mrweb

MEASURING BRAINS & BODIES

Applied Consumer Neuroscience and Biometrics in MR

MARCH 2022

DEVELOPED IN ASSOCIATION WITH

HCD research®

ARTICLES

PODCASTS

INTERVIEWS

VACANCIES

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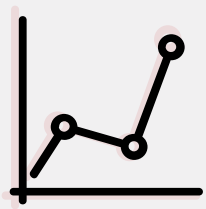
DOES YOUR *product* MEET THE *promise?* *Prove* IT.

HCD Research optimizes and validates product formulations/ experiences, packages, communications and brand/product connections globally

HCD takes a holistic approach to consumer research by employing applied consumer neuroscience which is the integration of traditional, neuroscientific, behavioral and psychological tools and methods to better understand consumers. We are methodologically agnostic, flexible and have years of experience in the healthcare, consumer and wellness space.

TRADITIONAL



NEUROSCIENTIFIC & BEHAVIORAL

PSYCHOLOGICAL

Please reach out to Allison Gutkowski at Allison.Gutkowski@hcdi.net to learn more about how HCD Research can help you!

Contact our VP of Research & Innovation Michelle Niedziela at Michelle.Niedziela@hcdi.net to discuss our publications, methodologies and approach to research.

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FOREWORD:
MEASURING BRAINS & BODIES

Better late than never, and we hope you'll agree this 'Brains & Bodies' issue is at least as interesting as it is tardy. Publication comes at a time when many economies are back up and running nicely post-Covid, making up for lost time, and the insight sector seems to be buoyant.

With two sponsors who are very much steeped in the science of neuromarketing and biometrics, we've tried to strike a balance between providing an introduction to the topic for those research professionals who aren't specialist but want to know more, and tapping the considerable technical knowledge and insight that HCD and MindProber can offer for some more technical discussion. Section 1 as usual gives an introduction and a 'recent news' summary, but for more of a grounding, seek out Michelle Niedziela's 'Best Practice' guide in section 3, which runs through many common techniques and their applications. You should also find the podcast interviews thoroughly 'approachable' for the layperson, with their usual mix of personal background / anecdote and discussion of trends and developments.

I say all that as someone who knew very little about it three months ago - I've really enjoyed learning. I also set out hoping that by the time we finished compiling content, my overriding impression would no longer be 'that stuff that was massively over-hyped ten years ago'. Success, on that front: our sponsors are companies / individuals with their feet very firmly on the ground, even 'though they're innovators, looking upwards and forwards and full of enthusiasm for what they do. It's taken a while, but the mood in 'neuro' has changed.

As ever, please follow up with our contributors and advertisers on anything where you want to know more; and get in touch with us with any feedback on the publication.

Nick Thomas, MrWeb

The field of market research has changed a lot in the past 10-15 years or so and will need to continue to evolve as we enter a new metaverse-driven world. When I first reached out to Glenn Kessler (President and co-founder of HCD Research) a bit over 8 years ago, I was interested in applying neuroscience and psychology to understanding consumer behavior. The field of 'neuromarketing' was still fairly new but also rife with pseudoscience and outlandish claims.

However, this also presented great opportunity to do things better, for meaningful research, for actionable results and real insights into consumer decision-making. At HCD we wanted the field to do better. We wanted our results to be better. We wanted our clients to be satisfied and feel confident about the science. And we wanted to be open and honest about it. We wanted to educate our clients so that they could be active partners in the research and better discriminate among the myriad neuromarketing companies out there.

HCD has been very active in this effort, writing articles, blogs, and tweets (as you can see in what follows). We even started our own annual symposium (NeuroU), bringing academics and industry together to grow the field.

There's still some work to be done. But I think we are on a good track. The field continues to evolve, as do the technologies. Clients are becoming more educated on the topic, now employing more neuroscientists and psychologists as behavioral scientists on staff, making them much more savvy consumers.

At HCD we will continue to try to fight the good fight. We will advocate for using the right tool for the right questions. And when we hear of a questionable application, we will ask to PROVE IT.

Michelle Niedziela, HCD

IN THIS ISSUE...

MYTHS & REALITIES:

AN INTRODUCTION TO NEUROMARKETING

By Michelle Niedziela, PhD, VP of Research and Innovation at HCD Research & Glenn Kessler, President of HCD Research

DRNO Timeline

EyeSee Expanding in APAC and Mexico *Feb 22 2021*
Behavioural research specialist EyeSee has opened a new sales office in Singapore and an operations office in Mexico City, following a year of record growth in 2020.

The interdisciplinary field of "neuromarketing" utilizes techniques from psychology, neuroscience, economics and marketing to gain a more comprehensive understanding of the consumer experience. Commercial tools for leveraging these methodologies continue to get better, faster, and cheaper; however, the field has been plagued with pseudoscience and "neuro-hype." Researchers and clients alike have experienced some disappointments as they incorporate these measures into their research. From EEG (electroencephalogram) headsets to facial coding, neuromarketing tools have never been so accessible (or confusing). We will discuss how misconceptions and neuro-hype have led to a misunderstanding about what consumer neuroscience can and cannot do, and what the future may hold for the field.

