SAY THAT TO MY FACE

Everyone knows that human communication involves far more than just words— we also benefit from a wide range of powerful nonverbal cues, such as body language, tone, and pheromones. Of all these cues available to us, the ability to read facial expressions and identify emotion in faces is one of the most crucial in human social interactions. Faces are so important to us that the human brain contains a sophisticated network dedicated to the processing of face-related information.

We develop our non-verbal communication tool kit from the moment we are born, and, as with all aspects of brain function, the more we practice, the better we become. However, modern technology use, typified by at least several hours a day of interaction solely with a screen may be eroding our ability to read nonverbal cues effectively. In 1987, according to one estimate, we spent on average six hours per day in face-to-face social interaction, and four via electronic media. In 2007 the proportion had reversed, with almost eight hours a day spent socializing via electronic media, and only two and a half hours in face-to-face social interaction. Young people are particularly avid text-based communicators— in 2013, 96% of young people ages 16-24 used text message every day to contact friends and family, and three-quarters used social networks. Face-to-face communication was less popular, with only 63% talking face-to-face with friends or family daily.

Communicating via text is, of course, completely verbal— it depends solely upon words or in the case of emoticons, images. Perhaps it is unsurprising then, that people who spend excessive amounts of time on the Internet have deficits in face processing ability. Research has established that when you show people pictures of faces and everyday objects, such as tables, the brain waves elicited from looking at the pictures of faces is larger than for tables, meaning that the faces have more significance for the average observer. A particular study looked at excessive Internet users, defined as those who were experiencing social and personal problems related to their Internet use. On average, excessive Internet users were using the Internet for six hours per day. When excessive Internet users viewed faces and tables, they had smaller brain wave responses compared to controls. This result suggests that for excessive Internet users, faces were of no more importance than everyday inanimate objects. Although it is unclear how this reduced EEG response to faces affects an excessive Internet users ability to socialize effectively, the importance of face processing in effective communication means the impact is likely to be significant.

However, the good news is that the brain is continuously adapting to its immediate environment. While excessive screen time may impede face-processing skills, the removal of screens improves them. Research shows that removing screens from pre-teens for just five days significantly improved their ability to read the emotion in the faces and actions of others, compared to their counterparts who remained plugged in. A group of sixth grade children attended a five day overnight educational camp which banned the use of screen technology, provided increased opportunities for face-to-face communication, and increased exposure to the natural world. A second group of children continued their normal daily activities for the same time period, which included screen technology use. Both groups reported on average using 4.5 hours of screen time per day, with approximately an hour texting, 2.5 hours watching TV and an hour video gaming. Before and after the five days, children were shown pictures of faces displaying different emotions and also watched videos of people interacting with the verbal cues removed. They were then asked to judge what emotions were being depicted in the pictures and videos. The children who attended the camp improved significantly more in reading facial emotions and reading the non-verbal emotional cues of others. However, we cannot be sure whether it was the removal of screens, the increased face-to-face opportunities or the experience of
nature that improved nonverbal ability. In any event, from a neuroscience perspective, this is a wonderful example of neuronal plasticity: it is not so much that an impairment is being corrected, as simply the brain developing the correct response to immediate needs.

Children do not have as high a level of expertise in face processing as adults as face processing ability develops throughout childhood and adolescence. Gaining expertise in face processing is dependent upon our face-to-face experiences: therefore experiences dominated by screen technology may result in children being at a disadvantage in what has previously been the most basic mode of human communication.

Many questions remain—such as whether a certain type of screen use is contributing to deficits in face processing, or whether it is just the extended time spent without face-to-face interactions, or indeed whether exposure to a nature itself has a fast and significant impact.

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YOU'VE GOT MAIL

Not only does checking your email for a limited number of times throughout the day reduce stress while completing important tasks, it reduces overall day-to-day stress levels.

Two groups of volunteers (both professionals and students) were assigned to either limited or unlimited checking of their emails each day for a week - then they swapped schedules. Stress levels during important daily tasks and at the end of each day were measured. ‘Limited email’ meant restricting their checking to three times a day while keeping their mailbox closed for the rest of the time: meanwhile ‘unlimited email’, as the phrase suggests, allowed checking of email ad lib, keeping their mailbox open and using any notification systems. Within this group, participants checked their emails a comparable number of times per day (15) to their normal habits.

However, the interesting group were those who were going against their usual routine with only limited email checking: they reported lower stress levels during important daily tasks as well as overall day-to-day reduced levels of stress. These individuals also reported feeling less distracted, which might help to account for less anxiety. Intriguingly, there were no differences between groups in the number of emails received nor how frequently they were answered, indicating the stress effect was due merely to the frequency of checking, rather than the volume of email.

Research is yet to determine whether stress can also be reduced from limiting the checking of other forms of computer-mediated communication such as social networking sites and text messages during important tasks or throughout the day. Emails, texts and social network notifications are thought to trigger dopamine releases, a neurotransmitter in the brain that is linked to pleasure. Dopamine is powerfully linked to the unpredictability of a reward. But if the unpredictability of receiving emails releases dopamine, which makes us feel happy, how does limiting email checking make us feel less stressed? Perhaps the answer lies in the fact that when we are constantly 'switched on' we are not so much ‘happy’ as aroused, which can also tend to negative emotions, whilst less stress does not necessarily equate with a high level of excitement, but a form of happiness better known as well-being.

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The price paid for multi-tasking is high.

