studies, Dr Joanne Cranwell, noted that parents seemed less concerned about inappropriate content in video games than with movies. University of Nottingham research found that while 80% of children aged 10 to 15 play packaged or online video games with an age rating higher than their actual age, more than half British parents are unaware of the harmful content.

However, the study makes no mention of the social or economic background of the adolescents who participated or the amount of time and effort their parents invest in their offspring. This is as important a factor as it is with other kinds of addiction, such as drugs or gambling. But given video games are clearly attractive to adolescents, regulators are

failing to restrict youth access to inappropriate content. Game developers should be made to reduce the amount of smoking and drinking in their games.

Research published in the journal *Molecular Psychiatry* describes how brain scans have provided evidence that playing violent video games can damage the physical brain and may even increase the risk of Alzheimer's disease. Scientists at the University of Montreal recruited 100 people to play a range of popular 'shooter' games such as Call of Duty, Killzone and Borderlands 2, for a total of 90 hours. They also gave them non-violent games to play from the Super Mario series.

The study discovery challenges previous findings that all video games have the capacity to enhance some aspects of mental processing that benefit certain cognitive systems, including boosting visual attention and short-term memory. But there is also behavioural evidence that there might also be a cost in terms of the impact on the hippocampus. The researchers saw less grey matter in the hippocampus of habitual players. The scans were followed by two studies to establish the cause – these found that it really was the gaming that led to the changes.

The hippocampus is important for spatial memory, which assists navigation and episodic memory, which recalls past experiences. London taxi drivers who stretch their memory ability by learning 'the knowledge' have been shown to possess unusually large hippocampi. But the more depleted the hippocampus becomes, the more a person is at risk of developing brain illnesses ranging from depression to post-traumatic stress disorder (PTSD) to Alzheimer's disease.

Previous studies have shown that gaming stimulates a habit-forming brain region – the caudate nucleus – at the expense of the hippocampus. The more the caudate nucleus is used to navigate through a game, the more the hippocampus loses cells and so shrinks. Brain scans showed that people who relied on the caudate nucleus suffered a measurable loss of hippocampus 'grey matter' after only 90 hours of playing action games. But the same amount of time spent playing 3D Super Mario games increased grey matter in the hippocampi of all participants, although in fairness, the results fall short of proving actual harm to players.

Playing violent video games regularly makes people less sensitive to disturbing images. Experts believe this is because they suffer less from emotion-induced blindness, which occurs when a person's emotions impact their perception of the world. Researchers from the University of New South Wales looked at how a person's gaming history predicted whether emotion-induced blindness occurred.

When people rapidly sift through images in search of a target image, a split-second emotional reaction can cause some of them to be unable to see the target. This occurs even if the player is looking straight at the target. It is possible the visual system stops processing the target in order to deal with the emotional imagery it's just been confronted with.

Researchers classified participants as frequent violent video games that often or almost always involved violence, if they played them for more than five hours a week. A control group who played no video games was compared to the violent players. None of the participants were aware of the link between the experiment and their video game playing history.

During the experiment, participants were shown a flashing sequence of images that were either emotionally neutral – such as a non-threatening animal or person – or a graphic or

emotionally negative content, such as a violent person, depictions of assault, or disgusting. Frequent violent video game players seemed to be less impacted by the emotional graphic or emotional images. In image streams containing violent or disgusting images, they were able to correctly identify the rotated target image despite the graphic content and with greater accuracy. The study was published in *Visual Cognition.*

In a study that involved 17,000 adolescents aged nine to 19 and conducted from 2010 to 2017, researchers found that video games do trigger increased aggression in youngsters. The data produced a correlation between games such as Grand Theft Auto, Call of Duty and Manhunt and increased physical aggression with prolonged use. Specifically, youngsters were more inclined to be physically aggressive with their peers and find themselves scolded by authority figures at school.

The results were published in the *Proceedings of the National Academy of Sciences* and included 24 studies across Canada, Germany, Japan and the USA.

Although no single research project is definitive, the research provides the most current and compelling evidence that there is an association between violent video games, subsequent increases in physical aggression, and violent behaviour. It is also possible that violent games could be a symptom of inherent aggression rather than the cause. In other words, the game brings to the surface a latent propensity for violent behaviour.

If children and teenagers are playing these games, either these games are having an effect on right and wrong, or they're having a detrimental effect on players' sense of right or wrong and that's why they are attracted to these games. Other research has suggested that playing violent video games could also encourage reckless driving, binge drinking and casual sex.

Violent video games have a bad reputation with many claiming they fuel aggressive and anti-social behaviour. The reality could be even worse with researchers uncovering evidence that games such as Call of Duty affect our brain's ability to process basic human emotions. Worse, chronic violent game addiction could make people 'cool, callous and in control' in disturbing situations.

A study by the British Psychological Society, published in *Social Affective and Cognitive Neuroscience* found that gaming was linked to lower empathy and emotional callousness, probably because violent games inhibit players' ability to process emotional facial expression and control their responses. Gamers had a reduced spike in brain activity associated with attention to emotional information when they viewed angry faces, suggesting they pay less attention to facial stimuli and find it harder to process visual information because they have been overexposed to angry faces in games.

Unusually, gamers showed more of a reaction to happy faces suggesting they have reduced response to threatening faces. Researchers believe this could be why gamers often have lower empathy in real life. The study showed that frequent players of graphically violent video games were less empathetic than infrequent players of graphically violent video games. Again, this points to frequency of play, rather than the level of violence.

Maybe if we were to accept a responsible censorship of the portrayal of violence in video games, TV shows and film, we might enjoy a less violent world. Electronic media and information technology means we now have everything at our fingertips, but of course, there has been a price to pay for this. Violence encourages violence, whether it is witnessed in real time or in decades old news reports. These studies, meticulously executed and recorded, prove the point and we must start to take note. The academics

with their notebooks and keen eyes should be given a louder voice – there should be a connection between their findings and the political elite who guide our futures.

If violent video games and TV shows can influence aggression, what would happen if we could harness this effect to calm people down?

Prisons have traditionally used programmes like woodworking classes and art therapy to keep inmates occupied and away from trouble – no easy task considering the reasons most of them are there in the first place.

In China, compulsory re-education has been the rule since the communist revolution – endless classes in political awareness, social responsibility and the good of the many outweighing the good of the few philosophy, has proved remarkably successful in reinforcing the Chinese hive mentality. But in the West, there are simply not enough resources to make this work, even if there was political will. In the UK, inmates are for the most part swept under the carpet, out of circulation, out of sight and out of mind until their release.

But new research suggests that getting prisoners to watch nature programmes can significantly reduce aggressive and antisocial behaviour – at least while they're still In prison. A team of researchers in the United States, led by Dr Patricia Hasbach, studied the mental health of prisoners at a correctional institution in Oregon. Part of the study involved inmates who watched films about the natural world during their recreation time. The films covered a variety of subjects such as flora, forests, the oceans, aquaria and even a burning log fire [although we are not told if the arsonists were allowed to watch that one.]

As with all such experiments, the researchers also employed a control group – of the 48 prisoners in the cellblock, only half were shown the nature videos. Over the course of a year, the prisoners who watched the nature films received a quarter fewer disciplinary episodes than those who did not. Incidences of actual violence and aggression fell by 26% in inmates who had regular exposure to the films, compared with those who didn't.

It is thought that watching nature programmes helps them 're-connect' with nature itself, something already known to improve mental health and wellbeing in humans. Both psychologists and ramblers recognise that feeling and being at one with nature is good for physical health and psychological wellbeing. Obviously, direct contact with nature would be better, but given the unfortunate circumstances, even indirect contact seemed to provide at least temporary relief from stress and inevitable feelings of antagonism and hostility.

The prison staff reported back to the researchers on a regular basis and they agreed the videos were a useful intervention for prisoners displaying warning signs of aggressive behaviour. Inmate surveys and interviews also indicated that negative emotions and behaviours such as aggression, distress, irritability and nervousness reduced following the viewing of the videos and that the effect lasted for several hours.

Dr Hasbach's research was presented to the American Psychological Association in Denver, Colorado in August 2016 and reported in the magazine *Popular Science*.

The importance of the study is self evident and the results could provide a model for other prisons, even high security establishments where they keep the real rubbish, to reduce aggression and violence – even stress and anxiety. In another experiment, students who watched the *Superman* movie were found more likely to help others and even engage in acts of kindness afterwards.

According to research carried out by Dr Shawn Green (assistant professor, University of Wisconsin-Madison) and Dr Aaron Seitz (University of California, Riverside) kids who played video games every day scored higher in subjects including maths and science – but students who spent hours on social media sites were more likely to fall behind.

The joint study suggests that certain types of video game, particularly the sort of games that depend on players' accurate decision-making and rapid reactions to fast moving targets can serve to boost brain function and produce positive improvements in cognitive function. Some 'action' games were even found to be of greater benefit than so-called 'brain training' programmes, rubbished by more than two-dozen academic studies.