Technology is ever changing and almost impossible to follow. If you buy the latest laptop today, within 6 months, another model will be more advanced than your recent purchase. While it is important to be willing and able to change with the times by staying on top of the latest tools and methodologies, these advances come with nuisances and complexities. To make actionable progress, continuous learning and mastery is necessary. The current business environment is a free-for-all race where suppliers compete to impress clients with new capabilities. One industry most affected by the rapid advancement of technology, with a mist of mythology and misinformation, is neuromarketing (also referred to as consumer neuroscience, applied neuroscience, or behavioral science).

With more accessible neuro-tools (cheaper headsets, greater popularity, etc.), the once very academic field has become more mainstream in consumer and market research, especially in the areas of advertising, marketing, product research and measuring consumer emotions. Finding the best tool to measure emotions is highly sought-after, since it presents an opportunity to better connect consumers with products, concepts, or packaging.

The once very academic field has become more mainstream in consumer and market research, especially in the areas of advertising, marketing, product research and measuring consumer emotions

However, this search has been plagued by difficulties. The complexity of studying and identifying emotions, as well as the need to choose the right tool for the right research question, underlines the need for interdisciplinary and thoughtful approaches. Consumer neuroscience providers, eager to sell services, often perpetuate neuromyths which lead to fundamental misunderstandings, misuse, and disappointment in the science.

Avoiding Neuro-Hype: Using the right tool for the right question

Marketers and consumer researchers have traditionally relied on consumers' self-reported reactions using survey research. Motivated to apply newer and more in-depth emotional and perceptual measures to understand and predict the consumer experience, researchers tap into neuromarketing measures. The ability to gain neuroscientific insights into the emotional product experience has therefore become very successful, as it provides useful information about the consumer experience.

The neuroscience toolbox has many great options for exploring a consumer experience, from measuring skin temperature and heart rate to more advanced technologies such as EEG and fMRI (functional magnetic resonance imaging). Neuro-measurements provide nuanced and complicated results that are heavily influenced by research design. Each tool within the neuro-toolbox has its strengths and weaknesses, along with having situations where measures are best applied and times where certain measures are not appropriate.

Realeyes Gets US Patent for Flagship PreView Product *Mar 1 2021*
Emotion analytics specialist Realeyes has received a US patent for the core technology of its flagship PreView product, described as a 'computer-implemented system and method for determining attentiveness of users'.

Feb - Mar 2021

An applied neuroscience approach... is most useful as a complement rather than a substitute to an existing methodology

An applied neuroscience approach is appealing, but it is most useful as a complement rather than a substitute to an existing methodology. Technical inconveniences in using neuroscience to study consumer experiences (such as experimental noise, reliability of measures, etc.) do exist. Therefore, the application of neuroscience and psychological methods should be done thoughtfully, with care, to correctly use certain tools to best answer specific experimental conditions. This means recognizing the limitations of these often-over-hyped tools.

To help sort through the clutter, be cautious of these "neuro-hype" characteristics:

- **Psychobabble.** The use of neuro-words or neuro-brands (now we're doing it!) is often intended to build confidence in a product or company. The field is much more interdisciplinary than just combining neuroscience and marketing, including psychology, sociology, and economics.

- **Reliance on anecdotal evidence.** In place of published studies, many neuromarketing companies offer case studies, and most do not validate their tools or methods with any scientific research. Any new measure or new application of a neurological tool must be validated before being used (and sold). While case studies can be very informative and lead to great research ideas, thoughtful research must still be done to validate a methodology.

- **Unprovable false claims.** When making claims about neuro-methodologies, researchers often fall into the trap of hindsight bias. They often try to fit the data into a story rather than do proper research design. It's the act of seeing the final score of the Super Bowl and then telling everyone you predicted it. No one can prove you didn't, and it can make you seem very smart. However, these types of falsities hinder the scientific process of moving the field forward.

- **Claims countering scientific fact.** It's not currently possible to "read the mind" with any tool. Brains are really complicated (neuro-understatement of the year). If the claim seems too good to be true, it probably is.

- **The absence of adequate peer review.** One of the biggest problems in neuromarketing is the absence of peer review (though some are trying to correct this problem). This is difficult for many neuromarketing companies trying to keep their methodologies proprietary. The lack of a legitimate scientific peer review process for proposed methodologies has allowed many neuromarketers to get away with using non-validated tools unchecked.