Multitasking is not a new phenomenon. Many of us (especially women, apparently) are effortlessly able to complete two or more things at once. Recently however, an unprecedented type of multitasking has become commonplace. On a daily basis, we interact with multiple screen devices teeming with endless incoming information, be they emails, social network notifications, news alerts, or text messages. Multitasking when using technology at work and at play has become the norm.

Whilst the input may seem infinite, our attention system is not: we just cannot process everything at once. Multitasking might seem like an efficient way to complete tasks, but research indicates that using a computer to chat simultaneously with friends whilst at the same time reading increases the time taken to read by 22-59% even after the additional time taken to instant message is accounted for.1

Laptops, iPads, and smartphones may well be becoming ubiquitous in and outside of the classroom, but it seems that multitasking during learning2,3 and studying4 reduces academic performance. When students were given simple Google, YouTube, or Facebook search tasks that occupied a third of class time, they scored 11% worse on a subsequent test compared to students who didn’t multitask during class.2

Frequent multitaskers may process information differently. It turns out that frequent multitaskers are better at multisensory integration, such as using apparently irrelevant auditory information to complete a visual task.5 However, by the same token, frequent multitaskers are more distractable.6,7 A pioneering study divided students into frequent and infrequent multitaskers, and then gave them distraction tasks.6 Students looked at shapes, numbers, or letters, but the goal was to remember something about just some of the images on the screen and to ignore the others. High multitaskers seemed unable to ignore the shapes they were told to ignore, and were unable to filter out what wasn’t important to that particular task. In all cases the low multitaskers outperformed their frequent multitasking counterparts. Other studies8,9 have failed to replicate these findings. However, these conflicting findings may be due to differences in the task given to the participants or differences in the criteria used for defining heavy and light multitaskers. There is also the possibility that a subset of “super-taskers” exists for which multitasking may have no negative impact or may even improve cognitive performance.10

Interestingly, depression and social anxiety12 and poorer wellbeing13 are also associated with multitasking. Multitaskers are also more impulsive and perform more poorly on measures of fluid intelligence.14 Crucially, we don’t know if multitasking causes these or if people with these attributes multitask more. We also need more research on different types of multitasking. Research has found that multitasking using Facebook and texting while studying is negatively predicative of overall GPA,
but emailing, talking on the phone and instant messaging are not related to GPA. In any event, frequent multitaskers are showing differences in brain structure: new research shows they have smaller grey matter density in a particular area of the brain called the anterior cingulate cortex (ACC). The ACC is involved in functions ranging from autonomic regulation of blood pressure and heart rate, to more sophisticated, vague and above all diverse processes from empathy to decision making to empathy.

As with much of the research into technology and the brain, we don’t know yet whether people with smaller ACC are more likely to multitask due or whether higher levels of multitasking causes the ACC to shrink. Moreover we cannot extrapolate from the anatomical changes to the behavioural ones seen with multi-tasking. But the fact that the effects of screen-based multi-tasking can be seen at both the level of the physical brain, and in performance, should perhaps encourage at least a brief moment of undistracted reflection.

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New research shows that we outsource thinking to our smartphones.

“I’ll just Google it.” How many times has this been the answer to a simple question that you are stumped by? Having technology at our fingertips means we no longer need to use our brain to remember facts, dates, numbers, names, places—or any answer to a simple question. And why would we want to use our energy-guzzling brains when something else can do it for us? In fact, thinking is so taxing to humans, that researchers have coined us “cognitive misers”: typically, we are stingy when it comes to spending effort on thinking. And with Google now at our fingertips, 24-hours a day, the future for lazy thinking has never been brighter.

Cognition theories offer two types of mental processing: (1) fast, intuitive thinking that requires little effort or thorough analysis compared to (2) slower, analytical, resource-intensive reflection. Those who are prone to Type 1 thinking are more prone to cognitive miserliness then those who utilize Type 2 thinking.1 Research has shown that individuals who are cognitive misers in their disposition and ability are more likely to let their smartphones do the work for them. In a series of three studies on US workers and Canadian college students, cognitive miserliness was measured with questions such as these:2

In a study 1000 people were tested. Among the participants there were 3 who live in a condo and 997 who live in a farmhouse. Kurt is a randomly chosen participant of this study. Kurt works on Wall Street and is single. He works long hours and wears Armani suits to work. He likes wearing sunglasses.

What is most likely?
Kurt lives in a condo
Kurt lives in a farmhouse

In questions such as these, an individual who is prone to high levels of cognitive miserliness will need to overcome their propensity to answer quickly and intuitively to select A, and use their analytical, resource-intensive thought process to arrive at the correct answer B.

Researchers found that in addition to high smartphone use being linked with reluctance to spend energy on thinking, for those without smartphones, this miserliness was also linked with search engine use on computers.1 The authors propose that those who use their smartphones or computers to Google simple questions either actually know the answer, or could easily learn it, but are unwilling to invest the cognitive energy to solve the problem by simply thinking about it.

The authors also found that specifically, using smartphones to search the Internet, but not for social media or entertainment, were linked to cognitive miserliness, validating further the concept of the smartphone as the extended brain. The authors note that no differences were found between
smartphone users and non-users in cognition overall, suggesting that cognitive miserliness leads to using a smartphone as the extended mind, rather than smartphone use causing cognitive miserliness. However, much more research determining what causes what is needed.

This research extends the “Google effect”. In a series of experiments, researchers found that participants strongly linked knowledge, and particularly, not knowing the answer to a question with computers and search engines. Follow-up studies revealed that people do not necessarily remember where to find certain information when they can remember what it was; conversely, they tend to remember where to find information when they can’t remember the information itself. They are also poorer at learning information if they know they can access the answer later—as is the case with search engines.

