5RIGHTS FOUNDATION

Disrupted Childhood

The cost of persuasive design

Version 2, April 2023

About 5Rights Foundation

5Rights develops new policy, creates innovative frameworks, develops technical standards, publishes research, challenges received narratives and ensures that children's rights and needs are recognised and prioritised in the digital world. While 5Rights works exclusively on behalf of and with children and young people under 18, our solutions and strategies are relevant to many other communities.

Our focus is on implementable change and our work is cited and used widely around the world. We work with governments, inter-governmental institutions, professional associations, academics, businesses, and children, so that digital products and services can impact positively on the lived experiences of young people.

Acknowledgements

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Foreword

Much has happened in the five years since the initial publication of this report. In the UK, the Age Appropriate Design Code (AADC) was introduced, creating the first privacy by design regime to better protect children. This saw huge changes to online services that reduced their toxicity for children. The AADC was followed shortly by the Irish Data Protection Commission's *Fundamentals for Child-Oriented Approach to Data Processing*, the California Age Appropriate Design Code, with others in the US and around the world set to follow. In Europe, the Digital Services Act was passed, promising further restrictions on profiling and unsafe features, and as this report goes to press, the long-awaited Online Safety Bill is inching its way through the UK Parliament.

Nothing in these legislative and regulatory advances has fundamentally changed the asymmetry of power between tech and the children that use it. And while it is gratifying to see much of the language of our first report enter the mainstream policy discourse, reluctantly, we must admit that wholesale change is yet to arrive.

While some progress has been made, the fact remains that children are still left to navigate spaces designed to hold their attention for commercial benefit, even when this comes at the expense of their wellbeing. Frustratingly, companies push responsibility onto parents and users, boasting of advanced parental controls and 'user agency', such as usage statistics, screen time caps, 'time out' prompts and linked parent accounts. This simply shifts accountability from corporates, who employ behavioural psychologists for the specific purpose of maximising engagement, to an overwhelmed parent or even a child. We must recognise that for today's children, the online and offline worlds have all but merged, and while we must equip them to negotiate both, with equal knowledge, preparation, confidence and skill, there is no doubt that the bulk of responsibility for product design and driving positive outcomes should remain with the companies themselves.

As we reach a tipping point in the regulation of digital technologies, it is critical that policymakers and regulators focus their attention on the use of persuasive design and the business models it serves, and put the safe and equitable design of products and digital systems at the heart of their work.

This was a much-admired report when it was first published and still offers a clearsighted view of what lies behind children's experiences online. My thanks to all authors past and present, and to Izzy Wick, 5Rights Policy Director, for updating the text.

Baroness Beeban Kidron

Introduction

Significant technological advances are very often accompanied by concerned debate. Will our daily lives be improved or disrupted? Will the need for human intervention or interaction be reduced? Will our relationships change? Digital technologies, unlike previous inventions, not only enhance real world existence, but offer parallel alternatives. Infinitely portable and powerfully designed alternative and augmented realities are on offer 24/7. The ready availability of digital services and the commercial incentives to maximise 'engagement' fuelled a gold-rush for children's attention. As we move towards web 3.0 and spend more time in virtual environments like the metaverse, risks to children will also evolve, and the nature of their interactions will become less 'screen-based' and more dynamic and interconnected.

As children's online and offline lives are increasingly blended, it is no longer helpful or feasible to distinguish between the two. What we must now urgently consider is the nature of children's experiences in this dynamic and interconnected world, and how the design of digital products and services affects their behaviours and development.

This report examines the persuasive design features and strategies common to many popular digital products and services used by children. It considers the impact of persuasive design on children's social, mental and physical development, and how the digital world can be redesigned to ensure children's rights are recognised, respected and upheld.

> ## "The system is failing… social networks — they are man-made. If they are not serving humanity, they can and should be changed."
>
> Sir Tim Berners-Lee, Inventor of the World Wide Web

The most commonly-used persuasive design strategies are those deployed in service to the 'attention economy' - a system where revenue is generated by monetisting engagement. Variously called 'dark patterns', 'reward loops', 'captology', 'sticky', 'dwell features' and 'extended use strategies', persuasive design is deliberately baked into digital services and products to capture and hold users' attention and create habitual behaviours.

The costs for children, who in the report call for fairer treatment, are palpable. They include personal anxiety, social aggression, denuded relationships, sleep deprivation and negative impacts on education, health and wellbeing. At the same time, the modus operandi of the tech sector – excessive data surveillance made possible by persuasive design - raises ethical, moral and legal questions.

Industry insiders, unhappy with compulsive strategies, demand that the technology sector operate within a fully-described set of ethical and social standards. Their powerful words reflect a broader discontent throughout civil society. Seeds of change are seen in the increasing focus of policy makers, the media and concerned adults on the costs to children of persuasive and habit-forming design.

Digital technology promises unlimited potential for children and society. To fulfil its promise, it must be deployed in a way that is accountable and proactively meets the

needs of its child users. Services and products should be required to anticipate the vulnerabilities associated with the different ages and developmental stages of childhood to fully realise their potential.

Whilst acknowledging the recent steps taken by some technology companies to better serve younger users, it remains the case that digital services have consistently failed to prioritise the needs of children over those of shareholders.

Since this report's initial publication in 2018, lawmakers and regulators around the world have begun to address the risks created by the design of digital platforms popular among children and young people. We have also seen laudable action from industry bodies like the IEEE Standards Association to establish 'what good looks like' for age-appropriate design, with the publication of standard 2089 in 2021.[1]

Finally, with the adoption of General Comment 25 on children's rights in relation to the digital environment by the UN Committee on the Rights of the Child in 2021,[2] it is now unequivocal that children's rights apply equally online and offline.

If we continue to allow persuasive design features to determine the decisions children make online, we are in danger of stunting the creativity and development of a generation. This has far-reaching consequences for individual children, families and society. We urgently need to consider whether children are autonomous, respected and protected online.

[1] Standards Committee of the IEEE Consumer Technology Society, IEEE Standard for an Age Appropriate Digital Services based on the 5Rights Principles, IEEE Consumer Technology Society (2021)
[2] UN Committee on the Rights of the Child, General Comment No. 25 on children's rights in relation to the digital environment (2021)

Definitions

Persuasive design, a term coined by psychologist BJ Fogg, combines the theory of behavioural design with computer technology.[3] Behavioural design uses a system of rewards and punishments to influence human behaviour patterns. Both persuasive and behavioural designs can be used to increase wellbeing for personal and social good. However, it is arguably more often used to manipulate human behaviour so that people subconsciously act in the commercial interests of others.

A brief history of behavioural design

At the beginning of the 20th Century, Russian physiologist Professor Ivan Pavlov discovered how to get dogs to produce an instinctive salivating response to a stimulus that bore no relationship to food. Having observed that dogs naturally salivate in anticipation of food, Pavlov experimented by ringing a bell whenever he fed the dogs. He then stopped bringing food and only rang the bell. The dogs, *'conditioned'* to associate the ringing with food, continued to salivate at the sound of the bell. This is known as classical conditioning.

In the 1940s, psychologists BF Skinner and Charles Ferster built on Pavlov's work introducing '*schedules of reinforcement'* whilst experimenting with pigeons. They found they could teach the pigeons that their behaviour had consequences. This form of reinforcement, *'operant conditioning'*, requires the deployment of both reward and punishments to be effective.

Classical and operant conditioning are acknowledged as having strengths and weaknesses, but others have gone on to build on the key insight that human and animal behaviour can be conditioned (trained) to change.

In the 1990s, neuroscientist Wolfram Schultz demonstrated that once the brain receives a cue or trigger to behave in a way that is rewarded, it will automatically seek out further rewards. His findings implied that the human brain could be trained to repeat '*reward seeking'* actions. Schultz concluded that the use of reward signals was so powerful that they constrained '*free will'* to act.

In the late 1990s, Professor BJ Fogg set up the Persuasive Design Lab and soon after published Persuasive Technology: Using Computers to Change What We Think and Do.[4] By 2009, he had developed The Fogg Behavior Model, combining advances in technology with behavioural science. The Behavior Model enabled computer scientists to build software that reward or punish certain behaviours in order to elicit desired changes in behaviour.[5]

Whilst Fogg's Persuasive Design Lab was set up with the intention of combining technology and behavioural science for social good (for example by developing programmes that use persuasive design to help people stop smoking or resolve conflict), the Lab became a '*hothouse'* for Silicon Valley. Alumni include Mike

3 BJ Fogg, 'Persuasive Technology: Using Computers to Change What We Think and Do', Ubiquity (2002)
4 BJ Fogg, 'Persuasive Technology: Using Computers to Change What We Think and Do', Ubiquity (2002)
5 BJ Fogg, 'A Behavior Model for Persuasive Design', Persuasive Technology Lab, Stanford University (2009)

Krieger, co-founder of Instagram; Tristan Harris, ex-design ethicist at Google; and Ed Baker, head of growth at both Facebook and Uber, among others.[6]

Fogg's is not the only theory of behavioural design; another notable example is Professors Richard H Thaler and Cass R Sunstein's Nudge Theory. Their model uses 'choice architecture' to ask questions in a way that nudges individuals' behaviour 'in beneficial directions without restricting freedom of choice'. [7] The Nudge Theory found favour with Britain's former Prime Minister David Cameron who set up The Behavioural Insights Team within the Cabinet Office in July 2010 to 'enable people to make better choices for themselves'.

Separately and together these theories build on the proven concept that human behaviour can be manipulated by priming and conditioning, i.e. by manipulating human instincts using rewards and punishments.

Persuasive design strategies are generally deployed online in service to a business model premised on 'engagement'. These strategies are designed to encourage users to give up more of their time and attention to maximise engagement. More engagement equals more data, more advertising opportunities and in turn, more revenue. In this way, persuasive design is a valuable tool for companies to meet their commercial objectives, often to the detriment of consumers.

> **"Never before in history have such a small number of designers… had such a large influence on two billion [now three billion] people's thoughts and choices."**
>
> Tristan Harris, ex-Google Ethicist, founder of the Centre for Humane Technology

In this report, we refer to persuasive design, which is known variously as behavioural design and 'nudging'. We also refer to dark patterns, habit-forming and addictive design. It is important to note that persuasive and behavioural design and nudge techniques are not 'bad' in and of themselves. They can be used to encourage 'positive' behaviour or give helpful reminders or warnings at opportune moments. Dark patterns are negative by definition, referring to design choices that are not always visible to and rarely in the best interests of the user. Below we define some of common terms used in relation to the collective practice known as persuasive design.

Dark patterns
The term "dark patterns" was coined in 2010 by the user experience (UX) designer, Harry Brignull, to describe "tricks used in websites and apps that make you do things that you didn't mean to, like buying or signing up for something".[8] Dark patterns are ubiquitous online, partly as a result of the use of A/B testing in product development, which shows them to be profit-maximising.

There is no universally accepted definition of dark patterns, but broadly it refers to designs practices commonly found in online user interfaces that lead consumers to

[6] WIRED, 'The formula for phone addiction might double as a cure' (1 February 2018)
[7] R Thaler & C Sunstein, 'Nudge: Improving Decisions About Health, Wealth and Happiness', Yale University Press (2008)
[8] Harry Brignull, Deceptive Design (2010)

make choices that often are not in their best interests, but generally serve the commercial interests of the provider.