Looking Forward

Consumer neuroscience, as a field, will only continue to grow. Technology will continue to advance, and measures will become more accurate. End clients and practitioners will need to better understand these tools in order to be

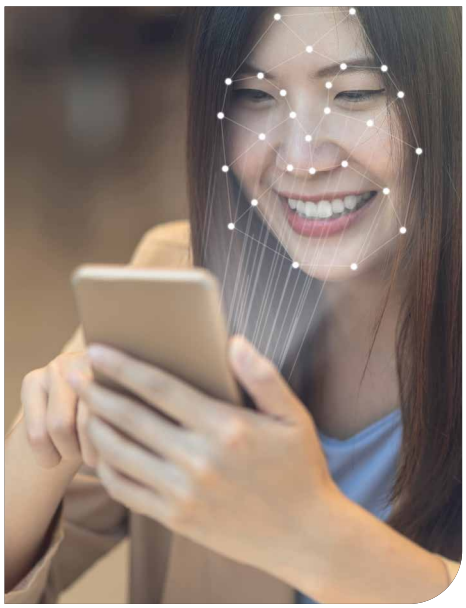
iMotions Unveils Remote Data Collection Module *Mar 1 2021*
In Denmark, human behavior analyst iMotions has launched a data collection module using a browser interface and a participant's own webcam to collect data from facial expression analysis and eye tracking, for integration with self-reported surveys.

DRNO Timeline

The future of consumer neuroscience will likely need to involve better ways to integrate non-conscious measures with cognitive data to make predictive analyses of the drivers behind different consumer responses.

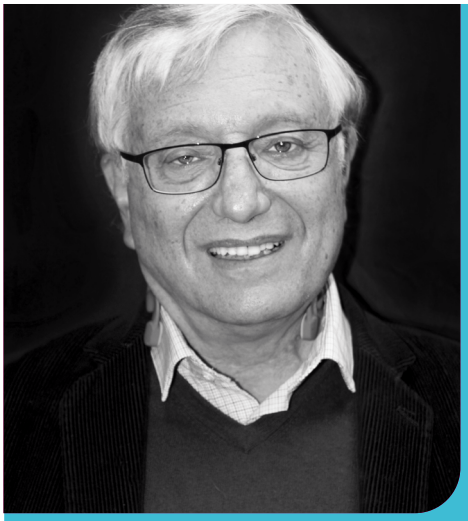
sure they are using valid approaches, but also to protect their own consumers. While it does not seem that real "mind reading" will be possible in the immediate future, concerns around these technologies will remain.

Technologies continue to improve and become faster, better, and cheaper. Neuroscientific methodologies will continue to develop in the future of consumer and market research, but with great technology comes great responsibility. Much more research will be needed to continue to validate new methodologies and theories to continue to make positive strides within the ever-expanding field of neuromarketing. The future of consumer neuroscience will likely need to involve better ways to integrate non-conscious measures with cognitive data to make predictive analyses of the drivers behind different consumer responses.



In this supplement we (and others) will discuss and review some of the most exciting developments in the neuromarketing/consumer neuroscience space, such as wearables and augmented reality, best practices for improving neuroscience applications in market research, and relevant case studies showcasing those applications. Combining proper use of neuroscience tools with traditional market research methods and also other disciplines such as behavioural science, will lead ultimately to a more powerful and holistic understanding of consumer decision making. With proper use "neuromarketing" can become a mainstream service with more automation, better standardization of methodologies, more accurate technologies and interpretations, and less sensationalism.

HCD is a marketing and consumer sciences company that provides expert recommendations by employing traditional and applied consumer neuroscience to optimize the design of products, experiences, and communications. We are "methodologically agnostic" and approach each client inquiry as a unique market research challenge. Our customized solutions employ the most appropriate research tools based on the specific objectives, and we believe this is the best way forward for the neuromarketing field.