What are the implications of outsourcing our brains to technology? You could argue that by unclogging our neuronal networks of facts and other answers to simple questions, we now have more time and space to focus on higher forms of intellectual pursuits. In fact, if individuals who are more likely to be lazy in their thinking style are outsourcing the job to technology, they are surely upgrading their soft tissue for a better model—Google is never impaired or decayed by bias, time, errors, or alcohol consumption.

Unfortunately, our brains adhere to a ‘use it or lose it’ policy. Without regular practice of storing and retrieving facts, our ability to do so risks being diminished. And the types of simple information that can be outsourced to search engines are essential elements of deeper cognition—the process of joining up the dots. In other words, if we use Google to supply the dots in the first place, then our ability to make new connections—to convert information to knowledge—may also be in jeopardy.

Furthermore, our thoughts are a quintessential element of our identity. How does having an “external mind” in the form of a smartphone, impact on self-perception? If our smartphones are an extension of our body, then what effect does that have on us when we misplace it, or our wifi signal drops? What level of faith, or conversely, doubt, do we place in the information we source from technology, if we view it as adjunct to our own thoughts? As technology becomes more biologically integrated, and our smartphones shift from our pockets into our bodies, the view of technology as an extension of our minds will only strengthen.

One thing is certain—our thinking has officially “transcended skull and skin.”

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New research suggests non-specific Internet use can be an addictive experience.

When Internet addiction was first proposed as a psychological disorder in the 1990’s, it wasn’t taken too seriously. These days however, very few people would try to argue that there is no such thing as problematic or excessive Internet use. Hundreds of research studies have found evidence showing that between 1-10% of individuals experience problems controlling their Internet use and they display similar physiological, neurological and behavioural profiles of substance and gambling addicts. In 2014, the DSM (the psychologist’s handbook that details all the known psychological disorders) was updated, which proposed Internet addiction as a potential disorder that required further investigation.

But the really interesting question is: what exactly is an Internet “addict” addicted to? Some researchers argue that the Internet itself is not addictive, but rather the activities the Internet can be used for. There is evidence supporting task-specific Internet addictions, such as online video game addiction, online sex/pornography addiction, pathological online gambling, and social networking addiction, among others. However, there is a distinction that can be made between specific Internet addictions such as online gaming addiction and generalized Internet addiction.

It seems that the experience itself of endlessly surfing the web, YouTube, and blogs can actually be addictive. New brain-imaging research in Germany has found changes in the brain linked specifically with this type of excessive, non-task specific Internet use. In male internet users, who reported using the Internet for 42 hours per week, those who displayed more symptoms of Internet addiction, such as experiencing more negative consequences of their internet use, feeling withdrawal symptoms when not using the Internet and an inability to control their internet use had less brain (grey) matter volume in an area of the brain known as the right frontal pole. This area of the brain is part of the prefrontal cortex, and under activation of the prefrontal cortex is strongly linked to poor decision-making, addictive behaviour and willpower. The study linked further differences in other areas of brain circuitry and excessive Internet use, and this overall pattern of difference associated with the brains of excessive Internet users resembles the changes in brain seen in substance addictions. As with all cross-sectional studies, the cause and effect is not clear. The brain changes may be due to excessive Internet use, but equally, brain volume differences could be a precondition for excessive Internet use.

Several studies have reported similar brain differences related to excessive Internet use however, previous findings have typically been linked to the specific task the excessive Internet user logs on for, such as online gaming. This study found that the link between reduced brain volume and excessive Internet use could not be accounted for by excessive online gaming, Internet sex use, or depression, indicating that excessive Internet use itself is also related to addiction-like brain differences. In any
event, the findings suggest that such widespread changes might well be reflected in a different general mind-set.

What could be addictive about aimlessly using the Internet, to no specific end? Surfing the Internet could arguably be considered a form of information seeking, whether the question at hand is formed before we hit the Internet or whether it develops along the way. As we navigate the Internet, new information we weren’t even looking for pops up, and before we long we can be ten pages deep into Wikipedia, absorbed in reading about a new topic without even planning to be there. Finding new information, whether it is intentionally searched for or simply discovered, is a pleasurable experience for our brains. Alternatively, perhaps Internet use is simply and more generally a different type of existence, to that offered by the three dimensional, less compliant real world: above all, it is a world where whatever you do will elicit an instant response- unlike real life. And perhaps instant feedback is not just reassuring, but becomes a prerequisite for well-being.

A fascinating study recently published investigated how people react when it is just them and their brains. In a series of 11 experiments, researchers asked nearly 800 participants to simply sit and think or daydream by themselves for just 6 to 15 minutes. Surprisingly, for many participants, it was difficult. In two of the experiments where the option to cheat was available, 32%-54% of the participants admitted cheating by using their phones or some other distraction to pass the short period of time. In the most bizarre finding of all, participants were given the chance to give themselves an electric shock during their 15 minutes of thinking time if they desired. Despite all participants previously reporting they would spend money to avoid being shocked, a quarter of the female participants and two thirds of the male participants administered themselves an electric shock during the thinking time. The authors speculate that people would rather have negative stimulation rather then having no stimulation at all.

Interestingly, enjoyment of the task was not linked to frequency of social media use or smartphone use. The authors propose that the technology age, characterised by never-ending sources of information, is symptomatic of our inability to just be alone with only our thoughts to entertain us. It is the basic process of incessant interaction, be it positive or negative, which could well be what Internet addicts are actually addicted to.