The OECD Committee on Consumer Policy have a working definition:

"Dark commercial patterns are business practices employing elements of digital choice architecture, in particular in online user interfaces, that subvert or impair consumer autonomy, decision-making or choice. They often deceive, coerce or manipulate consumers and are likely to cause direct or indirect consumer detriment in various ways, though it may be difficult or impossible to measure such detriment in many instances."[9]

The California Privacy Rights Act[10], passed in 2020, is understood to be the first legislation to provide a definition of dark patterns, as follows: "a user interface designed or manipulated with the substantial effect of subverting or impairing user autonomy, decision-making, or choice." The EU's Digital Services Act (DSA) defines dark patterns as "practices that materially distort or impair, either purposefully or in effect, the ability of recipients of the service to make autonomous and informed choices or decisions." The DSA expressly prohibits online services from using dark patterns or presenting choices in a non-neutral manner, or subverting the autonomy, decision-making, or free choice of users.[11] The European Data Protection Board has also published guidance on deceptive design patterns in social media platform interfaces, providing recommendations for social media controllers on how to recognise and avoid these patterns.[12]

Nudge techniques

Nudge techniques borrow from the concept in behavioural economics that the design of 'decision environments', also known as 'choice architecture', influences individual and collective decision-making. Without depriving the decision makers of choice, it influences the choices they make. This theory was popularised by two American scholars at the University of Chicago, behavioural economist Richard Thaler and legal scholar Cass Sunstein, who in 2008 published the book *Nudge: Improving Health, Wealth and Happiness.* They define a nudge as "any aspect of the choice architecture that alters people's behaviour predictably without forbidding any options or significantly changing their economic incentives."[13]

The UK's Age Appropriate Design Code refers to nudge techniques in its standards for children's data protection. It defines these techniques as "design features which lead or encourage users to follow the designer's preferred paths in the user's decision making."[14] Services likely to be accessed by children are prohibited from using nudge

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[9] OECD, Dark commercial patterns, OECD Digital Economy Papers, No. 336, OECD Publishing (2022)
[10] The California Privacy Rights Act (CPRA), also known as Proposition 24, is a ballot measure that was approved by California voters in 2020, amending the California Consumer Privacy Act
[11] Recital 67, Digital Service Act (2022): "Providers of online platforms should therefore be prohibited from deceiving or nudging recipients of the service and from distorting or impairing the autonomy, decision-making, or choice of the recipients of the service via the structure, design or functionalities of an online interface or a part thereof."
[12] European Data Protection Board, Guidelines 3/2022 on Dark patterns in social media platform interfaces: How to recognise and avoid them (2022)
[13] R Thaler & C Sunstein, 'Nudge: Improving Decisions About Health, Wealth and Happiness', Yale University Press (2008)
[14] Information Commissioner's Office, Age Appropriate Design: a code of practice for online services (standard 13: nudge techniques), (2020)

techniques to lead children to make poor privacy decisions under the AADC. They are also encouraged to use pro-privacy nudges and nudges designed to promote health and wellbeing. The AADC was the first statutory code to refer to the use of nudges, bringing persuasive design firmly into the purview of privacy regulators.

Chapter One

Where childhood and technology meet

The opportunities that the digital world offers young people are undeniable. Digital technologies have transformed the ways in which children play, socialise, learn and interact with the environment around them. The tenor of the debate about the opportunities and risks to children online has evolved over the last few years, from concern over the amount of time children spend in front of screens to a far greater fear about what their screens are actually showing and how they might be nudging and or orchestrating children's expectations and behaviour. Evidence suggests that the negative effects of screen-based activities on children depend as much on the quality of the activities as the quantity.[15] In this chapter we move beyond screen time to examine how children engage with the digital environment and the impact of these interactions on their lives.

> **"I think that services should assume that young people are going to be on it because young people are all over the internet: the internet is our oyster."**
>
> Aged 16

Children

Children are inherently optimistic about the opportunities that the digital environment offers and believe that it adds significant value to their lives. In the UK:

- Nearly all children aged 3-17 went online in 2022 (97%)
- 93% of 5-7-year-olds watch videos online
- 63% of 8-11-year-olds use social media
- 32% of 8-11-year-olds have profiles on TikTok and 24% on Snapchat.
- Nearly half of 12-15-year-olds post their own video content online
- Three-quarters of 12-15-year-olds play video games online.[16]

There are, however, multiple indications that their digital engagement can have a negative impact on their wellbeing.

> **"When you're not on your phone or social media you feel as if you don't know what's happening. Also, because of social media, people now struggle to function in a social area when you can't use your phone."**
>
> Aged 16

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[15] Common Sense, Tweens, Teens, Tech, and Mental Health: Coming of Age in an Increasingly Digital, Uncertain, and Unequal World (July 2020)

[16] Ofcom, Children and parents: media use and attitudes report 2023 (March 2023)

Often children display absolute devotion to their devices, on the one hand saying they 'could not do without their mobile phone for a day',[17] that they are 'best friends' with their phone[18] or don't feel 'right without it'.[19] At the same time, they report being 'addicted', 'attached', 'distracted', 'obliged', 'always consuming', having 'no control' and feeling 'panicked'. Common Sense Media found that use of screen media among 8–18-year-olds in the US has increased by 17% since the start of the pandemic (March 2020).[20] 4-in-10 young people aged 13-25 surveyed in the UK in 2021 say they rarely disconnect from social media and that they use it constantly throughout the day.[21]

> **"Even though social media can be great, it can be like a contagious disease where people can't stop looking at their phones and spreads the word of 'oh you need to look at this'."**
>
> Aged 12

The tension between being **governed by** and **devoted to** their device is, in part, a result of the persuasive strategies baked into the digital services that children use.

Parents and carers

Parents are often told that their children are 'digital natives' which implies that children are in control. In reality, research consistently shows young people do not climb far up the digital 'ladder of opportunities', but instead spend most of their time on a handful of platforms, predominantly social media-based, which offer a much more homogenised and commercially driven environment.

> **"Tech companies don't seem to think about how hard they are making parents' lives."**
>
> Parent of a five and nine-year-old

Meanwhile, headlines scream about bullying, intimate image photo sharing and dangerous social media challenges among children, to which the response is often to teach them to be resilient. This suggests that children can make effective decisions regarding their own safety and wellbeing in an environment over which they have little control, and which has not been designed to meet their needs or serve their best interests.

These mixed messages — that children are simultaneously in charge, that they are unsafe, that they must have digital skills, and that products and services dictate the terms of their use — leave many parents confused. These mixed messages do not account for the full range of opportunities on offer or the difficulties that the digital environment presents for children, among them the impact of persuasive design.

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[17] Common Sense, 'Technology Addiction: Concern, Controversy and Finding a Balance' (May 2016)
[18] Financial Times, 'The secret lives of children and their phones' (6 October 2017)
[19] Ibid.
[20] Common Sense, Common Sense Census: Media Use by Tweens and Teens 2021, (2022)
[21] Ditch the Label, The Wireless Report 2021

> **"I worry… that he seems to be overwhelmed with so many messages and constant communication from his friends. The alerts go off constantly. I couldn't cope as an adult, it's overwhelming for children."**
>
> Parent of a 12-year-old

75% of UK parents feel concerned about their child seeing age-inappropriate content online, and 50% feel concerned about the pressure on them to spend money online.[22] Many social media sites and games have introduced controls that give parents and carers the ability to see how much time their children spend on the service and to set time limits. As critics have noted, limiting the amount of time a child spends using a screen or engaging with a particular service does not address the risks created by the way the service is designed or how it engages with the child, it merely limits their exposure. Importantly, most parental tools do not give parents or guardians the ability to alter the quality of their children's experience, for example, limiting how much advertising they are exposed to, adapting the design features that feed social comparison, or influencing the type of content they are shown. For some, the illusion of being in control is more dangerous than the knowledge they are not.

> **"We set boundaries and when he's at home we can enforce them — not easily but eventually. When he's out of our sight it's a whole other issue and I resent having to 'police' him all the time. That isn't the sort of trusting parent I want to be."**
>
> Parent of a 12-year-old

Parental controls also require a degree of adult involvement and for those adults to have a level of 'digital literacy.' In the UK, nine in ten parents feel they high awareness of safety-promoting technical tools and controls, but only seven in ten had used any of them. More worryingly, just a third of parents are aware of the correct minimum age requirement for social media use, which for most online services is 13, but in some cases may be 14, 16 or 18.[23]

Not all children have active or engaged parents, and many adults do not feel they have the requisite knowledge to use tools designed to support their children online. There is also a concern that such tools will introduce a level of parental surveillance that may be inappropriate for older children, or cause tension within families. And of course, some children do not have parents at all.

> **"Sometimes [there are arguments] between my husband and me, sometimes between us and the children. It's usually because someone is on a device when someone else wants to talk to them or it's dinner**

22 Ofcom, Children and parents: media use and attitudes report 2023 (March 2023)
23 Ofcom, Children and parents: media use and attitudes report 2022 (March 2022)

> ## time or some other family situation where the tech is getting in the way."
> Parent of an 11 and 16-year-old

Teachers

There has been a huge increase in the use of educational technology (EdTech) in schools over recent years, in part due to the reliance on technology for remote learning during the COVID-19 pandemic. Some of the most commonly used EdTech products are commercially provided, highly data extractive and use the same persuasive design strategies found on social media, such as gamification and personalisation.

Natalia Kucirkova describes this as the "commercially driven design logic of personalised EdTech"[24] where the same methods used to maximise data capture, recommend content and personalise experiences on social media are applied in digital learning products. The logic follows that a user will be interested in content that is similar or closely related to content they have previously engaged with. "Like-like" design principles are incompatible with the prevailing pedagogy that learning is most effective when it is effortful, collaborative and involves serendipitous discoveries or learning through surprise.

> *"Students' achievement is reduced to narrowly defined objectives where rewards are given for small task completion to extrinsically motivate students to continue with the task… Each click or tap triggers a response that pushes the child towards a desired goal – as if there was only one right answer for each question…"*
>   - Natalia Kucirkova, 2022

> ## "Show My Homework sometimes causes a distraction because I start doing my homework and then get a message or a notification and then have to check on that and I get carried away."
> Aged 16

ClassDojo

ClassDojo is a US-based app offered for free to teachers worldwide to track and nudge children's behaviour in the classroom. Children are awarded positive behavioural points for behaviours considered by the teacher to be positive and points are deducted for behaviours they consider to be negative

"You are rewarded Dojo points if you do excellent homework or complete tasks to a certain level. I don't think it helps learning because kids just want the points. However they don't retain the information" – Aged 13

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[24] Natalia Kucirkova, The promise and pitfalls of personalised learning with new EdTech, published in Education Data Futures: Critical, Regulatory and Practical Reflections, Digital Futures Commission, 5Rights Foundation (2022)

What children, parents and teachers are experiencing is often not the result of intentional use, but the consequence of deliberate design strategies that train device users to remain engaged, at any cost, even in a learning environment. While the aim is for technology to benefit children and families in all settings, in many households and learning environments it becomes a source of tension and confusion.

Chapter Two

The commercial imperative

Many aspects of the digital environment that were conceived as free and open are increasingly privately-owned and tightly controlled. Services that look free are predicated on a service contract paid for with the currency of personal data. The value of this data and the lengths to which the digital environment is designed to gather it are opaque to most users, and nearly all children.

> **"When an online service is free, you're not the customer. You're the product."**
>
> Tim Wu, The Attention Merchants: The Epic Scramble to Get Inside Our Heads
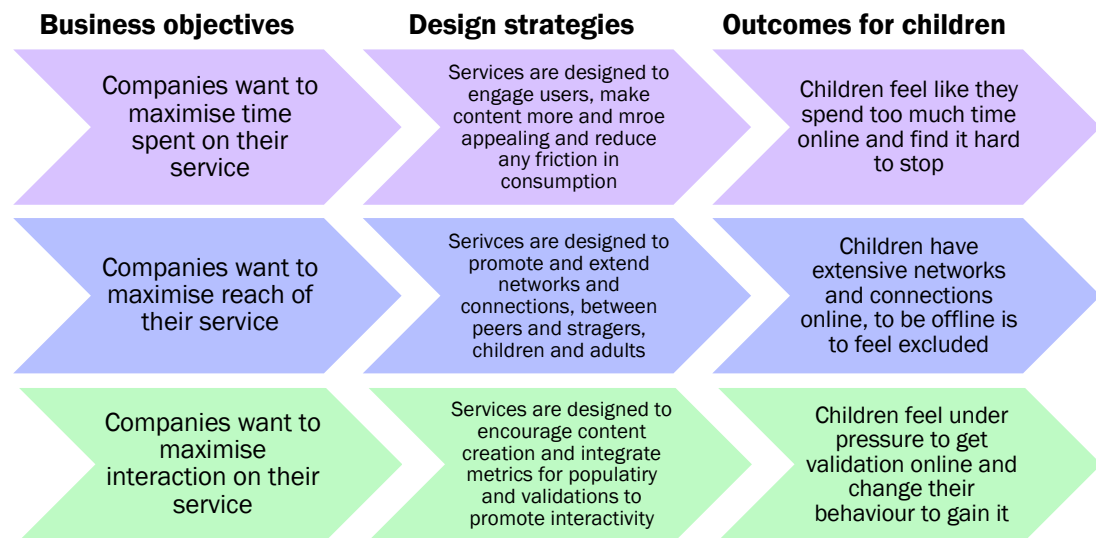
The zero-sum game for our attention

Tech companies, particularly those that provide services free of charge at the point of use, deal in the currency of personal data that is sold to advertisers for profit. Information that a company can extract or infer is valuable to advertisers who then use that data to target groups and individuals with products. The more time we spend on a service, the more data is generated about our interests, habits, behaviours, even those we may not be aware of. It follows that services are designed primarily to maximise the amount of time we spend on a service and the amount of data that can be generated through our 'engagement'.