Glenn Kessler
President of HCD Research

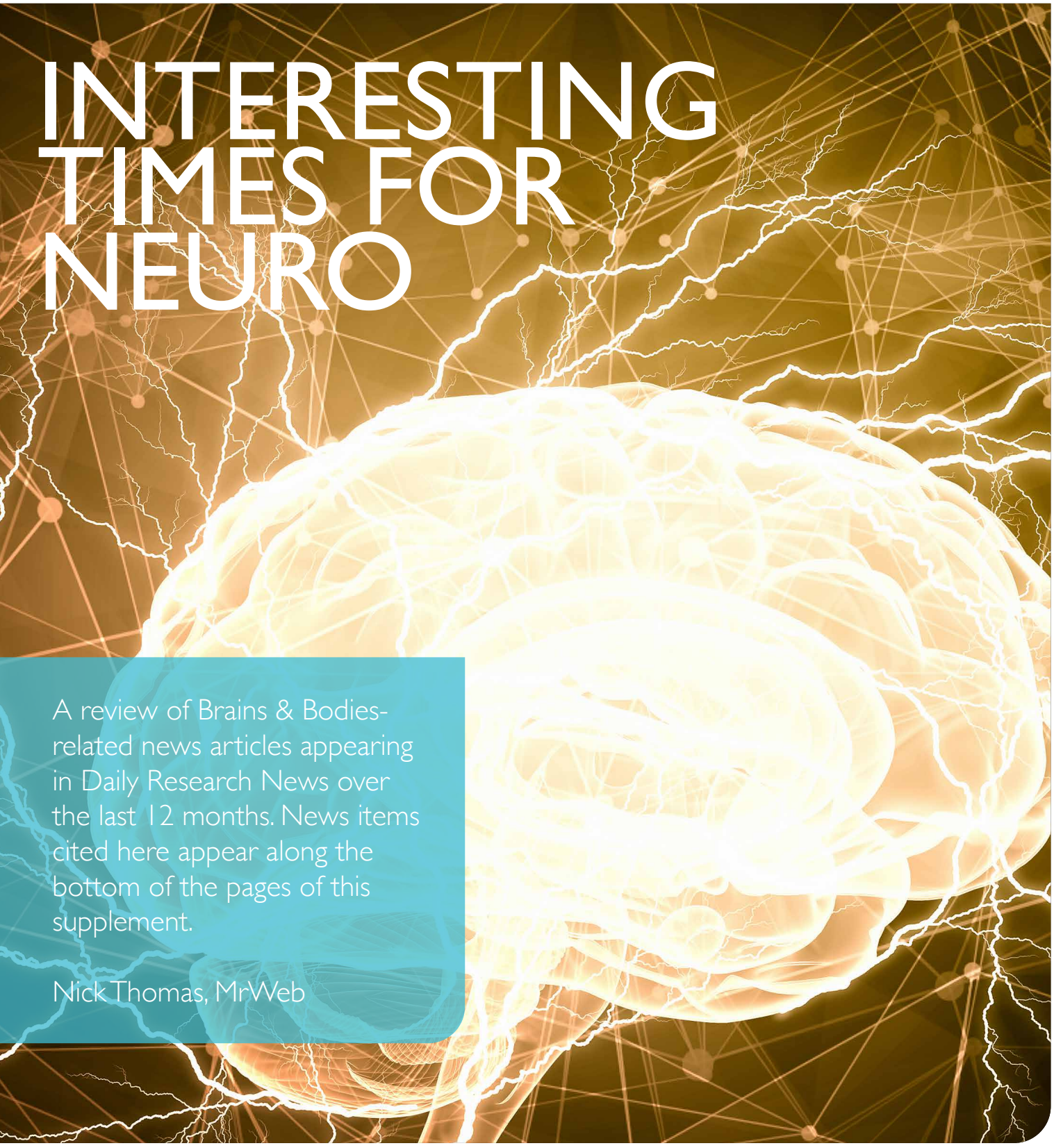
HCD Research is a communications and sensory research company which uses applied consumer neuroscience methods and traditional research tools to answer a variety of research questions. In addition to years of experience in management, marketing and market research analysis, he has conducted political communications research for campaigns and evaluated Super Bowl Advertising for major media outlets, becoming an 'expert' in political advertising.

Glenn has a regular guest speaker at The College of New Jersey, The Wharton School, University of Pennsylvania and The Rutgers Graduate School of Business and Management. He is now focused on bringing innovation and new business opportunities to HCD.

For Michelle's picture and biography see p34. For her podcast interview see p12

Facebook Illinois Privacy Lawsuit Settled for $650m *Mar 1 2021*
In Illinois, USA, a federal judge has approved settlement of the 2015 lawsuit alleging that Facebook tagged the faces of users and used other biometric data without their permission. The social network will pay $650m, including 'at least' $345 for each of the class action's c.1.6m plaintiffs.

INTERESTING TIMES FOR NEURO



A review of Brains & Bodies-related news articles appearing in Daily Research News over the last 12 months. News items cited here appear along the bottom of the pages of this supplement.

Nick Thomas, MrWeb

New Cross-Platform Feature for Canvs TV *Mar 4 2021*
In New York, emotion and behavior insights specialist Canvs AI has released a cross-platform feature for its Canvs TV solution, offering users a quant and qual overview of how their program is performing across Twitter, Facebook, Instagram and YouTube TV.

DRNO Timeline

'Interesting Times' is a phrase that's normally used ironically, to mean challenging or downright difficult times - but often said with a laugh or a raised eyebrow, indicating optimism about getting through them, and sometimes used by those who recognise that there is opportunity in most forms of adversity. I think for applied consumer neuroscience we could use it here halfway between its colloquial meaning and its literal: the path forward is difficult; it's also exciting.

These have undoubtedly been two challenging years for many in the field, and for a decade now serious practitioners have fought to gradually establish its undoubted potential against a flow of cynicism generated mostly by the excessive hype surrounding its early days. Nevertheless the world's response to Covid-19 has caused short-term problems for the field, not long-term - difficulties in getting face-to-face with respondents and strapping on kit; and difficulty getting enough of that kit, given supply shortages - while the changes in work and life brought about by the pandemic response ought on the whole to be quite good for the sector, and other change (such as the growth of wearables and ever-growing comfort with consumer technology) also militates strongly in its favour.

We might group practitioners into two types: those who have mostly focused on hunkering down and trying to survive the short-term; and those who have combined coping with leaping, seizing new opportunities. The split is not so much to do with company mentality, perhaps - there are a lot of dynamic players in neuro, and many of those are in the 'survival' category - but with the specific technologies on which they are focused and the techniques in which they specialise.