Of course, like the 'brain training' devices promoted by Star Trek Captain Patrick Stewart, this increase in cognitive ability may be limited to the perfection of one type of activity rather than overall intelligence. Nonetheless, 'action' games have been seen to also improve attention skills, neuro-processing and cognitive functionality. Researchers in Australia led by Alberto Posso at RMIT University in Melbourne, Australia, keen to add their own contribution to the debate, tested more than 12,000 15 year-olds in maths, reading and science, and recorded data about the students' online activities. These students were tested according to the *Program for International Student Assessment* (PISA) – a test that measures 15-year-old students' reading, mathematics, and science literacy every three years in more than 70 countries.

The researchers found that video games could help students apply and sharpen skills learned at school, although they did not disclose the titles of specific games. However, previous studies into video game behaviour described them as anything from computerised card games to realistic fantasy worlds involving millions of players.

It appears that students who play online games almost every day score 15 points above the average in maths and 17 points above the average in science. This is a significant improvement, because online gaming involves the player being able to solve puzzles in order to move to the next level. It also involves using some of the general knowledge and skills found in maths, reading and science that have been taught in class. Dr Posso and his team have even suggested that teachers consider incorporating popular video games into teaching, so long as they are non-violent.

Conversely, teenagers who regularly spend time on Facebook or chat online every day scored 20 points lower in maths than students who never used social media. They could be spending this time on study, but it may also indicate that they are struggling with maths, reading and science and are going online to socialise instead. Maybe teachers could find a way of blending the use of Facebook and other types of social media into their classes as a way of helping those students engage. However it's also important to recognise that other factors could have an impact on teenagers' willingness to learn.

So, playing certain kinds of video games could actually boost a child's intelligence and improve their exam results, but the bottom line is this: Children's success or failure in life ultimately stems from good parenting, the setting of boundaries, and a reasonable degree of discipline, accomplished mostly by setting the right examples.

Social Media Addiction

Most people think that psychology is the study of the mind – it isn't. Psychology is the study of behaviour. Observing, measuring and predicting behaviour gives us a window on the mind. We can 'people watch' over a cup of coffee at the corner café, or we can get people to answer questionnaires, or even take part in a series of cunning, even covert experiments to more closely observe and predict the behaviour of our fellow human beings. Or… we could look at their Facebook pages and take a close look at what they're up to and how they express themselves online.

It's possible to tell whether a post has been published by a male or a female without looking at the photo or even knowing the identity or gender of the page's owner. Believe it or not, the most common words and expressions used by women are *shopping*, *excited*, *love you* and the <3 (heart) emoticon.Their posts are more concerned with emotions (how they felt) than with what they've been doing. Men on the other hand are more likely use extreme bad language, four letter words and their derivatives, as well as a plethora of other euphemisms to describe various parts of one's nether regions. The content of men's posts more often relate to sport and alcohol consumption.

Teenagers use lots of emoticons as well as variations of the expression ha ha! They are more likely to discuss school, homework and teachers than older people – no big surprise there – and to use abbreviations such as LOL, LMFAO and the slightly more complicated ROFLMFAO, etc.

At the older end of the scale – 30 and over – people post more about work, sleeping, and wine, as well as weddings, restaurants and genteel weekend breaks.

The extended Facebook family are either creative, confident and conscientious, or borderline narcissistic, neurotic, and often suffer from low self-esteem and regular Facebook users fall into three groups. The biographers for instance are really extroverts, obsessed with making public every particular of their lives, no matter how embarrassing or superficial – where they're going, who they're with, what music they're listening to, what they've just watched on TV, and so on, ad nauseam.

Then there are the narcissists, who will spend hours photoshopping their self-portraits to share with the world their beauty, their massively improbable life success, and if they have wealth, that too.

Finally, there are the publicists – the people who use their Facebook page as an advertising platform as part of the promotion of their businesses. [I belong to this group – you will never see even a tiny sliver of my private life on Facebook, only stuff that advertises my events and the odd interesting or amusing picture to make it a bit more interesting.]

Researchers at Brunel University, led by Dr. Tara Marshall, carried out an analysis of 555 online surveys completed by Facebook users. The surveys focused on the Big 5 personality traits – extroversion, openness, agreeableness, neuroticism and conscientiousness. The surveys also measured self-esteem and narcissism. Surprise, surprise – they found that Facebook users did publish posts that fell in line with their personality traits.

Specifically, they found that people who scored high in neuroticism sought the kind of validation from other users that they can't find offline. When they receive more LIKES and positive comments they tend to experience the emotional benefits of social inclusion, whereas those who receive none feel ostracised. Worse, the loss of even a single LIKE or the receipt of one negative comment would cast them out into the emotional wilderness. In many cases, it caused them to repost and log in to their account more frequently in the hope that things would take an upturn. This behaviour is startlingly similar to problem gambling, where addicts 'chase' losses in the vain hope of another win.

Extroverts take advantage of Facebook as a tool for social engagement and make every effort to publicise their social activity. They are less motivated by LIKES and more motivated by interaction with others.

Narcissists update their achievements such as diet, exercise, how many books they've sold, and how much money they've got. They are attention seekers and as far as their Facebook page is concerned, they will also measure validation through their number of LIKES in much the same way as the neurotics do. According to Facebook, updates about achievements receive the most LIKES and this encourages narcissists to write achievement themed posts.

Open, curious and creative people are more likely to post about political beliefs and intellectual topics. These personality types share impersonal information, such as current events and research content. They are unlikely to seek social interaction and are more interested in disseminating information.

Conscientious users post infrequently and are more aware of how others receive their content. When they do post, it is most often about wholesome personal matters, such as their children.

People with low self-esteem post frequently about their current romantic interest or their long-term partner, and it has been suggested that their motivation is to reduce their own insecurity and demonstrate to others that their relationship is healthy and progressing well. Paradoxically, these posts receive fewer LIKES and make users seem less likeable.

If we are to understand more about the human condition, especially in an age when technology has revolutionised our lives in more ways than we fully recognise, it's important to understand why people write about certain topics in certain ways on Facebook and other social media.

Doubtless more research will be done along these lines and hopefully the results will be posted online by open, curious and creative people. In the meantime, it might be a healthy

idea for Facebook users to understand which group they belong to… and why.

There is already a mountain of research showing that online communication is a poor second to face-to-face contact – and by a long mark. Written words are only part of communication – tone of voice, facial expression and body language make up the greater part. Nearly all previous studies clearly demonstrate that time spent on social media is associated with a greater likelihood of loneliness and depression. A great misunderstanding about social media is that if you turn it off, your social life is over.

Exceptions can be found in Wikipedia and online scientific publications, probably because they are designed to communicate knowledge, rather than to entertain. The full findings of the study were published in the journal *Nature Communications*.

Technology is fuelling loneliness by reducing the need for face-to-face contact. The increasing use of social media was eroding communities, with few Britons even speaking to their neighbours any more. The workplace has also become more isolated, with advances in technology meaning more people can work remotely. The Coronavirus lockdown has meant that huge numbers of staff are now working from home – a trend that is likely to continue.

Loneliness is a public health issue – an estimated 9 million people in the UK are lonely.

Loneliness has previously been perceived as chiefly a problem among the elderly, but research has found students are more likely than over 75s to be isolated, but because of lockdown, younger age groups are being affected by loneliness. Figures from the Office for National Statistics released in April 2020 found almost 10% of 16 to 24-year olds said they were often or always lonely – three times the figure for over 65s. The national survey showed 23% of young adults said they were lonely some of the time, a proportion that fell to 18% for the 25-34 age group and to 17% among over-75s. Dr Dawn Snape, an assistant director at the Office for National Statistics, said that social media was creating new problems for the younger generation.

Children and young people are hugely connected – within seconds they can find out they've been left out of something and can see it happening in real time. If they're being left out of something that their friends are doing, it's happening in real time, if they're sitting there watching their friends at a party, watching everything that is happening at the party that they haven't been invited to – the desperation of feeling that you have been left out of a friendship group is something that's hard to bear for a teenager. This is the first generation that has ever had to deal with that and the repercussions of that.

New research tells us that Facebook personal messaging has a major impact on wellbeing and overall life satisfaction in much the same way as getting married or having a baby.

The conclusion is based on a narrow premise – that Facebook users feel better when people they know and care about post a few simple words rather than just a perfunctory click on LIKE. Posts and comments are not exactly labour-intensive, but they might remind recipients of existing meaningful relationships. But can a line of type really be as satisfying as a normal conversation with all its nuances and subtleties?

The study, collated by Drs Burke and Kraut, researchers at Carnegie Mellon University's Human-Computer Interaction Institute, involved nearly 2,000 Facebook users from 90 countries and appeared in the *Journal of Computer-Mediated Communication* – an IT industry publication.

Each of the 2,000 participants agreed to take part in a monthly survey conducted over three months. By monitoring users mood and behaviour, the researchers found that comments from close friends caused an increase in psychological wellbeing, satisfaction with life and overall happiness that were as significant as those associated with major life events.

