



REACH OUT AND TOUCH

**THE JOY
OF THE
PHYSICAL
IN THE
DIGITAL AGE**

Reach Out And Touch
is published as a partnership
between Sappi Europe
and John Brown.



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THE THINGS WE TOUCH MEAN MORE TO US.

We become attached to them. We understand them more deeply, rely on them, gravitate towards them. Print is a haptic experience. This publication – with its thought-provoking essays, eye-opening statistics, powerful illustrations and tactile pages – takes you on a journey to discover how the power of touch changes the way we think, feel and behave; and ultimately, influences how we spend our money.

Print is an enduring force in the digital age. We remember text and recall brand advertising more when we encounter them in print. We trust the printed word more than the pixellated one. Print excites the senses in a way that no other medium can replicate.

If print were invented now, you would be amazed at this haptic medium – it's a wonder format you can touch, carry and feel. Reading a magazine, book or newspaper – even a leaflet or menu – is an experience that engages more of our senses by virtue of the paper's physicality. As such, print can be a physical manifestation of a brand and our perception of it – it is trust, quality and value come to life in three dimensions.

Leading global paper manufacturer Sappi and award-winning content creator John Brown are passionate about paper, storytelling and engaging consumers in a way that surprises and delights. This is why we have teamed up to create the haptic experience you now hold in your hands.

We hope you enjoy the unrivalled trust, value and intimacy that you get from something you can touch.





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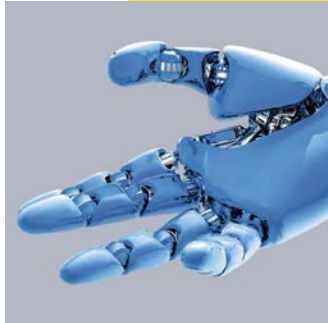
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28



38

48



06 Selling point

How feel affects purchasing decisions

10 Hello world

The influence of touch from the womb onwards

14 Icons of touch

The importance of packaging design

22 Changing lives

How sight loss transformed an architect's career

28 Feeling hands-on

Introducing next-generation prostheses

30 Let's get physical

The enduring appeal of analogue technology

36 Haptics in numbers

Facts and figures

38 My favourite

Five leading creatives enthuse about their most treasured tactile experiences

44 See me, feel me, touch me

A ground-breaking ad that excites the senses

46 Total recall

New research in text comprehension

48 Good on paper

A paper engineer on her medium of choice

50 The power of print

How the printed word remains a success, as a key part of brands' multi-channel campaigns, and in the rise of independent magazines

56 Keep in touch

The rise and rise of the greetings card industry

58 The revolution will be printed

Exciting advances in paper technology

64 References

Sources for statistics and studies



46



14

10



**TOUCH CAN BE AN
ALMOST IRRESISTIBLE
URGE FOR HUMANS.
JOANN PECK
EXPLORES WHAT
THAT MEANS FOR
CONSUMERS AND HOW
WE CAN HARNESS
THE POWER OF THIS
FASCINATING SENSE**

PHOTOGRAPHY BY ELIZABETH WEINBERG/TRUNK ARCHIVE



The importance of touch should not be underestimated. ‘Keep in touch’ and ‘on the other hand’ are two of the many phrases that reflect its historical primacy. In marketing, touch has numerous implications, yet it has lacked the attention it deserves. Internet shopping accounts for less than 9 per cent of global retail sales; one of the many reasons for this is the absence of touch online. This powerful sense influences customer decisions in ways we may not realise.

What motivates customers to touch?

Spending countless hours observing shoppers in stores has given me many insights. A key finding is that there are large individual differences in how much people touch. Some love to touch and become frustrated and less confident

in their purchase decisions when they’re unable to do so. These ‘high need for touch’ people are the ones ripping open packaging in stores in order to assess the feel of products. While a magnified visual may give ‘lower touchers’ the information they seek, it can frustrate ‘high touchers’ as they will be even more motivated to touch.

Different product categories can also influence this desire. As touch is so effective at assessing texture, softness, weight and temperature, if a product varies on one of these attributes, customers are more likely to touch it before deciding whether to buy. For example, they may select the most chilled bottle of wine if they plan to drink it soon. In buying a laptop for travel, they may pick up several to feel which is the lightest. And determining the texture of

a sweater or the softness of a pillow may be critical to the purchase decision.

While we know that people touch to get product information, what may be less obvious is that they also like to touch for the sake of touching. They enjoy the interesting texture of paper, the silkiness of a soft shirt and the luxurious feel of cashmere. Even when they aren’t planning to purchase, the lure of some products rewards touchers with a positive experience. They are touching for fun.

What are the consequences of all this touching? Some are obvious, while others are less so. One important insight is that if a customer merely touches a product in a store, they are more likely to purchase it impulsively. In one large grocery study, I placed a sign encouraging touch (‘Feel the freshness’) by the peaches and nectarines. This sign not only increased touching of the product, it also led to a significant increase in unplanned purchases. So, simple touch can increase sales.

The endowment effect

Enabling customers to touch a product also increases the valuation, or the amount they are willing to pay for that product. Forty years of research has shown that an object’s value increases once a person has taken ownership of it – the endowment effect. In other words, we value what we own. Further studies have examined the endowment effect in the context of psychological ownership, or the feeling that something is ‘mine’. Psychological ownership can tie someone to an object in an emotional way.

For example, you may think of a parking space or a seat in a coffee shop as ‘yours’. You do not legally own them, yet you feel an ownership connection. Because of this, you may feel infringed upon if another person is using your parking space or seat. Conversely, a great aunt may give a gift that isn’t really ‘you’. While you legally own the gift, you may not feel any psychological ownership or connection with it.

One antecedent of psychological ownership is control. If someone can control something – even physically control it through touch – they are more likely to feel ownership. And this

increases how much they are willing to pay for an object, since ownership leads to valuation. We ran several studies and found that the valuation of a product can increase as a result of touch. This is partly because a customer may obtain some information through touch that they would not otherwise have. Think about the packaging of pens that allows a customer to feel the grip prior to purchase. This additional information adds value, and hence increases the amount a customer is willing to pay for them. So, simply touching a product increases the feeling of ownership, which increases the value of the product. This is an extremely powerful idea for marketers to understand.

Touch can also be persuasive. I have found that touch that is pleasant, or even neutral, influences customer responses. We partnered with a local children’s museum to design a brochure encouraging donations. The front of the brochure included a soft, fuzzy circle as part of the design. This was not a product attribute, but it did fit with the ‘hands-on’ concept of the museum. This inclusion of a touch element increased customer willingness to donate time and money to the organisation, further emphasising the power of touch.

In the context of services, we have found that a touch element can lead to much larger customer inferences. For

SIMPLY TOUCHING A PRODUCT INCREASES OUR FEELING OF OWNERSHIP, WHICH INCREASES THE VALUE OF THE PRODUCT

example, a beautifully textured business card increases perceptions of the quality of the business, as well as customer satisfaction, while a higher-quality paper brochure increased ratings of both a bank and a health club. We also have some evidence that having a tangible touch cue at the end of an experience is especially persuasive. Business cards being given out at the end of an exchange, or a restaurant bill being delivered on pleasant-feeling paper or encased in a textured folder, may boost customer evaluations of the service even further.

In the hands of the customer

Knowing what we know, how can we harness the power of touch? There are implications for online companies as well as for more traditional bricks-and-mortar establishments. And often, strategies can be complementary, using the best of both. First, it is important to get the product in the hands of the customer. Many online companies offer free shipping and friendly return policies, which are essentially letting the customer test-drive the product and foster a sense of ownership. Once a product is in the customer’s hands, they see it as their own and they value it more. For example, an online optician may allow a customer to try five pairs of glasses at home and choose which ones to keep – and results show that

people often keep more than one pair. Free trial periods make customer purchases more likely because they can obtain product information through touch and it increases their sense of ownership.

It is simpler to encourage touch in a store than online. A display or packaging with interesting textures may compel a shopper to reach out and touch a product. For example, placing soft sweaters centrally in a customer traffic pattern will encourage touch exploration. Once it is in their hands, that sense of ownership is already forming.

Even if a product doesn’t have an obvious touch attribute, customers can be encouraged to feel it. Apple retailers strategically tilt the screens of laptops so that customers must physically adjust – and therefore touch – the screens in order to view them.

Impulse purchasing, an increased feeling of ownership, higher valuation and higher customer satisfaction: the benefits of touch in marketing are huge. So invite touch. Invite play. People are seeking experiences and to have fun. Use touch strategically to add richness to the retail environment. The results are extremely valuable to marketers as well. *Joann Peck is Associate Professor of Marketing at the Wisconsin School of Business, University of Wisconsin-Madison. For references, see pages 64-5.*



HELLO WORLD

It is the first of our senses to develop in the womb and it remains central to our psychological and cognitive growth. Neuroscientists Katerina Fotopoulou and Laura Crucianelli detail the power of touch

ILLUSTRATIONS BY KARI MODÉN

We tend to think of touch as the sensory ability by which humans explore surfaces and materials. Yet science suggests that touch makes far more important contributions to human life. It not only brings the skin, our largest organ, in contact with the physical world, but it also directly connects our body to the social world.

We have known for a long time that touch is a unique and powerful non-verbal channel of communication. A momentary touch by a waiter or a salesperson can increase a person's positive evaluation of the encounter, their tipping and even their purchases. It was, however, as late as the early 1990s when physiologists discovered that humans, like other mammals, may have a dedicated neurophysiological system for the perception of a gentle, slow, soft, stroking touch – that which occurs between a mother and her baby or two lovers. Subsequent experiments have shown that we are primed to perceive pleasure when either receiving or giving this kind of touch, and we experience it as socially supportive, even when we have no other cue or

information about what the other party may have been intending to communicate. As a result, emotionally painful feelings of social rejection, as well as physical pain, can be reduced by touch alone. In essence, touch is indispensable as it allows our minds to speak the language of the body.

Our earliest sense

Touch is the first of our senses to develop, our earliest form of communication and the first sense to reach maturity, remaining central throughout our lives to how we learn about our own bodies in relation to the world and others. Studies have long shown that babies respond to their mother's touch while in the womb and that twin foetuses will initiate movements intended to touch each other even before 20 weeks of gestation. Interestingly, one of the most influential contemporary theories of child psychology, the attachment theory, suggests that physical contact is the central requirement for healthy psychological and physical development, signalling as it does to the baby a responsive and caring environment. Close bodily contact is seen as superior to other forms of comfort, particularly when an infant is distressed or needs soothing.

Touch is also important for the perception and communication of psychological values, especially during social interactions. This dual function of touch, informing us about both the physical and the emotional aspects of one's bodily experience, depends on mechanisms that can be found both on the skin and in the brain. Touch typically occurs among other sensory and motor experiences and in given social contexts. Moreover, each individual has a touch history, with memories of it starting in the womb and becoming progressively tightly linked with other sensory and emotional experiences.

For example, consider holding a lemon in your hand and closing your eyes. As you explore its familiar shape and feel, it's almost impossible not to think of its colour, its smell and the acidity of its taste. These different sensory properties, perceived at different times and by different senses such as vision, touch, smell and taste, are nevertheless unified in our memories and hence in our current perception. The same multisensory integration underlies many ►





of our cherished tactile experiences, such as stroking a purring cat, applying a perfumed body lotion or tracing the letters of an impactful sentence in a book.

This integration of touch with other sensations is how we build the foundations of our sense of self. It starts with being cared for as a child, when we deploy all the senses. We go through the routines of being fed, washed, calmed down and put to sleep. Through these experiences, we gain multiple opportunities to learn how to recognise and regulate our own needs within the context of a safe environment.

A natural medicine

Thus, emotional touch in early life is fundamental for the healthy development of both body and mind. As we progress through life, we gain a drive for social attachment, proximity and interaction that is learned from those first months. When we move on to experience separation or rejection by others, we may experience psychological pain. Yet it transpires that if rejection hurts, touch can also be a source of healing. Seminal rodent studies have shown that the frequency of maternal tactile behaviours, such as licking and grooming, early in life play an important role in determining behavioural responses to stress in the short term, as well as in adulthood. When puppies are separated from their mothers, the loss of touch inhibits secretion of growth hormones and DNA synthesis, and stimulates excessive stress responses. Importantly, these effects can be selectively reversed by soft, gentle stroking of the puppy, but not by other types of stimulation.

It has also been proved in humans that social touch is a very good medicine for stress and pain of many kinds, as it is capable of stimulating the body’s natural painkillers. Simple, everyday behaviours, such as hand-holding with partners, family members or friends, are capable of regulating both mental and physical stress and pain. Several investigations in adults have found that warm, social, physical contact among

couples can lead to decreases in blood pressure and stress, and can reduce physical pain. Similar findings are piling up regarding the role of hugs, massage and other touch-based ways to influence the neurochemistry of the brain associated with stress, pain and bonding.

The effect of touch on the brain

Most theories link the effects of touch with three neurochemical systems in the brain – the cortisol-based stress-reactivity system, ‘social’ hormones such as oxytocin (the feel-good hormone sometimes known as the love drug) and the opioid system. Work in other animals has confirmed the importance of touch in these and other neurochemical systems. Affiliative touch behaviours, such as grooming, tactile play and tickling, have been shown to stimulate the production of the body’s natural opiates, the endorphins, so that, for example, the more grooming a monkey receives, the greater the changes in the brain’s opioid system. There are also similar findings in animals as regards the flow of oxytocin, known to be released during orgasm. What these neurochemical systems seem to have in common, other than their tight links with touch and social bonding, is their association with sensory pleasure and analgesic effects. There’s no doubt that positive touch has a unique evolutionary role in linking us to other members of our species and regulating our health in the process.

For references, see pages 64-5.