News items on DRNO have occasionally touched on Covid problems, but the impact of the pandemic response has mostly been seen in the absence of news about certain companies and areas. We've featured HCD Research, headset pioneer ***Tobii,*** voice analytics specialist Phebi, and eye tracker / behavioural science firm EyeSee multiple times, as well as Walnut Unlimited, a British-based group with a strong neuroscience offering. We've also covered emerging independents like MindProber and launches of neuro and behavioural science reports and offerings by marketing groups and ad targeting specialists. Yet, on the whole, there have been fewer firms from the field shouting about their progress: expect to see this changing as economies and confidence pick up again.

Tobii

Swedish eye tracking developer Tobii has just appointed a new CEO, Anand Srivatsa, replacing co-founder Henrik Eskilsson; announced recovery, growth and the acquisition of Phasya shortly before; has spun off its Dynavox arm, which develops speech generating devices, eye trackers and eye gaze/ eye-controlled devices for people with disabilities and special needs; and has launched a mobile capability for research conducted through its 'Sticky' self-service online platform.

StreamPulse Partners for In-Home Neuro Measure *Mar 8 2021*
StreamPulse, the in-home division of Texas-based neuromarketing researcher MediaScience has teamed up with neurometric equipment manufacturer Shimmer to develop StreamPulse Neuro, a system for measuring consumers' emotional response in a natural viewing environment.

March 2021

Integrations and partnerships

Partnerships launched 2021-2, either bringing elements of neuro into projects, or using other platforms to roll out and simplify neuro include HCD's launch last autumn of a UX Product; Forsta and Watermelon combining their CX expertise; and Belgium's One Inch Whale and Color Navigator launching a joint venture, Research & Visual Nudging

There have been partnerships too for healthcare sector firms Rare Patient Voice (RPV) and Clinakos; HCD and online community software platform Vesta, to launch a suite of emotional and psychological research tools to capture non-conscious feelings; AI-based quallie Emozo Labs and panel firm Global Survey; wearable insights tech firm Shimmer Research, mobile MR specialist IVP Research Labs and the Schlesinger Group, for an at-home biometric neuromarketing research service; and Shimmer and StreamPulse, part of Texas-based neuromarketing researcher MediaScience, to develop a system for measuring consumers' emotional response in a natural viewing environment.

We've also covered launches and roll-outs for Video ad targeting firm Tremor (facial coding and surveys combined); media and entertainment company Australian Radio Network (ARN) [and see ARN's earlier neuroscience-based media research initiative]; UK-based Phebi, about whose Emotional Resonance Score you can read in this issue; US emotion and behavior insights specialist Canvs AI; and US-based life sciences medical, commercial and compliance company QPharma, which launched an analytics wing, *Neolytica*.

Patents were awarded to NY-based consumer emotion analytics platform Truthify; and emotion analytics specialist Realeyes for the core technology of its flagship PreView product, described as a 'computer-implemented system and method for determining attentiveness of users'.

Ian Forrester, former Insight Head at video tracking platform Unruly, launched a new company DAIVID, which automates ad testing by using facial coding, eye tracking and computer vision data to predict human attention levels and emotions.

There were eye tracking launches for India's Entropik, Denmark's iMotions; and US-based facial expression technology provider Affectiva, which now measures 'sentimentality' and 'confusion' in viewers of content, using AI.

There are several reasons for optimism: we'd pick out advances in consumer tech and familiarity with it; and the development of new use cases, illustrated by the many ***integrations and partnerships announced*** already. Companies with a broad range of data and research offerings - often very large companies - have spotted neuro lying in the toolbox and realised that although they haven't used it much since it arrived there long ago, it's actually still rather shiny, and now it's becoming rather useful.

Appointments

Appointments in the field have been a mixture of high level, gearing for expansion; and business development, perhaps trying to open up and expand again after things 'normalise'. Since last autumn, Guy Maxwell returned to insight business Walnut Unlimited as Head of Qual, after six years at MMR; video attention measurement and emotion analytics specialist Realeyes added former Brand Networks CEO Dave Fall as Chief Product Officer; behavioral science insights agency BEESY added two in New York; Sentient Decision Science hired former System1 researcher Simon Wyld as SVP of Sales; and Unlimited Group appointed Simon Collister PhD as Director of its Human Understanding Lab.

Earlier UK-based integrated agency group Unlimited promoted CFO Ed Guest to COO; and Chris Bland to MD of its Walnut neuro division; having added five new recruits in the Spring.

Companies... have spotted neuro lying in the toolbox and realised that although they haven't used it much since it arrived there long ago, it's actually still rather shiny, and now it's becoming rather useful

DRNO Timeline

Phebi Launches 'Emotional Resonance Score' *Mar 16 2021*
In London, speech analysis tech firm Phebi has launched an Emotional Resonance Score (ERS), tracking emotional responses to a set of items or concepts, automatically comparing positive and negative responses and presenting the results in rank order.