> **"The thought process that went into building these applications, Facebook being the first of them... was all about:** *'How do we consume as much of your time and conscious attention as possible?'* **God only knows what it's doing to our children's brains."**
>
> Sean Parker, former Facebook president

Design strategies on social media are shaped by three broad commercial goals: to increase the number of users, to maximise the amount of time users spend on the service, and to increase the amount of content generation and interaction with the service. As designers themselves acknowledge, "reducing attention will reduce revenue."[25] These business objectives shape design strategies, and in turn, outcomes for children:

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[25] 5Rights Foundation, Pathways: How digital design puts children at risk (July 2021)

Business objectives	Design strategies	Outcomes for children
Companies want to maximise time spent on their service	Services are designed to engage users, make content more and mroe appealing and reduce any friction in consumption	Children feel like they spend too much time online and find it hard to stop
Companies want to maximise reach of their service	Serivces are designed to promote and extend networks and connections, between peers and stragers, children and adults	Children have extensive networks and connections online, to be offline is to feel excluded
Companies want to maximise interaction on their service	Services are designed to encourage content creation and integrate metrics for populality and validations to promote interactivity	Children feel under pressure to get validation online and change their behaviour to gain it

Research by Cambridge University's Psychometrics Centre in collaboration with Microsoft Research Centre, found that with nothing more than the 'Like' button, a user's sexuality (88% and 75% accuracy for men and women respectively), drug use (65% accuracy), parental relationship status (60% accuracy), ethnicity (95% accuracy) and political views (85% accuracy) could be deduced.[26] Similarly, a 2021 investigation by the Wall Street Journal into TikTok's algorithms found that in just 36 minutes of watch time, the app can form a deep understanding of a user's interests, based only on signals like pausing, rewatching or lingering on a video. Some of the accounts the journalists set up ended up lost in rabbit holes of similar content, including one that was fed a stream of videos about depression. Others were served videos that encouraged eating disorders, sexualised minors and discussed suicide.[27]

Concerns have also grown about the use of centrally-held personal data being mis-managed by government agencies. In November 2022, the UK data regulator reprimanded the Department for Education (DfE) after a major GDPR infraction which resulted in the personal data of 28 million children being used by gambling companies. The investigation found that DfE failed to protect children's data from unauthorised processing by third parties (for reasons other than the provision of educational services), with data subjects "unaware of the processing" and unable "to object or otherwise withdraw from this processing."[28]

The current generation of children are the first to have data collected about them at every stage of their life, even before birth. Veronica Barassi in 'Child Data Citizen' (2020) examines how children's data is mined and commodified before they are born, and throughout childhood, from pregnancy apps and social media posts, education and learning apps, smart home devices, and medical records.[29] The impact of 'sharenting' - when parents and caregivers share information about their children online, usually through photos and videos on social media - has become more acute as data profiling and inference models have grown more sophisticated. According to Harvard Law

[26] M Kosiniski, D Stillwell, T Graepel. 'Private Traits and Attributes are Predictable from Digital Records of Human Behavior', Proceedings of the National Academy of Sciences (April 2013)
[27] Wall Street Journal, Inside TikTok's Algorithm: A WSJ Video Investigation (July 2021)
[28] Information Commissioner's Office, Department for Education reprimand (November 2022)
[29] Veronica Barassi, Child Data Citizen: How Tech Companies Are Profiling Us from before Birth, MIT Press (2020)

Professor Leah Plunkett, adults 'sharent' because the digital world "makes it very easy to do and even encourages it."[30]

This runs counter to social norms offline where barriers to sharing are much greater and sharing is normally between two interested parties, with no intermediary who profiles a child (or parent) for commercial gain.

Central to this value chain are persuasive design strategies that entice and keep the user online in order to create more data.

> ## "It makes me angry that businesses use specific designs to keep young people on their app/website. They are exploiting unknowing, young people so that they can build up ad revenue."
>
> Aged 17

In 2018, former Google design ethicist Tristan Harris launched the Center for Humane Technology, which describes the challenge of persuasive design in the following terms:

"There's an invisible problem that's affecting all of society... Facebook, Twitter, Instagram, Google have produced amazing products that have benefited the world enormously. But these companies are also caught in a zero-sum race for our finite attention, which they need to make money. Constantly forced to outperform their competitors, they must use increasingly persuasive techniques to keep us glued. They point AI-driven news feeds, content and notifications at our minds, continually learning how to hook us more deeply - from our own behaviour. Unfortunately, what's best for capturing our attention isn't best for our wellbeing: Snapchat turns conversations into streaks, redefining how our children measure friendship. Instagram glorifies the picture-perfect life, eroding our self-worth. Facebook segregates us into echo chambers, fragmenting our communities. YouTube autoplays the next perfect video, even if it eats into our sleep. These are not neutral products. They are part of a system designed to addict us."

It is not reasonable to design services to be compulsive and then reprimand children for being preoccupied with their phone. The commercial imperative of Big Tech to design compulsive use into digital products and services conflicts with the needs and rights of children. In considering how to fulfil those needs and rights, we must first understand persuasive design strategies.

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[30] Leah A. Plunkett, <u>Sharenthood: Why we should think before we talk about our kids online</u>, MIT press (2020)

Chapter Three

Persuasive design strategies may be used singly or in combination, but they all follow Professor Fogg's understanding that human instincts can be accelerated, nudged and determined by technology that, in turn, changes or trains human behaviour. There are some persuasive design strategies to which children are more susceptible than adults. This is because children have less developed executive functioning skills, which are required to anticipate likely outcomes and self-regulate behaviours and emotions.

In this chapter we examine some of the most used persuasive design strategies and consider in detail those that have the greatest impact on children. The below table borrows from the taxonomy of dark patterns published by the OECD in 2022,[31] as well as 5Rights' own research, to describe some of the most common examples of persuasive design in products and services popular among children.

Type	Name	Description	Example
Dopamine hits and anticipation	Notifications	Alerting users to a change, typically a new message, update, social media post etc.	Buzzes, pings, vibrations, pulses, the colour red
	Random rewards	Providing 'rewards' that are unknown and undetermined by the user	Loot boxes
	Anticipation mechanisms	Features that generate a sense of anticipation before gratification	Typing bubbles to indicate that another user is actively typing a message
	Affirmations	Features that indicate approval or provide validation	Likes, hearts, claps
Social proof / Fear of missing out	Popularity metrics	Numbers associated with a user's engagement, usually displayed visibly on a profile or post	'Likes', friends, followers, shares, claps, scores
	Activity messages	Indications about other users' actions that generate FoMO or anticipation	Instagram pulses Read receipts
	Reciprocity	Sense of obligation to reciprocate or mirror other user's actions	Likes Virtual Gifts Snapchat Streaks
	Para-social relationships	Nonreciprocal socio-emotional connections with 'high-profile' users such as celebrities of influencers	Influencers OnlyFans Creators 'YouTubers'
	Ephemeral content	Content that expires or 'disappears' after a certain length of time. Ephemeral content cannot be recovered by users	Instagram stories BeReal TikTok Now Polls
Forced action	Forced registration	Forcing users to register or tricking them into thinking registration is necessary	'Login in to view posts from this account' 'Don't have an account? Sign up!'
	Forced disclosure	Tricking or forcing users into sharing personal information	'Don't miss out on special rewards just for you!'

[31] OECD, "Dark commercial patterns" , OECD Digital Economy Papers, No. 336, OECD Publishing (2022)

	Friend spam / address book leaching	Manipulative extraction of information about other users	'Allow access to you contacts'
	Gamification	Encouraging users to 'earn' access to certain functionalities or credits through game-play or repeated use	'Spin the wheel to see if you've won a prize!'
	Logging in	Encouraging users to log in via an account e.g. Google or Facebook	'Log in with Facebook/Google/Twitter/ TikTok'
Interface interference	Hidden information	Obscuring important information that could prevent meaningful consent from being obtained	For example, displaying terms and conditions as large blocks of text in very small font, making it difficult to read.
	False hierarchy	Visual prominence given to a certain setting or version of a product that favours the provider's aims	In a review of 240 popular apps (including children's apps) on the Google Play Store, 61% were found to include false hierarchy dark patterns[32]
	Pre-selection	Pre-selecting options or settings that may not be in the best interests of the child	81 of 240 apps popular on the Google Play store contained more than two pre-selections to set notifications (push, email, SMS) 'on' by default
	Trick questions	Intentional or obvious ambiguity (e.g. double negatives or 'inverted' tick boxes)	Tick box selection: "Please do not send me marketing emails/share my information with third parties
	Disguised ads	Hiding or concealing the nature of an advertisement or failing to make it clear that something is a paid promotion	In a review of 135 popular children's apps, 95% contained at least one type of advertising, many of which were specifically designed to look part of the app.[33]
	Confirm-shaming / Toying with Emotion	Emotionally manipulative framing to make users select a certain option	For example, "Keep this app free and improve the ad experience by allowing tracking."
Obstruction	Hard to cancel or opt out /click fatigue	When it is easier for the user to sign up or opt-in and disproportionately difficult to cancel or opt-out	Highlighting the 'opt-in' or 'yes' options in a brighter colour, and obscuring the opt-out options
	No save	Preventing users from saving progress until they reach a predetermined point, or complete a certain action	Providing no option to save
	Slowing progress	Barriers that force a user to engage with something before they can access information they are seeking. Each barrier is small, but as the user swipes, removes and negotiates the barriers, their time online is	Adverts you can't skip or close, videos that break up news article.

[32] OECD, "Dark commercial patterns", OECD Digital Economy Papers, No. 336, OECD Publishing (2022)
[33] Ibid.

		extended before getting to what they initially sought.[34]	
	Immortal accounts	When it is difficult or impossible to delete an account or related data	Not providing users with the option to delete their accounts permanently (Facebook) or retrieve their personal data
	Intermediate currency	Purchases in virtual or 'in-game' currency that obscure real-world cost	Robux (virtual currency in Roblox). Roblox users cannot wirthdraw money without a Roblox premium subscriptions ($5 USD per month) and they have to be age 13 of over
Seamlessness	Cross-platform sharing	Functions that encourage users to share content on other platforms	Seamless share to Twitter when posting an OnlyFans update. Link stickers on Instagram stories allowing users allows to link directly to a web page.
	Autoplay	Content automatically playing without initiation by the user, or 'pre-loaded' to begin when the previous piece of content has played, minimising or eliminating breaks during which a user might decide to disengage.	TikTok autoplays videos when a user scrolls
	Infinite scroll	Content feeds that load automatically without any end point and without requiring actions from the user to reload	Social media feeds (newsfeeds, 'For You' pages)
	Seamless payments	Design that removes steps or barriers to payments	'One click' or hidden payments

Most of these dark patterns will be familiar to adults, such are their prevalence in e-commerce sites, social media and other commonly used services. More surprising is their prevalence in products and services aimed at children. A 2022 study of apps used by 3–5-year-olds found that the majority used manipulative design features, including para-social relationship pressure, fabricated time pressure, navigation constraints, and lures to encourage longer gameplay or more purchases. Only 20% of apps had no manipulative design features. The research also showed that apps with manipulative design features were more commonly used by children from lower socioeconomic backgrounds.[35]

The dopamine hit

Human beings respond to the promise of a reward by releasing a chemical in the brain known as dopamine.[36] In some settings the reward is obvious; for example, an

[34] Anthony Wagner, associate Professor of Psychology at Stanford University, explains "Where there are multiple sources of information... [users] are not able to filter out what's not relevant to their current goal. That failure to filter means they're slowed down by irrelevant information."
[35] J. Radesky et al., "Prevalence and Characteristics of Manipulative Design in Mobile Applications Used by Children", JAMA Network Open, Vol. 5/6 (2022)
[36] K Berridge & T Robinson, 'What is the role of dopamine in reward: hedonic impact, reward learning, or incentive salience?', Brain Research Reviews, 28 (1998). Referenced in 'Why we're all addicted to texts, Twitter and Google', Dr. Susan Weinschenk, Psychology Today (11 September 2012)

affirmation, such as a 'Like' from another user. Others are less understood, for example, bubbles to indicate another user is typing or a 'read' receipt. The anticipation triggers a small release of dopamine, which technology theorist Dr. Michael Chorust has described as the brain's "reward-seeking drug". Once the reward has been absorbed, the dopamine fades, leaving the desire for more.