By conversing via Facebook or email or text with people you already know and like, and with whom you already share a bond, you are bound to feel better, just as you do when you talk to them in person. When we read their messages, we can ‘hear’ their voices and understand the subtleties of hidden humour – or frustration – because we already understand their politics, their beliefs, their LIKES and disLIKES, their foibles and their eccentricities. But to suggest that the occasional line of type has the same effect seems to fly in the face of reason.

One problem is that negative things we encounter in the world count more than positive ones.

Nonetheless, their assertion is that people who are feeling down may indeed spend more time on social media, and they choose to do so because they've learned – just like any other kind of addiction – makes them feel better.

But watch out for Facebook! Parents might want to take a closer interest in what’s happening on their children’s Facebook pages, and that means looking at more than just who they’re talking to.

Facebook is facing allegations it is gathering information on youngsters who 'need a confidence boost' to help advertisers target kids. According to national newspaper *The Australian,* a leaked Facebook internal document suggests the firm could allow advertising agencies to use the data to target young and vulnerable users.

The confidential 2017 document details how, by monitoring posts comments and interactions, Facebook can work out when children as young as 14 feel ‘overwhelmed, defeated, stressed, anxious, nervous, stupid, silly, useless,’ and a ‘failure.'

Facebook calls this ‘Sentiment Analysis’ and it includes information on when young users are most likely to feel certain emotions. According to the document ‘Monday – Thursday is about building confidence; the weekend is for broadcasting achievements.' In a statement issued to The Australian, Facebook promised an investigation into the matter. They said 'The data on which this research is based was aggregated and presented consistent with applicable privacy and legal protections, including the removal of any personally identifiable information.'

In 2012, Facebook ran an experiment on tens of thousands of its users, in which it altered which status updates appeared in the news feed, selected based on posts’ emotional content. An algorithm determined whether a post was positive or negative, and Facebook's aim was to see if the selected group became more sad if they saw a greater number of negative posts. The results showed that they could. Facebook was criticised because people claimed it was engaging in social engineering for commercial benefit. Not, of course, that Facebook would care.

According to a team of researchers led by Brian A. Primack, M.D., Ph.D., director of the Center for Research on Media, Technology and Health and assistant vice chancellor for health and society at the University of Pittsburgh School of Health Sciences, the number of social media accounts you have says a lot about your mental health.

Young adults who use more than seven different social media platforms are more than three times more likely to report symptoms of depression than those who are happy with just one or two. In fact, the more accounts you have, the more time you need to spentd checking them – the more accounts you operate, the more complex the multitasking exercise becomes. Trying to maintain a presence on multiple platforms will inevitably lead to stress and anxiety. It's hard work trying to maintain a credible presence on multiple platforms. Worse, multitasking is known to be associated with poor cognitive and mental health.

There are unwritten rules and cultural assumptions special to each platform, which also makes them more complicated to navigate. The more platforms you engage with, the more likely will be the irritation caused by all the minor frustrations of having to understand and follow different rules, inevitably leading to negative feelings and emotions.

Social media platforms are risky places – even the most minor faux pas will be stored forever and could lead to embarrassment in the future. A joke posted 20 years ago may come back to haunt you, and in this new age of 'Woke' culture, you can be sure your Facebook or Twitter account will trawled for past misdemeanours!

Another danger is that many users may be searching for safe and accepting environments online. People who already suffer from depression and anxiety might feel worse because they are searching for genuine social fulfilment on social media – the exact place it doesn't exist!

Physicians should be asking patients with depression and anxiety about their social media use and making them aware that this may be related to their symptoms.

In 2014 Dr Primack and his team surveyed 1,787 adults between the ages of 19 and 32 using an established depression assessment scale as well as questionnaires designed to assess social media use. The questionnaires asked about the 11 most popular social media platforms at the time – Facebook, Twitter, LinkedIn, Instagram, Snapchat, YouTube, Google Plus, Reddit, Tumblr, Pinterest, and Vine. After reviewing the data, researchers found that the participants spent an average of 61 minutes a day on social media and visited their social media accounts 30+ times a week.

Participants who used from 7 to 11 platforms reported 3.1 times higher levels of depressive symptoms than those who used 0 to 2 platforms. Those who used the most platforms were 3.3 times as likely to report high levels of anxiety symptoms than those who used the least number of platforms. Over a quarter of the participants were classified as having high indicators of depression. The more time spent catching up on social media, the greater the likelihood of serious mental problems. Some users run the risk of experiencing feelings of rejection, exacerbating pre-existing negative thoughts and emotions.

Worryingly, this is especially true for young adults, some of whom may go on to suffer from Internet Addiction, now a recognised psychiatric condition closely linked to depression.

There is also a risk that depression could lead to increased social media use. Worryingly, there is a danger that exposure to falsely idealised representations of others on social media platforms could cause feelings of inadequacy or even worthlessness because of an inaccurate belief in the success and happiness of others. This is especially true in the case of youngsters who can develop feelings of inadequacy if their peers appear to be living better and more exciting lives on Facebook!

Good social media experiences do not outweigh bad ones. For every 10% increase in negative social media experiences, the risk of depression rises by 20%. This low mood is not reversed by positive interactions, such as a LIKE of a picture or a nice comment. Researchers believe social media makes people feel inadequate when they see others posting highlight videos of their lives. Ironically, teens don't even like it when they're with a friend and their friend is looking at their phone.

Often, users feel much of what they see and read on social media really is shallow and pointless – and meaningless doesn't help depression. And then there's the problem of cyber-bullying, all too often unreported but nonetheless a major cause of depression and anxiety.

Around 92% of 16 to 24 year-olds use social media. Most sites stipulate a minimum user age of 13, but a survey carried out for BBC children's channel, *CBeebies*, found that more than 75% of 10 to 12 year-olds have social media accounts. Most worrying, the NSPCC cite social media as a major cause of the dramatic increase in the number of children admitted to hospital because of self-harming.

Just one hour a day spent on social media is enough to adversely affect children's happiness, and the effect is worse for girls, who mostly worry about their appearance. The longer children spend chatting social media sites, the less happy they feel about a number of aspects of their own lives, such as their school, their schoolwork, their appearance, their family and their lives compared with their friends and peer group. Girls are more at risk because they worry more about their appearance and their school life. They can feel miserable by criticism of their appearance on photo-sharing sites.

Children – especially teenagers – can sometimes feel inadequate when they view photographs of their peers having fun without them. However, children who invest time in interacting with others online did feel happier about their friendships.

Online social networking is the one aspect of childhood that has changed dramatically in the last decade. Rather than social media being the great inclusive miracle of the modern age, in many instances it has the opposite effect and this is causing concern among policy-makers and bodies responsible for safeguarding children. Some NGO's think that the time children spend on social media should be regulated, but no one has been able to come up with any practical suggestions as to how this could be enforced.

Now we have Apple's Siri and Amazon's Alexa – and doubtless there will be more devices with human-like voices to help us through the day. New research has shown that conversations with these devices can offer short-term relief from feelings of loneliness. Researchers from the University of Kansas have warned that in the long-term, spending too much time with artificial intelligence 'personal assistants' could stymie social interaction.

People who feel socially excluded often take steps to address their loneliness, but they did not feel the need to get back into society after interacting with 'anthropomorphic' devices. The research could help firms design products that can increase the wellbeing of people who feel lonely, without sacrificing genuine social interaction, but a computerised voice can never be a real substitute for personal interaction.

Over four experiments, a group of volunteers were made to feel socially isolated while researchers monitored their responses. To establish feelings of loneliness, the team asked the participants to write a few sentences about a time in their lives when they felt isolated or socially excluded – maybe they had been stood-up on a date, or not invited to a party.

In one experiment they played a computerised game of 'catch' in which other participants stopped throwing them the ball and instead threw it to other ‘players’ after a few initial throws. Participants believed they were playing with real people online, but their teammates were actually computer programs designed to leave them out of the game. They were then asked to use a vacuum cleaner that had been specially designed to look as if it was smiling. They were also asked to think about their phone in human-like terms, considering questions like 'how much it helps you.’

Rather than seeking out normal human interaction, participants who had engaged with the devices were content with the comfort they offered and became less interested in seeking out the real thing. Those that felt they were talking to Siri directly experienced fewer feelings of loneliness. But as lead author Dr James Mourey said, ‘Alexa can’t be a perfect replacement for your friend Alex, but the virtual assistant can affect your social needs.’

However, the team found that there were limits to how far this effect would extend. As soon as people were told that it only *appeared* the vacuum cleaner was smiling, they seemed to understand it was only a machine and not a person. It was only then that the effect diminished.

It’s possible that we are addicted to Social Media because our brains have evolved to make us that way! Hard to believe? Most of us crave company and have a deep-rooted evolutionary need to engage and converse with others. It’s eminently possible that the reason social media has proved so popular is because it allows us to gossip on a larger scale than ever before. Texting, emailing and twittering just might be the result of an uncontrollable urge to communicate! The age of the Loneliness of the Long Distance Blogger has arrived!