SOCIAL TOUCH IS CAPABLE OF STIMULATING THE BODY’S NATURAL PAINKILLERS, WHILE WARM PHYSICAL CONTACT AMONG COUPLES CAN LEAD TO DECREASES IN BLOOD PRESSURE

ICONS OF TOUCH

The real thing_15

Multisensory packaging is the one most likely to attract customers. *Charles Spence*, Professor of Experimental Psychology at Oxford University, explains how the desire to touch something physical increases impulse purchasing

PHOTOGRAPHY BY ANDY BARTER

The past few years have seen a rapid growth of interest in the multisensory design of product packaging. Traditionally, the focus has been on packaging’s look, but now designers, marketing executives and research scientists are starting to think much more carefully about how it sounds when it’s interacted with, how it smells and, increasingly, what it feels like in the hands. The aim is to create a signature sensory cue that distinguishes one brand from the rest – think of the iconic shape of the Coca-Cola bottle, or the look and feel of the Jif lemon juice packaging – as well as enhancing the consumer’s experience of the product.

It is becoming increasingly clear that people’s feelings about a given product are very often influenced by their response to the packaging. One of the classic examples of the power of packaging comes from studies on wine. It has been shown that people tend to prefer wine from cork-stoppered rather than screwtop bottles, even if they can tell no difference under blind tasting conditions. Similarly,

even though the bag-in-a-box represents a more sustainable form of packaging, people experience wine sold this way as tasting different – inferior, in fact – than the same wine served in a cork-stoppered bottle.

Weighted for quality

In some of our own observational research, we were able to demonstrate a correlation between the weight of a wine bottle and how much you pay. By analysing several hundred bottles in an Oxford shop, we found that for every extra pound that you pay for a bottle of wine, you get an average of 8g more glass. Astute marketers, of course, are already on to the potential benefits of adding weight to packaging to indicate quality. In fact, I have heard that the correlation between price and weight is even stronger in the case of lipstick (another product, note, with a size that is essentially fixed).

In our research over the past decade or so, we have found that adding a small weight to everything from boxes of chocolates to cans of fizzy drinks results

in people rating the contents as being of higher quality and, in the case of edible products, likely to be more satiating. It even affects our perception of scent. Our researchers documented a 15 per cent increase in perceived fragrance intensity when a handwashing solution was presented in a heavier container. Little wonder that perfumes are still so often sold in heavy glass bottles.

This is a particularly interesting challenge for designers, given recent moves towards light-weighting, and even eliminating product packaging wherever possible. As such, a number of researchers are currently trying to figure out whether they can use other cues, such as colour, to give the psychological illusion of weight to their product packaging. Interestingly, many studies conducted over the years have demonstrated that white or yellow objects tend to feel lighter in the hand than black or red ones of equivalent weight. That said, it is currently unclear whether it may be saturation rather than hue, per se, that is the key factor.

Aside from weight, we tend to prefer products that we find easier to grasp, or even to imagine grasping, slightly more than other products whose packaging we find it harder to imagine picking up or engaging with. Packaging designers take advantage of this by creating affordance points (clues about how the product should be used) that improve grip or add texture, such as the indentation on many roll-on deodorant cans. Some brands then place important details, such as the brand logo, near this point, as the eyes usually precede the hand when picking up an object.

Signature feel

Beyond the weight and affordances of the product packaging, the next thing to consider is how it feels to the touch – is it rough or smooth, for example? Does it have the feel of a specific material? A few years ago, the plastic packaging of Velvet toilet tissue was treated to give it a luxurious, velvety feel. Similarly, Heineken created a distinctive feel on its beer cans using

a special tactile coating technology, which created ‘drops’ resembling the condensation that appears on a can in the fridge. With one’s eyes closed, say, or when feeling around in the bottom of the ice bucket, it would still be possible to identify the Heineken can from all of its smooth competitors. It’s worth noting, as well, that embossed labels or crests on the front of bottles and cans serve to encourage the customer to pick up the packaging in order to feel the texture.

Recent research has also questioned if packaging can be given a natural feel. The intuition here is that a product will be rated as more natural or authentic if that is how the packaging feels, too. Some years ago, Japanese designer Naoto Fukasawa produced some hyperrealistic packaging designs that perfectly rendered the complex feel of the outside of a strawberry, a banana’s skin and, most impressively of all, the hairy feel of a kiwi fruit. While not cheap, these packaging textures show just what is possible when it comes to the feel (and appearance) of packaging design.

Finally, there is the firmness of the packaging. Research in the USA demonstrated that whether a drinking vessel was flimsy or firm influenced how a soft drink was rated. Putting these various factors together, the combined differences in weight and firmness may help to explain why so many people believe that beer and Coke tastes better out of a glass bottle than from a can. Research we conducted with Andrew Barnett of Barney’s Beer at the Edinburgh Science Festival demonstrated that simply knowing that a beer had been poured from a glass bottle was sufficient to make people say it tasted better than a glass of beer that they had seen poured from a can instead.

In conclusion, therefore, it seems that the weight, texture/feel, compressability and temperature of product packaging are probably all much more important determinants of the customer experience than people generally realise. And, as such, it is probably high time that we all wake up and feel the packaging. ► *For references, see pages 64-5.*

TOUCH
& SNIFF

JIF LEMON

Taking its cue from nature itself, this bottle was developed by designer Bill Pugh in the 1950s, who carved a wooden core and covered it in peel before creating the plastic mould. This haptic package replicates the feel of squeezing an actual lemon, but more conveniently and with less mess.

GUERLAIN

Originally sold in pots, French brand Guerlain's first bullet lipstick was unveiled in 1870. In 2009, the company pushed the boundaries of lipstick luxury to the hilt with Rouge G, which has a weighty, curvaceous casing that integrates a sleek double mirror and has a satisfying click closure. Jeweller Lorenz Baumer was enlisted to bestow the design with the look of a precious jewel. The packaging of the Rouge G has evolved by offering a bespoke case for the refillable lipstick, making it a sustainable option that represents the brand's environmental policy while giving the customer a genuine heirloom.



CHANEL N°5

Designed in 1921 by Coco Chanel, the simple lines and plain white label of The Classic Bottle became as iconic as the fragrance itself. The chiselled stopper was inspired by the geometry of the Place Vendôme, which Coco could see from her room at the Ritz in Paris. Each bottle is opened by breaking a thread held in place by a wax seal – a unique moment of tactile sensuality.



COCA-COLA

The original Coca-Cola bottle was patented in 1915 by the Root Glass Company, whose brief was to see off imitators and develop a bottle 'so distinct that you would recognise it by feel in the dark or lying broken on the ground'. Coca-Cola has always prioritised haptic qualities in its packaging, from the embossed glass logo to the curved shape.

APPLE

With an entire ethos built around brilliant design, Apple creates packaging to be an extension of the tech within – smooth, simple and intuitive. Opening an Apple box is a truly sensory experience – it's slow and seamless – with a devoted fan base. Unboxing iPhone videos are a YouTube phenomenon – one for the iPhone X has had more than 13 million views to date. The psychological theory is that these unboxing videos are aspirational, encouraging an appetite for something the viewer wants but doesn't yet have – the perfect marketing formula.



TOBLERONE

The triangular shape of this bar is so distinctive that even if it's stripped of its branding, it's instantly recognisable. Patented in 1906, the chunky peaks of chocolate resemble the famous Swiss Matterhorn pictured on the packaging. Bern, where it is produced, is represented by a bear superimposed on the mountain.





IN 2008, FOLLOWING THE REMOVAL OF A BENIGN BRAIN TUMOUR, ARCHITECT, PLANNER AND CONSULTANT CHRIS DOWNEY LOST HIS SIGHT. RATHER THAN THINKING OF THIS AS A CAREER-ENDING EVENT, CHRIS BEGAN TO RELY ON HIS OTHER SENSES – MOST OF ALL, TOUCH – AND DISCOVERED THAT A WHOLE NEW UNDERSTANDING OF ARCHITECTURE WAS POSSIBLE. HERE, HE EXPLAINS HOW HIS BLINDNESS HAS BROUGHT A UNIQUE PERSPECTIVE TO HIS WORK

THE FIRST IMPACTFUL EXPERIENCE OF A BUILDING IS THE GRIP OF THE FRONT-DOOR HANDLE. TOUCH CONTRIBUTES IN AN ALL-ENCOMPASSING WAY



Though incredibly important to an architect, touch is not a sense that is always appreciated by us. In fact, a criticism often levelled at our profession is that we have become so visually orientated. With all the screens we now work with, sight is easy and quick – it gives us the ability to see at a distance and we don't even have to be there in person. But in reality, the end product is not on a screen, it's not a representation; it's a real thing in space and time. And a big part of that is the full range of sensations that you get only by physically experiencing a building.

With sight, the reaction is, 'Oh, that looks good,' as opposed to, 'That feels good.' Touch is something subtler, as it might not come to mind as quickly. For most people, 80 per cent of the environmental sensory

experience is visual, leaving just 20 per cent for everything else. Our sense of taste doesn't have a whole lot to do with architecture, but the senses of touch, smell and hearing are so important.

The haptic moment

Touch is especially key, as it is almost the antithesis of sight: sight is distance, it's detached, there's no direct physical relationship between the viewer and the object seen; touch is the most immediate, the most impactful sense – it's how you directly engage. Touch really does inform that sense of complete architectural design. When you transform 'It looks good' into 'It feels as good as it looks', that's a better place to be.

That's not to say that as architects we go around

feeling buildings everywhere we go. People might think that is what blind people do, too – touching buildings to feel our way around – but that's not the experience whatsoever.

There are things we architects know are going to get touched, such as a doorknob or a front door. Think of those haptic moments in life. One we often experience is a handshake. Without sight, the first thing I have to work with when I meet someone is their voice. You can tell a lot: how tall they are, based on where the voice is coming from (as long as you understand the level of the ground – are they on an incline?). You also get a glimpse into a person's personality from their speech patterns. But it all happens so quickly as, without sight, you have to focus so much more on it, while still listening to what they say. Then you have the handshake: by its intensity and its length, you can almost sense the sincerity of the grip. The same is true of a front door. That first, immediate, impactful experience of a building is the grip of the front-door handle (unless it has an automatic opener).

I also really like to think about the sequence of things as you move through a building, what you know you are likely to physically engage with, and then design that object for each moment in the sequence of experience. Touch, then, may or may not be immediately understood by the visitors to the building, but it contributes to the experience in an all-encompassing way.

Chris created this tactile handrail for the LightHouse for the Blind and Visually Impaired



The creative touches

In architecture, we use drawings to design our work. We may use models, too, but they're also about visualising the space, rather than the surfaces – seldom are they designed to be explored through touch. In my work, however, touch is a vital part of the design process.

I worked on a project in San Francisco called the LightHouse for the Blind and

Visually Impaired. We were designing the staircase to link the three floors of their space. That stairwell was the heart of everything, the unifying element of the three separate floors – without it, you'd have to leave the space to use the elevators in the surrounding building's common area. The staircase was very important, as was the experience people would have when they used it.

While I was designing the handrail, I remembered a past visit to a museum. Going down to a lower gallery, I'd found the first step with my cane and reached for the handrail. The minute my hand took it, I was stopped in my tracks. It was unlike any handrail I'd ever felt, fitting the hand incredibly well. I had to take a photograph of it.

When we were designing the staircase for the LightHouse, we studied that photograph. At first, we created drawings. I would sketch the designs, and then the architects I was working with would draw it on the computer, and finally I would print their drawings to work with. But I realised that there was something wrong with the process: we were doing it all visually. We couldn't grip these drawings, we couldn't experience them. So, instead, we created a 3D print of all the sections of the handrail we were exploring, which allowed us to actually grip it ourselves. It really transformed the process into one appropriate for the sensory experience it was being tailored to.

Embellishing our understanding

Thanks to the tools I use in my design, I can feel the drawing. For architects, the mind plays an important part in visual design – you're an active viewer, a critical viewer, so your mind is hard at work, thinking through each condition, how it fits into the overall experience and what you're trying to achieve.

My tactile perspective makes everything so much more immediate. Reading a plan through touch is very different from looking at it visually, and in some ways more difficult: you don't see the whole thing ►

READING A PLAN THROUGH TOUCH IS VERY DIFFERENT FROM LOOKING AT IT VISUALLY, AND IN SOME WAYS MORE DIFFICULT

immediately and then understand the detail; you find the detail first and then have to build out to the whole.

It can take a while to figure it out, but once you do, once you have the lie of the land, you can really work with it – because you’re in the space. It’s like the parable of the group of blind men who have never seen an elephant and are each touching a different part. Each man conceives of the elephant in a different way, based on their limited, subjective experience – the one feeling the animal’s trunk has a very different mental picture from the one who is feeling the flank.

As I work with a design over time, my understanding gets embellished with all the surfaces that define a space: the floor, the walls, the ceilings, the windows, the lights, even the colour, how the light comes to the space – a lot of the things we think about visually. Having had sight for 45 years, I can still visualise the space, it’s just a matter of engaging in it intellectually

as I, with my fingertips in the space, review, study and move through it.

An architectural drawing can be as detached as sight. If we’re just looking at it, we tend to look at it for its compositional value: ‘It’s a good composition, great job! You can go home now.’ Whereas with a sense of touch, and your mind needing to be active in thinking through all those things, it takes you to a deeper level of understanding what it would be like to be in that space.

Not good to touch

If not done well, the wrong sense of touch in architecture can be hugely detrimental. It can go from, ‘It looks good,’ to, ‘Oh my God, this thing feels horrible.’ For example, something often done is a simple steel bar handrail – it might look really crisp and really good in a drawing, but the minute you try

to walk down the stair holding onto that handrail, you notice what wasn’t considered, such as the edges and that it’s not comfortable to grip. It changes your perception of the building. And if you don’t have sight, and that’s the only thing you experience, it doesn’t leave you with a good impression of the building – whether you’re conscious of it or not.