> ## "The short-term, dopamine-driven feedback loops that we have created are destroying how society works... No civil discourse, no cooperation, misinformation, mistruth."
>
> Chamath Palihapitiya, former vice-president of User Growth, Facebook

Children's predilection to seek immediate gratification is developmentally driven and makes them particularly susceptible to habit-forming rewards.[37] It means it is difficult for them to ignore the prospect of a dopamine reward, even when this conflicts with other essential daily activities, such as sleeping or eating.[38]

Notifications
Human beings respond to noises, movements and light. It is a necessity borne from our hunter-gatherer forebears who needed to be alert to the presence of predators or other dangers.[39] Notifying, or summonsing, is one of the most powerful strategies of persuasive design. It comes in many forms - pop-up messages; short, long, or insistent vibrations; surges of light or sharp sounds. All are designed to create a sense of urgency, which acts as a powerful summons. Often the only way to stop the influx of notifications is to comply with the call for attention.

> ## "I constantly feel like when I'm doing my homework I want to go and pick up my phone, just to see what's happening on Snapchat... they tell you when someone is typing so I feel like you get that double notification... your phone just keeps vibrating,"
>
> Aged 16

> ## "You can't leave it because you'd be up all night answering the old messages and the new ones asking why you didn't answer the first message — sometimes I get LITERALLY hundreds."
>
> Aged 14

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[37] Between 10–12 years old, children find it hard to think of the longer-term consequences and seek immediate rewards. (See p. 18, 'Digital Childhood: Addressing Childhood Development Milestones in the Digital Environment', 2017)
[38] B Carter et al, 'Association between portable screen-based media device access or use and sleep outcomes', JAMA Pediatrics, 170(12) 1202-1208 (2016)
[39] This is known as the 'orienting reflex' (See Chapter 4.1. 'Treatment of Attentional Problems', G DeGangi, Pediatric Disorders of Regulation in Affect and Behavior, Second Edition (2017)

Children are less able than adults to prioritise competing demands so tend to answer the newest first, instilling a habit of responding to 'the new'.[40] This has profound implications since routines and habits formed before the age of nine are unlikely to change in adulthood.
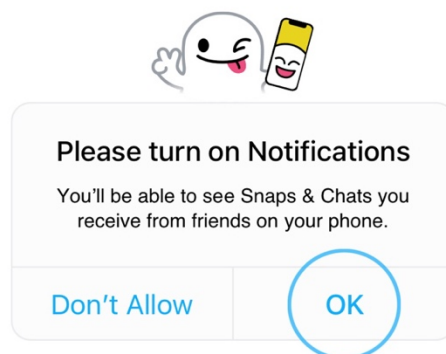
Habit-forming summons are further enhanced by machine learning and artificial intelligence systems which are able to learn when a user is most likely to respond, so send notifications at an 'optimal time'.[41] Demands and invitations, such as *'tap here', 'watch, 'accept', 'Like', 'agree', 'share', 'post'* or *'read'* may seem small but will frictionlessly lead to further demands for action.

> ## "When I walk around and see people staring at their phones often it's because they've taken out their phones to look at notifications, that's something I feel is not going in the right direction for society."[42]

Justin Rosenstein, co-designer of the Like button

The UK's Age Appropriate Design Code encourages the use of positive nudges to support children's health and wellbeing. It gives recommendations for different techniques that will encourage wellbeing enhancing behaviours, such as encouragement to take breaks or mid-level pauses and save features.[43] Following the introduction of the AADC in 2021, TikTok no longer sends push notifications to 13-15 years olds after 9pm, or to 16–17-year-olds after 10pm.

Whilst notifications can be switched off, this action almost always triggers warnings to users that they risk missing out on new content.[44] Users are then forced to weigh up the intrusiveness of the notifications against their fear of missing out. For many children, this represents an impossible choice. The persuasive strategy of constant summons creates an exhausting level of demand that exploits a child's human instinct to respond.

Please turn on Notifications
You'll be able to see Snaps & Chats you receive from friends on your phone.

Don't Allow   OK

In this example, there is a request ('please') and an incentive ("you'll be able to see Snaps & Chats") to turn on notifications. The option to agree is pre-selected with a blue circle.

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[40] Chamath Palihapitiya, 'On money as an Instrument of Change', Stanford Business School (13 November 2017) Discussed in 'Former Facebook exec says social media is ripping apart society', The Verge, 11 December 2017

[41] "Optimal Time uses a machine learning algorithm to automatically predict when a user is likely to open your push. It sees the highest success rates. Optimal Time accounts for users' individual engagement patterns, sending push notifications when users are prone to open the app. The intelligence of the algorithm contributes to much higher open rates." Leanplum, 'Personalize or Bust: the Impact on App Engagement' (2016)

[42] Alphr, 'The inventor of the Facebook Like: "There's always going to be unintended consequences."' (20 October 2017)

[43] Information Commissioner's Office, Age Appropriate Design: a code of practice for online services (standard 13: nudge techniques), (2020)

[44] New Statesman, 'Pushier notifications: how social media is getting more invasive' (28 June 2017)

Randomised reward mechanisms
Variable rewards, also known as 'randomised reward mechanisms' (RRMs), hold a special thrill, as the user anticipates a reward that they know could come but is tantalisingly just out of reach. A gambler waiting to see where the roulette wheel will stop or a viewer watching a presenter's dramatic pause before they announce a winner: in both cases, the individual experiences a dopamine rush as they anticipate the unknown outcome. Online services are littered with these apparently benign reward features.

> Professor Adam Alter explains: "...it's not guaranteed that you're going to get Likes on your posts. And it's the unpredictability of that process that makes it so addictive. If you knew that every time you posted something you'd get 100 Likes, it would become boring really fast."[45]

Loot boxes
Loot boxes are randomised reward mechanisms found in video games. Players purchase loot boxes using real-world or virtual (in-game) currency, then receive an apparently randomly-generated reward. The player does not know what reward they will receive before purchasing.

Over half of the top 100 grossing mobile games on the Apple and Google app stores contain loot boxes. At the end of 2019, the loot box market in the UK was estimated to be worth £700 million.[46]

There is a growing body of evidence that suggests a link between loot box use and problem gambling, resembling a 'dose-response' (i.e. dopamine driven) relationship. This is unsurprising, given the similarities between loot boxes and gambling products. A 2019 study found that 76% of 10–16-year-olds feel that online video games try to make you spend as much money as possible. Children generally have less developed impulse control and a limited understanding of purchasing decisions and likely outcomes.[47]
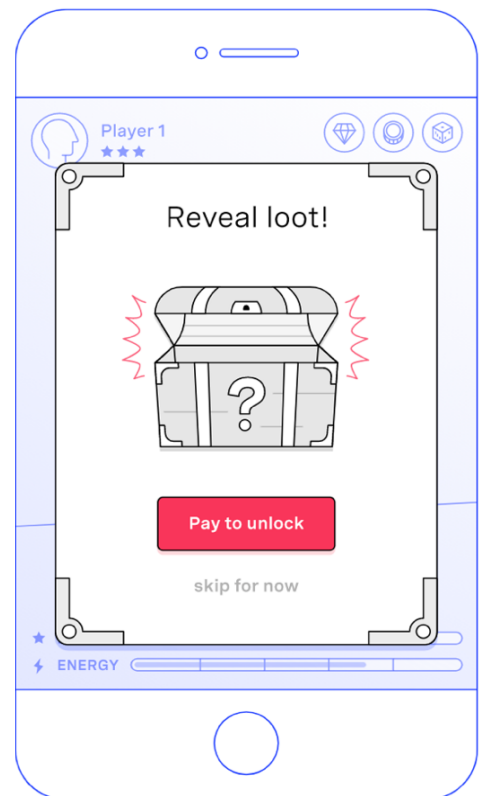
The Belgium Gambling Commission banned loot boxes in video games in 2018, claiming they were "in violation of gambling legislation." Since then, the video game developer Blizzard has confirmed that one of its most popular games will not contain loot boxes, and EA games will allow players to see the contents of loot boxes before purchasing. But as it stands, many of the most popular games among children are still littered with loot boxes and other random rewards.

[45] Business Insider, 'What happens to your brain when you get a Like on Instagram' (25 March 2017)
[46] D. Zendle, R. Meyer, P. Cairns, S. Waters and N. Ballou, The prevalence of loot boxes in mobile and desktop games. Addiction, 115: 1768– 1772 (2020)
[47] Parent Zone, The Rip-Off Games How the new business model of online gaming exploits children (August 2019)

As policymakers in other jurisdictions begin to accept the comparable design and impact of loot boxes and gambling products, other appropriate regulation will likely come into force. In July 2022, the UK Government concluded after a period of consultation that children should not be able to purchase loot boxes unless enabled by a parent or guardian.

However, it is likely that until regulation focuses on random rewards as a category of feature, loot boxes in games will likely be replaced by other forms of persuasive design that apply the same principles behind randomised reward mechanisms.

Thousands of games use reward mechanisms to make playing compulsive. What is less apparent is that the same persuasive strategies are woven into most other digital services, such as social media, shopping, news, education or even entertainment. They prime users to repeat behaviours; as the loop becomes ingrained so the action becomes a habit. Neuroscientist Norman Doidge explains that the brain is not static but that conditioning (repeated activities) alters it.

The ability for the brain to change is called 'neuroplasticity';[48] this makes it more capable of adapting to a changing environment, but also more vulnerable to outside influencers.[49]

A user's device is the means to access rewards; an equally integral part of the loop. Users habitually touch their pocket, bag or phone to check for their smartphone and then reactivate it in order to generate new rewards.

Social proof and fear of missing out

Human beings are social creatures. Persuasive design strategies exploit the natural human desire to be social and popular. For young people, social validation requires constant attention, curation and renewal. At key development stages it can be overwhelmingly important to be accepted by your peer group.[50] A 2021 UK survey found that 1 in 5 children regularly compare themselves, their success and their happiness to the people they follow online.[51]

> **"A social validation feedback loop… exactly the kind of thing that a hacker like myself would come up with, because you're exploiting a vulnerability in human psychology."**
>
> Sean Parker, former Facebook president

Fear of missing out, or 'FoMO', is described by Professor Andrew Przybylski as "a pervasive apprehension that others might be having rewarding experiences from which

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[48] N. Doidge, 'The Brain That Changes Itself: Stories of Personal Triumph from the Frontiers of Brain Science', Penguin (2007)
[49] Ibid
[50] At 13 to 15-years-old, children are "Highly dependent on peers for a sense of wellbeing. They need to feel as if they are part of a group." (See: 'Digital Childhood: Addressing Childhood Development Milestones in the Digital Environment, 2017)
[51] Ditch the Label, The Wirless Report 2021

one is *absent"*.[52] Those who regularly experience FoMO display a slavish need to stay online just in case they miss an opportunity for personal validation. Others may experience FoMO through the self-perception of their own status, passively watching others they believe to be more popular than they are, which only exacerbates their feelings of missing out. Such '*pervasive apprehension'* is fuelled by automated and targeted messages pointing to the activity of other users in an individual's network (and the network of their network) revealing a vast swathe of activity from which they, the non-active user, is excluded.

> ### "Companies target your paranoia to make you feel you're missing out and that if you're not online something drastic concerning you may happen."
>
> Aged 16

Those with FoMO use social media much more compulsively, including checking social media accounts as soon as they wake up, during mealtimes and last thing at night. The need to quantify relationships, and the associated pressure to not miss something, compels a child to enter a cycle in which they act and share continuously, thereby extending their time online.

Popularity metrics

Quantifying friends, followers, likes or scores creates a metric of personal value. At a glance, one user can see how many reactions another is getting and measure themselves against that. Content ranked by popularity in a newsfeed is given pride of place on the screen and algorithms designed to promote the already popular help it travel further, while the engagement rates climb.