It doesn't hurt that the people running neuro companies and divisions are now very realistic as well as very smart. MindProber's Pedro Almeida interviewed for this supplement describes the company as 'a one-trick pony' and says the key to well-grounded growth is to expand the use cases for techniques that are known to work, not just to snowball new techniques and 'invent things we can do' with them. At the end of both the video podcasts in this issue you'll see me ask for a motto or key phrase, and Pedro and HCD's Michelle Niedziela each answer in just two words: respectively 'No Bullshit' and 'Prove It!' If that doesn't sum up succinctly the journey on which the sector has come since the days of excessive hype, I don't know what can.

People running neuro companies and divisions are now very realistic as well as very smart

Regulation & Legal

Techniques like facial coding are always going to attract scrutiny from privacy groups - quite rightly, we might add - and the last year has been no exception, with headlines reflecting both this fact and the reasons why potential unicorns find it worth negotiating the minefield. New York-based facial recognition provider Clearview AI has in the last year been notified of a £17m fine and told to stop processing citizens' data by the UK's Information Commissioner, after a joint UK-Australian regulators' probe found it in breach of privacy regulations: however it's not been all bad news for the firm, which won new funds of $30m in July, valuing the company at $130m.

Elsewhere on the regulatory front, Britain's newly appointed Information Commissioner John Edwards launched a major listening exercise last month; as three US Democrats launched a privacy bill imposing a blanket ban on 'surveillance advertising', including the most common current forms of ad targeting. The ARF issued an analysis of the current state of the identity resolution industry, to help 'demystify' solutions and practices and give information on providers; and also in the States out-of-home ad body the OAAA launched guidelines recommending a move toward an impressions-based measurement system, providing both forecast and reconciled-as-delivered daily impressions. No annual regulatory round-up would be complete without a mention of Facebook, who in March 2021 settled a six-year-old lawsuit alleging that it tagged the faces of users and used other biometric data without their permission - the sum of $650m includes 'at least' $345 for each of the class action's c.1.6m plaintiffs.

Acquisition & Investment

Money continues to flow in the field: if you can find the applications and establish the use case (or of course if you're just very persuasive and the potential is huge), funds are there and companies are interested in buying ready-made units in as part of their offering. In October, Swedish eye tracking technology firm Smart Eye bought Danish emotional response software measurement developer iMotions for $46.6m. There were also relevant acquisitions for digital experience analyst Contentsquare; ad and brand specialist Phoenix MI; US-based business data firm ZoomInfo; sports data firm Genius; and camera app Snap. Funds for expansion went in the US to in-store video analytics firm Deep North and customer success intelligence specialist CompleteCSM; and in London to human behaviour understanding and prediction specialist Humanising Autonomy.

A part of the body / a sense about which we haven't said too much elsewhere in the supplement - although see Michelle Niedziela's podcast interview - is testing via the human nose and tongue: however Aromyx, which has developed technology to digitize and quantify the information from sensory receptors in these organs, raised $10m in Series A in August.

Snap Buys Fashion Sizing Tech Company Fit Analytics *Mar 19 2021*
Camera app Snap has acquired shopper apparel and footwear sizing technology specialist Fit Analytics, which captures customer intelligence for clothing firms. Terms of the deal have not been disclosed.

VIDEO PODCAST
in conversation: MICHELLE NIEDZIELA

Watch the full video at mrweb.com/drno/michelleniedziela.htm

Interview by MrWeb's Nick Thomas

DR MICHELLE NIEDZIELA, PHD, VP OF RESEARCH & INNOVATION, HCD RESEARCH

NT: Tell us about your parents...

MN: Both my parents were entrepreneurs. My father had been in the military, and when he came out he married my mother who is Taiwanese - she came over from Taiwan and they started a fan business together. It was the late '70s, the time of the Clean Air Act, so it was the right timing for this new technology: they were selling ceiling fans into people's homes, and they started off with a small apartment with fans piled up to the ceiling - actually my mum while pregnant with me was helping to install ceiling fans in people's homes!

DRNO Timeline

Shimmer Partners for Turnkey At-Home Neuro Launch *Mar 23 2021*
Wearable insights tech firm Shimmer Research has partnered with mobile MR specialist IVP Research Labs and data collection firm Schlesinger Group, to launch an at-home biometric neuromarketing research service.

Eventually they opened up stores and did fairly well - they were able to see the business grow and then step back a bit.

NT: So what was your experience of growing up in that household?

MN: My dad always jokes that my first words were helping in the store and saying 'Cash or Charge' to customers... but in my memory I spent a lot of time in accountants' and lawyers' offices playing with the desk toys that they all have - those balls with the magnets that go backwards and forwards, but more generally spending a lot of my childhood hearing my parents talking about contracts and legal things and finance, all of that.