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DO SMARTPHONES GIVE A HEAD START IN LIFE?

What happens when the developing brain encounters smartphones?

A new study made headlines last month after it found that babies as young as six months old are using smartphones and other mobile devices.1 The research, presented at the Pediatric Academic Societies annual meeting, also showed that over a third of infants under age one have used smartphones or tablets and, by age two, almost all children have. By one year of age, 14% of children were spending at least one hour per day using mobile media.

Given that mobile devices have become so ubiquitous, and parents are more time-poor then ever, it is not surprising that infants as young as six months are now accessing the screen. However, these findings are contradictory to the American Academy of Pediatrics (AAP) recommendation that discourages any screen time for children under age two. The AAP recommendations are based off research that shows that there is no benefit from traditional screen time, such as television or DVDs, for infants under two, and there is the potential for harm.2

But smartphones and other mobile devices are interactive: does that mean they might provide benefits for infants that passive screen watching can’t? There is currently no evidence either way. What we do know is that in the first two years of life, the human brain undergoes an explosion in growth unlike no other. It is a critical period of development, a brief window in time, during which an infant’s brain is profoundly shaped by their interactions with the world.

While the research is in the pipeline investigating infants and mobile devices, pediatric experts have weighed on how the use of smartphones and other mobile devices might impact infants.3 As with all technology, the likely benefits and risks to the user depend on how the device is being used, as well as how often. Smartphones and mobile devices can enable communication, entertainment and education: here is what we do know.

When it comes to communication, the use of smartphones and other mobile devices to connect with long-distance or otherwise unreachable family members, through voice or video calls, is inarguably a positive feature. The study showed that 59% of infants had called someone (we assume intentionally).3 While mobile technologies allow us to connect with loved ones, they shouldn’t replace an infant’s exposure to face-to-face communication.

As for education, comparably, 41% of infants had used apps.3 Although some apps targeted towards children are simply weird, many on face value appear to be educational, such as building literacy and numeracy skills. Experts do not verify these claims, meaning it is up to parents to determine which educational apps might be useful. Can infants learn effectively from educational apps? Not only do we need more research, we also need to investigate whether learning from educational apps are superior, comparable, or inferior to learning from an adult, or other real-world experiences. For example,
research with 5-6 year olds has shown that reading an e-book improved literacy more than reading a traditional book, but only when the e-book was read with an adult.4

Pediatric experts propose that smartphones and their slick design, and apps with visual and audio effects could engage infants with educational content above and beyond what traditional real world tools can, but they could also distract them from learning. As such, apps targeted towards young children need to strike a balance between engagement and distraction to effectively facilitate learning.3

Perhaps the most obvious reason for giving your infant a smartphone would be to amuse them. Most parents let infants play with mobile media while running errands (60%), doing chores around the house (73%), to calm the child (65%), and to put the child to sleep (29%).1 Experts are concerned about the impact that mobile devices as distractors from boredom or frustration or soothers from distress (or “shut-up toys”) might have on a young child’s ability to regulate their own emotions.3 While smartphones might be helpful in calming down or distracting a child in the short term, pediatric experts are concerned that if they are used regularly, a child who is still developing their ability to regulate their own emotions could suffer.3

Infants also are using video games on mobile devices for entertainment. The research revealed that 38% of infants used mobile devices to play video games, an increasingly popular pastime amongst all age demographics.1 While video games have been shown to improve various aspects of attention and memory, it remains to be seen whether this benefit confers to infants. However, we can safely assume that if video games are able to modify attention and memory in the fully developed brains of adults, then their introduction at such a critical time of brain development is likely to be even more profound. But will it be positive? Parents also need to carefully monitor content, as aggression has been linked to violent video games.

Furthermore, it is important to consider that even if playing video games benefit young children, time spent playing video games displaces from playing from traditional toys or interactions with adults. This is the case for all aspects of a mobile device—although it may be flashier, brighter, and louder than any traditional toy, it is not necessarily superior. Pediatric experts point out that vital skills such as empathy, social skills, and problem-solving develop as the child explores the natural world, interacting with humans, and relying on their own initiative and creativity—all of which a smartphone limits.3 After all, the cardboard box that the device came in leaves far more to a child’s imagination than an app can offer.

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Video games improve attention, but is there also a link with dementia?

‘Dementia’ is a term sadly all too familiar these days, as instances soar of Alzheimer’s disease and other comparable conditions all characterized by confusion, disorientation, and impaired memory—literally a ‘loss of mind.’ However, the notion that an analogous state might be linked to the screen lifestyle is as controversial as it is potentially troubling.

“Digital Dementia” is a term coined by neuroscientist Manfred Spitzer to describe an overuse of digital technology resulting in the breakdown of cognitive abilities.1 Spitzer proposes that short-term memory pathways will start to deteriorate from underuse if we overuse technology. Although, in this blog, we have recently explored outsourcing your memory to smartphones, these two concepts are different—the mental disarray within the brain implied by the term ‘dementia’ is far more basic and complete. An under-practiced memory process is far from being comparable to the wider cognitive devastation that is dementia.

Perhaps a potentially more informative line of enquiry would be to explore the wider ways in which the screen lifestyle could induce states analogous to dementia. For example, new research has found a potential link between action video gaming and the potential increased risk for developing psychological disorders, including dementia.2 Researchers set out to investigate how action video gamers and non-video gamers navigated a virtual maze, using one of two potential strategies. The spatial strategy involves remembering the location of various landmarks within the environment and mentally building a map of these locations and their position relative to each other.3 Establishing relationships between landmarks allows for flexibility when navigating the world, as you are able to orientate yourself within your mental map. This particular strategy relies on a familiar area of the brain long associated with spatial memory: the hippocampus.