> ### "When you see other people posting, and you see…what other people like and comment on… It tells society 'that's your popularity', based on how many likes you get."
>
> Aged 16

[52] A. Przybylski et al, 'Motivational, emotional, and behavioral correlates of fear of missing out', Computers in Human Behavior, Volume 29, Issue 4, pp. 1841-1848 (July 2013)
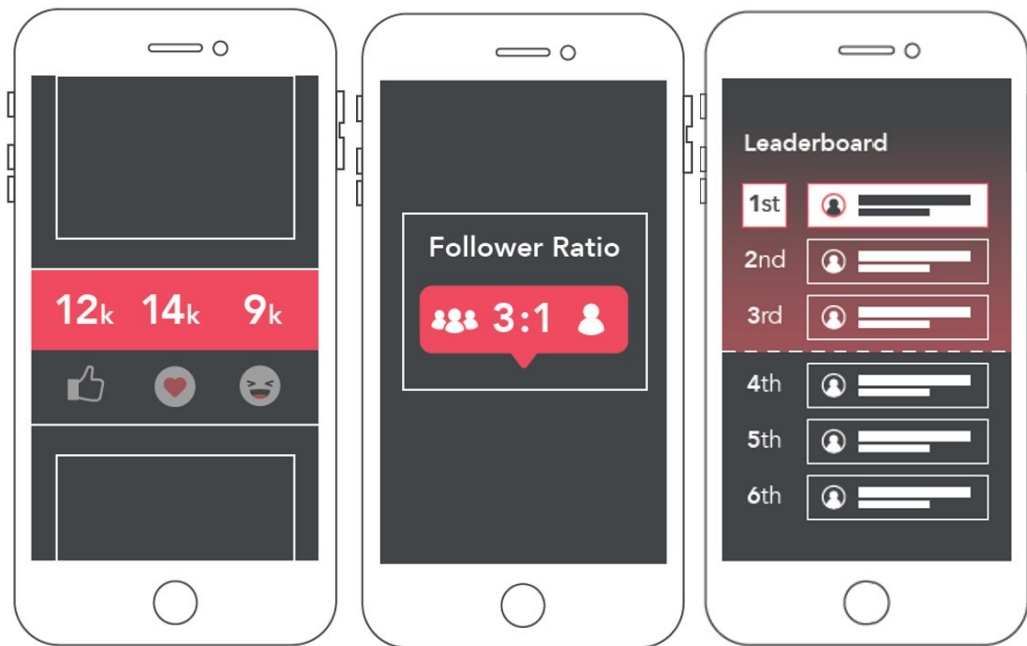
> **"It becomes almost stressful to post anything, because the amount of likes you get is your social standing. Your popularity or how much you're liked is based upon numbers on a screen.**

Aged 16

> **"You feel the need to use social media all the time in order to be social or popular."**

Aged 14

Molly Russell was 14 when she ended her life after viewing graphic self-harm, suicide and depression related content on social media. The coroner leading the inquest into Molly's death concluded that she had died from an act of self-harm while suffering from depression and "the negative effects of online content."[53] The coroner observed that while the content itself was harmful, it was made considerably worse by features such as comments, hashtags and likes, with some posts attracting over 10,000 likes. High numbers of likes and comments created a sense of legitimacy and normalised the extreme content, and as the coroner noted "glamorised and even glorified self-harm."

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[53] Courts and Tribunals Judiciary, Molly Russell: Prevention of Future Deaths Report, (13 October 2022)

Design choices such as hearts that visualise 'likes' exploit the desire for social affirmation which is strong in children and young people. There have been cases of children as young as 7 years old being pressured into performing sexual acts on livestreams in exchange for likes. During the Covid-19 lockdowns, with children spending more time at home, online, there was a marked increase in the volume of 'self-generated' child sexual abuse material i.e. under 18s producing and sharing sexual images or videos of themselves. Self-generated imagery increased by 77% in 2020 compared to the year before, the material predominantly involving girls aged 11 to 13 years old, in their bedrooms. Sadly, the age of children producing and sharing this kind of imagery is getting younger, and the number of cases rising; in 2021 there was a three-fold increase in self-generated imagery depicting 7-10-year-olds.[54]

"It feels good to be appreciated by loads of people… it makes you want to do it again."

Aged 16

Research from the UK regulator Ofcom shows that children's behaviour is influenced by 'high performing' content (content with high engagement figures) that is shocking or extreme in nature. Knowing that more shocking or attention-grabbing content receives more engagement, some children take risks in pursuit of the visible approval and sense of validation they would receive from other users.[55]

Bubbles, streaks, gifts and receipts
Part of being a social animal is a sense of obligation weighted against the nature and depth of the social bond. Most people feel a greater obligation to their trusted circle of family and friends than to the broad network of people they know less well, and significantly more than their obligations to those at the furthest fringes of their community.

By contrast, online reciprocity frequently extends indiscriminately to as many people as possible in the user's network so that, in addition to intentional acts of social validation or communication, it can require large numbers of responses that do not acknowledge the complexity or limits of the relationships. Young people engaged in swiftly changing friendship patterns are held to old obligations or made to feel guilty about moving on. This presents a perfect scenario for social anxiety.

The obligations baked into services are presented in a manner that deliberately punish inaction, for example, by letting the sender know when the recipient has received or

[54] Internet Watch Foundation, Annual Report 2021 (2022)
[55] Ofcom and Revealing Reality, Research into risk factors that may lead children to online harm, (October 2022)

read a message. Knowing someone knows that you are online creates a heightened obligation to respond. Creating large quantities of social obligations within online relationships offers not only the exhausting prospect of constant social management, but can prevent the development of more nuanced and satisfying relationships driven by personal choice, not numerical highs.

For children at different development stages, their peers represent a powerful mirror of status and identity. Persuasive design strategies that emphasise quantity over quality create the backdrop for social anxiety and issues of self-esteem.

Snapchat scores and streaks

Snapchat assigns users 'scores' based on their activity and engagement. The more interactions a user has with others (snaps sent and received), and the more content they consume and share, the higher their score. When two Snapchat users send each other a snap a day for three days in a row, they start a streak. The 'goal' is to keep the streak going for as long as possible. As the unbroken streak rises, it becomes a way of quantifying a friendship. It is common for children to maintain multiple streaks with competing friendships or to build streaks with children they don't know well to appear popular.
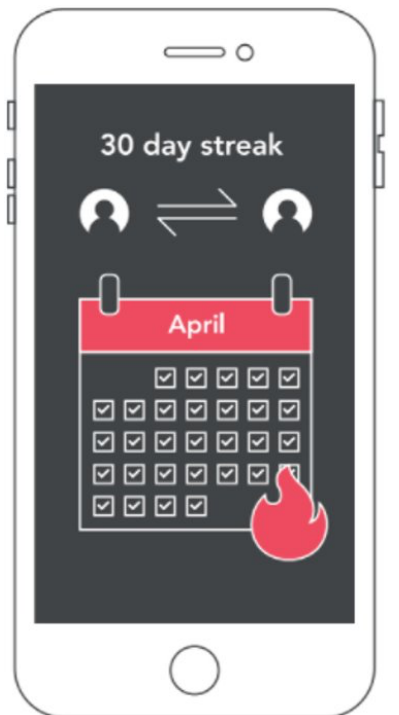
'Streak management' can be time-consuming and distracting. The user is notified each time they receive a snap, which acts as a prompt to reciprocate. The compulsion to maintain the streaks, coupled with the need to not let others down, means that it is not unusual for children to get friends or siblings to 'babysit' their streaks at times they are unable to access their phones.

Breaking a streak is often viewed as an indictment of a friendship. To avoid these socially awkward events, users are obliged to send multiple snaps a day irrespective of the quality of the relationship or the content of the communication. This cycle of obligation is deliberately designed to encourage repeat visits to Snapchat.

The maintenance of children's streaks can run into many hours a week. In a 5Rights workshop, children were astonished by their weekly total time spent on Snapchat. One boy discovered that he had spent 32 hours on the app - effectively four working days - during each of the previous three weeks.

"I'd probably change Snapchat score because I think that's encouraging people so much to try and go on Snapchat as much as possible." Aged 16

"(There is) pressure of losing your friends and ending lifelong friendships if you forget to send a streak one day." Aged 13

Ephemeral content

Content that 'expires' following a period or after a certain action has been taken generates a sense of urgency and artificial scarcity. This sense of scarcity creates demand: if young people know that their friends' posts will disappear at the end of the day, or only appear at a certain time, they are more likely to engage at certain times, or check the app routinely.
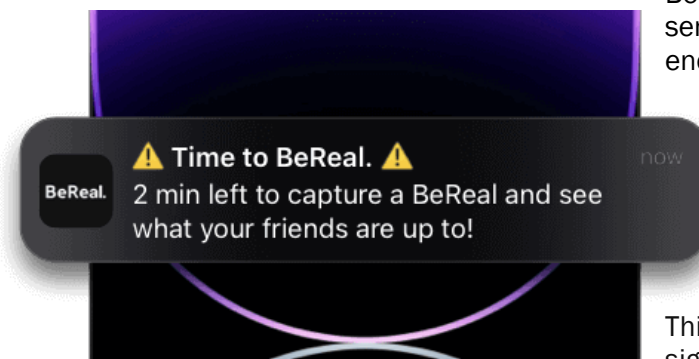
BeReal is a photo sharing app that sends users a daily notification encouraging them to share a photo of themselves and their location during a two-minute window. Every day at a different time, the app sends a notification to all users instructing them to share a photo in 2 minutes. This notification uses the warning sign emoji with a "2 minutes left" message to create a sense of urgency, with a reference to friends on the app to generate a fear of missing out.

Seamlessness

Routinely, the amount of time required or spent doing online tasks is concealed. The decision to continue watching, playing or scrolling is removed from the user and designed into the service in one seamless user experience.

"Sometimes I get home from school and spend hours scrolling through my phone, and I find it hard to stop even when I'm not really interested anymore. Sometimes I'm actually grateful when my phone runs out of battery because it forces me to break away from scrolling for a bit."

Aged 16

Infinite scroll

Perhaps the most common design technique found on social media, infinite scroll. In the early part of the 2010s, infinite scroll became a standard feature of digital design practice. Infinite scroll eliminates natural breaking points in a user flow, removing any obvious opportunities to take a break or stop. Infinite scroll consolidated its position as persuasive design strategy *supreme* when the majority of social media consumption tipped from desktop to mobile, with users swiping with their thumbs, rather than selecting buttons, to reach additional content.

"Scrolling forever gives me a sick feeling in my stomach. I'm so aware of how little control I have and the feeling of needing to be online and always consuming." Aged 18
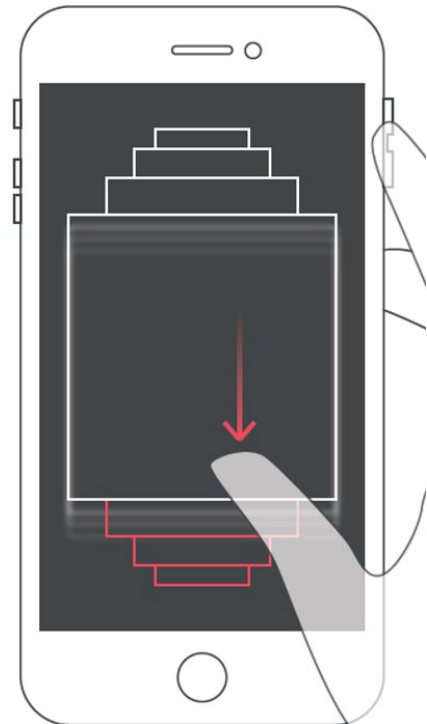
Autoplay

When video or audio content plays without initiation from the user, conscious engagement can tilt towards unintentional use. Content that autoplays is determined by recommendation algorithms and based on what the user has previously liked, shared or otherwise engaged with.

In 2021, YouTube disabled autoplay for users under the age of 18 and all accounts on YouTube Kids. This coincided with the meteoric rise of TikTok, where children are served short-form videos in a never-ending stream of algorithmically generated, autoplaying content. In a recent survey, the UK communication regulator found that children spoke favourably of the automatic serving of content in TikTok, as it removed the need "to make any decisions or actively look for things to engage with." [56]

"On YouTube you have to decide what to watch all the time and sometimes I can never think what to pick… But on TikTok it just comes up for you." [57]

Aged 12

Dopamine hits, social proof and FoMO, and seamlessness are useful 'buckets' to categorise common persuasive design strategies, but they also characterise the various emotions and experience of children online. Now we have described the most common persuasive design features, and the commercial incentives that justify their use, we must examine their impact on children and childhood.

[56] Ofcom, Children and parents: media use and attitudes report 2022, Ofcom (March 2022)
[57] Ofcom, Children's Media Lives (2022)

Chapter Four

The impact of persuasive design on childhood

Young adults today are the first generation to have grown up with social media. While persuasive design existed long before the internet, its prevalence in digital technologies has had a palpable impact on a generation of children who grew up with ready access to a smartphone. In this chapter we examine the effects of persuasive design strategies on children's lives.