But that does not answer the question why, when there’s easy access to Facebook, Instagram and Twitter, some social media obsessed teenagers are lonely?

A report commissioned by the National Citizen Service Trust involving 1,000 teenagers between the ages of 12 and 17 and conducted by Dr Jennifer Lau at Kings College, London, found 60% of teens said they were lonely and one in 20 said they never spent time with friends outside school.

Girls were generally lonelier than boys, but a worrying third of all respondents said they rarely felt popular with their friends. Partly, this may be due to the number of celebrity Facebook, Instagram and Twitter feeds available at any time of the day or night for young teens to peruse at their leisure. A lot of young girls avidly follow their idols and many must wish they were as popular as the Kardashians. The real fear is that these teens are at risk of developing mental health issues later in life. But there is a direct correlation between lack of social integration and loneliness amongst young people.

Some teenagers have such poor social skills that they positively fear meeting new people. Some deliberately make excuses not to interact with people face to face. A few refuse even to answer the telephone and are thrown into paroxysms of fear if the door bell rings. Low self-esteem is a common factor and hinders teenager’s progress toward independence. It can result in anxiety and if it emerges in adolescence and isn’t treated, there can be lifelong repercussions.

Interacting on a face-to-face basis with one’s peers is the only effective way of learning the skills that get us through life and will be crucial in the workplace. Good social skills are important to potential employers, but it is during our early development, that we learn

what's a joke, what's not a joke, as well as the boundaries which define behaviour and our place in the social hierarchy.

Logan Annisette, a psychologist at the Windsor University in Ontario, Canada, thinks that social media, which is disproportionately used by younger people, could also be making young people immoral. Frequent use of ultra-brief social media is associated with negative effects on the user's ability to engage in reflective thought (the research shows they are less likely to do this) and this could affect moral judgement because they are less aware of the effects of their own actions and the effect of these actions on others.

There is a possibility that at least in the short term, it could lead to a decline in academic performance and increased difficulty in the formation of relationships – two extremely important issues for teenagers and young adults – the very generation that text and twitter the most. The implications of this are not yet clear – we will have to monitor a generation as they grow up and enter adulthood. Before we have all the answers.

Nonetheless, social media has become integral to human interaction. South Korea, China and Japan all run government sponsored programmes designed to wean computer-addicted teenagers away from their virtual existence and back into the real world.

New research from the University of Pittsburgh School of Medicine has revealed that the more time young adults spend using social media, the more the likelihood they will suffer from depression. More than a quarter of people who spend more than an hour a day on social media sites reported having higher than normal incidences of depression. The researchers claim that social media sites might be fuelling Internet addiction, a psychiatric condition connected to depression. Worse, it might be that people who are already depressed might be compensating for the emptiness in their lives by spending more time on social media – and thereby establishing a vicious circle – a cycle of depression caused by the adverse influence of the unrealistic posts of others who at first glance appear to live more fulfilled and exciting lives that elicit feelings of envy. And that doesn't take into consideration the effects of possible cyber-bullying.

Some social media sites have already taken steps to help users who may be depressed. Search words like 'depressed, suicide, feeling low' are automatically redirected to a message that begins '*Everything OK?'* and then provides users with links to resource sites which may then be able to provide help. Facebook was supposed to be testing a feature where users can anonymously report worrying posts, followed with a pop-up window encouraging them to talk to friends or call a helpline. So far, there is no sign of of Facebook installing this on its platform.

Incidences of depression are unconnected to the amount of time spent online. Compared with those who checked least frequently, participants who checked social media accounts most often were 2.7 times more likely to suffer depression. Similarly, compared to peers who spent less time on social media, participants who spent the most time on social media were nearly twice as likely to suffer depression. The figures were arrived at after the researchers factored out other things that might cause depression, including relationship status, living conditions, employment, income etc.

It might be that Internet addiction may be an indication of the presence of more severe psychological issues. This relatively new obsession with social media might simply fuelling existing conditions such as depression, anxiety, impulsiveness, and short attention span.

24 hour connectedness may be socially acceptable, but two separate studies warn that we need to be more vigilant about the way people – particularly teenagers – use the internet.

In particular, parents and teachers need to be on the look out for signs of desperation and anger.

In one of the studies, a team of psychiatrists headed by Dr Michael Van Ameringen monitored 254 undergraduates at McMaster University in Ontario, Canada. They found 33 were addicted to the internet, and 107 were on the spectrum. Those who were addicted were unable to extract themselves from social networking sites, impulsively watching streamed videos and messaging friends. They also struggled to efficiently carry out their daily routine, falling into bouts of depression, failing to pay attention, and failing to manage their time efficiently.

A second study, conducted by Dr Jan Buitelaar, professor of psychiatry at Radboud University Nijmegen Medical Centre in the Netherlands, claims that excessive use of the internet may disguise mild or severe psychopathology because excessive use of the internet may be strongly linked to compulsive behaviour and addiction.

Both studies represent a key step forward in understanding mental illness in the 21st century. The big social media companies might find themselves having to exercise a little more social conscience than simply being asked to pay their fair share of corporation tax.

It seems that Facebook harbours the same disregard for its own employees as it does for its users. Dozens of moderators – both former and current employees – are suing Facebook for severe mental trauma after being exposed to violent and sexually disturbing images in the course of their work. Thirty moderators, whose jobs involved removing harrowing material from the site, claim they were not given adequate training to deal with the content, or access to doctors or psychiatrists while working for Facebook.

Their lawyers claim that several have attempted suicide, while others have been diagnosed with PTSD. Others have succumbed to severe depression, flashbacks and anger issues, while some have complained that changes in character have led to the breakdown of relationships. The case has been lodged at the High Court in Dublin, where Facebook has its European headquarters. The agencies that recruited them are also being sued.

In 2020, Facebook agreed to pay £37 million to former moderators in the US who brought a similar claim in a California court, blaming the horrific content for causing mental trauma. A Facebook spokesman said *“We are committed to providing support for those that review content for Facebook as we recognise that reviewing certain types of content can sometimes be difficult. Everyone who reviews content for Facebook goes through an in-depth, multi-week training programme on our Community Standards and has access to extensive psychological support to ensure their well being. This includes 24/7 on-site support with trained practitioners, an on-call service, and access to private healthcare from the first day of employment. We are also employing technical solutions to limit their exposure to graphic material as much as possible. This is an important issue, and we are committed to getting this right.”* Of course they are!

Sharing 'selfies' can make women feel more anxious and less attractive, even when they use filters to ‘enhance’ looks. Taking and posting selfies on social media does have adverse psychological effects.

Scientists led by Jennifer Mills from the Department of Psychology at York University examined the behaviour of taking and posting selfies online. Her team looked at 110 female undergraduate psychology students who were randomly assigned to one of three

experimental conditions. All participants were between 16 and 29 years of age and had active accounts on Facebook or Instagram.

Participants in the first group took and uploaded an untouched selfie; those in the second group posted a preferred and retouched selfie to social media, and the third acted as a control group.

The team measured the participants' mood and body image before and after they had manipulated the picture by asking participants to quantify how they were feeling at the time, including anxiety, depression, confidence, feelings of fatness, physical attractiveness and body size satisfaction.

Women who took and posted selfies to social media reported feeling more anxious, less confident, and less physically attractive compared to those in the control group. The emotionally harmful effects of selfies were found even when participants could retake and retouch their selfies. The study was published in the peer-reviewed journal *Body Image*.

Selfies cause more misery among schoolchildren than bullying because the pressure to be thin on social media is so great. While they can shrug off airbrushed celebrity selfies, seeing their friends online is making kids question their own bodies and appearance.

Researchers at the University of Birmingham also analysed 1,300 responses from teenagers at British schools aged 13 to 18 to determine their attitude to sites such as Facebook, Twitter and Instagram. They found a new fashion to be 'slim thick' – a slender waist but large bottom, which is the body shape of celebrities like Kim Kardashian and Jennifer Lopez. The trend of taking selfies, which focus on body types like this, is leading some young people to develop unhealthy ways of thinking as they compare their appearance to others of their age.

Celebrities always seem to appear flawless on social media, which goes some way to explain why young girls become obsessed with their appearance. The effect is so serious that teen girls are being driven to plastic surgery in an attempt to look like the filtered versions of themselves taken in photo-editing apps like Snapchat, which can remove blemishes and whiten teeth, but also create a false sense of reality. Doctors from Boston Medical Center claim that access to the same photo-editing technologies is making them obsessed on removing any trace of imperfection.

As these ‘perfect' images become the new normal, researchers say the tend can have a devastating impact on the physical and emotional development of teens, potentially triggering mental conditions such as body dysmorphic disorder (BDD), a psychological disorder where someone is obsessively focused on a perceived flaw in their appearance – real or imagined.