I was an only child, and I spent a lot of time with my parents travelling the world, or crossing the US, whether it was for business or for vacation, but my experience was very varied in that sense. I did have a normal childhood as well, playing with kids in the neighbourhood and all that, but I did get a very varied perspective from them, and perhaps a lot of business acumen as well, just vicariously, hearing what they were going through.

> I failed miserably and I had to take a step back and say Wait a Minute I probably shouldn't have done Chemical Engineering.

NT: I'm assuming that you'd describe yourself as a scientist just as much as a businessperson. Did your parents push you in that direction as well? Or rather not push but you know... influence?

MN: You know, they didn't push me in any direction, I was very much an over-achiever on my own! And they kind of let me do it both to my delight and my detriment - they thought that it was good for me to try to do something and fail at it, and I actually agree with that. So for example when I came out of high school I had all the honours credits and even quite a few college credits, and I actually had it in my head that I wanted to be a chemical engineer. It wasn't because I was actually good at chemistry, or that I loved it - I actually didn't know much about it - but I heard it was really difficult, and so I thought 'I'm going to go and be a chemical engineer'. I failed miserably at it, and I like being open and honest about that because people hear that you're a scientist and all that and they assume that you always had this trajectory and were always really good at it - and No, I failed miserably and I had to take a step back and say Wait a Minute I probably shouldn't have done Chemical Engineering.

When I came home my dad was really funny, he said 'I knew Chem Eng wasn't for you, but you had to have that experience and see it for yourself'. So I went back to university and started taking some other classes including a psychology class that had some biological psychology in it, and it really interested me. Then I read some books and this whole idea of neuroscience was really appealing to me, and I was able to go to a larger university after that and major in neuroscience, and decide to go into Grad School. I think the importance of failure is a really good lesson.

Rats & Clients

NT: ...so that started you off in a career in neuroscience. What did you do first of all - the client side?

MN: My idea was not to work in industry. When I was in grad school I was going to do a PhD and be a research professor - be at one of the large universities getting research grants, and I was particularly interested in behavioural neurogenetics. That's what I got my PhD in and what my dissertation was on, and I worked for ten years or so looking at rodent models etc... And how genetics influenced behaviour, and I ended up being severely allergic to rodents! You can develop it over time, and I guess because of my intense exposure to rodents over time I ended up being horribly allergic, to the point where I couldn't touch a pen that had been in the animal room without breaking out into hives, or having to use an inhaler to breathe.

So I was doing my post-doc at the University of Pennsylvania Monell Chemical Senses Center, which is the leading taste and smell research center. It was kind of unique in that it had both government and industry funding, and my advisor there as I was developing worse allergies said 'You know you actually are a very sociable person and you like talking to people, you might do well in industry - have you thought about applying?' - because I really needed to decide what to do.

NT: I was thinking he would say 'You might meet fewer rats there' - 'though that would depend on which sector of industry you went into...

EyeSee Appoints US Business Development Director
Mar 25 2021
In the US, behavioral research specialist EyeSee has appointed long-time PRS exec Heather Graham as Business Development Director.

March 2021

Rats & Clients continued

MN: Yeah! So yes my first job was a listing that was perfect, it said 'looking for a PhD with experience in psychology and behaviour, particularly in taste and smell' - and that was me! - everything that was listed was very much my experience. That was with Johnson & Johnson where I joined as Senior Scientist and lead for their behavioral science efforts. At the time, it's interesting because there weren't really any companies that had behavioral science programs, so I think they were very forward thinking in that, focusing on innovation, particularly in taste and smell for their consumer products.

NT: ...and you also worked at Mars?

MN: Yes, the thing that people have to remember about going into industry... they have massive lay-offs, and after a couple of years at J&J they had a massive lay-off. Then I had to rethink what I wanted to do, but I had this background in taste & smell which made me a little bit unique and there was this opening at Mars Chocolate, so I was able to work in a chocolate factory doing global sensory program management, really interesting and different.

When you eat a Snickers, you expect it to taste the same whether you buy it in China or in Texas, right? So there are people whose whole job is to make sure that even if there's a hurricane which disrupts our flow of peanuts from Nicaragua, and we have to get our peanuts in Argentina - which is arguably a better peanut - it's going to change the taste of their Snickers, and people get upset and think something's wrong with it. So there's a whole sensory program around making sure that every product stays within signature, and whether you buy your orange juice in January or in August you want it to taste the same, and someone has to make sure that happens.

NT: In those two client side roles were you building on a long heritage of taste and smell research / expertise and just building a new element, or was it more revolutionary?

MN: No that kind of taste and smell work has been around a lot longer than most people realise. It's an old and very well-established scientific field in food science in particular. It's interesting that most people aren't aware that even for the fragrance of their shampoo, there's a whole team of scientists that specialise in that fragrance.

Writing Your Own Job Description

NT: After that you moved agency side - was HCD your first job away from corporates?