Mental health and wellbeing

Our childhood and teenage years are a time of intense cognitive development and neuro-psychological change. At different stages, we test boundaries, explore different forms of social interaction, experiment with identities, develop skills in emotional regulation and come to experience feelings of shame and social comparison. We have explained how the need for social validation creates a habit of needing more. Managing public and frequent interactions online creates enormous pressures for young people, and with it comes anxiety, low self-esteem and mental health challenges at ever-increasing levels.[58]

> **"I just feel like now I need to be on social media to try and get that happiness booster all the time, even though I hate it."**
>
> Aged 15

For many years, we were cautioned not to mistake correlation with causation in relation to rising social media use and lower levels of life satisfaction and wellbeing among teens. But it has not escaped the attention of researchers, parents and children themselves that the arrival and widespread adoption of social media between 2009 and 2012 coincided with a "collapse in teen mental health" that continues today.[59] From 2009 to 2019, the proportion of US high school students reporting persistent feelings of sadness or hopelessness increased by 40%.[60] Mounting evidence of the positive correlation between high social media use and mood disorders has refocused attention on those aspects of the online world, including persuasive design, that may contribute to lower wellbeing, and exacerbate existing mental disorders among teens.[61]

The correlation between social media use and wellbeing among young people depends on a number of factors. It is important to recognise that not all children are the same, and children's experiences online are shaped by multiple environmental and personal factors, including age, developmental capacity, gender, sexuality, and familial

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[58] In 2022, 18% of UK children aged 7 to 16 had a probable mental disorder, compared to 12.1% in 2017 (See: NHS, Mental Health of Children and Young People In England (November 2022))

[59] The number of US teenagers with depression doubled between 2011 and 2019, with more than *23%* of girls ages 12-17 experienced a major depressive episode during 2019. (See: US National Survey on Drug Use and Health 2020 (2020))

[60] U.S. Surgeon General, Protecting Youth Mental Health: The U.S. Surgeon General's Advisory (2021)

[61] J Elhai et al, 'Problematic smartphone use: a conceptual overview and systematic review of relations with anxiety and depression psychopathology', Journal of Affective Disorders 207, 251-259 (2017)

circumstances. It follows that there will be certain groups of children, at certain times, who will be more vulnerable to the effects of persuasive design. Children will experience periods of increased sensitivity relative to their developmental stage, but not necessarily at the same age. In girls, for example, social media use between the ages of 11 and 13 years is associated with a decrease in life satisfaction the following year, whereas in boys this happens later between the ages of 14 and 15 years, suggesting that sensitivity to social media is linked to developmental changes that occur later in boys than girls.[62]

Many studies have found that the correlation between social media use and harm is stronger among girls. Facebook's own internal research, revealed by whistle-blower Frances Haugen, showed that among teenage girls experiencing suicidal thoughts, 6% in the US and 13% in the UK traced those thoughts back to Instagram. A third of teenage girls also believed that Instagram made them feel worse about those their bodies.[63]

> *"Social media sites trap girls in spiral questioning their attractiveness and self-worth. They're encouraged to compare themselves to others and seek approval for the way they look, while reinforcing beauty standards that favour thinness and whiteness."[64]*
> - Nancy Jo Sales, author of *American Girls: Social Media and the Secret Lives of Teenagers*

Caught up in reward loops and automated cycles of dopamine highs and lows, children and teens, at critical stages of their development, are acutely sensitive to the effects of persuasive design, that evidence suggests is contributing to lower levels of wellbeing and life satisfaction.

Bullying and aggression
The culture of excessive sharing online has resulted in an epidemic of self-doubt, anxiety, low self-esteem and increases in inter-personal aggression and online bullying.[65] In the UK, 1 in 8 social media users aged 11 to 16 report being bulled online, rising to more than 1 in 4 among those with a 'probable mental disorder'.[66] And in the US, nearly half of teen girls were cyberbullied in 2022.[67]

An excessive amount of sharing can also lead to exaggerating, polarising and aggressive behaviour, fuelled by the need to get noticed. Research from the Youth Endowment Fund in 2022 found that 55% of teens had seen real life acts of violence on social media in the last 12 months, and 62% who had committed an act of violence themselves thought social media played a major role in why children commit violence.[68]

[62] A. Orben, A. Przybylski, SJ. Blakemore, et al, Windows of developmental sensitivity to social media. Nat Commun 13, 1649 (2022)
[63] Wall Street Journal, 'Facebook knows Instagram is toxic for teen girls, company documents show' (September 2021)
[64] Nancy Jo Sales, 'Teen girls are struggling. They need our help', The Guardian (February 2023)
[65] C. Woods & H. Scott '#sleepyteens: social media use in adolescents is associated with poor sleep quality, anxiety, depression, and low self-esteem', Journal of Adolescence, 2015;
[66] NHS, Mental Health of Children and Young People In England (November 2022))
[67] Pew Research Center, Teens and Cyberbullying (2022)
[68] Youth Endowment Fund, 'Children, violence and vulnerability 2022: A Youth Endowment Fund report into young people's experiences of violence' (2022)

As the difference between 'online' and 'offline' has become less distinct, the negative effects of children's offline experiences carry over into their 'online' lives and vice versa. In most cases, children who experience bullying offline are more likely to experience bullying online. Similarly, content and interactions online that feel more personal, familiar or local can impact a young person's 'offline' behaviour; an Ofcom report examining online risk factors included testimony from one 13-year-old girl who now avoids people and places in her local area due to content she sees online.[69]

Relationships

Online relationships can enrich a child's social and emotional life, especially for those children who may be isolated in other settings. However, the persistent demands to interact and seek validation from others can diminish their quality of relationships, putting quantity before quality. It can also reduce levels of emotional understanding and create conflict, particularly in the home. A 2022 study has found that two thirds (65%) of parents in Australia experience conflict and tension with their children around the use of digital technology,[70] corroborating earlier findings that most friction is caused by disagreements over time spent online rather than those over types of content that might be engaged with.[71]

> ### "Often, we can be right next to each other and still be Snapchatting each other."
> Aged 15

> *"The wrong photo can lead to school-wide or even national infamy, cyberbullying from strangers, and a permanent scarlet letter. Performative social media also puts girls into a trap: those who choose not to play the game are cut off from their classmates. Instagram and TikTok have become wired into the way teens interact, much as the telephone became essential to past generations."*
> - Professor Jonathan Haidt

Despite the huge potential of online services to connect people and enrich relationships, it can also have an inverse effect on young people, who may withdraw and become more isolated. Confronted by highly curated depictions of the lifestyles, friendships and relationships of others, young people can develop an unrealistic world view, believing 'everyone is happy, except me'.[72]

[69] Ofcom and Revealing Reality, Research into risk factors that may lead children to online harm, p21 (October 2022)
[70] Stephanie C. Milford, Lynette Vernon, Joseph J. Scott, Nicola F. Johnson, "An Initial Investigation into Parental Perceptions Surrounding the Impact of Mobile Media Use on Child Behavior and Executive Functioning", Human Behavior and Emerging Technologies, vol. 2022
[71] S. Livingstone, A. Blum-Ross, J. Pavlick, and K. Ólafsson, In the Digital Home, how Do Parents Support their Children and Who Supports them? Parenting for a Digital Future: Survey Report 1, The London School of Economics and Political Science: Department of Media and Communications (2018)
[72] Prof. Clifford Nass, 'Multitasking may harm the social and emotional development of tweenage girls, but face-to-face talks could save the day, say Stanford researchers', Stanford News (25 January 2012)

Nearly half of Gen Z survey participants reported feeling negatively about their finances from spending time on social platforms, and more than 3 in 5 parents whose children use social media say it has contributed to their children having unrealistic expectations about money.[73]

Parasocial relationships and attachments have also become more common with the rise of influencer culture, where children and young people develop one-sided relationships with celebrities or online influencers. These relationships are complicated further by the financial incentives for influencers to push certain products of services. As academics Rachel Berryman and Professor Misha Kavka note, "the combination of commodification and intimacy can make it difficult for children to realise that the person on-screen is not their 'friend', and the video is not a playdate".[74]

"From the child's point of view, it might be a very intense and seemingly personal interaction that they have with that influencer that offers them an identity and offers them a sense of a community that they can belong to... [This quality] can be used to inspire or to offer positive messages, but the influencer is pretty much at liberty to say what they want, whether it is disinformation or inappropriate sexualisation or advertising and marketing."
- Professor Sonia Livingstone

Seeking validation from others, many children and young people feel pressured into producing, sharing or engaging with sexualised content online. 1 in 4 girls in the UK have shared a sexual image of themselves and of those, a quarter said they felt pressured into it, and almost a third initially wanted to but later regretted it. Despite most social media and online gaming services disallowing nudity, pornography, or sexually explicit content, this kind of material is readily accessible, and on many services, actively pushed to children and young people through content recommendation systems. The preponderance of pornographic material on social media has a corrosive effect on young people's views of healthy relationships, with abusive sexual behaviour and physical contact being normalised.

A survey by the NSPCC and the Children's Commissioner for England found that 44% of boys aged between 11 and 16 who regularly viewed pornographic content reported that it gave them ideas about the type of sex that they wanted to try. Most young people also said girls expect sex to involve physical aggression, such as airway restriction. This corroborates findings from the UK school's regulator as part of its review into sexual abuse in schools, which found that "children and young people... had learned more about sexuality from social media than from school or had got their education about relationships from their peers and social media."[75]

[73] Sarah Foster, 'Survey: Social Media makes nearly half of Gen Z and Millennials feel negatively about their finances', Bankrate (July 2022)
[74] Rachel Berryman and Misha Kavka, 'I Guess A Lot of People See Me as a Big Sister or a Friend': the role of intimacy in the celebrification of beauty vloggers', Journal of Gender Studies, volume 26:3, pp 307–320 (2017)
[75] Ofsted, Review of sexual abuse in schools and colleges (June 2021)

Pathological use and addiction

Just as some children are more vulnerable to certain online hazards and harms than others, some have a propensity to use digital devices and online services to excess. Once again, we find ourselves asking in which direction this correlative relationships flows: does technology cause excessive use or is excessive use a symptom of a predisposition to addictive behaviour? We have already shown how certain persuasive design features tap into deeply ingrained human impulses, and evidence from longitudinal studies is beginning to show the effects of these strategies on developing teenage brains.[76] While there is clearly a strong correlative relationship between frequent use of social media and certain disorders and behaviours among young people, the notion of 'addiction' to digital technologies is still a contested one.

But increasingly, we hear children's engagement online, notably with social media and gaming, being described in terms of an 'addicts' narrative, not least by children and young people themselves. A 2019 research study found that 1 in 4 young people show signs of 'problematic smartphone usage', associated with increased odds of depression, anxiety, higher perceived stress and poorer sleep quality.[77] And in 2019, the World Health Organisation classified 'gaming disorder' as a mental health condition. That same year, the first *National Centre for Gaming Disorders* opened in the UK with approximately 70% of their patients aged 18 or younger.

> Whistle-blower Frances Haugen revealed that according to Meta's own estimates, five to six percent of 14-year-old Instagram users "have the self-awareness to admit" that they have no control over their usage and that it is materially harming their health or schoolwork, adding that, in fact, "it is likely that far more than five to six per cent of 14-year-olds are addicted to Instagram."[78]

Interestingly, children and young people themselves often describe their usage and engagement with digital devices using language associated with addiction. A 2022 survey found that 42% of young people self-reported what they considered to be early signs of addiction to social media. They wanted companies to 'prioritise the mental health of consumers rather than making it as addictive as possible' and to 'remove [the] addictive features.' 80% reported that they wanted to leave a social media platform for wellbeing reasons but felt like they were unable to.[79]

> **"The more time you use social media the more addicted you are and there is no control over it."**
>
> Aged 15

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[76] For example, a 3-year research study of 12-year-olds from schools in the US found a strong correlation between habitual 'checking behaviours' on social media and changes in the brain's sensitivity to social rewards and punishment. (See: MT Maza, KA Fox, S Kwon et al. Association of Habitual Checking Behaviors on Social Media With Longitudinal Functional Brain Development. JAMA Paediatrics, (January 2023))

[77] S.Y. Sohn, P. Rees, B. Wildridge et al, Prevalence of problematic smartphone usage and associated mental health outcomes amongst children and young people: a systematic review, meta-analysis and GRADE of the evidence. BMC Psychiatry 19, 356 (2019)

[78] iNews, 'Millions more teenagers could be addicted to Instagram than is known, says Facebook whistleblower, the Independent' (October 2021)

[79] YoungMinds, Online Safety Survey (2022)

When excessive behaviour becomes pathological
Dr Henrietta Bowden-Jones, Imperial College London, expert on behavioural addictions

Some children and young people have a higher propensity towards using smartphones and tablets to excess. This changes over time and is closely linked to resilience as well as the ability to withstand environmental stimuli in a positive and constructive way.