And then there are the surrounding textures. Something I never thought about when sighted and working as an architect was the wall surface behind the handrail. One of the principles of universal design is tolerance for error: the appreciation that not everyone uses things with the same level of precision or dexterity. I was in a convention centre once, which had a handrail attached to a very rough wall. When I ran my knuckles across the wall, it felt like running your fingers across a cheese grater. It may have looked very nice, but it didn’t support that notion of imprecision or tolerance for error.

It’s short-sighted, if you’ll excuse the pun, not to anticipate that people may accidentally hit an area around a tactile surface. And the sense of touch is not just based on what you feel with your hand – it’s about your whole body. After all, we’ve all experienced good benches and bad benches. There are two ways you understand a surface underfoot when you’re blind: one is with your cane, as your cane tip hits the ground and the texture is vibrated through the shaft to your hand; the other is through your footfalls, which is also true of sighted people. You don’t get the same level of texture perception as you do with your cane, but you can glean a lot of information. You get a sense through your feet of the overall character that the building conveys.

A building design should always be considered as a tactile experience as well as a visual one. I need to anticipate the areas that get touched intentionally or accidentally. Architects are accustomed to putting together material sample boards. We put materials next to each other to get an overall sense of the colour palette and what comes through that colour, such as the warmth or coolness of the space, but this process is typically done on a visual level. I use those materials to evaluate the tactile experience as well – not just the surface, but selecting a material that has the properties that will enable you to do the joinery, the edges, the corners and the bends in a way that all contributes to that experience. Anticipating those things that will be touched is vital to the architectural design process.



THE TOOLS OF THE TRADE

1. Wax sticks

I use these where I can feel the drawing underneath that I’m working on. It’s like I’m looking at it through tracing paper and drawing on top, only everything is tactile.

2. 3D-printed models

We did a 3D print of all the sections we were exploring for a handrail, and then we were able to actually grip it ourselves – and have the client work with it – to narrow down the things we liked. Then we kept evolving the design based on how it fitted the hand, not how it looked visually.

3. Embossing printer

I take drawings people see and turn them into PDFs – they look like normal drawings on the computer screen, but my printer converts all the lines to a tactile experience, so I can ‘read’ them.



FEEL-GOOD BRANDING

In 2017, chocolate brand Maltesers created a Braille poster – made with model chocolate balls – to promote diversity in advertising. The poster, on display at a London bus stop, read: ‘Caught a really fast bus once, turns out it was a fire engine,’ to tie in with Maltesers’ ‘Look on the light side’ campaign. Audio directed people to Facebook if they needed the Braille translated.

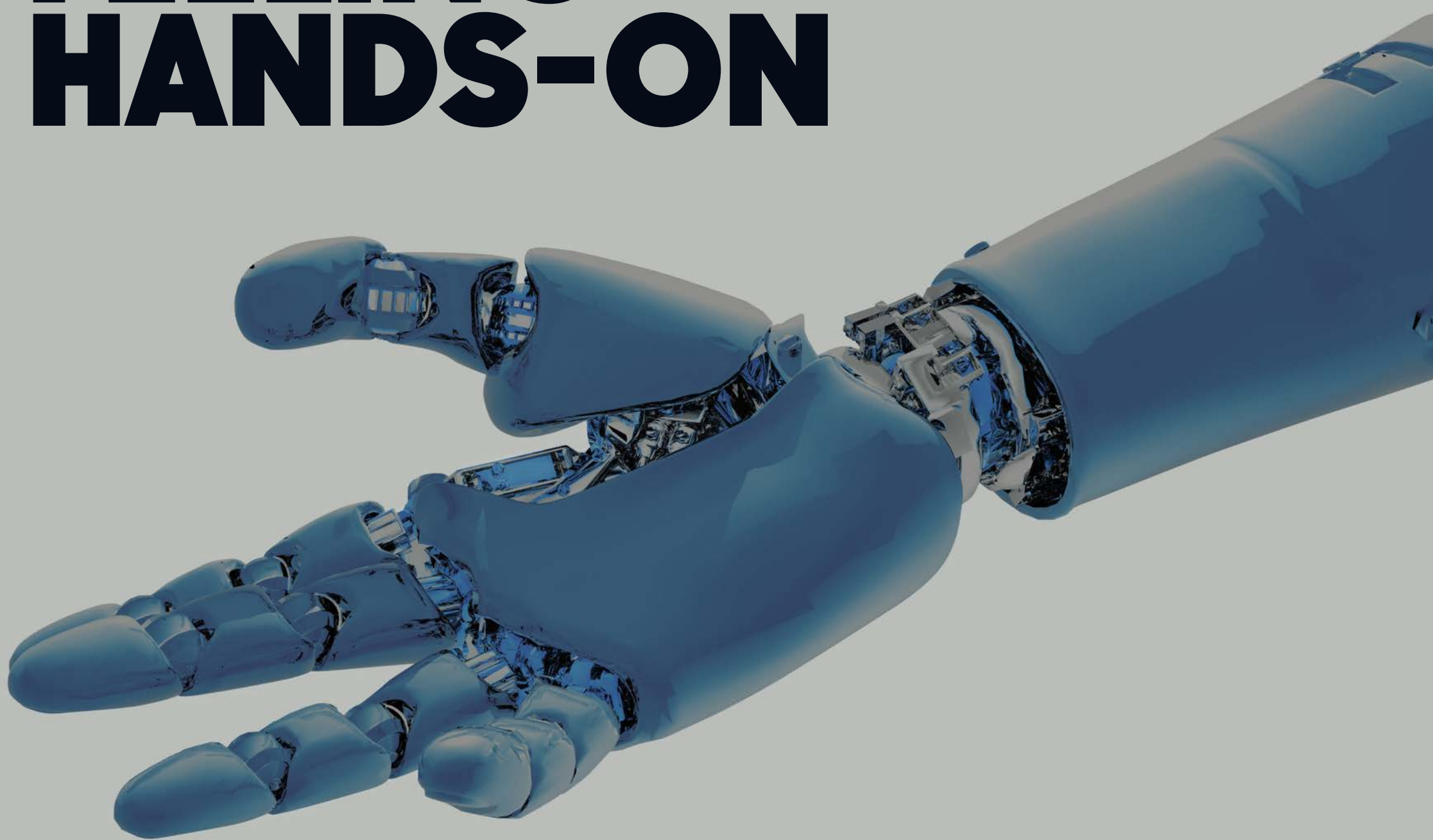
Chris consulted on San Francisco’s Salesforce Transit Center, helping to create a navigable path for visually impaired passengers



Photography: © Don Fogg/Mark Cavagnero Associates Architects.
© Pelli Clarke Pelli Architects/Transbay Joint Powers Authority

21st-century prosthetics are incorporating ground-breaking haptics to enhance the life of the disabled user

FEELING HANDS-ON



Prostheses – artificial devices designed to replace a missing body part – have existed for thousands of years, from artificial toes in ancient Egypt and shield-supporting metal hands in the Middle Ages through to lifelike plastic limbs in the 20th century. Nowadays, previously rudimentary prostheses have been replaced with carbon-fibre appendages, which are stronger, lighter and even capable of a range of movements. But until recently, every iteration of these devices had been missing a crucial feature: the sense of touch.

Intuitive connections

‘Touch helps guide us through every movement we make,’ says Dr Marcia O’Malley, Professor of Mechanical Engineering at Rice University. ‘For able-bodied people, it’s a totally instinctive sense. Imagine you pick up a cup of coffee. You know how far you need to reach, how hard to grasp the mug, how smooth the mug is, its temperature and how to get it to your mouth, all because of your sense of touch. People who use prostheses can’t decipher this information without actively relying on other cues and senses, which makes basic tasks much more challenging.’

Dr O’Malley and her research team have spent years working on technology that will enable prostheses wearers to overcome these obstacles, identifying haptics as the most promising solution.

Haptics-equipped prostheses contain electrodes in a socket that fits over the stump of an arm. When the user flexes the muscles that remain in the stump, electrical signals are picked up by the electrodes, which relay messages to the prosthetic hand, telling it to open, close, grasp or extend (‘there’s some muscle training involved for the user,’ says Dr O’Malley). This feeds back with a haptic response that gives the user a more intuitive understanding of the object they’re holding. A ‘squeezing’ sensation around the stump might reveal how hard the hand is grasping, for example, while vibrations might indicate texture or that the object is slipping.

Recreating muscle sense

The impact of this innovation is significant. A 2017 study by Dr O’Malley and her colleagues found that tactile feedback on the skin allowed blindfolded test subjects to more than double their ability to discern the size of objects grasped by a prosthetic hand. The artificial limbs that Dr O’Malley works with are non-invasive, although there are more advanced prostheses that rely on surgical integration, such as DARPA’s Revolutionizing Prosthetics programme, where electrodes or wires are implanted around nerve bundles under the skin. But according to the study, even non-invasive prosthetics could help replicate the vital ‘muscle sense’ that prostheses wearers lack.

Refining the basics

Dr O’Malley concedes that prosthetics face some challenges, but says that haptic technology has given the field a new focus. ‘It’s one thing having a device that can move in all these humanistic ways, but users’ actuators – that is, the different things they can do with their existing muscle to facilitate these different movements – are more limited. We’re working on ways to expand this, but right now we have to prioritise and refine the most important movements, and it’s haptic feedback that’s adding a vital level of functionality.’ As Dr O’Malley notes, prosthetics will never enable wearers to regain the sensation of their missing limb. However, innovation in the technology does mean that artificial limbs will become more naturalistic, helping users regain the functionality only possible through the sense of touch that so many of us take for granted.

For references, see pages 64-5.

let's get physical

David Sax enthuses about the success of the
analogue fightback in the digital age

ILLUSTRATIONS BY TOBY TRIUMPH

Sales of printed books, vinyl records, instant film cameras and other analogue media are on the rise. But what's driving it, if the digital alternative is readily available? Those of us who are gravitating back to analogue in some way are not doing it as a rejection of digital; rather, we're actually drawn to it as a complementary technology to the apps, software and hardware that we use every day, in work and at home. We are adopting analogue because it provides something that digital simply cannot. After a long period using digital technology – around 20-something years – we've had time to evaluate its benefits and also where it might fall short.

We're rediscovering analogue – or, for young consumers, adopting it for the first time – for two reasons. The first is for purpose and productivity: when we feel it delivers a better performance. So, for example, we take notes in a Moleskine notebook not out of a sense of nostalgia or romance, but rather because it is a functional action that delivers a different result than recording ideas on a screen. And after using both, we are finding a combination of the two that works.

You see this most interestingly in digital companies, which, far from being Luddites, have the best technology at their disposal. Google, for example, uses paper in the first stage of product design. All designers and engineers take a mandatory course on how to draw these things on paper. This is because Google discovered that it makes the ideas better and less constrained than if they were created using software.

Another example is Amazon, which eschews PowerPoint in favour of paper memos for executives to read quietly for 30 minutes before discussing at a meeting. They cannot use devices in that period, so everybody is literally on the same page. They are able to digest ideas without distractions, which enables them to have a more focused conversation, rather than staring at a presentation filled with stock imagery or being diverted by their phones.

Many other companies use whiteboards, or find ways of involving paper and physical things in the design process, all of which are aimed at the notion of productivity. In this way, they are potentially able to make and sell a product

upon which a robust business model can be built that points towards a profit. A physical product, with its identifiable costs per unit, is a measurable means of assessing revenue. This is versus a typical digital start-up, whose business model is based on free user access in order to acquire numbers, in the hope that it will one day get bought out, but which doesn't actually make any money. (Think Uber or Spotify.)

Deep connections

The second reason for our embrace of analogue is what I call 'analogue for the heart'. Illogically, we're indulging in things that we're told should not exist or are too costly or too cumbersome. After all, books, vinyl, film photography and board games can all be simulated on a phone, for relatively little money, taking up no space and having less of an environmental impact in terms of what they take to produce (for example, a sound file versus a vinyl record made of toxic plastics).

And yet, we are gravitating towards that physical experience because it makes

us happy. It gives us something that's tangible, whether it's holding a novel in our hands, having vinyl on our shelf, or seeing a photo emerge from a camera that can be pinned to a board, framed or given to someone – these are the sorts of things that the digital equivalents simply cannot deliver. And it is something that is really deeply, inherently human and relates to who we are as consumers. We like physical matter, we want to be able to buy things and give things and play things and have things strewn about our house and hold things in our hands. The psychological and emotional rewards are much higher, and we are willing to pay for that.

Interestingly, the consumers that are driving this analogue trend are the younger ones – the generation Ys, the millennials and, increasingly, those even younger. They have grown up with digital technology and it is as familiar to them as the air around them. So there is a novelty and a deep connection to these physical, feel-good things and they see them as 'special'.

So, the embrace of analogue is down to a combination of the head and the heart:

WE ARE GRAVITATING TOWARDS THAT PHYSICAL EXPERIENCE BECAUSE IT MAKES US HAPPY. IT GIVES US SOMETHING TANGIBLE

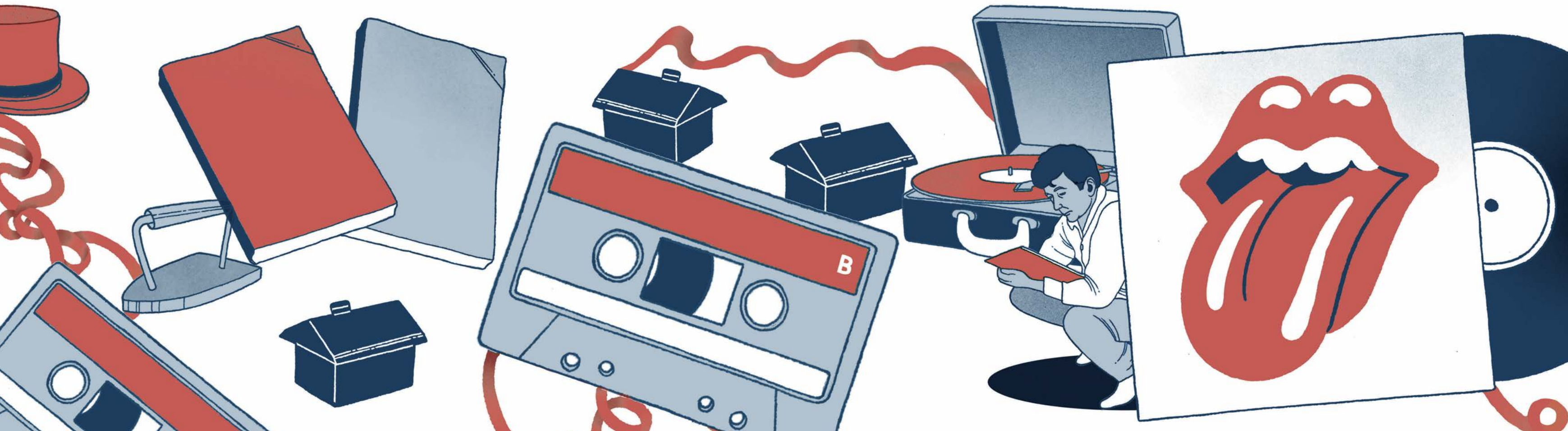
the practical focus on productivity and the illogical, irrational, but very much romantic and pleasure-driven reasons.