The response strategy, by contrast, entails learning the series of movements that follow from a set position, such as a certain pattern of left and right turns after seeing a particular landmark. Whereas the spatial strategy enables you to determine a direct path to any location, the response strategy is rigid in this regard as it relies on a series of movements triggered specifically by certain locations, and presses into service a different area of the brain, the striatum.3 The researchers found that video gamers were more likely to navigate the virtual maze using the response strategy.

Perhaps the exaggerated involvement of the striatum shouldn’t come as a surprise. We know that action video gaming is linked with greater brain volume in the striatum,4 but this may be at the expense of a reduction in hippocampal volume.2 Although this proposal requires further investigation, previous research has shown that reduced grey matter in the hippocampus is associated with an increased risk for schizophrenia, post-traumatic stress disorder, depression and dementia, amongst other disorders.
Perhaps the crucial question then is whether rigid yet efficient ‘response strategies,’ or the more flexible ability to make connections, are more important for the optimal cognitive tool kit—and indeed whether such a simple dichotomy can indeed encapsulate the impairments embraced by the single term ‘dementia.’

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The Internet Tricks Your Brain Into Thinking It Is Smarter Than It Really Is

Not only are we becoming increasingly dependent on the Internet for the answers - we are even confused about what we actually know.

"...as we know, there are known knowns; there are things we know we know. We also know there are known unknowns; that is to say we know there are some things we do not know. But there are also unknown unknowns - the ones we don't know we don't know." - Donald Rumsfeld

Humans have always sought ways to enhance our finite capacity of our brains, in particular relying on other resources to hold information for us. Prior to the Internet, we depended on our co-species to share the immense burden of information required to successfully navigate the world - such as which plants were poisonous and which were edible. We continually updated these shared banks of knowledge through our ongoing face-to-face interactions, and as we evolved, we supplemented our human memory banks with tools such as books. When we source information from other people, and even when we rely on non-human sources, such as books, there is no confusion between what we know and what the source is providing - we are aware of the limits of our own knowledge.2 In contrast, new research has revealed that when we use the Internet, in best Rumsfeld tradition, we no longer know what we know and what we don’t.

In a series of nine experiments on over 1000 participants, Yale researchers have found that searching the Internet creates an illusion of knowledge, in which we conflate information that can be found online with the actual knowledge in our heads.2 Participants were told to look up the answers to simple ‘why’ or ‘how’ questions commonly entered into Google, such as ‘How does a zipper work?’ The questions were simple enough for most people to have a sense of the answer, and they were asked to search the Internet to confirm the details. Participants who had looked up explanations in this way later rated themselves as significantly superior in their ability to give explanations to a set of completely different, unrelated questions, compared to the control group who had not used the Internet. Additionally, those who used the Internet to answer the original questions expected that they would have increased brain activity, corresponding to higher quality explanations, when answering the second set of unrelated questions.

Furthermore, it turned out that accessing the Internet alone did not justify the overconfidence in one’s own knowledge. Rather, the knowledge illusion was specifically driven by the act of searching the Internet, regardless of the type of search engine used, and regardless of whether the searching produced any relevant answers, or indeed any answers at all. It seemed that the very act itself of searching for knowledge on the Internet fools the brain into thinking we have more answers than we really do.
We already know that we outsource our thinking to technology. The results of these experiments suggest that this outsourcing habit conceals from us the extent to which we rely on external information. As technology makes such information ever more easily available and accessible, so the researchers of this study predict, the ability to assess one’s own knowledge will only become more difficult.1 By making the error of assuming they are relocating external information into their own heads, people may unwittingly exaggerate how much intellectual work they can do in situations where they are, in reality, on their own. For example, a student using the Internet to study may only discover once they are ensconced inside the exam room, how little they actually know. What seems like a relatively innocuous shift from personal to technological dependence for information could indeed have profound effects on how we make sense of daily life.

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COULD A JANE AUSTEN NOVEL MAKE A GOOD VIDEO-GAME?

Video games and novels offer very different experiences with very different outcomes, especially when it comes to empathy.

Empathy comes from the ability to understand the minds and emotional states of others, and stories offer a highly effective scenario for rehearsing empathy. Novels teach us empathy through narratives that depict characters and their emotional states: could video games offer the same experience? Perhaps not. Successful video games, such as Tetris for example, stand-alone completely from the human condition. Meanwhile the majority of popular video games are violent, and research shows that playing violent video games decreases empathy. Then again, some video games do strive for emotional depth- games that feature complex characters, with detailed backstories, who make difficult moral choices playing a pro-social game (relative to a neutral video game) increases empathy and decreases pleasure at another’s misfortune (‘schadenfreude’). So just how good or bad are video games compared to books, when it comes to developing those all-important skills of empathy?

When we read novels, we enter into the minds of others and identify with their hopes, dreams, and fears. In video games, stories that explore this type of internal conflict are rare. An analysis of popular video games found that one narrative type dominates - that of the single protagonist, typically male, who experiences external conflict – or the mythological adventure of a hero’s journey. The focus of video game stories is the interaction the character has with the environment. While identification with the protagonist of a story could be the key to learning empathy, video games overwhelmingly offer protagonists that are far more two-dimensional than their counterparts throughout the pages of a novel. The characters on the screen are largely good or bad- heroic or anti-heroic a and tend to be stereotypes, with limited diversity portrayed, as reflected in the male protagonist bingo card below.