From my experience working with young people who experience significant compulsive behaviours, their inability to manage the amount of time they spend online playing games, watching YouTube or being on social media is often closely linked to emotional states that may feel overwhelming. These are normally negative ones such as low mood, anger, feelings of abandonment and fear of social exclusion.

At times, these behaviours worsen as the young person disengages from previously rewarding activities and relationships in the real world. Someone may stop attending netball team practice or their music lessons and thus cut themselves off from a whole series of nurturing and positive relationships fuelled by shared interests to seek out online relationships with fellow gamers or friends. The more isolated the person becomes, the more likely they are to turn towards online activities to supplement the loss of interaction. Many end up as recluses in their bedroom when their activity has intensified in terms of hours.

There is an ongoing debate as to whether some of these intense compulsive behaviours can be deemed to be addictions. For example, if someone is gaming 14 hours a day, he may be defined as suffering from Gaming Disorder. A young person playing online poker all night may be suffering from Gambling Disorder.

However, there are many more young people who use social media and gaming in an excessive way who, while not addicted, still use their mobile phones and tablets too intensely. This problematic use is often an attempt to navigate the difficulties of growing up in contemporary society.

Driving users to understand the need for screen-free time, for exercise and for real life interactions is part of a stimulus control approach to shaping behaviour that will benefit everyone, whatever their age.

Dr. Caroline Fisher similarly argues that pathological internet use affects an individual's sense of wellbeing and can lead to social withdrawal, self-neglect, poor diet and family conflict.[80] A study of 1,613 adolescents aged 10 to 16 years from secondary schools in northern and central UK found that there was a significant positive correlation between problematic internet use and substance abuse, mediated by bullying and victimisation.[81]

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[80] V Murali, S George, 'Lost Online: an Overview of Internet Addiction, Advances in Psychiatric Treatment', Advances in Psychiatric Treatment, 13, 24-30 (2007) (Referred to in 'Getting Plugged In: An Overview of Internet Addiction', Dr. Caroline Flisher, Journal of Paediatrics and Child Health pp. 557–559, Volume 46, Issue 10 (October 2010))
[81] M. Samara, A.A. Massarwi, A. El-Asam, S. Hammuda, P.K. Smith & H. Morsi, 'The mediating role of bullying and victimisation on the relationship between problematic internet use and substance abuse among adolescents in the UK: The parent-child relationship as a moderator', Frontiers in Psychiatry, 12, (2021)

Opportunity cost

There is an undeniable truth that if you spend (or lose) a great deal of time doing one thing, something else must *'give'*. This is the opportunity cost.

> **"All I want to do is disconnect from my phone for a long period of time, perhaps weeks, but there are always pressures preventing me. I love the way the internet allows for lots of new opportunities, yet it prevents me from doing a lot of things."**
>
> Aged 17

The potential to access information, creative activities, undertake research or build and maintain important relationships online must not be ignored. Research published by the UK communications regulator, Ofcom, found that "features that reduce friction may encourage children to use platforms or games for extended periods, contributing to opportunity costs... children find it easy to keep consuming content, prolonging the amount of time they spend online."[82]

But out of an average 8 hours and 39 minutes of daily screen time, the typical teenager spends just 12 minutes on creative activities. For pre-teen children aged 8-12, this figure is even lower, at just eight minutes a day.[83]

> **"I love reading, but by the time I've spent an hour too long on my phone, I can no longer read my book."**
>
> Aged 17

> *"The capacity for boredom is the single most important development of childhood. The capacity to self-soothe, go into your mind, go into your imagination. Children who are constantly being stimulated by a phone don't learn how to be alone, and if you don't teach a child how to be alone, they will always be lonely."*[84]
>
> - Professor Sherry Turkle

> **"You lose precious time with your friends and family that you cannot get back."**
>
> Aged 13

[82] Ofcom and Revealing Reality, Research into risk factors that may lead children to online harm, (October 2022)
[83] Common Sense, 'The Common Sense Census: Media Use by Tweens and Teens', p41 (2021)
[84] IMB, 'Breaking free of our addictions to persuasive technology' (18 May 2017)

Development of memory is another opportunity cost. Dr. Benjamin Storm's research on internet use and memory found that when participants were allowed to use Google to answer questions, they used it even when they already knew the answer.[85] He commented: "Memory is changing. Our research shows that as we use the internet to support and extend our memory we become more reliant on it. Whereas before we might have tried to recall something on our own, now we don't bother."[86]

Memory and imagination share the same set of development and cognitive needs as 'agency' — that is, children making choices based on information that they can understand in conditions that allow for those choices to be meaningful.[87]

The development of memory is a key component of creating an individual's identity, holding shared experiences and therefore forming a group identity — a necessity for building and maintaining communities and society.

Perhaps one of the most publicised opportunity costs of compulsive device use is sleep deprivation. A 2021 review of evidence found that electronic media use is associated with shorter sleep duration in children and adolescents, and for young teens aged 13-15 there were additional associations between screen time and problems falling asleep, and between social media use and poor sleep quality.[88]

> **"I spent 14 hours on the computer in one day learning [a computer game]; I was up until 3am the next day."**
> Aged 17

> **"It is hard to live in a technological society and not get trapped in social media. You find that someone does it so you do too, and after a while you are addicted and miss out on things in life."**
> Aged 14

Results from a three-year pilot programme in Canada that developed a school-based sleep promotion programme for students, found that children who don't get enough quality sleep are more likely to have excess body weight, poorer diet quality, and lower physical activity levels.[89]

The opportunity cost of attracting and keeping children online impacts on their creativity, autonomy, memory, sleep and education.

[85] B Storm, S Stone, A Benjamin, 'Using the Internet to access information inflates future use of the Internet to access other information', Memory, pp.717–23 (2016)
[86] Science Daily, 'Cognitive offloading: How the internet is increasingly taking over human memory' (16 August 2016)
[87] 5Rights Foundation, Digital Childhood: Addressing Childhood Development Milestones in the Digital Environment', p7 (2017)
[88] Lund, Lisbeth et al, 'Electronic media use and sleep in children and adolescents in western countries: a systematic review', BMC public health vol. 21 (September 2021)
[89] H Chahal et al, 'Availability and night-time use of electronic entertainment and communication devices are associated with short sleep duration and obesity among Canadian children', Pediatric Obesity (September 2012)

Let's pretend: Creating opportunities to role play
Dr. Angharad Rudkin, Children's Clinical Psychologist and Associate Fellow of the British Psychological Society

We are entering unprecedented territory when it comes to parenting children in the digital world. When television first made its appearance in the 1950s there was widespread concern about the effect this would have on the way children learnt and played.

While today's narrative about the digital world is not so full of suspicion and fear, we are dealing with a far more ubiquitous issue with children as young as three-years-old having frequent access to smartphones and tablets.

The research is growing but still lags behind the rapid pace of technological development. What is clear, however, is that we have to understand each child's developmental needs in order to truly get to grips with the opportunities, as well as the risks, of digital engagement.

For example, pretending or role playing is an essential pastime for two to five-year-olds. The opportunity to play at being a grown up or to pretend to be a superhero serves an important function in terms of cognitive and social development, of identifying with others and building self-identity.

Vast increases in digital use by pre-schoolers leaves less opportunity for important self-propelled and imaginative play. The increase in digital play in this age group means that pre-schoolers are engaging in different types and quantity of pretend play, with, as yet unknown consequences.

Profiling, personalisation and surveillance
Arguably a persuasive design strategy in itself, personalisation is a powerful tool by which a user is persuaded to take a certain course of action, and ultimately, extend use.

Algorithms follow user behaviour patterns on such tight loops that they know the 'exact' mix of ingredients that will appeal to each individual user. When it comes to children, these algorithms collect extremely intimate personal data.

Lawyers Joe Newman, Joseph Jerome and Christopher Hazard explain that the move from standalone games to interactive online games brings with it a significant shift in the ability for game designers to:

"...collect and generate enormous amounts of information about their players, much of which may be considered highly sensitive. This data includes information relating to the real world, ranging from a player's voice or physical appearance to [their] location or social network. It also includes detailed information from the player's actions within the game world, which may be analysed to create in-depth profiles of a player's cognitive abilities and personality."[90]

[90] J Newman, J Jerome and C Hazard, 'Press Start to Track?: Privacy and the New Questions Posed by Modern Videogame Technology', American Intellectual Property Law Association, Quarterly Journal (2014)

This loop of data gathering and profiling is a norm across the digital environment and creates super-charged personalised profiling, described by Professor Lupton and Dr. Williamson in their paper *The Datafied Child* as 'dataveillance'.

> Dataveillance (an amalgam of data surveillance) is defined as: *"…the monitoring or evaluation of children by themselves or others that may include recording and assessing details of their appearance, growth, development, health, social relationships, moods, behaviour, educational achievements and other features."*[91]

This surveillance codifies presumptions and assumptions about a child's nature, their characteristics and ambitions at a time when children and young people are experimenting with, and exploring, their own identities. In this way, the system not only investigates behaviour, it shapes it.[92] Professor Lupton and Dr. Williamson express concern that unless 'scientific neutrality' is imposed, children's life chances and access to opportunities will be increasingly shaped by 'social sorting' that has little or no oversight and is constructed to gather highly sensitive personal information that is extremely valuable for marketing and other commercial or as yet unknown purposes.[93]

The power of personalisation is not limited to commercial environments, and its potential to 'optimise' services and processes both provided by and used within government or local authorities is starting to come into mainstream use, with data now ollected as users participate both as citizens and consumers.

Device dependence, the formation of hard-to-break habits, feelings of addiction and compulsion are all widely reported by children.[94] There are also questions about the legality, ethics and safety of creating dependence and habits at a time of immaturity and rapid development.

> **The fridge problem**
>
> Imagine a near future in which refrigerators can sense when a child is hungry and offer snacks based on how much a company has paid for their product to be suggested. Who has responsibility for the nutritional needs of that child? Parent or carer? The government? Or the company who controls the data gateway to the fridge? Or should the 'perfect' nutritional balance be built into the artificial intelligence?
>
> If so, should 'perfect' be set against income, ethnicity, an ecological footprint, a daily read out of the child's state of health, their family's traditions, ethics of food production, or simply based on what they ate yesterday? What if it doesn't spot the diabetic, a religious dietary requirement, or a life-threatening allergy? And what if that hungry child yearns occasionally for a chocolate bar but is only ever offered a carrot stick?

[91] D Lupton, B Williamson, 'The Datafied Child: The Dataveillance of Children and Implications For Their Rights', New Media and Society, Vol 19, Issue 5, pp. 780-79 (23 January 2017)
[92] R Botsam, 'Who Can You Trust? How Technology Brought Us Together and Why It Could Drive Us Apart', Penguin Portfolio (October 2017)
[93] Ibid
[94] Children's Commissioner for England, 'Life in Likes: Children's Commissioner's report into social media use among 8–12 year-olds' (January 2018)

Some of the questions raised by the Fridge Problem resemble existing ethical questions. Some are new. But a small set of questions about a smart fridge quickly amplifies into profound questions about self-determination, rights, liability and agency.

The advent of smart homes, smart schools and smart cities, creating a world where your television knows when you have sat down, or where homework is shared with future employers, and a car is designed to decide who to save — the driver or the pedestrian — at the moment of a malfunction, means that human beings and intelligent machines will have to learn to coexist. But on whose terms? With virtual reality available in more and more digital products and services, particularly in gaming,[95] and with the metaverse on the techscape horizon, it is more important than ever to address questions of agency, design and accountability.

> **"Putting people into virtual worlds can be incredibly effective at changing their behaviour, and those changes can happen without the person's awareness… where virtual reality might go in the future could be so destructive of a sense of truth, a sense of free will, the sense of the civil project. It could be really the destruction of us all."[96]**
>
> Jaron Lanier

In this context, the oversight of persuasive design strategies that prime human beings to behave in certain ways becomes an urgent ethical question for policy makers and civil society.

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[95] The Global Virtual Reality in Gaming Market was valued at $7.5 billion in 2021 and is forecast to reach a value of $37 billion by 2028 (Source: Vantage Market Research)
[96] The Times, 'Social media is tearing society apart' (15 November 2017)

Chapter Five

Seeds of change

The digital environment is entirely man and woman-made. Any, or all, of the persuasive design strategies described in Chapter Three could be abandoned, recalibrated or redesigned to meet the needs of children and young people.