Teenage girls with BDD will often turn to social media for validation… and then to cosmetic surgery in an effort to improve their appearance on social media. A poll by the American Academy of Facial Plastic and Reconstructive Surgeons found 42% of surgeons said they'd seen patients who sought procedures to enhance their selfies and other social media photos while 58% of facial plastic surgeons have seen a rise in cosmetic surgery or injectables in patients under 30 years old.

The culture of selfies, filters and photo-retouching apps can create false expectations of how they are supposed to look and how they want the rest of society to believe they look. Patients often present themselves with photographs of what they want to look like, but surgeons cannot possibly reproduce the look exactly which inevitably leads to

disappointment and possibly more surgery! Often, surgery will worsen their condition. The majority of patients who underwent cosmetic surgery were still unhappy with their appearance. First their nose, then their lips, then their eyes, and so on. Up to 40% of people with BDD are delusional and don't believe it's in their head, so they go to multiple cosmetic surgeons until one of them accepts them as a patient. The truth is, the best treatment for such patients patients are psychological interventions.

According to the International OCD Foundation, BDD affects between 1.7% and 2.4% of Americans, which equates to about one in 50 people. The study was published in the *Journal of the American Medical Association Facial Plastic Surgery.*

It can be hard to resist the lure of Facebook. Social media sites such as Facebook – supposedly just a way to catch up with friends – have also become a tool with which to affirm the gender identities of users who now have a variety of genders to choose from on their profiles.

What started as a Silicon Valley success story might inadvertently have created a future where people are permanently distracted from the world around them by their reliance on devices, something which is confirmed by the latest scientific research into apps, which seems to confirm the negative effects they can have.

In an article for *The Conversation*, Simon McCarthy-Jones, Associate Professor in Clinical Psychology and Neuropsychology at Trinity College Dublin, looked at how these sites are manipulating our behaviour, and how we could take back control.

According to James Roberts' excellent book *Too Much of a Good Thing: Are You Addicted to your Smartphone?* there are six core components of any addiction:

1. Integration: how ever-present the behaviour is in daily life.
2. Euphoria: whether there is a feeling of anticipation or excitement around the behaviour.
3. Tolerance: the need for an ever-increasing 'dose' of the behaviour to achieve the desired 'high.'
4. Withdrawal Symptoms: feelings of irritability, stress, anxiousness, desperation and even panic that arise when not engaged in the behaviour.
5. Conflict: the degree to which the behaviour impedes relationships with other people.
6. Relapse: the degree to which attempts to limit the behaviour fail.

How can you live the life you want, avoiding the distractions and manipulations of others? To do so, you need to know how you work. 'Know thyself', the Ancients urged. Sadly, we are often bad at this. The problem is, others are getting to know us increasingly well. Our intelligence, sexual orientation, and much more, can be computed from our Facebook LIKES. Machines that use data from our digital footprint are better judges of our personality than our friends and family. Using our social network information, artificial intelligence, will soon know even more. The challenge now – right now! – is how to live our lives when others know us better than we know ourselves.

How free are we now? There are industries dedicated to capturing and selling our attention and using social networking as bait. Facebook, Instagram and Twitter may have drawn us closer round the campfire of our shared humanity, but their intentions are in no way altruistic! There are costs – both personal and political and we must decide if the benefits of these sites outweigh the cost. And how can we be expected to make rational decisions

when social media is so addictive? All decision making should be informed, but how can it be if we don't know what's happening behind the curtain?

Sean Parker, the first president of Facebook, has talked about the process that went into building it and said it was *'All about how do we consume as much of your time and conscious attention as possible?'*

To do this, he said the user had to be given '*A little dopamine hit every once in a while because someone liked or commented on a photo or a post… and that's going to get you to contribute more… It's exactly the kind of thing that a hacker like myself would come up with because you're exploiting a vulnerability in human psychology… The inventors, creators, it's me, it's Mark [Zuckerberg]… understood this consciously. And we did it anyway.*'

Humans have a fundamental need to belong and a fundamental desire for social status and human needs create human vulnerabilities. Our brains treat information about ourselves as a reward – when we are rewarded with things such as food or money, our brain's 'valuation system' activates.

But it is also activated when we encounter information about ourselves. Such information is thus given great importance. That's why, if someone says your name, even across a noisy room, it automatically pops into your consciousness. Information relating to our reputation and social rank is particularly important. For evolutionary reasons, our brains are wired to be sensitive to this and we begin to understand social dominance at 15 months of age. Social networking sites grab our attention because they involve self-relevant information and bear on our social status and reputation. The greater your need to belong and be popular, and the stronger your brain's reward centres respond to your reputation being enhanced, the more irresistible is the site's pull.

Gambling is addictive because you don't know how many bets you will have to make before you win. The famous psychologist Burrhus Frederic Skinner, an American psychologist, behavioural scientist, author, inventor, and social philosopher, and professor of psychology at Harvard University from 1958 until his retirement in 1974. In his Harvard pigeon lab, he discovered that if pigeons were given food every time they pecked a button, they pecked it a lot. If they were only sometimes given food when they pecked a button, they not only pecked much more, but did so in a frantic, compulsive manner.

Skinner's pigeon experiment was repeated at Harvard in 2004, but this time, it was called Facebook and didn't involve pigeons. Instead, it used humans – and the results were the same.

When you check Facebook you can't predict if someone will have left you self-relevant information or not. So Facebook and other social media sites are like slot machines that pay out self-relevant information. Maybe it's no coincidence that Facebook originally advertised itself as 'the college addiction.' Today, Facebook addiction has become a reality, although as Facebook is just one of many social networking sites, perhaps the term 'social networking addiction' would be more accurate.

The term 'addiction' itself is potentially problematic. A 5-year follow-up study found that many excessive behaviours deemed to be addictions – such as exercising, sex, shopping and video gaming – were often temporary. Also, excessive social network use is not necessarily problematic for everyone. Labelling excessive involvement in an activity as an 'addiction' is problematic. Are aspiring. Young classical musicians who practice their

instruments eight hours a day victims of addiction? Or are they simply dedicated to their art?

However, whichever way you argue it, excessive social network use has been argued – and convincingly – to lead to symptoms associated with addiction. These include behaviours similar to drug addiction, such as becoming preoccupied with it, using it to modify your mood, needing to use it more just to get the same effect, and suffering withdrawal when you stop using it – so much so that you are compelled to start using it again. Symptoms that indicate excessive use include an increased tendency to experience negative emotions, being unable to cope well with everyday problems, a need for self-promotion, loneliness and fear of missing out.

Is there a way to benefit from social media sites without being controlled by them? Companies could redesign their sites to mitigate the risk of addiction by installing opt-out default settings for features that encourage addiction and make it easier for people to self-regulate their usage. Users could empower themselves. It is already possible to limit time on these sites using apps such as Freedom, Moment and StayFocusd. Users could also be asked to consider whether personal reasons are making them vulnerable to problematic use. Government regulation may one answer. But then how likely is it that Big Tech would want to comply with such a request?

Another former Facebook executive who joined Facebook in 2007 and became its vice president for user growth, Chamath Palihapitiya, has spoken out against the social network he helped to create. Suggesting users take a break from social media altogether, he said that he felt ‘tremendous guilt' for the influence Facebook has had and its ability to manipulate users. Practicing what he now preaches, he has banned his own three children from the site. Palihapitiya has particularly criticised the ways people communicate via social media, including hearts, LIKES, and thumbs-ups.

Speaking to an audience at Stanford Graduate School of Business, Mr Palihapitiya said '*I think we have created tools that are ripping apart the social fabric of how society works. The short-term, dopamine-driven feedback loops we’ve created are destroying how society works. No civil discourse, no cooperation, misinformation, mistruth. And it’s not an American problem – this is not about Russians ads. This is a global problem.*'

Palihapitiya also believes social media is also responsible for boosting the spread of misinformation and allowing people with evil intentions to manipulate users. He cited an incident in India where hoax messages about kidnappings shared on WhatsApp led to the lynching of seven innocent people.

A Facebook spokesman countered 'Facebook was a very different company back then, and as we have grown, we have realised how our responsibilities have grown too. We take our role very seriously and we are working hard to improve. We've done a lot of work and research with outside experts and academics to understand the effects of our service on well-being, and we're using it to inform our product development. We are also making significant investments more in people, technology and processes, and – as Mark Zuckerberg said on the last earnings call – we are willing to reduce our profitability to make sure the right investments are made.’

Possibly the only words of truth in that statement were ‘we're using it to inform our product development.’ Right… but for wast purpose? The rest is just public relations spin.

Justin Rosenstein developed the iconic LIKE feature for Facebook, but he has cut himself off from notifications and other online distractions. He has banned all apps on his phone –

including Facebook – because he doesn't trust himself not to get addicted to them. He has set up his laptop up to block access to Reddit, removed himself from Snapchat and placed limits on the amount of time he spends on his former employer's product Facebook.

The LIKE button led to a massive upswing in popularity on the platform, kick-starting a trend for copycat features that keep users hooked in.