Analogue touch

Touch is a huge part of this, if not the major part. You can hold a tablet or a phone in your hand, of course, but you're doing so merely as a means to look at something else on it. And everything on that screen is the same – just rendered pixels. There is no variation in texture, just the smooth glass of your screen. So it's the tangibility of the actual,

physical object that indulges our haptic sense. Touch is still one of the most important ways we have to experience the world that we live in. We spend all day touching things with every part of our body; it's the way that we first communicate with the world as a child. When we have a digitised version of something, touch is completely eliminated. The reward we get from the touch of something may be seen as insubstantial, but it actually triggers a very deep emotional reaction. Think of a book. There's no logical reason ▶

Photography (pp30-31): Oliver Hoffmann/Alamy Stock Photo





why we should read something on paper rather than digitally. The information is exactly the same, we don't get fewer letters or words or ideas. And yet, as many who have used an ebook will attest, there is something missing – and that thing is touch. It is the weight of the book, the texture of the spine and the edges, and the roughness of the pages. It is the sight of the grain and the quality of the paper that has been used. Again, all of these things should be inconsequential, yet there is a reason why physical book sales are growing and ebooks are declining, and that is because the consumers, deep down, somewhere beyond that logic, prefer touch. There is something that they enjoy; it gives them something greater.

I have two young children. They love books; they read them every night. When my son was two, he would come walking in carrying his choice, saying, 'book book book book book!' We learn from a very young age the value and pleasure of books, and they are a very tactile thing. The physicality of a book is built into the experience of reading from that age, and that doesn't diminish over time; we might have more opportunities to read in other sorts of ways, but the pleasure of the book and paper continues.

It's the same for vinyl records – it's the physical thing you are buying, the physical thing that is the premium, and touch is a premium that people are willing to pay for.

The live factor

The notion that a simulation, with screens and headphones, can be a convincing alternative to the real thing is a false one. Silicon Valley's evangelical promise of virtual reality is not ultimately satisfying. The analogue world is the world that we live in and anything that we experience with all five senses is going to be richer. We inevitably glean more enjoyment attending a live concert than we do watching the same event on a screen. And that's due to all the other influencing factors – the anticipatory crowds, the reverberations we feel with our body. This experience takes more effort and costs more money, both to produce and to consume, but the reward is greater, and that's something that we increasingly see as of value.

These are real social experiences, not #socialexperiences. You can go to a concert and witness people holding up their phones, streaming and tagging it, but they are creating a simulation of real life. That's what Instagram is based upon – an experience in the real world you want to share. We're social creatures, after all.

Another thing that is interesting is how the board games industry is thriving. You can play all sorts of games online with other people around the world; it's a massive multi-million-dollar industry, and there's a social aspect to it, but sitting alone in front of a screen is different to playing a board game or cards face to face with friends or family. The game is almost an excuse for the socialising that happens: the laughter, the jokes, the drinks that you share. My wife plays Mahjong with a bunch of her friends once a month. They make snacks, catch up and bond. The game isn't the point (they've all been playing for eight years and they haven't got any better!). It's the social aspect – whether it's people meeting for a book club or chatting in a record store – that is the substantial thing. It's the same in the workplace. There's a real benefit to having people sit together at a meeting. I speak at conferences all the time, and it's not

the talks or the presentation slides that matter, it's the parts in between: you make coffee, you chat, you crack jokes, you form friendships – that's what is important.

Sensual retail therapy

One of the consequences of the growth of digital technology is that it shifted a lot of thinking in the business world. Existing things were dismissed as having no value once digital came along and proved itself 'superior' in some way. Take retail: when online shopping first launched, the thinking was: 'This record or book store is worthless – look at the greater selection and cheaper prices online!' Yet independent book stores are surging (between 2009 and 2015, the number grew by 35 per cent in the US) because they have the value of physical space, the analogue means of getting to a reader, they provide something that digital does not. Just as you cannot hold a digital item in your hand, you cannot build a relationship with the people working in an online store.

Online retail can only provide two things: price and selection, which is always going to be a race to the bottom. Apple was the first computer company to open its own stores. If you go to an Apple store on

any day of the week, it's crowded, not because of price or selection, because you're often paying more in an Apple store, but because they provide the best retail therapy experience – things you can touch, things you can see, good service.

It doesn't make long-term sense to suggest that physical retail is dead when online retailers are busy opening bricks and mortar shops or launching frequent pop-ups. While we may never return to the 1990s landscape of a burgeoning high street, it is similarly short-sighted to predict its eternal demise. We are biological, flesh-and-blood creatures; we interact with the world through all five senses – and the companies that turn that to their advantage are more likely to enjoy a successful future.

David Sax is a journalist and the author of The Revenge of Analog: Real Things and Why They Matter (PublicAffairs). For references, see pages 64-5.



VINYL RECORDS
4.2 MILLION
SOLD IN
2018 – HIGHEST
LEVEL SINCE
THE EARLY 1990s

TABLETOP GAMES
24%
REVENUE
GROWTH 2016-17

PRINT BOOKS
£1.63
BILLION
BOUGHT IN THE
UK IN 2018

CASSETTE TAPES
90% SALES
INCREASE YEAR-
ON-YEAR IN 2018

**WITH VINYL, IT'S
THE PHYSICAL
THING YOU ARE
BUYING, AND
TOUCH IS A
PREMIUM
PEOPLE WILL
PAY FOR**

HAPTICS IN NUMBERS

THE AVERAGE
READER
SPENDS

40
MINUTES
READING
A MAGAZINE

36%
HAVE BRAND
RECOGNITION AFTER
SEEING A PRINT AD

16%
HAVE BRAND
RECOGNITION
AFTER SEEING
A DIGITAL AD

65%
TRUST PRINTED NEWSPAPERS

57% TRUST ONLINE
NEWSPAPERS

190.6
MILLION
PRINTED BOOKS WERE SOLD
AS THE MARKET GREW FOR
THE FOURTH YEAR RUNNING
IN 2018 IN THE UK

1 IN 2

PEOPLE SHARE ADVERTS
THEY READ IN MAGAZINES
WITH FRIENDS AND FAMILY

IN 2018, THE NUMBER
OF INDEPENDENT
BOOKSHOPS ROSE BY

15 TO 883
AN INCREASE FOR
THE SECOND YEAR
IN A ROW

IN 2018, THE UK TABLETOP GAMES MARKET WAS WORTH
£350 MILLION
AND IS GROWING

18%
OF VIEWABLE
DIGITAL DISPLAY
ADS ARE NOTICED

73%
OF PRINT ADS
ARE NOTICED

81%
HAVE PURCHASED
SOMETHING
OR TRAVELLED
SOMEWHERE AFTER
READING ABOUT
IT IN A MAGAZINE

For sources, see pages 64-5.

MY FAV OUR ITE

The sensation of pulling a vinyl record from its sleeve and playing it for the first time, the wonder on children's faces as they discover pop-up books and the thrill of a competitive board game... Here, five creative leaders recall their most treasured tactile experiences

INTERVIEWS BY
DOUGLAS HEAVEN

Karen Elson, *Vogue Italia* 1997 – a classic example of Perry Ogden's analogue fashion photography, rich in depth, texture and colour



PHOTOGRAPHS BY PERRY OGDEN

Perry Ogden is a British fashion and documentary photographer, and film director, based in Dublin



Tactile experiences_39

I love magazines; I love seeing something printed on the page. For me, that's a great end point for a photograph. You get incredible luminosity on screens, which can make an image look brilliant. But some images that look great on screen can look dead when printed.

Still, I work with everything. Phones take great photos, but the images are different. Digital is good for things such as modern architecture, where you have lots of concrete and glass. But when you have texture – interiors, clothing, bodies – digital doesn't even come close to film. I can usually tell if

something has been shot on digital or film. I never feel the depth with digital; it flattens everything out. You have to work hard in post-production to create that depth. For example, pictures that I took in the late Nineties and early 2000s for Italian *Vogue* (above) wouldn't work so well if they had been shot on digital.

When I work with digital, I'm always fighting it. It's too sharp, there's too much detail. When I was working on film all the time, I never looked for ways to make the image sharper. When digital came along, there was more of a groan than a celebration. ▶



A RECORD
AND ITS PAPER
SLEEVE MAKE
YOU FEEL AN
EMOTIONAL
ATTACHMENT
TO MUSIC

VINYL BY DAVID HEPWORTH

David Hepworth is a music journalist, writer and publishing industry analyst. He edited *Smash Hits* in the 1980s and launched *Q*, *Mojo* and *Empire*. His book *A Fabulous Creation: How the LP Saved Our Lives* (Transworld) is out now



Growing up, the only thing I ever wanted was long-player records – not just the vinyl but the whole LP. I used to fantasise about being locked in a record shop overnight. How wonderful would that feel? To me, it was like Disneyland. The combination of a vinyl record and its large paper and cardboard sleeve makes you feel an emotional attachment to music that you don't get with any other medium.

As a 16 or 17-year-old, I'd go into town a couple of times a week and look through the new-releases rack, and I'd read the records – not hear them. You'd look at the track list, the liner notes. You'd take note of who the producer was, which record label put it out. You handled it before you owned it.

When you took it home, you then played it on a player that stayed in a corner of your room. You sat there and you concentrated on it. With a record, you're aware of the

mechanical process taking place as it spins around, which is very appealing. Because you're physically engaged with the music, you're emotionally engaged, too. And when you put a record on, you left it on, because changing tracks before CDs was a delicate business. If you bought a record, you were going to invest a huge amount of time in it.

One of my favourite LPs was the self-titled second album by The Band. The cover is a photo of the group taken in the rain on a road near Woodstock. They look like a perfect band. They're like soldiers in old photographs from the American Civil War, figures from some lost rural America. The designer chose to make the background brown, giving it earthy tones. When you listen to the record, the image grounds the music. The packaging and what's inside are in perfect sync, and I never get fed up with looking at it 50 years later.



I've just finished designing a new font, Mental Block (shown). Once it's digitised, everyone can buy it. When I'm working on a design, I use the publishing software InDesign, but I'm rooted in print.

I'm in my fifties so I've lived through the shift to digital. People think of it as a total game-changer, but we're still the same as we were when we lived in caves: we still eat, breathe and procreate, and we still want to look at pictures, whether they appear on a printed page or a website. But I'm passionate about print because paper exists in a way that digital files do not.

When you make a print product – whether that's a book, magazine, poster or flyer – you get something tangible. That's not true with computers. You can't even open a file you've been emailed if you don't have the right software. And what about Zip drives, Jaz drives and floppy disks – all these ways of storing data – that five years later nobody could open?

Yet the first books ever printed are still as legible today as they were 500 years ago. And if you go to a zoo, a museum or an art gallery, you can take away a little printed booklet that will remind you of that trip forever.

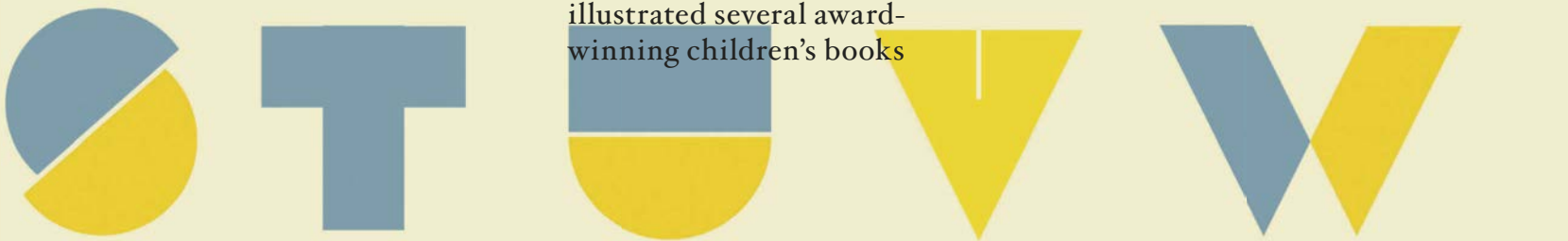
Because it's a tactile object, you have an emotional response. Digital makes the need for printed things even more important.