There is no single vision of the future of tech, but the ethical and social issues raised by persuasive design will be magnified by emerging technologies and AI. This inevitable amplification of impact has led to calls for more oversight. The New York Times journalist and tech analyst, Farhad Manjoo, speaks for many when he says: *"My default position about whether this stuff [technology] is going to be good or bad in the world has changed. So in the past, my reflexive bias of a new piece of technology tended toward optimism… it's going to make us more efficient or help us connect with people and that has to be good… But I think we should all be more sceptical of the unseen and longer-term potential dangers of these technologies before we rush to embrace them."*[97]

As the digital environment becomes integrated with the physical environment, users willbe automatically plugged in: not merely for extended use, but for permanent use. This will create a *de facto* situation where users are guided through life along algorithmically-determined pathways acting in the best interests of whoever owns or pays to use their data.

The World Wide Web turns 35 next year Few anticipated its rapid dominance of economic and civic life — referred to as the Fourth Industrial Revolution.[98] In the UK, the last great industrial revolution of the 19th century saw 17 Factory Acts,[99] and vast swathes of further legislation on town planning, utilities, food safety and child labour, to balance societal needs against the rise of the commercial instincts of a handful of ultra-wealthy, industrial entrepreneurs. These acts included provisions that regulated the hours and welfare of children and young people.

The assets of the digital revolution are less visible and more mobile. Cables and servers transport and store data across the globe blurring jurisdictional lines, making it harder to pinpoint the exact whereabouts of a user's personal data.

Whilst the multibillion-dollar market value of the most successful tech companies points to data as the *'gold'* of the digital revolution each piece is hard to value. The lack of clarity as to where data sits and how much it is worth makes it difficult to find, regulate or tax.

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[97] NPR, 'How 5 Tech Giants Have Become More Like Governments than Companies', Terry Gross interviewing Farhad Manjoo on Fresh Air (October 2017)
[98] World Economic Forum, 'The Fourth Industrial Revolution: At a Glance' (April 2016)
[99] Technical Education Matters, 'The Factory Acts' (16 February 2016)

Whilst some continue to assert that these issues and the fast-moving nature of digital innovation preclude effective regulation, there is an increasingly active number who believe that the unfettered commercial freedoms singularly enjoyed by the tech industry create a negative environment and that limits must be set, including limiting the impact of persuasive design strategies on the choices and outcomes of children and young people.

Taking Action

The public school district in Seattle has filed a lawsuit against TikTok, Instagram, Facebook, YouTube and Snapchat for "successfully exploited the vulnerable brains of youth, hooking tens of millions of students across the country into positive feedback loops of excessive use."[100] They claim these services are responsible for worsening mental health and behavioural disorders including anxiety, depression, disordered eating and cyberbullying; making it more difficult to educate students; and forcing schools to take steps such as hiring additional mental health professionals, developing lesson plans about the effects of social media, and providing additional training to teachers. Seattle Public Schools Superintendent Brent Jones said, "our obligation is to create the conditions for students to thrive and have high quality learning experiences... the harm caused by these companies runs counter to that."

Similarly, an article published in the journal of legal analysis in 2021 called on the US Federal Trade Commission (FTC) to include dark pattern audits in their consent decree process. It states *"Many dark patterns appear to violate federal and state laws restricting the use of unfair and deceptive practices in trade. Moreover, in those instances where consumers enter into contracts after being exposed to dark patterns, their consent could be deemed voidable under contract law principles."*[101] The following year, the FTC published a report showing the increased use of dark patters and the action the FTC is taking against tactics designed to "trick and trap" consumers.[102] In March 2023, the FTC finalised an order requiring Epic Games to pay $245 million as penalty for the use of dark patterns, tricking players into making unwitting purchases and allowing children to make unauthorized charges without parental approval.[103]

Out of the darkness, into the light

Increasing awareness of persuasive design strategies and the effects they have not only on young people but other vulnerable groups has led to a number of initiatives to bring dark patterns to light, and related calls for action from designers, policymakers and regulators. A group of experts from the Technology University of Dublin have developed a framework for the detection of web-based dark patterns.[104] Across the Atlantic, the Digital Civil Society Lab at Stanford hosts the 'Dark Patterns Tipline' – an initiative started by a team of designers, researchers, legal experts and advocacy-minded individuals to better understand how technology is exploiting people. Anyone can

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[100] The Guardian, 'Seattle public schools sue social media platforms for youth mental health crisis' *8 January 2023)
[101] Jamie Luguru, Lior Jacob Strahilevitz, 'Shining a Light on Dark Patterns', Journal of Legal Analysis, Volume 13, Issue 1, pp. 43–109 (2021)
[102] Federal Trade Commission, 'FTC Report shows rise in sophisticated dark patterns designed to trick and trap consumers' (September 2022)
[103] Federal Trade Commission, 'FTC Finalizes Order Requiring Fortnite maker Epic Games to Pay $245 Million for Tricking Users into Making Unwanted Charges' (March 2023)
[104] A. Curley, D. O'Sullivan, D. Gordon, B. Tierney, I. Stavrakakis, 'The Design of a Framework for the Detection of Web-Based Dark Patterns', ICDS 2021: The 15th International Conference on Digital Society (July 2021)

'report' a dark pattern. The Tip Line highlights examples from people's lived experiences to illustrate how dark patterns lead to everyday harms.[105]

The legal innovation studio *Amurabi* have created a holistic platform to fight against dark patterns: identifying sites or apps that contain dark patterns, remedying dark patterns with 'fair patterns', training stakeholders (designers, developers, digital marketers) and raising awareness among the public.

Their set of on-shelf 'fair patterns' are the result of their R&D Lab, and combine neurosciences, UX design, plain language and the Competition & Markets Authority's principle of 'fairness by design'. The goal is not 'just' to create the opposite of dark patterns, but to 'equip' users with the necessary knowledge to regain their autonomy online, and make informed and meaningful choices.

At the time of writing, some specific fair patterns are being developed for minors (e.g. protective defaults, smaller doses of information, references to concepts that kids and teens can easily grasp etc), show below:[106]
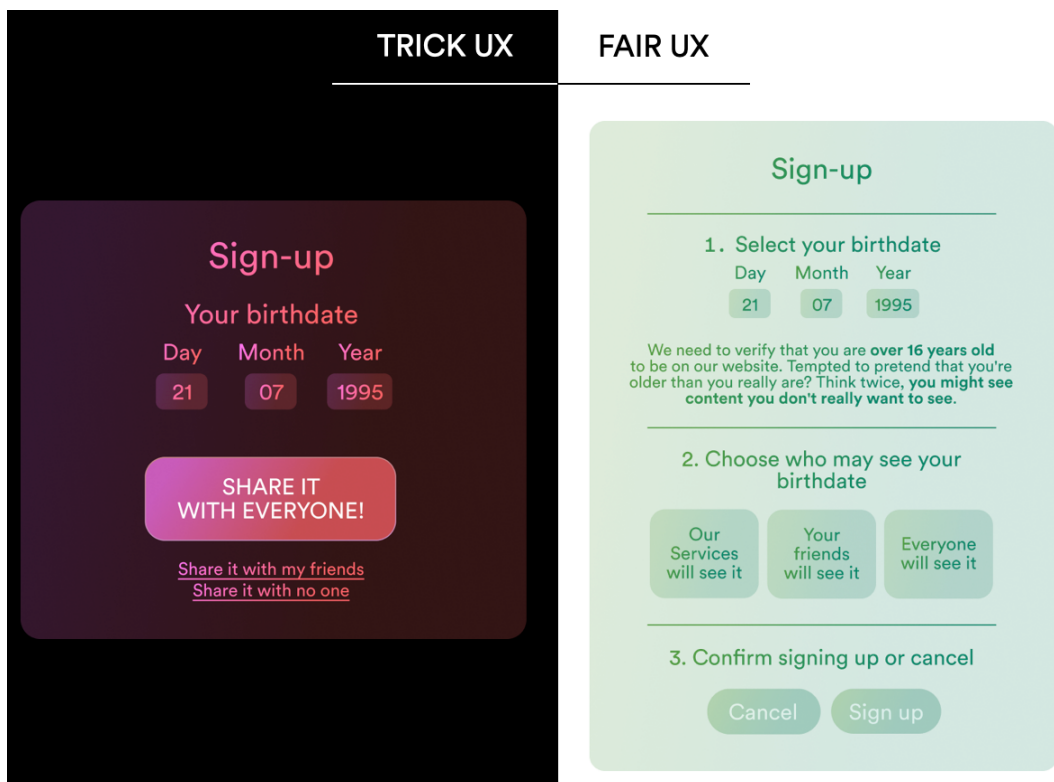
[105] The Dark Patterns Tipline
[106] Potel-Saville, Talbourdet, 'Empowering children to understand and exercise their personal data rights', Legal Design Perspectives, Ledizioni (2021)
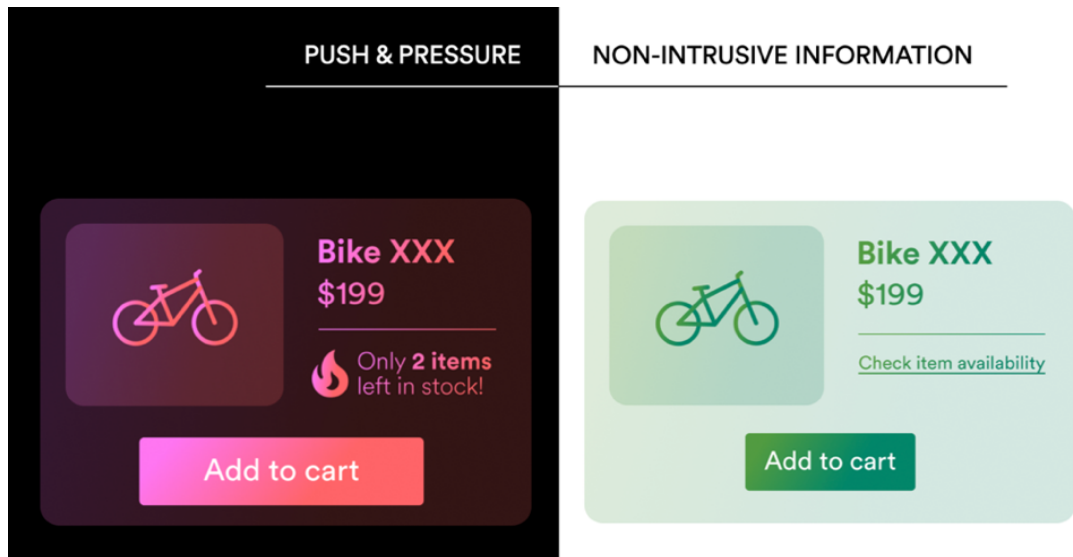
Notably, these initiatives are driven largely by not-for-profit groups and academic institutions, rather than the tech sector itself, or indeed regulators. It is now time for policymakers around the world to encode this work into regulatory frameworks, and accelerate progress to not only bring dark patterns to light, but to bring them to heel.

Conclusion

As the implications of a '*digital-first*' world become clearer, and the conflicts between Big Tech's commercial imperative and society's established norms are exposed, governments across the world have begun to consider how to apply existing legal principles to the online world, and adapt, enhance and add to legislation to tackle harms, business practices and impacts specific to the digital environment.

The ubiquitous use of persuasive design strategies in the digital environment is an issue that affects almost all children. Whilst the digital environment tantalisingly embodies both progress and the promise of creativity and knowledge, its current dependence on persuasive technology makes it a toxic environment for children and young people that limits opportunity and creativity.

> "Our ability to live the lives we want to live... through technology is a design problem, not just a personal responsibility problem"[107]
>
> Tristan Harris

Children are vulnerable to mental health issues associated with identity development, familial and social pressure. The digital norms relating to extended use amplify these pressures and therefore their vulnerability. It is imperative that for children to engage purposefully and playfully online, the digital environment must be designed with their needs and rights in mind.

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[107] Tristan Harris, 'Tech companies design your life, here's why you should care', (March 2017)

"The power to design user behaviour ought to come with a standard of ethical limitations."[108]

Nir Eyal

The current asymmetry of power between the developing child and the most powerful companies in the world is not in the 'best interests' of the child. 5Rights Foundation wishes to see a global effort to set the ethics, governance and legal boundaries for the global technology companies and those that use technology to engage with children. This issue is bigger than any single nation state, bigger than a single company, and bigger than any single voice.

All stakeholders have a duty to define and adhere to ethical design standards to deliver age-appropriate experiences to children.

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[108] Nir Eyal, 'Want to design user behaviour? Pass the 'Regret Test' first', Nir Eyal (2018)