He believes that the lure of social media and other apps can be as addictive as heroin and that they are having a noticeably detrimental effect on people's ability to focus. He is also concerned that profit motives have led to the app notification becoming just another way for companies to sell their products, by driving users back to apps that play host to their adverts. He also argues that the solution to the problem may be state regulation of apps, which he views on a par with tobacco advertising.

Automated alerts were found to have the most adverse impact on mood, with work related messages second, and pop-up notifications also negatively affecting mood.

Researchers at Nottingham Trent University examined the effect of notifications over five weeks. In a group of 50 participants, they found that 32% of the digital notices had the power to bring about negative emotions, including causing people to feel hostile, upset, nervous, afraid or ashamed. The researchers created an app called NotiMind, which participants installed on their handsets. It collected information about the nature and frequency of notifications and users' mood throughout the day.

Selfitis – or the obsessive taking of selfies – appears to be a genuine mental condition, and psychologists have devised a test which you can take to see where you fit on the selfitis scale. The word selfitis was first coined in 2014 as part of a spoof news article claiming it was to be deemed a mental disorder by the American Psychiatric Association.

Following this, researchers at Nottingham Trent University and Thiagarajar School of Management in Madurai, India, investigated whether there was any truth in the phenomenon. After confirming that 'selfitis' does indeed exist, they tested out a framework for assessing its severity on volunteers. They say there are three categories – borderline, acute, and chronic.

Borderline selfitis occurs when people take selfies at least three times a day, but do not post them on social media. Someone is classed as acute if as many are taken and the pictures are actually posted online. If you have an uncontrollable urge to take photos of yourself around the clock, posting them to Facebook and Instagram more than six times a day, the you are a chronic selfie-taker

The paper, written by Dr Mark Griffiths from Nottingham Trent University said the study arguably validates the concept of selfitis and provides benchmark data for other researchers to investigate the concept more thoroughly. The research, which was published in the *International Journal of Mental Health and Addiction*, took place in India – the country that has the most Facebook users – and 60% of all selfie deaths. Typical selfitis sufferers were attention seekers lacking in self confidence. They constantly post images of themselves in the hope of boosting their social credentials.

Selfies are bound to evolve as technology develops. There are already options for 3D, cartoons, and a variety of special effects.

The scale, which runs from one to 100, was compiled after testing 200 participants in focus groups that looked the factors that drove the condition of selfitis. You can take the

test by reading the statements below. You can give yourself a rating of 1 to 5 for each one, where 5 is strongly agree, and 1 is strongly disagree.

1. Taking selfies gives me a good feeling to better enjoy my environment,
2. Sharing my selfies creates healthy competition with my friends and colleagues,
3. I gain enormous attention by sharing my selfies on social media,
4. I am able to reduce my stress level by taking selfies,
5. I feel confident when I take a selfie,
6. I gain more acceptance among my peer group when I take selfies and share them on social media,
7. I am able to express myself more in my environment through selfies,
8. Taking different selfie poses helps increase my social status,
9. I feel more popular when I post my selfies on social media,
10. Taking more selfies improves my mood and makes me feel happy,
11. I become more positive about myself when I take selfies,
12. I become a strong member of my peer group through selfie postings,
13. Taking selfies provides better memories about the occasion and the experience,
14. I post frequent selfies to get more 'LIKES' and comments on social media,
15. By posting selfies, I expect my friends to appraise me,
16. Taking selfies instantly modifies my mood,
17. I take more selfies and look at them privately to increase my confidence,
18. When I don't take selfies, I feel detached from my peer group,
19. I take selfies as trophies for future memoriesI use photo editing tools to enhance my selfie to look better than others.

Scores are as follows: 0-33 – Borderline | 34-67 – Acute | 68-100 – Chronic.

There is no doubt that children are being dumbed down by social media and the most dramatic falls in intelligence are among teenagers who would normally be expected to perform well.

A new analysis of intelligence test results spanning 30 years by Professor James Flynn shows an 'alarming' fall in scores by groups who once boasted the highest 'critical thinking' ability. The trend marks a surprise reversal of the Flynn Effect which has seen IQ scores rise year on year among all age groups in most industrialised countries over 75 years. The Flynn Effect rise was attributed to significant improvements in education and living conditions, and as evidence that intelligence is improving.

New analysis by Prof Flynn has now found declines in the IQ of children not only in the UK but also in European and Scandinavian countries. The only exception is the United States,

where youngsters are still improving their IQ, but this is because schools had been inadequate and now improving.

Professor Flynn – Emeritus Professor of Political Studies at Otago University in New Zealand – said he could not be certain about what was behind the decline in the intelligence of Britain's cleverest children, but he believed that internet-obsessed teenagers could be losing the ability to think because they were no longer prepared to tackle challenging problems. Rather than burying themselves in a novel by Jane Austen or Charles Dickens, they were so fixated on platforms such as Twitter or their smartphones that their attention spans were shrinking. He added that is might be because they were not willing to work on the mental exercises you need to do top-level thinking.

Two major factors which cause social media to impact mental health for both genders are online harassment and interrupted sleep. Girls are more likely to suffer from these problems by age 14, perhaps because they may be more active on the chat functions of the sites, but also because they experienced worse psychological effects from doing so. Researchers at University College London (UCL) published their findings in the *EClinicalMedicine* journal – a sub-publication of *The Lancet.* The study analysed data from nearly 11,000 14-year-olds from the Millennium Cohort Study (MCS).

Only 4% of girls reported not using social media, compared to 10% of boys.

So what can parents do to protect their children?

Certainly parents can get their children to bed earlier and make sure they are eating wholesome food. They should also pay close attention to any behavioural problems. Parents should also turn off their children's phone location settings if they don't want people to find out where they live. Children should be also be warned only to share pictures only with people they know and trust. One solution is to only use private networks that offer a secure way of sharing pictures. The only way to be 100% sure that you don't leave a digital footprint is not to post any digital photos in the first place!

Online harassment or cyberbullying, affects 40% of girls compared with just 25% of boys. In addition, 40% of girls said their sleep was often disrupted, compared with just 28% of boys.

Online trolling is the worst thing that social media addicted children – and social media addicted adults – can suffer.

Most people think that Internet trolls are angry sociopaths firing off abusive rants to strangers. Mostly, they are not – they are ordinary people, just like you and me. But under the right circumstances, almost anyone can become one. Around 40% of Internet users say they have been victims of trolling, while 20% of comments on American news website cnn.com have to be removed by moderators.

It's important to understand why people take to the Internet to indulge in bullying, or trolling, as it's more commonly known. Scientists at Stanford and Cornell Universities were interested to find out how and why people are 'triggered' to become angry Internet trolls.

Given that human beings are by nature, suggestible, individuals can also be susceptible to being swept along with the crowd – they can be unwittingly submerged in the larger organism of the group. The same is true when individuals are exposed to lots of personal attacks online by others. This is how, and when, Internet bullying gets massively out of control. One person throwing a stone through a window makes it easier for others to follow suit. Lots of people throwing stones through the windows make it easier for others to burn

the whole building down. This is the same pattern of behaviour that leads to full-scale riot – an individual throws something at a policeman, the rest follow suit, and inevitably someone throws a petrol bomb.

Some of those involved in the riot will – after the event – question their own behaviour and may even be surprised that they did it. Whipping the crowd into a frenzy is surprisingly easy – the Nazis had it down to a fine art. People hypnotised in stage shows also experience this effect. After the event, some are compelled to ask 'why on earth did I do that?'

And so it is with social media. Just one person making a negative comment about another can initiate a spiral of bullying.

Researchers at Harvard and Cornell recruited 667 people for an experiment, which involved giving people an easy test to complete before they read an online news article and accompanying neutral responses. After reading the article, they were asked to leave their own response.

About a third of the participants posted a negative comment or a personal attack that included swearwords or unacceptable language. But this proportion almost doubled – to 68% – when they were given a difficult test to worsen their mood and then shown negative 'trolling' comments about Hillary Clinton before reading the article and commenting.

The biggest problem with Internet trolling is that it is impossible to control. Kids kill themselves because they are bullied online.

Passing a nasty comment about someone behind their back is more than likely forgotten in time. But once posted online, it's there forever. Trolling is like standing at the top of a tall building and emptying a sack of feathers into the wind. There's no chance of picking every feather up again. To be suddenly be hated by strangers – right or wrong in opinion – can be psychologically destabilising

Women and members of ethnic minority groups are disproportionately the target of Twitter abuse. Where these identity markers intersect, the bullying can become particularly intense. The constant barrage of abuse, including threats to kill and threats of sexual violence, is silencing people, pushing them off online platforms and further reducing the diversity of online voices and opinion – and it shows no sign of abating.

40% of American adults have experienced online abuse, with almost half of them receiving severe forms of harassment, including physical threats and stalking and 70% of women described online harassment as a 'major problem'.

The business models of social media platforms such as Twitter and Facebook, promote content that is more likely to get a response from other users because more engagement means more advertising revenue. But the consequence of this policy is divisive or strongly emotive or extreme content, which can in turn create online groups that reflect and reinforce each other's opinions, and help propagate the spread of even more extreme content and a niche for 'fake news.'