The internet is great for a lot of things, but not for those that work best in print. As a creative designer, you really like to see things printed, whether you put them on your wall or stick them in a magazine rack. The beauty of the web is that it lets you reach huge numbers of people very quickly. I'm going to set up an online shop but use it to sell prints of my new font, just as Caxton or Gutenberg or Dürer did. In that sense, nothing has really changed. ►



GRAPHIC DESIGN BY GEOFF WARING

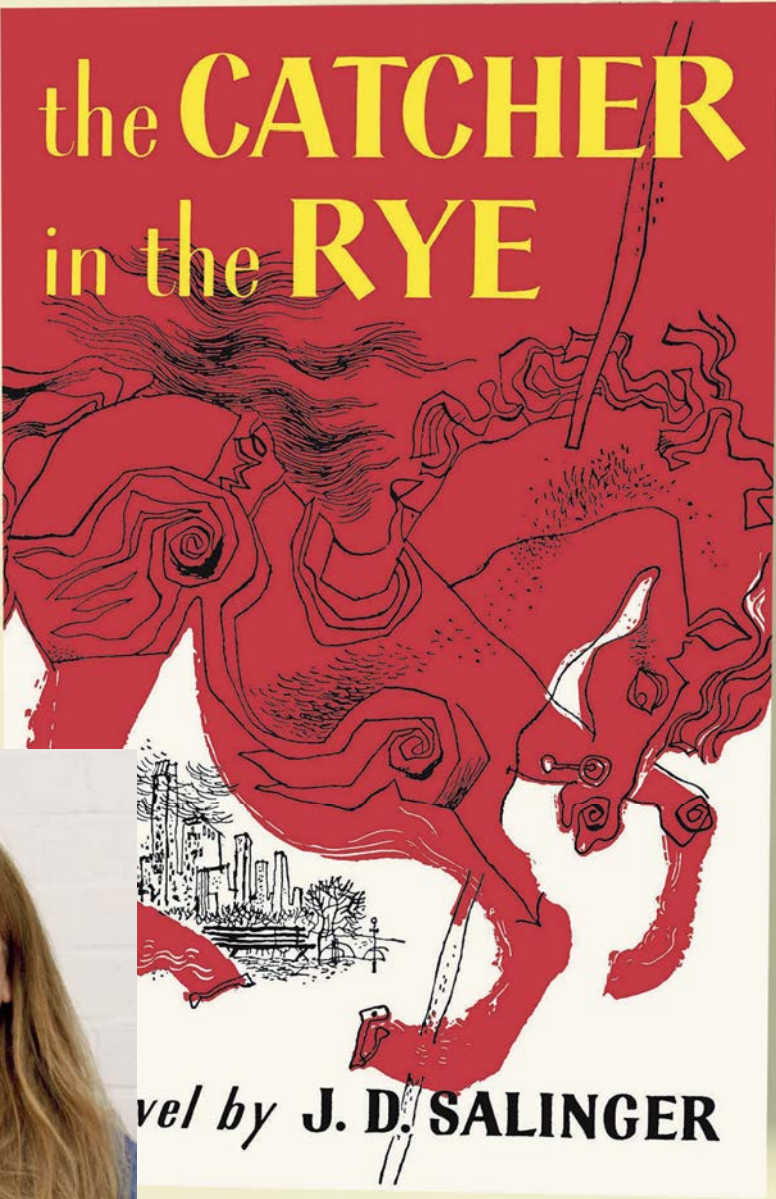
Geoff Waring is a graphic designer and photographer. He has also written and illustrated several award-winning children's books





BOOKS BY KAREN McCOMBIE

Karen McCombie is the best-selling author of more than 90 children’s books, which have been translated into many languages. Her latest novel, *Little Bird Flies* (Nosy Crow), has been critically acclaimed and chosen as *The Sunday Times* Children’s Book of the Week



I LOVED GETTING LOST IN THE LIBRARY, PULLING THE BOOKS OUT AT RANDOM

difficulties, I’m as good as I can be thanks to two books that I met when I was 10 and 14 respectively: *Little House on the Prairie* and *The Catcher in the Rye*. I write for older children myself, but when I read to younger ones, I turn to the fail-safe pop-up picture book *There Are Cats in This Book* by Viviane Schwarz. The children’s anticipation, excitement and bemusement as the silliness unfolds under flaps of card are a sheer delight. Stick that story on a screen and it would be like watching your favourite band in concert as a tinny-sounding blur on your phone. Young children are relentlessly on the move, relentlessly curious, relentlessly hands-on. For them, the joy of a picture book is one-third story, one-third pictures and one-third moving parts. It was flat! But now it opens! Yay! At the end of an author talk at a school, kids often rush towards me with a book in their hands to get a signed copy. But the less-confident readers are the ones I wait for. To see their own name written in a book, with an author’s signature underneath – it’s personal. It brings books alive for them. They’ll show their teacher and friends and their grown-ups at home. They can look at it again and again, and remember the day That Author came in and looked them in the eye and smiled and talked – and this might just be the book, the very book, that gets them reading others.

When I was young, we had 12 books in the house – four each for my parents and myself. We changed them weekly on a Saturday morning pilgrimage to the grey, Victorian wonderland that was the nearby Aberdeen Central Library. I loved getting lost in the children’s section, dragging my fingers along the multicoloured spines, pulling the books out at random. At Christmas and on birthdays I’d receive a book token, and little by little, I began to build my own small library. Those titles now live on a dedicated shelf in my office. More than a doll or a teddy, they are signifiers of my childhood, and links to the quiet comfort and company of my parents. Aspects of your childhood shape the adult you become. In spite of life’s glitches and



BOARD GAMES BY GRAHAM LINEHAN

Graham Linehan is an award-winning comedy writer, best known for a string of successful sitcoms including *Father Ted*, *Black Books* and *The IT Crowd*

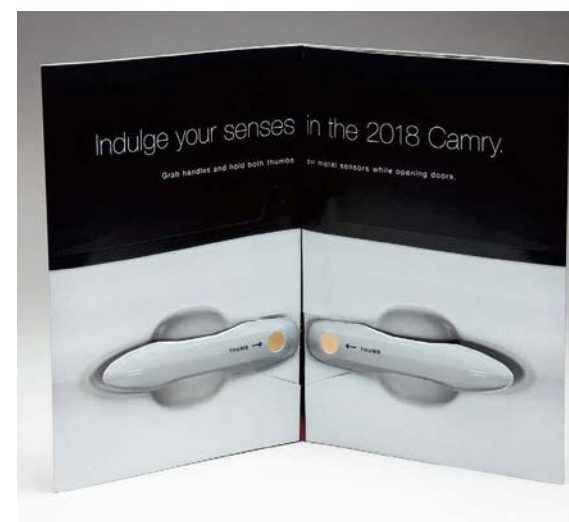


There are so many joyful elements to board games. A little overhead map of a place got me excited as a kid. Miniature worlds are thrilling; I find them almost spooky and that gets my pulse racing. It’s also to do with touch – opening the box and holding the dice in your hands. My kids play games online – as do I, sometimes – but it’s more enjoyable to face someone across a table. I’m a big poker fan, and there are things your opponent does that tell you what you should be doing with your chips – you’re not able to see that online. Just a flicker of an eye and you know you’ve got them; it’s lovely. I shouldn’t take this much pleasure out of beating my 12-year-old, but I do. I love dice games more than anything else; there’s something about dice that I find very attractive. A brilliant game that I think should replace Monopoly in every home is Lords of Vegas, which is about building casinos in Las Vegas. It’s one of those games

where it’s fun to be extremely greedy. Everyone earns money on each turn, so there’s just this brilliant feeling of constant reward. It’s sneaky as well because you’re looking to take over the other players’ casinos. Another great game is King of New York, about being a King Kong-type monster attacking a city. The pieces are great and the dice are gorgeous. All of this creates a kind of magic that exists in the air between you and the other players. I would never have seen it coming, but of course board games are going through a renaissance. It’s obvious that this would be one of the responses to an online world. You want a way of interacting with objects and people in front of you. Our senses, including touch, are not fully used in a computer game. One reason I could never be a professional poker player is that my hands shake whether I have good cards or not; it’s the adrenaline. These things add up to an experience that disappears online.

see me feel me touch me

As a physical medium, print can be engineered to excite all the senses. For the launch of their latest car, Toyota Senior Analyst Ann Dragovits reveals how her marketing team engaged *InStyle*'s readers, inviting them to use touch, smell, sight and hearing with a ground-breaking print insert



When Toyota planned its Sensations campaign for the all-new 2018 Toyota Camry, one standout element was a print insert for *InStyle* magazine, conceived by Toyota's Ann Dragovits and her team. 'This was a tactic that was tactile – it was something you could hold and feel,' says Dragovits. Upon reaching the insert, readers were invited to take hold of the car door-style handles (above), put their thumbs on two sensor pads, and open the insert to reveal the Camry's interior from the driver's perspective (below right).

The pop-up created a 3D environment, while the sensor pads monitored the reader's heart rate on a light-up monitor where the infotainment system would usually sit – they were invited to 'let your heart race' and watch the results in real time on the heart-rate monitor.

'Our goal was to bring someone into the interior of the all-new Camry in a way that was personalised to them, which we did by monitoring their heartbeat. We worked with our partners to model the interior with a pop-out, 3D layered effect, so that, when you open the gatefold and have your fingers on the heart-rate monitor sensors, it really comes to life.

An immersive experience

'It leveraged all the senses,' continues Dragovits. 'In addition to touch, there was sight and sound with the heartbeat monitor, and even smell – we were able to incorporate a smell similar to the Camry's leather interior, which helped to fully immerse readers into the experience. While we do feature the exterior on the outer folds of the insert, the focus was,

for the first time, really on the leather interior. We were able to move the needle on people's excitement about the attractive styling – print's multiple layers enabled us to do this.'

The Toyota team acquired data to help understand which *InStyle* readers would respond best to the advertising and target them. '*InStyle* was a reliable partner logistically, technically, contextually and from an audience standpoint, working with us to get this "first to market" unit placed within the magazine.'

Surprise and delight

The insert went out to 50,000 of the magazine's subscribers and the results were amazing.

'We received more than 108 million PR-related impressions – across various free magazines and digital sites – and that was in just the first two months after the unit was released, which was huge for us,' reveals Dragovits. 'More than half the consumers spent more time with this ad than they typically do with print ads. On average, they spent around three minutes with the ad, with some spending 10 minutes. It was incredibly exciting to see how people interacted with something so engaging in print.'

Dragovits and her colleagues wanted the reader to be surprised and delighted

by the unexpectedness of the insert – it's something you wouldn't normally find in a magazine.

'The insert was part of the broader Sensations campaign, the purpose of which was to tap into our drivers' emotions and sensations – all the elements were crafted to showcase what it would be like to drive the Camry,' explains Dragovits. 'We didn't just want to tell them, but to give them an experience of what it would feel like.'

Print's physical presence made the insert an integral part of this approach. 'There's more engagement and better brand recall when more senses are involved,' Dragovits points out.

Across the campaign as a whole, the team relied on all channels to work together to achieve their goals. 'It wasn't about choosing one medium over another, it was about how these tactics complement each other throughout the broader campaign,' says Dragovits. 'Each channel has its strength and we look at how we best utilise these strengths within them. There are always opportunities for thinking outside the box – we pushed the boundaries of what you can potentially do in print. Knowing it is such a tactile medium and being able to leverage sight, sound, motion and smell has really opened up a lot of thinking around the medium itself.'

50,000
OF THE
MAGAZINE'S
SUBSCRIBERS
RECEIVED
THE INSERT

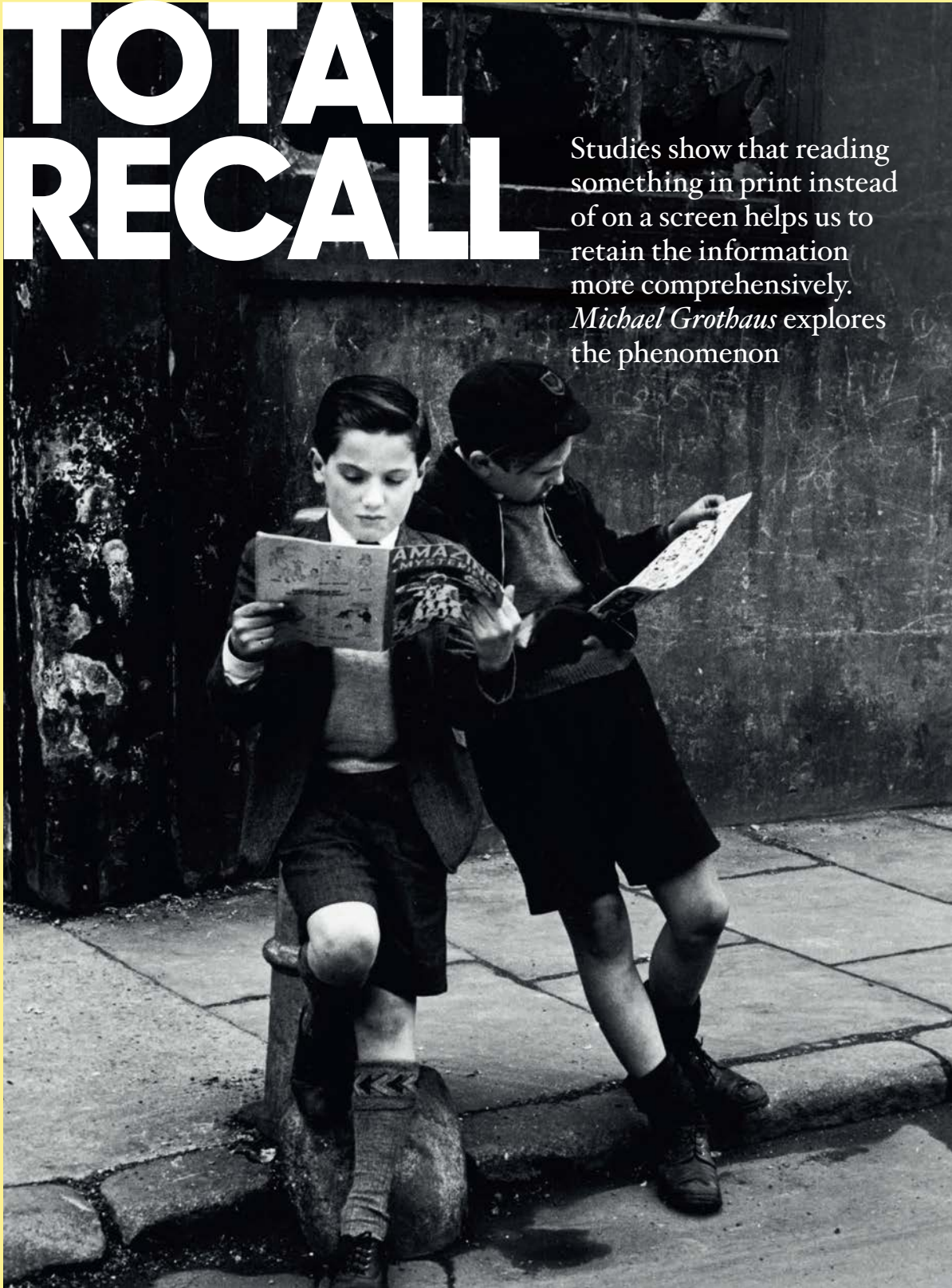
108 MILLION
PR-RELATED
IMPRESSIONS
ACROSS MEDIA
IN THE FIRST
TWO MONTHS

50%
OF CONSUMERS
SPENT AN
AVERAGE OF
THREE MINUTES
WITH THE AD



TOTAL RECALL

Studies show that reading something in print instead of on a screen helps us to retain the information more comprehensively. *Michael Grothaus* explores the phenomenon



It is not an understatement to say that digital mediums have taken over every aspect of our lives. We check what our friends are doing on the glowing screens in our hands, read books on dedicated e-readers, and communicate with customers and clients primarily via email. Yet for all the benefits the digital world has brought us, there is growing evidence that the brain prefers analogue mediums.