Emotions are central to the experience of reading fiction- when we read a novel, we do so to enter the life and world of someone else, and to be moved. Accordingly, novels can and do portray the entire gamut of human condition. In contrast, video games grossly under-represent the diverse range of human emotions, and with the majority of popular video games featuring violence, instead focus heavily on the narrower range of emotions relating to aggression. A detailed analysis of popular modern and older style video games concluded that the emotions relating to extrapersonal conflict (i.e., antagonism caused by and toward external forces) are far more prevalent than those concerning inner conflicts or self (i.e., self-awareness, beliefs, self-doubts). The emotion of aggression is most commonly portrayed aided and abetted by contempt, love, optimism, anxiety, dominance, and outrage, are also represented. Relatively few games evoke alarm, cynicism, morbidness, remorse, guilt, pessimism, envy, and shame, - and tellingly no games at all promote disappointment. The emotional conflict of fear and anger most frequently dominates while the emotional conflict between joy and sadness features least.

A major difference between video games and novels, is that the former lack a narrative structure. While there are back-stories of video game characters and often highly detailed “cut-scenes” that act as mini-movies to continue the story of the game, the back-stories of characters typically do not exceed more than a quarter of total gaming time. Narrative structure. The majority of the time, we assume the role of the protagonist, and our own in-game actions can therefore contradict the pre-established narrative of the video game character. The very nature of gameplay is in conflict with a traditional linear narrative- at its core, video gaming is about decision-making, and gaming scenarios are reversible. If a regrettable outcome for the protagonist occurs in a video game, it can be reversed.
or avoided by replaying the scenario, and often to progress in the game a player must replay the scenario.3 In contrast, the satisfying narratives in novels “depend on a linearity that counts against the ability to replay fictional states of affairs so that they might turn out differently.”3

We can do things in a video game that change the story, but in a novel we cannot manipulate a novel’s protagonist or his outcomes. So does the interactivity specific to video games contribute to empathy? Firstly, fMRI studies show that the passivity of reading a novel is not necessarily reflected in brain activity. While reading a short story, brain imaging showed that perceptual and motor areas of the brain were activated. For example, if the protagonist did an action such as picking up an Easter egg, the part of the reader’s brain associated with grasping was activated.8 We recruit the vision and motor parts of the brain to create a representation of the words we are reading. Still, while we might use motion and vision areas of our brain to help understand and imagine the scenes from novels, the heroes and heroines are on a journey we cannot influence.

A big difference is that in novels our goal is to interpret the story, whilst with video games our goal is to interact with it.7 Within video games, we are able to pilot the protagonist- his future is ours to shape, albeit within the parameters of the gameplay. While novels, or even television or movies will not induce feelings of guilt because we are unable to control the events, video games are interactive:accordingly, gamers report feeling guilt for their moral choices towards non-real characters.9,10 But if we are feeling guilt- or pain, or frustration, or any emotion resulting from action occurring to our video character, these are emotional responses to something being done to a proxy of ourselves. This type of self-focused emotional response is very different to the empathy towards others we experience from novels.3

Neuroscience research has investigated novels, video games, and how they relate to the concept of ‘theory of mind’. Theory of Mind is the ability to infer about the mental state of others - to ‘read another’s mind’- a highly related process to empathy for which reading fiction is linked to superior ability. A large meta-analysis of fMRI studies found substantial overlap between areas of the brain involving these skills and areas linked to understanding stories, in both adults and children.6 In stark contrast, fMRI studies of violent video games show that core areas of the brain involved in these very abilities, are suppressed while video gaming occurs in violent scenes.7 This result makes sense, as it is the avoidance of empathy that improves the ability to act violently or kill opponents in both real life and in video games.

The formulaic hero/villain narratives of video games, the stereotypical portrayals of protagonists, the focus on aggressive emotions, and the need to suppress morals to enact violence in video games all lead us to conclude that current popular video games are poor teachers of the human condition. However, sensory-drenched video games and flash technology do have a literally sensational appeal that novels do not.

Nonetheless, video games need not always be all about fun: empathy is being targeted by certain video games, such as the Project Syria game, which is a virtual reality experience designed to educate users on the current civil war situation in Syria.11 This educational type of game in which the horrors of war are experienced first-hand has the ability to capture people far removed from the situation in a way a news bulletin never will. But usually we play video games to relax, escape, be challenged and entertained. If video games were developed to better depict a full range of emotions and internal conflict in characters, with less emphasis on violence, we might not play them anymore. As we spend increasingly greater amounts of time video gaming, let’s not forget the limits of the virtual world and reach for a book for insights into others and ourselves.
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FIVE REASONS IPADS SHOULD NOT BE IN CLASSROOMS

There is growing backlash against iPads in the classroom, as there remains no evidence that they help learning, and some experts even argue they could have a negative effect.

iPads arrived with a bang in 2010, and before long, were being heralded across the world as a game-changer for education. Schools from Kindergartens to colleges became voracious consumers of these beautifully designed and ingenious devices: some chose to roll out 1:1 programs (where all students are given an iPad) whereas others were implementing BYOD programs (Bring Your Own Device) in order to avoid the costly expense of purchasing and upgrading iPads for the school. But is the unalloyed enthusiasm for iPads in classrooms justified? Here are five reasons to think again.