According to Dr Larisa McLoughlin, a researcher at the University of the Sunshine Coast, Australia, cyber-bullying can be both overt – name calling, mocking, shaming – or covert – exclusion, isolation. Cyber-bullying can involve written or verbal behaviours such as phone calls, text messages and comments on social media.

Examples of cyberbullying include, but not limited to:

- Trolling – purposefully posting hurtful comments to provoke a response,
- Visual Behaviours – posting, sending or sharing pictures or videos, usually to cause embarrassment,
- Exclusion – intentionally excluding someone from an online group or, in the case of online gaming, excluding a player from groups or teams,
- Catfishing – falsifying online identities to trick the victim into romantic relationships,
- Impersonation – using the victim's name and account to damage the victim,
- Stalking – for example sending multiple text messages to the victim to show the bully knows exactly what they are doing, or where they have been,
- Threatening violence – for example threatening some form of traditional bullying, such as a physical fight.

Researchers at Stanford University agree that social media shaming can have the opposite of the intended effect. Those who are targeted online by moral crusaders tend to gain sympathy rather than disdain from others. So-called 'moral mob' warriors can end up looking like bullies, despite calling out racism or discrimination.

The researchers asked 3,400 internet users how they felt about public outcry towards offensive or controversial posts. The users were shown a picture of Lindsey Stone, who posed for a picture at the Tomb of the Unknown Soldier at Arlington National Cemetery in 2012, making an obscene gesture next to a sign that read 'Silence and Respect.' Ms Stone, and the colleague who took the picture, both lost their jobs following an impassioned online campaign. She also was inundated with death and rape threats on Facebook.

Participants who saw the post had just one negative comment thought that the reaction was just a single comment condemning it, and also thought the reaction was worthy of praise. However, when lots of people started leaving negative comments, the participants started to disagree. According to psychology professor Benoît Monin, there's a balance between sympathy and outrage. As outrage increases, sympathy kicks in. Once a comment becomes part of a group, a balance starts to appear.

When US filmmaker James Gunn was fired from Disney over historic tweets joking about pedophilia and rape, there was the usual flurry of moral outrage on Facebook, but this was a soon followed by a campaign for Mr Gunn – who produced blockbusters such as The Avengers and Guardians of the Galaxy – to be rehired.

The researchers also tested people's sympathy levels based on whether people felt differently depending on the victim's' pre-existing status, for example, whether or not they were a well-respected or liked celebrity, or considered loathsome, such as Bill Cosby, Jimmy Saville, or Paul McKenna. They found that even those who were hated, for example white supremacists, were still sympathised with.

This reveals a real-life moral dilemma… is the mass shaming of individuals really the best way to achieve social progress? This research was published in the journal *Psychological Science.*

Our human ability to communicate ideas enabled us to build the modern world. The internet offers unparalleled promise of cooperation and communication. But instead of embracing a massive extension of positive communication, we seem to be reverting to

tribalism and conflict. So much for the idea of the Internet bringing humanity together in some Utopian mutually beneficial collaboration.

Mostly, people conduct their real-life interactions with strangers politely and respectfully. But online, people can be nasty, vicious, vindictive and hateful.

Over the years, scientists have proposed various theories about why humans cooperate so well that we form strong societies. The evolutionary roots of our general niceness, most researchers now believe, can be found in the individual survival advantage humans benefit from when we cooperate as a group.

Our extraordinary impulse to be nice to each other – even at the expense of our own interests – is not unique, and is apparent in many species. But cooperation is a social dilemma – it relies on a certain level of trust that the others in your group will be nice. If everyone in the group contributes, everyone wins. But from the perspective of the individual, this isn't always a good deal. Even though everyone is better off collectively, by contributing to a group project that no one could manage alone, for example contributing to a hospital building – there is a cost at the individual level… financially, you make more money by being more selfish. And yet there is a lot of evidence that cooperation is a central feature of human evolution.

However, in the long term, individuals benefit and are more likely to survive if they cooperate with the group. Being allowed to stay in the group and benefit from its protection, both physical, economic and social is reliant on our reputation for behaving cooperatively.

In the small-scale societies of our distant ancestors, all our interactions were with people you were going to see again and interact with in the immediate future. That kept in check any temptation to act aggressively or take advantage and free-ride off other people's contributions.Cooperation breeds more cooperation in a mutually beneficial cycle. Rather than work out every time whether it's in our long-term interests to be nice, it's more efficient and less effort to have the basic rule: be nice to other people. The problem is… social media has changed all that…

Throughout our lives, we learn from the society around us just how cooperative we should be. Social institutions such as government, family, education and legal systems influence behaviour. But the rules can also change. Social emotions can be transformed online – in particular, moral outrage. Brain-imaging studies show that when people act on their moral outrage, their brain's reward centre is activated, which makes them feel good about it. This in turn reinforces that behaviour, so they are more likely to intervene in a similar way again.

So, if they see somebody acting in a way that violates a social norm, such as smacking their children, and they publicly confront the perpetrator over it, they feel good afterwards. And while challenging a violator of your community's social norms has its risks (you might get attacked) it also boosts your reputation.

In our relatively peaceful lives, we are rarely faced with outrageous behaviour, so we rarely see moral outrage expressed. But look on Facebook or Twitter and you get a very different picture.

Recent research shows that messages with both moral and emotional words are more likely to spread on social media – each moral or emotional word in a tweet increases the likelihood of it being retweeted by 20%. Conversely, content that both triggers and expresses outrage is much more likely to be shared. We have created an online

environment that selects the most outrageous content and paired it with a platform where it's easier than ever before to express outrage.

Unlike in the physical world, online, there is no personal risk in confronting and exposing someone – you can express your outrage with a few clicks of a mouse – you don't have to be physically nearby. The upshot of this is that there is a lot more outrage expressed online!

If you criticise or punish someone for violating a norm, that makes you seem more moral and trustworthy to others, so you can broadcast your moral character by expressing outrage and punishing social norm violations. People kid themselves they're upholding moral standards by expressing outrage and righteousness. It's less likely you will be able to boost your reputation by addressing a small group of friends or colleagues than if you broadcast it to your entire social network, which will dramatically amplify the personal rewards of your outrage.

This satisfaction is compounded by the feedback from social media in the form of LIKES and retweets and so on. The design of these platforms often makes expressing outrage a habit, without regard to its consequences, insensitive to what happens next.

Suddenly, our morality is now under the control of algorithms whose purpose is to make money for giant tech companies. We would all like to believe our morals and values are intentional and not knee-jerk reactions to whatever is placed in front of us on our smartphone, which has been designed to furnish Big Tech with the largest profit margin!

On the upside, the lower financial cost of expressing outrage online have allowed marginalised, less empowered groups to promote causes that have traditionally been ignored. For instance, moral outrage on social media played an important part in bringing attention to the sexual abuse of women by high-powered males. In February 2018, Florida school kids posting on social media about the latest in a long line of high-school shootings helped to shift public opinion and shame a number of big corporations into dropping their discount schemes for National Rifle Association members.

In fairness, posting images in online photo-sharing forums may give people a sense of routine, boost their interactions with others and make them feel more engaged with their surroundings. Posting photos can also encourage people to leave the house. Sometimes sharing photos with others helps people cope with a death or illness in the family.

Societies took thousands of years to develop and perfect meaningful person-to-person interaction. 20 years of social media seems to be undoing that achievement. Face-to-face conversation involves not just words, but lightning fast interpretation of body language, tone of voice and facial expression and a host of subtle signals – all important parts of communication which help us understand others' intentions toward us, and others understand our intentions toward them. Online, all we have is a few lines of text and a few cartoon emoticons.

The best advice for dealing with online abuse is to stay calm and remember that it's not your fault – the best way to retaliate is to block and ignore. You can always reach out to family or friends for advice. You could also take screenshots and report online harassment to the relevant social media service. If it includes physical threats, report it to the police.

In the meantime, Facebook's decision to block Australians from seeing or posting any links to domestic or foreign news outlets on its platforms may have serious unintended consequences. The absence of mainstream news has created a golden opportunity for

YouTubers, conspiracy theorists and nut-jobs to push their own agendas. So stand by for an avalanche of fake news, conspiracy theories and misinformation dominating the platform as hundreds of pages and groups dedicated to promoting extremist ideas continue to operate. Facebook is poised to become a mine of disinformation – and no credible news.

Meanwhile, mischief-makers and extremists can now live stream straight to the public without anyone holding them to account, giving them the kind of power only dreamed of by dictators. Facebook's argument is that it – and other social media organisations – should not be governed by rules and restrictions that apply to publishers and broadcasters.