Studies have shown that taking notes in longhand can help you remember important meeting points better than typing notes out on your laptop or smartphone. The reason could be that ‘writing stimulates an area of the brain called the RAS (reticular activating system), which filters and brings clearly to the fore the information we’re focusing on,’ according to Maud Purcell, a psychotherapist. If that is the case, and the analogue pen really is mightier than the phone, it’s no wonder some of my colleagues have ditched their smartphones for paper planners.

And it’s not just recording our thoughts on paper that appears to be better for us. Absorbing information from analogue mediums now appears to improve memory retention and, thus, productivity. In a study conducted by Dr Anne Mangen, a professor at the Reading Centre at the University of Stavanger, Norway, participants were given the same 28-page mystery story to read either on an Amazon Kindle or in print format. After the participants had read the story, they were asked a number of questions about it. ‘We found that those who had read the print version gave more correct responses to questions having to do with time, temporality and chronology (for example, when did something happen in the text? For how long did something last?) than those who had read the story on a Kindle,’ says Dr Mangen. ‘And when participants were asked to sort 14 events in the correct order, those who had read it on paper were better at this than those who had read on the Kindle.’

While this has yet to be exhaustively investigated and understood, Dr Mangen, who now chairs E-read, a European research network of interdisciplinary scholars and scientists researching the effects of digitisation on reading, says one explanation for the benefit of reading

TAKING NOTES IN LONGHAND CAN HELP YOU REMEMBER IMPORTANT MEETING POINTS BETTER THAN TYPING THEM OUT, WHILE ABSORBING INFORMATION FROM ANALOGUE MEDIUMS NOW APPEARS TO IMPROVE MEMORY RETENTION

printed books may come down to what’s called meta-comprehension deficit. ‘Meta comprehension refers to how well we are “in touch with” our own comprehension while reading,’ says Dr Mangen. ‘For instance, how much time do you spend reading a text in order to understand it well enough to solve a task afterwards?’

One study revealed that people think they are better at comprehending information when they read it on a digital screen. This resulted in participants who read a text on screen doing so much faster than those who read it in paper format. Despite spending less time reading the material, the digital readers predicted they would perform better on a quiz about the text than those who read it on paper. Yet when the digital and paper groups were tested, the paper groups outperformed the digital groups on memory recall and comprehension of the text.

Should you print your emails?

Books are one thing, but do our brains absorb information better if we read from other physical mediums, such as newspapers and magazines? Not necessarily.

‘Length seems to be a central issue, and closely related to length are a number of other dimensions of a text – for example, structure and layout. Is the content presented in such a way that it is required that you keep in mind several occurrences/text places at the same time?’ asks Dr Mangen. In other words, she says, complexity and information density may play a role in the importance of the medium providing the text.

‘It may be that for certain types of text or literary genres (for example, romantic page-turners), medium does not matter much, whereas for other genres (cognitively and emotionally complex

novels, for instance), medium may make a difference to comprehension or to the reading experience. But this remains to be tested empirically.’

In other words, unless people are sending you novel-length emails (which, let’s face it, they shouldn’t be), you don’t need to rush to the print button, as reading short snippets of information on a screen probably doesn’t hinder memory retention or comprehension.

A place for print and digital

Dr Mangen also stresses that it isn’t correct to proclaim that information gleaned from print is always going to be just as good, if not better, for memory and comprehension than that learned from digital.

‘It is not – and should not be – a question of either/or, but of using the most appropriate medium in a given situation, and for a given material/content and purpose of reading,’ she says. She notes that ‘all media and technologies – old as well as new – have distinct user interfaces, and that the user interface of paper in some circumstances and for some purposes may support key aspects of reading (retention of complex information) or of study (writing notes in the margins) better than digital devices do.’

Slowly does it

If you’re a fan of digital books, then you’re not out of luck. Like the digital readers mentioned in the study above, you may think you are absorbing the information better than you actually are, and thus move through the book faster. A simple solution to this is to slow down and take more time reading the material, and you might absorb the information just as well as those who naturally take longer to read a paper book. *Michael Grothaus is a novelist and journalist. For references, see pages 64-5.*

GOOD ON PAPER

Creating 3D underwater kingdoms is all in a day's work for paper engineer Helen Friel. When she's not designing paper artwork for editorial and advertising clients, she also illustrates interactive and immersive books, including the first pop-up book sent into space. Here, she extols the joys of her medium



Paper is such an interesting material to work with because it's so accessible – everybody uses it every day. When you're a kid in school, you make things with paper, so it's familiar. But it's incredible when you look at what it can do, the properties it has and what you can create with it. Paper is so much more than the sum of its parts.

People find paper design fascinating because they know the material well, so it's almost like magic seeing it transformed into something else. People can see how my paper creations could have been made, that they could almost do it in their own home, but they can't quite work out how it's done – like a magic trick. You can get

**PAPER ALLOWS
ME TO CREATE
A RELATIONSHIP
WITH THE READER
I WOULDN'T BE
ABLE TO ACHIEVE
ON A SCREEN**

STYLING HELEN FRIEL
PHOTOGRAPHY BY CHRIS TURNER

Helen created this
paper set for UK
Vanity Fair

close enough in your understanding to appreciate it, whereas with things like CGI, you're so far away from knowing how to do it that you can't appreciate the work that goes into it. But everybody uses packaging, they know how to fold a box together, so they can understand that it's difficult to work with complex shapes in paper.

I started working with paper in my second year of university. I did a pop-up project and it went well, so I did another and another, and it snowballed from there. It's incredibly satisfying to create something with your own hands and see the final object. I like how clean paper is to work with as I'm not very good with ambiguity in my work – I like to be able to test and change and improve it, in a scientific way. I've always enjoyed angles and practical things, so that's part of the craft.

It's lovely when you first start a project and you get the paper out. The paper I work with is fairly smooth, so it doesn't have a lot of texture. You have a stack of it, maybe an inch thick, and by the time you've finished, you have all these 3D objects. It's the same as wood, it has a warmth to it because it's made with natural fibres. Working with the grain is very important, especially if you're making a small tube or something. Paper doesn't always do what you want it to do. It doesn't want to fold in a certain way, or it has to be held, and it can tear. Paper cuts are an occupational hazard!

I've also always loved pop-up books. My latest book, however, isn't a pop-up, although it's still interactive – it has a map and a magnifying glass. When you're a kid, there's a magical quality to something you can touch and hold in your hands. It's like a precious object, which you don't get so much with a Kindle or an iPad. The books that engage the reader are those designed to make them think a bit. With a pop-up book I created, *Midnight Creatures*, you have to use a torch to find the shadows. Working with paper allows me to create a physical and emotional relationship with the reader – something I wouldn't be able to achieve on a screen. I enjoy making something that's not obvious, that you have to work on for a little bit. You get so much more out of the book that way. It's almost like you take it so far, but then the reader has to come and meet you halfway.

THE POWER OF PRINT

PART 1 BOOST YOUR BRAND

Over the next six pages, we explore the resilience of the printed word – specifically, why brand magazines and independent newsstand titles are thriving



FINNISH
DEPT
STORE



RESTAURANT



PET
RETAILER



TRAVEL

This year marks the 30th anniversary of the worldwide web, a phenomenon that many believed would sound the death knell of print. Instead of facing their demise, though, ink-on-paper products are enjoying something of a rebirth. Brands have discovered that, when it comes to the written word, the importance of touching something tangible has never been more appreciated.

Businesses from airlines to supermarkets are producing magazines designed not only to promote their marketing message but to build a deeper relationship with their customers. Furthermore, catalogues – which had been considered the medium most vulnerable to online competition – have reinvented themselves as premium products that cut through the digital noise, spawning the ‘flick to click’ phenomenon.

Former *GQ* editor James Brown, who now edits football monthly *FourFourTwo*, reckons there is ‘definitely’ renewed interest in print. ‘If you went back ten years ago, when people were saying

print was dead, it was just a failure to understand that it isn’t a case of print or digital, it’s about knowing how to disseminate the content you create across all platforms,’ he told the BBC’s *MOTD: The Premier League Show* earlier this year.

British restaurant group Boisdale is a live example of this multi-channel approach. It has 30,000 followers across social media and sends out a weekly e-newsletter to its 85,000-strong database of subscribers, but its greatest communications investment is a quarterly magazine called *Boisdale Life*. The 84-page glossy was launched in 2014 to improve customer engagement. Regular diners, such as broadcasters, politicians and captains of industry, were persuaded to

write for the magazine, and their articles appear alongside interviews with music artists scheduled to perform at the venues. As well as the 10,000 copies available in the restaurants, a further 90,000 are distributed via five-star hotels, first-class airport lounges and lobbies of City of London office blocks.

Publishing Director Andrew Davies says the magazine offers added value. ‘We see it as being in line with the trend for vinyl rather than streaming on Spotify,’ he says. ‘People want to touch and play things and experience a different sort of sound when they listen to vinyl, and the same applies to print. For our luxury advertiser, the touch and feel of a glossy magazine is not an ►

“THE TOUCH AND FEEL OF A GLOSSY MAGAZINE CANNOT BE REPLICATED ONLINE”



MANY PEOPLE ARE INSPIRED TO BUY ONLINE AFTER READING A PRINTED CATALOGUE

environment that can be replicated online. We think there will always be a place for magazines.'

Davies' faith in the future of print is shared by Mark Scanlon, Chairman of Walstead Group, Europe's largest web offset printing business. 'People still like the touch and feel of a magazine or a catalogue. They enjoy the experience of flicking through the pages. They like the look of a quality magazine sitting on their coffee table. One side of our business is producing advertising leaflets. They go through people's doors or into their shopping baskets as they enter the supermarket. Customers don't just ignore them as they might an email. They look at them, check out the bargains and direct

their shopping accordingly. There are billions printed every year and they are popular in countries with very high internet usage, such as Germany.'

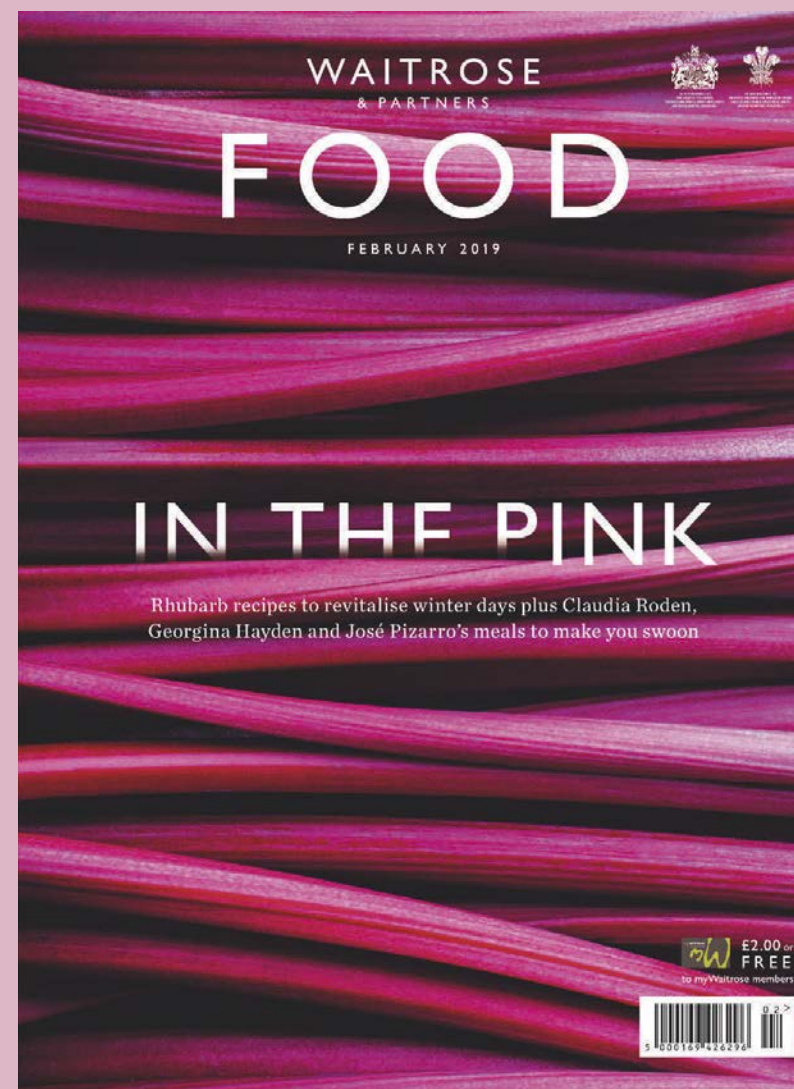
While online sales are mushrooming, many consumers make their online purchases after being inspired by a printed catalogue. 'With so many brands emailing customers on a daily basis, physical catalogues cut through the digital noise,' says Clare Hornby, the founder of womenswear brand ME+EM. '“Flick to click” can be very powerful.'