1. There is no evidence they improve learning

There is no long-term, large-scale, scientific study assessing the iPad as a tool for learning.¹ This seductive new technology pervades classrooms all over the Western world without us first establishing the benefits and risks to students. Research has nonetheless attempted to play catch-up with the roll-out of iPads, and there are a handful of small-scale studies coming up with mixed results for whether iPads affect learning outcomes (for better or worse). Investigations have found that whilst students are enthusiastic about iPads, overall, there was no link between iPad use and either positive or negative effects on academic performance. The review concluded that impact of the iPad on learning outcomes remains inconclusive.¹ Shouldn’t education policy be built on pedagogy, not popularity?

2. iPads only add to the financial problems of our education system

In much of the Western world, a fundamental problem is that teachers are underpaid and overworked for what is arguably one of the most important jobs in society. Many of us remember a particular inspirational teacher who at a critical time believed in you more than you believed in yourself. It is hard to envisage an iPad performing the same role. Nonetheless, tools that make a teacher’s job easier should be embraced: yet iPads have been adopted without consultation with the very people who will be using them as tools in the classroom. Research shows that educators are more skeptical of iPads then their students, and they are deeply concerned about how the iPad in the classroom fundamentally changes their role from the “sage on the stage” to the “guide on the side”.² When schools are tasked with purchasing iPads, a costly exercise once the initial outlay and the ongoing maintenance are taken into account, finances are either diverted away from other resources or could be better invested—say in teachers’ salaries. Alternatively, when the funding for iPads is shifted onto parents, such as with BYOD programs, the socio-economic inequity inherent in the schooling system only deepens.³

3. iPads are distracting

There are great features of iPads that can be highly useful to teachers and students alike. Research shows that students are positive and excited about iPads which motivates their learning: they have rated the iPad highly as an information-seeking tool, as they are now able to access instantly other learning materials and Internet resources.² Moreover, iPads are valuable as tools for communication and collaboration with peers and academics as well as for self-management through apps such as calendar, reminders, notes, emails and so on. However, a consistent finding across several studies was that the iPad could potentially be a
distraction as it is associated more with entertainment than education.\textsuperscript{1,2} The ability to connect to the Internet is another big potential source of temptation away from the learning job in hand. Multitasking is highly prevalent with screen technology,\textsuperscript{4} and evidence is clear that multitasking during study or learning hinders academic performance.

4. Onscreen reading is NOT comparable to traditional reading

Even if we disable Wifi on the iPads in classrooms to remove the potential for Internet distraction, iPads as an education tool differ dramatically from print books. Experts argue that reading text on screen is changing the very meaning of reading.\textsuperscript{2} When we read a traditional book, we do so continuously, slowly, closely, linearly. We might annotate the page and flip back and forth between pages to absorb what is being read.\textsuperscript{2} In comparison, when we read a book onscreen, we can instantly search for certain passages or key pieces of information. Experts argue this means when we read on screen, we are reading “on the prowl”- skimming and scanning and clicking hyper links to get the gist of the information. The worry is that reading onscreen is incompatible with traditional reading: “deep reading is a child of print.”\textsuperscript{2,268} Research has shown that the distracting nature of reading on an iPad makes it more awkward to read on and harder to following narrative and be transported into the story.\textsuperscript{5} Unsurprisingly, students vastly prefer the comfort and legibility of reading print.\textsuperscript{2}

5. Children need less screen time, not more

Advocates of iPads in classrooms as young as Kindergarten rightly argue that children need to be taught 21\textsuperscript{st} century skills to prepare them for adult life. This is certainly true, yet every single study is showing that children are consuming far too much technology already- up to 18 hours per day for teenagers aged 13 - 18.\textsuperscript{6} This much screen time is displacing important face-to-face social interactions, physical activity, time spent outdoors, and time spent being forced to entertain oneself (i.e. boredom). Children enter the schooling system already heavily tech savvy- nearly all children by the age of 2 have used a tablet computer or smartphone.

Neurologists are concerned that screens overtax our limited attentional resources and cause mental fatigue.\textsuperscript{7} What also prepares you for adult life is the ability to pay attention for long periods of time, possess self-control, and think in a deep and meaningful way about issues. Without iPads, classrooms remain a sanctuary for deep thought: what’s more, removing iPads from a classroom does not mean going completely tech-free at school.

In the five short years since the iPad was invented, it has shaken up the education system- for better or worse. As journalist H.L. Mencken once quipped, ‘for every complex problem there is an answer that is clear, simple, and wrong.’ There is no simple game plan for such a multifaceted and diverse agenda as an education system, where one size can never fit all cultures, ages and abilities. Perhaps however, before a parent or teacher hands over an iPad to improve or accelerate learning, they should ask first what precisely the outcomes are that they wish to achieve.

References


ME, MY SELFIE AND I

Research is uncovering what your selfie says about you.

In 2015 selfies resulted in the deaths of more people than those from shark attacks: to be precise, the victims were engaging in daring acts to get a good selfie. Why are we so obsessed with broadcasting our inevitably grinning faces?

In part, advances in technology are responsible for the selfie phenomenon. In 2010, Apple released the iPhone with a forward-facing camera—the same year that Instagram, arguably the social networking epicenter of the selfie, was born. In just a few short years, selfies became so eponymous that in 2013—just 3 years after the birth of Instagram—“selfie” was awarded the title of ‘Word of the Year’ by the Oxford dictionary. In 2015, over 80 million photos were posted to Instagram—per day—with a significant number of these being selfies.

But surely the opportunity alone afforded by technology cannot account for our selfie-culture. What is the real motivation? A scientific study published last month investigated the motives for using Instagram and found five major reasons: social interaction, archiving, escapism, peeking (on others), and self-expression— including the desire to be noticed by others and to “show-off”. Self-expression is an important facet of human identity—particularly for youth. Are selfies just a modern form of an age-old desire for self-expression, or are they symptomatic of an unprecedented narcissism? Perhaps the arrival of the selfie has blurred the line between these two possibilities...