Stephen Scheeler, the former CEO of Facebook Australia and New Zealand was among those calling for a boycott of the site after it blocked news content in his home country. Mr Scheeler said that it is time for regulators to get tough on the social media giant, comparing the move to the sort of censorship practiced by the Chinese Communist Party. Scheeler insists that giants like Facebook have an obligation to act fairly in the countries they operate in, adding *'It's like an act of war. That's how we should view this…* For Facebook and Mark [Zuckerberg] *it's too much about the money, and the power, and not about the good.'*

The first shot in the war between Big Tech and sovereign states has already been fired. Australia passed a world-first law designed to make Google and Facebook pay media organisations for hosting their news content. The bill passed the Australian Senate in February of 2021, but only after politicians from all parties agreed to water down key elements of the law after Facebook blocked all news content.

Ministers painted the move as a victory over the tech giants, saying both Facebook and Google are now signing deals worth millions of dollars with news publishers. Critics claimed Australia capitulated, handing tech companies the advantage. The changes gave the tech companies extra time to negotiate deals with publishers and allow them to bend the rules if they made a 'significant contribution' to journalism by handing over enough cash. More importantly, the move sets an international precedent that countries drafting their own laws, such as the UK, US and EU states, will find it hard to beat.

In the UK, in the light of Facebook's news blackout in Australia, the UK competition watchdog warned that tougher rules to curb the power of tech giants were urgently needed. Andrea Coscelli, chief executive of the Competition and Markets Authority, said the social media company' embargo in Australia laid bare the 'political power that comes with economic power.' He said Facebook's temporary block on news content showed how the firm behaves like a monopoly. Its decision to ban all Australian news content, including pages of official Covid-19 guidance, initially prompted an international outcry, but still the Australian government agreed to water down the law.

Initially, Google had threatened to pull its search engine out of Australia altogether, but backed down at the eleventh hour. Facebook's news ban also brought down charity pages, domestic violence shelters and missing persons groups. Mr Coscelli also said the fiasco demonstrated exactly why the dominance of tech companies needed to be tackled as a matter of urgency. Both Google and Facebook's hold dominance over internet advertising.

Facebook claims Australian ministers have given assurances that the site will be able to pick and choose who it buys news from, something that would significantly weaken the

bargaining position of media firms. The rule would allow Facebook to block firms that demand too high a price for their news and to under-cut them by buying news from their rivals.

Certainly Google and Facebook opposed the changes because they feared it would create and international precedent that would threaten their business models. Facebook claims that it neither takes or asks for news content that's hosted on its site by users, even though it earns advertising revenue from those pages. It effect, it's the users' fault for putting it there. The big tech companies soak up the lion's share of advertising revenue and closely-guard their algorithms and data management systems.

Facebook is about to introduce End-to-end Encryption on its platform and also on Facebook Messenger and Instagram, which Facebook also owns. End-to-end encryption is already used on Facebook-owned WhatsApp. It ensures only the two participants of a chat stream can read messages, and no one in between – not even the company that owns the service – can read it. Nor can the police or the security services.

Privacy is one thing, but providing a paradise for pedophiles is quite another. With End-to-end Encryption, pedophiles, criminals and terrorists will be able to operate with impunity and without any fear of being caught. According to Rob Jones, director of threat leadership at the National Crime Agency (NCA) End-to-end encryption is a 'high-risk experiment' and a 'disaster for child safety and law enforcement.' But then, when has profit ever considered the safety of children?

In 2019, Facebook made 15.8 million global referrals of child sex abuse material, but End-to-end encryption will put a stop to that as the technology will in effect create a haven for child sex offenders. WhatsApp claimed it would not compromise on security because that would make people less safe. Surely even Mark Zuckerberg can see a conflict between business objectives and safety of sexually abused children!

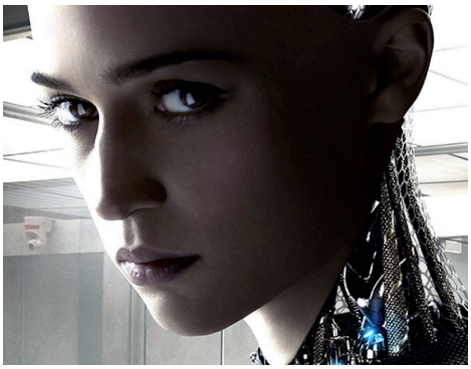
On February 10th 2021 pedophile David Wilson was jailed at Ipswich Crown Court for 96 child sex abuse offences. Wilson used fake social media profiles to pose as girls and get young boys to send him indecent images, approaching up to 5,000 boys online. With End-to-end Encryption, it is unlikely he would have been caught. End-to-end encryption would also prevent its moderators from uncovering abuse.

In 2020, Facebook sent 12 million CyberTips to the US National Centre for Missing and Exploited Children, which receives industry referrals before disseminating them to law enforcement agencies to investigate. That cooperation would also come to a stop. End-to-end encryption locks moderators out of their own network.
Facebook have made improvements in other areas – particularly bullying and harassment, having reviewed 6.3 million pieces between October and December 2020, up from 3.5 million between July and Septembers, due in part to improvements in the technology used to detect comments. On Instagram, the number doubled from 2.6 million to five million. 6.4 million pieces of organised hate content on Facebook was inspected, up from four million.

However… according to a report based on data by 1,000 members of Gen Z, Millennials are beginning to quit social media and spending less time on Facebook, Twitter and Instagram – and even the dating app Tinder. According to the report by Boston-based market research company *Origin*, large numbers of people are switching off permanently. The only exception is the picture-based messaging App Snapchat.

Astonishingly, more than a third of all young people have already left some form of social media. According to the *Origin* report, people are choosing to quit social media for a variety of reasons. 41% of those questioned said they wasted too much time on social media, and 35% said that other millennials are too distracted by their online lives. Other reasons included no longer being interested in the content. 22% of users said they wanted more privacy and couldn't cope with the pressure to get attention. Just under 20% of users said social media made them feel bad about themselves.

Falling for the machine



Voice assistants are not only becoming increasingly popular, they are now mainstream, and humans are already getting emotionally attached to them.

In the six months since its release, Amazon sold a staggering 11 million *Echoes* in the UK. Apple, Samsung, Microsoft, Google and Amazon are all major players in this highly competitive and fast evolving game.

A study conducted by advertising agency JWT and marketing company Mindshare surveyed more than 1,000 UK smartphone owners aged 18 and over, as well as 100 Amazon Echo owners. Their findings are bound to have an impact on how companies design their voice technologies for human interaction.

The numbers speak for themselves:

- 20% of mobile searches on Android are now done by voice,
- 52% of smartphone users believe it would be easier if technology could speak back,
- 55% of people use voice assistants for convenience,
- 45% said they use their voice assistant because it was fun,
- 72% of regular voice assistant users think brands should have unique voices and personalities,
- 37% of voice technology users say they like their voice assistant so much, they wished it was a real person,
- 25% admit to having had a sexual fantasy about their voice assistant.

There's a reason tech companies tend to give them female voices.

Researchers at Stanford University found that both men and women preferred female voices because they were found to be warmer and more understanding – except when the voice assistant was teaching them about computers – in that case, both groups expressed a preference for a male voice. But female voices were better at giving advice about relationships.

Microsoft's Cortana, Amazon's Alexa, and Google's Assistant all have female voices, although Apple has added the option of a male voice for Siri's British English version.

To successfully enable voice assistants to integrate into our lives, companies are striving to understand how the technology can simplify everyday tasks by adding value and removing friction from the experience. Thoughtful and helpful interactions that genuinely enhance the experience will almost certainly result in greater engagement and deeper relationships between humans and machine.

One can only guess what direction humans – especially young humans – will take when these voice assistants are given human form, as they undoubtedly will in time.

It is possible that people have preconceived expectations and perhaps even inbuilt prejudices about male and female roles. Doubtless the PC brigade will have something to say about that, but as devices become more sophisticated, it is likely that one day soon, they'll also be helping our children with their homework. In that case, different voices might be useful.

Neuroscience experiments have found that the emotional response to voice assistants is still considerably lower than for face-to-face human interactions or touch/text interface. This is almost certainly due to a temporary lack of more complex personalities, but that will come, and probably sooner than we think. We are fast approaching the time when computers will be able to programme themselves. Within the next 20 years, it will be impossible to spot whether you're having a conversation with another human or the latest voice assistant.

There are advantages to having a voice assistant. For instance, you can always turn it off when you need peace and quiet, it won't answer back, it won't get tired or complain and it wall always tell the truth – unless of course newer versions allows owners to programme them to do just that.

People's emotional response to Amazon's Alexa grew during the course of the study as people became more comfortable using it. Familiarity is bound to eventually lead to trust, and this indicates a potential for closer relationships.

At the moment, voice assistant use is focussed on private spaces and mainly in the home, so perhaps it's understandable that so many users have sexual fantasies about their virtual assistants, but it is inevitable that future devices will take human form. In the next few years, robots will become more realistic and more versatile. Prototype sex robots are already available, though expensive, but mass production will make them affordable.

What sort of relationships people might form with androids that are hard to distinguish from real humans is for the time being, a matter of speculation. What is certain is that artificial humans will change societies in ways we cannot yet imagine.

The kind of future depicted in films such as Blade Runner, AI and Ex Machina may not be that far away.