Even the world's biggest digital brands have been turning to print for headline-grabbing ways to build communities. Last year, Facebook published a paper magazine called *Grow* and US Amazon distributed

a toy catalogue over the festive period, complete with stickers and QR codes. Airbnb also launched a magazine in 2017 in partnership with Hearst: it doesn't want to be seen purely as a booking service but as a community of like-minded travellers. 'When you checked into an Airbnb, there was nothing branded,' says Editor in Chief Mike Steele. 'Now they're sending out *Airbnb Magazine* to every single host home. That's a million copies. It's an act of hospitality. It's something special.'

'A decade ago, many pundits predicted that print would be replaced by digital,' says Catherine Maskell, Managing Director of the Content Marketing Association. 'While print consumption has declined, the reach and effectiveness of branded magazines has remained constant. Six of the UK's top-ten print magazines by circulation are produced for brands, with the top title distributed to almost 2.5 million people. They inspire their readers in ways that are almost impossible to replicate on digital formats.' ►

WE REACH
NEARLY 2.6
MILLION
POTENTIAL
CUSTOMERS
PER MONTH



WAITROSE & PARTNERS

The supermarket invests in a vibrant multi-channel content strategy that includes a healthy dose of print. Rochelle Venables, Partner and Marketing Manager, Publications and Content, explains why

'Insight tells us that our most loyal customers consistently demonstrate a real appetite for print. Obviously, for us, that has the dual benefit of being able to showcase our premium content in beautiful, market-leading publications that have real sticking power, while protecting our print advertising revenue. Moreover, print publications help us to reinforce our credentials in key areas. Just over a year ago, we launched *Waitrose & Partners Health* magazine - committing to a new print title shows our customers how serious we are about health as a part of our business strategy. The fact that the title was immediately profitable just strengthens the rationale that print should continue to play a key part in our marketing mix for the foreseeable future. Our magazine titles are also available free of charge to our myWaitrose members, meaning we are able to reward our most loyal customers with a valuable, tangible benefit that they can put right into their shopping bags to take home.'



Waitrose & Partners Food is the UK's biggest food monthly, with a circulation of 693,840. *Waitrose & Partners Health* has a circulation of 445,000



appeal of something well edited and finite, to hold in the hand; a genuinely periodical viewpoint rather than rolling surface news.’

Design is a key differentiation, says Matt Alagiah, Editor of *Printed Pages*, a biannual created by the digital brand It’s Nice That. ‘Our website is about filling templates. But when it comes to print, our designers have more freedom. We don’t do *Printed Pages* for the bottom line. There’s something about the tangibility of print that immediately shows the quality we are capable of as a media company.’

A magazine can transform the business of the digital mothership, as has happened with the dazzlingly inventive *Eye on Design*, a tri-annual launched in 2018 and published by the non-profit AIGA (American Institute of Graphic Arts). ‘We went into this with a business plan to make sure that we weren’t just publishing a vanity project but creating a sustainable model,’ explains

founder and Director Perrin Drumm. ‘We didn’t anticipate how the print magazine would become a calling card to boost the entire *Eye on Design* brand. After our first issue, we were suddenly taken seriously both as a source for design journalism and as an editorial business. Something clicked and it has everything to do with the physicality of print. The assumption is that print is ephemeral and online is everlasting, but in my experience with *Eye on Design* it’s been the opposite: our online readership is huge compared to our print circulation, but the magazine is the thing that sticks. It’s transformed our brand as well as our bottom line.’

Let’s not forget newspapers. The original broadsheet format has been rediscovered and given a frenetic, fragmented urgency in look and content. There’s *Good Trouble*, a howl of outrage that grew out of the website that

‘celebrates the culture of resistance’, and *Civilization*, a text-heavy, oversized journal that tells ‘New York’s Stories & Secrets’. And on 6 March this year, news site BuzzFeed gave away 20,000 copies of a 12-page newspaper. Simply called *BuzzFeed*, it follows the brand’s wittily idiosyncratic approach: the strapline reads ‘Social. Mobile. Recyclable’.

What’s next for the independent magazine? ‘It’s now a question of how many will be the new mainstream,’ says Leslie. ‘Big publishers are going to start making things that to all intents and purposes are small indie magazines. We’re already there with the new *Esquire* [now six issues a year] and *Glamour* [twice a year]. But that’s natural: same as it ever was.’ *Ian Birch is the author of Uncovered: Revolutionary Magazine Covers – The Inside Stories Told by the People Who Made Them (Casell).*

PART 2 GREEN SHOOTS AT THE NEWSSTAND

Legacy magazines may be in decline, but small-circulation independent titles are booming. Ian Birch, former Editorial Director of Hearst and Emap, unravels the phenomenon

The mainstream magazine industry is in a state of panic. Copy sales are collapsing and advertising is migrating online, where Google and Facebook suck up most of the oxygen and cash. But when experimentation is suppressed in one sector, it bursts forth in another – and the explosion of new and ever more eclectic magazines in independent publishing is testimony to this. The current boom dates back to the late Nineties, which saw a clutch of ground-breaking European titles, including *Self Service* and *Purple* from France, *032c* from Germany and *Re-Magazine* from the Netherlands, all championed by creative director and author Jeremy Leslie, who leads magCulture, a design studio, online resource and magazine shop in London, which sells more than 500 independent titles. ‘These magazines could hardly be more different from the mainstream,’ Leslie explains. ‘They are alternative in terms of content, photography, production values and bespoke typography.’

The number of launches has tripled in the past five years and a network of specialist shops has emerged to cater

for the rising demand. In addition to magCulture, there is Magazine Brighton, Athenaeum in Amsterdam and Do You Read Me?! in Berlin, while Tate Modern devotes a significant amount of space to them in its main bookstore. There’s also the online subscription service Stack, which sends out a niche publication every month.

Many of the titles started as online platforms. These new magazines, suggests Leslie, ‘have found their editorial voices online and established themselves as specialists in an area.’ The majority of them look, feel and are priced like a hybrid of a magazine and a book. They have a long shelf life and because they are meticulously designed, they are prominently displayed in work and private spaces. When a new issue comes out, the old one isn’t recycled but filed on the bookshelf.

Simon Armstrong, book buyer for Tate museums, believes, ‘People want a physical product because everything’s on screens. The idea of a solid object is attractive.’ Penny Martin, Editor in Chief of biannual women’s magazine *The Gentlewoman*, agrees: ‘It is a reaction to digital. The



WHEN A NEW ISSUE IS OUT, THE OLD ONE ISN'T RECYCLED BUT FILED ON THE BOOKSHELF

The greetings card market is thriving, with Britons sending an average of 33 cards per person per year. *Amanda Fergusson*, CEO of the Greetings Card Association, explains why, even in the social media age, a thoughtful card remains an important means of making a statement

KEEP IN TOUCH

CARD BY CHRISTINE LEECH

When analysing the sustainability of print, the success of Britain's greetings card industry is easily overlooked, despite the fact that we are world leaders in a sector that continues to grow rapidly year on year. We buy more cards per person than any other nation and the tradition is a deeply embedded part of our culture. Most birthday gifts are still accompanied by a card, for example, which is not the case in other countries.

One of the historical reasons is our postal service. Founded by Henry VIII, in 1516, Royal Mail has always been affordable, efficient and fast, and our card industry has grown hand in hand because of this. Britain is also celebrated the world over as a leader in the creative and design spheres, which has doubtless contributed to the ingeniousness of our cards.

The British spend more on greetings cards per person than any other nation. In 2017, this totalled £1.7 billion, with more than £1.5 billion of that coming from single card purchases on the high street. The British attachment to sending cards highlights how significant physical messaging remains to us, even in the age of social media. The feel of a card, the paper stock, embellishment and overall quality are hugely important for publishers and consumers alike.

Online card-creation services such as

Moonpig have married the physical and digital worlds and now account for six per cent of the market. While we can potentially enjoy messaging a larger audience in the digital world, we still enjoy the option of the traditional method, knowing it will demonstrate that we have made an effort and that the recipient is receiving something a bit more special.

Social media has also driven people's awareness of occasions that might merit

100 MILLION
NEARLY 100 MILLION SINGLE CHRISTMAS CARDS WERE SOLD IN 2017, BRINGING THE TOTAL SALES FOR THE UK CHRISTMAS CARD MARKET TO ONE BILLION

sending a card. Birthdays are flagged on Facebook, while a post that you have just passed your driving test might in turn prompt a friend to send a congratulatory card. This may be one of the reasons why 18-34-year-olds are sending more cards than a generation ago.

The GCA's Thinking of You week each September promotes the mental-health benefits of receiving cards, as well as the

feel-good factor of sending them. During this week, the organisation distributes cards to mental-health units in hospitals, Age UK drop-in centres and schools, encouraging people to send a card in the hope that they will receive one in return.

Just seeing a card envelope peeping out from all the bills on the doormat creates a feeling of pleasant anticipation. You may or may not recognise the handwriting, but you're looking forward to the pleasure of reading the message or discovering who it's from. It's an immersive experience.

If your sender has been successful in their choice of card, the image will resonate immediately with you – whether the card elicits a squeal of laughter or a feeling of profound love.

The final reveal is when you open the card and see the bespoke message, written just for you. Cards with printed verses also continue to be popular. Perhaps it's our British reserve, as verses

£1.7 BILLION
THE LATEST GCA MARKET REPORT SHOWS THAT IN 2017, THE UK PUBLIC SPENT £1.7 BILLION ON GREETING CARDS

allow us to convey some of the emotions we don't feel comfortable saying in person. There aren't many affordable treats that can make such an impact.

Cards with thoughtful messages carry a strong emotional charge, which is why many of us like to keep some cards we receive. At the end of a person's life, there's a strong chance that there will be a lot of cards among their belongings.

The GCA is celebrating its centenary this year, and our membership is at its highest since 1919. We may be in a digital age, but the tactile experience inherent in sending and receiving paper cards allows us to connect and keep in touch with each other on a deeper, more meaningful level.

THE REVOLUTION
WILL BE

PRINT
ED

Rather than making digital screens more tactile, why not make paper technological? Clever innovations mean print is becoming a springboard to a whole new co-existent world for brands and industries to explore

ILLUSTRATIONS BY MICHELE MARCONI



'YOU DON'T EXPECT A BOOK TO SING OR SHOW YOU A VIDEO. THERE IS SOMETHING TRULY MAGICAL ABOUT IT'

Thanks to technology – perhaps ironically – paper products continue to thrive. While speciality papers have enabled brands to appeal to multiple senses – for example, smooth textures that mimic velvet, rough textures that feel like sandpaper, varnishes that react to light and heat – the use of paper as a conduit for augmented reality (AR) truly bridges the gap between print and a digital device.

One project that encapsulates that approach perfectly is 'Next Generation Paper', a research project from a team at the University of Surrey. Led by Professor David Frohlich from the Digital World Research Centre*, the project uses AR and printed electronics to connect paper directly to the web with hotlinks, in what the team call second-generation (2G) and third-generation (3G) paper. This enables the reader to obtain related information on any nearby digital device, just by turning a page or touching the surface of the document, photograph, poster or book.

Currently, the project is exploring how this could connect the use of paper and screen-based information in tourism, where brochures and guides already co-exist with mobile apps, digital photography and online booking systems. The opportunities are virtually limitless, with multiple industries ideally placed to benefit from this approach – interactive text books in education; patient records in healthcare; music and entertainment; cultural interpretation in museums and galleries. All are real and practical possibilities.

'Everything's getting closer, and there's a co-existent connection between paper and technology,' explains Professor Frohlich. 'So we're trying to get away from the idea of paper versus screen; instead,

putting paper and screen into the same product is the obvious next step.'

'Screens are preferred because they are ubiquitous now, but in the future, user interfaces may move away from touch screens,' says Dr Radu Sporea from the Advanced Technology Institute (ATI), who was part of the project team. 'Print may have new uses when that happens.'

As Professor Frohlich explains it, 2G paper is optically recognised with a camera, triggering associated digital information to be played or displayed on a nearby device. Meanwhile, 3G paper dispenses with the camera altogether and contains tiny sensors printed or embedded in the fibres of the paper itself. This will trigger the same kind of associations around it: 'Essentially, you're taking a typically static object, such as a book, and allowing it to interact with the world, and with other devices around it,' says Frohlich. 'I believe augmented paper will be a commercial reality within three to five years. 2G will come first, and 3G will follow. Touch-sensitive paper, with hotlinks, is our holy grail: as soon as you know exactly where people are touching and pointing in a book, you can start to instrument the entire surface. At the moment, we have a shifting interface

between the book and the smartphone. But, in future, the objective is to put the whole interface within the printed book.'

The project was funded by the Engineering and Physical Sciences Research Council (EPSRC), part of the UK Government's commitment to developing the digital economy. The end result is an augmented guide book, or a-book, to Cornwall, with extra pictures, videos and interviews – it was released as an experimental demo in early 2019, in association with Bradt Travel Guides.

Despite the freedoms offered by the digital interface, Professor Frohlich remains passionate about paper. 'There is potentially so much distraction associated with the digital experience,' he observes. 'Paper products, such as books and magazines, are often actively chosen to escape from social media because paper will never interrupt you. Even our product has to be manually initiated to obtain the additional information. We're trying to design a new kind of reading behaviour involving paper and screen and, in doing so, we hope to make media tangible again. You don't expect a book or magazine to sing or show you a video, and there is something truly magical about that.' ▶

Paper hits a high note

Robert Slot, Director of Tech at TBWA\NEBOKO in Amsterdam, describes how his team combined conductive ink, a McDonald's paper tray liner and a digital interface to create McTrax – a beats-creating experience to engage customers.