Research has shown the social networking site use is linked to narcissism— but whether narcissists use Facebook more, or Facebook makes us more narcissistic is unclear. While there has been many investigations in the past five years into social networking site use, especially Facebook, there has been comparatively little research into the selfie phenomenon specifically. However, emerging research looking particularly at selfies and narcissism is painting a bleak picture. Three studies in 2015 found that narcissism predicted selfie-posting frequency, linked narcissism AND psychopathy with selfie-posting frequency amongst men and a third study found that the link between narcissism and selfie-posting was stronger in men than women.

Perhaps these trends are symptomatic of a new lifestyle that traffics in the instant, the highly transient and constantly shared thoughts, experiences and moment to moment living. Where do you end and the outside world begin? Where is your unique identity? Perhaps it’s no longer internalized and individual. If so, the only element that remains as exclusive and inviolate proof of your unique identity is... your face.

Before posting a selfie, consider that you may be sending a different message to your followers than intended. Psychology researchers set out to investigate what a selfie can reveal about our personality. First, thirteen different selfie features were identified, including “duckface”; “height of camera”; “photoshop editing”; “amount of body (shown)” and whether the person was alone or not. The results showed that features of selfies reflect their owners’ personality traits. Showing positive emotions in a selfie predicted agreeableness (kindness, co-operation and trustworthiness) and openness (curiosity, creativity, and risk-taking), whereas duckface indicated neuroticism (anxiety, moodiness, low-self-esteem). A selfie may indeed be a form of expressionism, but not in the manner to which the owner of the face in question had originally aspired!
References


THE INTERNET HAS CHANGED BULLYING- FOR THE WORSE

How much do we know about cyberbullying on social networking sites?

Social networking sites are popular, particularly amongst teens, and for all generations there may be some beneficial effects in being able to connect with friends and colleagues online. But social networking sites also have a dark side, especially for those with less experience of human spitefulness. While cyberbullying can affect an individual of any age, it is teens that experience it the most. Cyberbullying is now a real and pervasive threat to the health and safety of today’s online youth.

Some aspects of cyberbullying are nothing new for today’s teenagers. One study found that the content of cyberbullying incidents in 91% of cases related to relationship issues, such as break-ups, envy, intolerance, and ganging up. These are all just typical adolescent tensions- the difference lies in that they are playing out in a far more dangerous environment. Compared to the traditional bullying of the playground or the times of Flashman, the online environment is a place where bullying has instant, widespread, and permanent effects - and a place where a bully can attack their victim 24 hours a day. Because there is the possibility for the abuse to be spread by others and to continue online and because bullies may be able to maintain a higher degree of anonymity than in face-to-face encounters, there is concern that the intensity of cyberbullying is greater than that of traditional bullying.

Although cyberbullying includes all electronic forms of bullying, such as instant messaging, chat rooms, email, text messaging, and intrusive or prank telephone calls, it is social networking bullying that is particularly insidious: the social networking environment amplifies the public nature of the act, creates more opportunities for anonymity of the perpetrator- and the bullying acts are left online permanently.

Just how common is cyberbullying through social networking platforms? In a review of 36 studies (58% were US samples; age range was 12-18 year olds), the prevalence of cyberbullying on social media was 23%, with a range of 5% to 74%. Between 5-11% of individuals reported being both victims and bullies. Common social media platforms for cyberbullying included social networking sites such as Facebook (4%-20%), message boards (26%), and blogs (5%).

Name-calling or insults, spreading gossip and rumors, and circulating pictures were listed as common forms of cyberbullying. The most hurtful or distressing situations reported involved pictures or videos, in which individuals were asked or coerced into sending pictures of themselves or were covertly filmed or photographed.

There is an apparent gender divide in the content of the bullying behavior: girls typically received messages criticizing their popularity or appearance, or alternatively they were excluded or isolated in the online environment, while boys often received homophobic messages or derisive comments about their physical abilities. Most studies found that girls were more likely to be cyberbullied than boys. Boys were more often cyberbullies than girls, more likely to be targeted by direct rather than indirect bullying, and more often bullied in dating relationships. Girls tended to be limited perpetrators while boys tended to be frequent perpetrators.
The most prominent themes describing the motivation behind cyberbullying, as reported by both cyberbullies and non-bullies, included a lack of confidence or the desire to feel better about themselves, a desire for control, finding it entertaining, and retaliation. While in most cases the recipients know the perpetrator, estimates of the prevalence of being cyberbullied by an unknown person ranged from 10% to 21%.

Adults, who normally would be supervising the lives of teens, are left on the outside – without the technological expertise or understanding of the environment to be of much help. Victims were most likely to tell friends, followed by adults (usually parents; 20%), and a significant minority (24%) didn’t tell anyone. A common theme was that adolescents were often hesitant to tell their parents about incidents of cyberbullying for fear that their computer privileges would be taken away. Findings indicated that adolescents lack awareness or confidence that anything can be done about cyberbullying; therefore, efforts should be made to increase education regarding how to address it and who to tell, focusing on both recipients and bystanders.

Social networking platforms have exploded in popularity in the past decade. Just six years ago, teen researchers likened the Internet for teenagers to the wild west - lawless and ruthless. Since then, we have implemented legislation and governance in order to protect youth online from cyberbullying - have we done enough? After all, it appears that here, at least, the screen world isn’t ‘just like’ real life.

References