Thanks to Novalia's touch-sensitive ink technology, paper can be truly interactive. Using this ink, you can print a whole host of buttons and touchpads on a piece of paper which, when synced to a digital device, can be used just like a musical keyboard.

McDonald's came to us because it wanted to create an in-restaurant experience to engage its younger audience. It was therefore essential that we used an item that they would encounter in the restaurant as part of any meal.

In our research into what moves the McDonald's target audience, we discovered that they were interested in DJing and music production. So to take advantage of these interests, we came up with the idea of turning the tray liner that came with a meal into a beat machine.

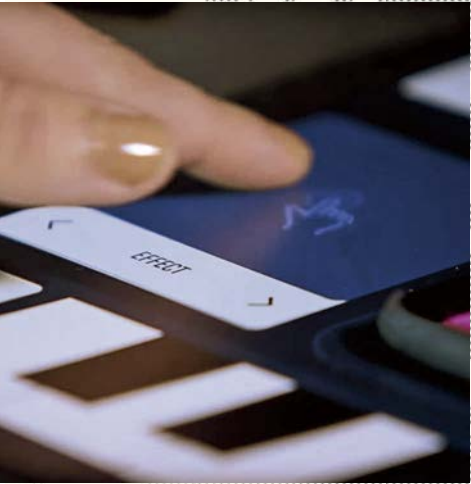
As soon as we had the idea, we started to search for suitable partners. Together with our technical partner on this job (This Page Amsterdam), we connected with Novalia, whose technology allowed us to make use of actual paper – perfect for what

we envisioned for the tray liner.

Interactivity on screens is something that most customers expect in this digital era. Paper allowed us to make something that is tactile and interactive, encouraging engagement with something surprising. It's harder to achieve that sort of magical experience on a screen, where haptics is often compromised in favour of interactivity. Everybody who experienced the tray liner was amazed that something like this was actually possible.

From the moment the press heard about the McTrax, the media attention was big. In the first week after the launch, McTrax was covered in titles such as *Vice* and *Fortune*. From there it got picked up in music titles such as *DJ Mag*, as well as in the mainstream media.

Although it depends on the idea and the objectives, this technology and similar analogue technological developments prove that any surface can become interactive. Combined with technologies such as augmented reality, innovative print technologies really help to break down conventional borders in our thinking about media and the materials we use.



COMING YOUR WAY SOON

PHOTONIC INKS

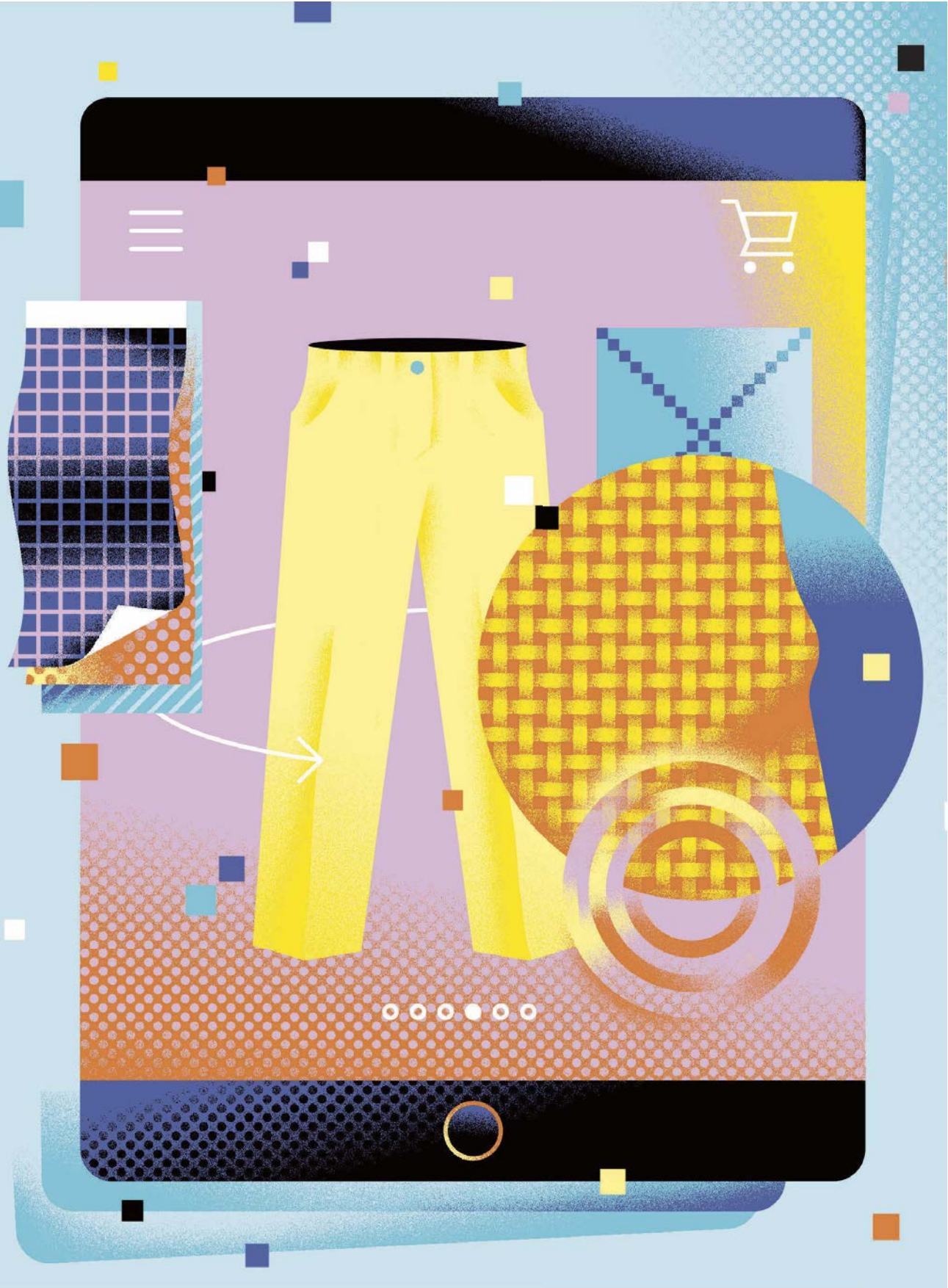
These inks change colour electronically in response to finger pressure or sunlight, thus creating ‘invisible’ printing. Such inks have amazing security potential in passports, for example, and will change the landscape for ‘secret messaging’. Brands are already using the technology: Ogilvy South Africa produced a children’s book called *The Book of Dirt* for laundry detergent brand Omo. The text and images only appeared when the reader smeared soil across its pages.

CONDUCTIVE INKS

By acting as a circuit, paper printed with conductive ink essentially becomes a touch-screen display (as with our McTrax case study on page 61). Marcin Ratajczak, co-founder of INURU, has developed light-up inks that can be printed on anything. ‘The technology can be applied to any surface: labels, packaging, business cards, books, marketing materials, car interiors and furniture,’ he explains. ‘INU-INK incorporates many movements as activation mechanisms. Touch is one; reaction to turning the page is another. Touch gives readers a visual feedback from previously static surfaces.’

3D PRINTING

It’s still in its infancy, but this technology has great potential within packaging where personalisation is key. Expect to be able to design and customise your own packages in the not-too-distant future.



FEEL ME, BUY ME

We can look at a beautiful picture of our online purchase, but we can never touch it as we could if we were in store. As Rachel England discovers, haptic technology is moving fast to bridge the gap.

E-commerce retailers are acutely aware of the limited nature of screen shopping and are investing in technology that promises to simulate touching the item as if you were in store. This kind of haptic technology, while often regarded in the same futuristic sphere as virtual and augmented reality, has been around for decades. Its earliest application saw it used in military flight simulators in the 1960s, and it wasn’t long before it made its way to the consumer market.

The first immersive experiences

According to *The Video Game Explosion: A History from PONG to PlayStation and Beyond* by Mark JP Wolf (Greenwood), Sega’s 1976 video game Moto-Cross (rebranded as FonZ) was the first to feature vibro-tactile feedback, letting players feel the rumble of their motorcycle as it crashed across the bumpy terrain and into other racers. Soon, all consoles touted this kind of immersive gaming experience and, in 2007, the technology moved to mobile devices, where physical mobile phone buttons were replaced with virtual keys that ‘vibrated’ on touch.

‘We’ve come a long way since these early examples,’ says Heather Macdonald Tait, formerly of Bristol-based Ultrahaptics. ‘Now, companies everywhere are integrating the technology into all kinds of offerings. Touch is a sense that we take for granted, but it’s absolutely critical in everything we do.’

Subconscious processing

According to Macdonald Tait, touch is processed 1.7 times faster than our other senses, and yet we experience it on a very subconscious level. ‘Think about filling your car with petrol,’ she says. ‘That “clunk” you feel when the tank is full

reaches your brain much quicker than a visual or aural cue. And yet you’re probably not consciously focused on the feeling of the pump in your hands during the process.’ But it’s subconscious stimulus that helps to keep us immersed in our environments, she says, which is why haptic technology is able to create such enriching experiences, whether that’s turning the pages of a magazine on a tablet or picking a lock in a video game.

‘The technology draws on four types of mechanoreceptors in the skin. These give the brain information about touch, pressure, vibration and tension,’ Macdonald Tait explains. ‘Tweaking these different factors allows us to create haptic experiences that are far more sophisticated than the simple vibration you get with games consoles and phones.’

Looking ahead

This increasingly detailed research, coupled with pioneering innovation, means that haptic technology is set to offer a whole world of exciting touch-



based experiences in the near future. Companies are working on developing haptic textures, which means, for example, that you’ll be able to ‘feel’ a suede jacket through your device before you buy it. This technology, already being showcased at conventions and tech fairs around the world, uses next-level haptic feedback, such as sophisticated vibration, to trick your mechanoreceptors into convincing your brain that you’re running your fingers along a textured surface rather than a smooth screen.

‘And then there’s completely hands-free haptics – technology that uses air pressure and sound waves to create the sensation of touch, even when you’re not touching anything at all,’ says Macdonald Tait. ‘Consumer-focused haptic technology has until now largely been confined to a screen or a surface, but that’s not how we experience touch in the real world. The challenge is making it truly three dimensional.’

Macdonald Tait envisions these concepts becoming a part of everyday life within as little as five years. Indeed, advances in virtual and augmented reality are progressing quickly, as is consumer adoption – research firm CCS Insight believes more than six times as many VR headsets will be sold in 2022 as in 2018, while data analyst Statista predicts the combined VR and AR market will be worth \$215 billion by 2021. It won’t be long until the haptic touch-screen keypads we know and use today are as retro as the first vibrating joysticks.

YOU’LL BE ABLE TO ‘FEEL’ A SUEDE JACKET THROUGH YOUR DEVICE BEFORE YOU BUY IT



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All figures are from the Greeting Card Association Market Report. This report, which covers sales January – December 2017, is the only research based on actual retail sales figures, with data confidentially submitted by UK publishers to market analysts Echo Research (formerly a division of Ebiquity).

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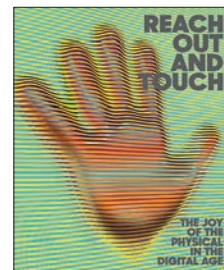


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PAPER FINISHES

Exciting, tactile finishes really make a printed product
stand out. Here are the ones we've used in this magazine

Cover printed on McCoy Silk 120# Cover
Body printed on McCoy Silk 100# Text



Front cover
4-colour process
sculptured emboss
soft-touch lamination
gun metal foil



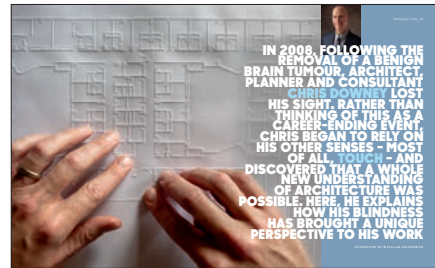
PP6-7 Selling point
4-colour process
high-build spot rough matte
UV coating



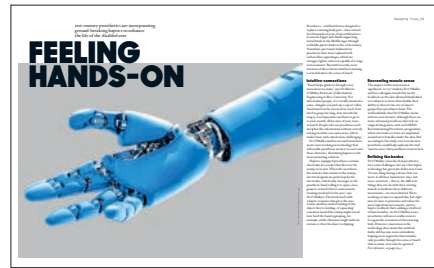
PP11-12 Hello world
4-colour process
die-cut image



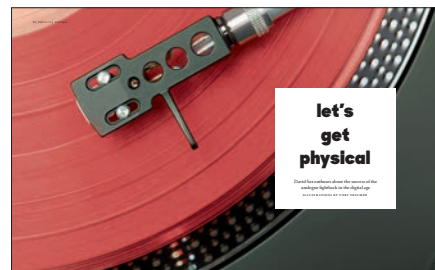
PP16 Icons of touch
4-colour process
sculptured emboss
lemon fragrance varnish



PP22-23 Changing lives
4-colour process
high-build spot matte UV coating



PP28-29 Feeling hands-on
4-colour process
chrome silver ink



PP30-31 Let's get physical
4-colour process
high-build spot gloss UV coating



PP38-43 My favourite
4-colour process with
match red
soft-touch coating



PP47 Total recall
4-colour process
high-build spot matte UV coating



PP51-53 Boost your brand
PP54-55 Green shoots at the newsstand
4-colour process
spot gloss UV coating



PP59-61 The revolution will be printed
4-colour process
spot vignette chrome silver ink



Back cover
4-colour process
sculptured emboss
soft-touch laminate