MN: Working in Mars I realised that I wasn't using much of my neuroscience background, but there was this burgeoning field / growth happening in the neuromarketing field, the whole idea of using neuro research for consumers. I think in MR in particular most of the work was being done in ad testing, and traditional marketing communications work, but I had done all this work in looking at using neuroscience in consumer products and so I actually contacted Glenn at HCD and I said 'Look I know you do a lot of work in communications research, but have you thought about doing this kind of work for consumer products? Like, I have a PhD in neuroscience, I know that I can learn the communications part, but let me talk to you about consumer products...'

NT: [laughing] I was about to say - based on our article covering your appointment at HCD eight years ago - that it looks like another job description written for you, but it actually sounds like *you* wrote the job description...

MN: I did actually! Glenn called me back after that conversation and said 'So... what would a job title look like for the person you were talking about?' - and we went from there and OK I should have said Emperor of the Universe but I went with Scientific Director.

NT: There's a company we work with called Smarty Pants that I think has a monopoly on that kind of Job Title [Emperor of the Universe], so I think you did well.

DRNO Timeline

Emozo Labs and Global Survey in AI Partnership *Mar 30 2021*
In the US, AI-based qualitative research provider Emozo Labs has partnered with data collection firm Global Survey to use artificial intelligence to better understand customers' conscious and unconscious responses.

Remote Possibilities

NT: Has the applied neuroscience sector as a whole suffered in the last two years, ie because other companies weren't able to shift emphasis to different approaches as readily as HCD?

MN: I think a lot of companies have suffered - in particular, some of them have pretty much closed shop for the last two years, and some of them are starting to come back online, because people are starting to do in-person research more, but I think it's not just that other companies were still going, but also there's been a shift in how people are having to do their research. That did push the technologies that are being used in this space to being things more in-the-moment, in terms of consumers' regular habitat. So instead of bringing people in to a central location test, you can test them at home - you can even do your qual research virtually. Because you know at HCD we're not just a neuroscience company, not just a psychology company, we're also a traditional MR company, and we've always said you have to do both, it's not a replacement, and a lot of traditional MR methods have shifted to see how we can do it online / virtually. Qual interviews or even focus groups, can we use smart speaker tech, can we use augmented reality? Necessity is the mother of invention, and it really has pushed people to think outside of the traditional MR box.

We have done in-person research in the past 18 months, obviously with different protocols and being extra-careful, and I think we'll always continue to do a combination depending on the research question. We've added some new technologies in where we're using a lot of AR and trying to get in-the-moment and in-context experiences - the past two years have shown us the importance of context, where people use the brands has really changed - things were out of stock, or maybe your needs changed because you're very concerned about cleaning. So really thinking about context in that sense, you might want to measure people in their homes rather than in a CLT.

> We have clients who say 'that's OK, but can we put some gear on someone's head?'

The Trouble with Brains

MN: People don't always realise that our brains are complicated. Your brain is 3 pounds of fatty mass here in your head which isn't very big, it's a small space, but you have 100 million neurons tightly packed into this small space, and 100 trillion connections between them, all in this tight space. Your brain is constantly active, right, there's no time when only 10% of your brain is active, it's 100% active all the time: but most of it is involved with keeping you alive - so when you put electrodes on your head you're still measuring all those things. Humans are complicated, it's not always that simple, so when we have clients who say 'that's OK, but can we put some gear on someone's head?'... they get so enamoured by all the tech, they may not realise that it's not going to give them the answer they want and they end up being disappointed with what they get.

Liking, for example - people ask 'Can we put gear on someone's head?' and all we want to know is do they like this more than another thing. Well now you're doing a very expensive study, and using a tool that is terrible at measuring liking: the best tool for measuring liking is 'asking people', there's no physiological tool that's going to tell you liking right. EEG is not a very good way of measuring emotion.

ARN Launches Australia Unplugged Research Series *Apr 1 2021*
Media and entertainment company Australian Radio Network (ARN) has launched an audience and commercial insights series called Australia Unplugged, promising to 'dig deep' to answer the questions about what's really on audio consumers' minds.

Mar - Apr 2021

Case Study 1
Sound & Stress

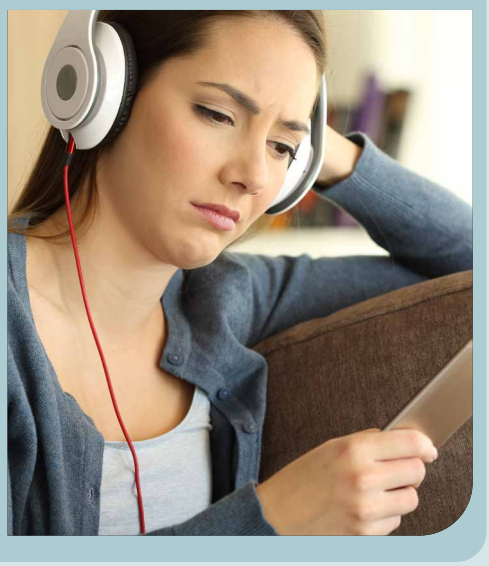
NT: Pick out an example of a recent project you've worked on where you've been able to do something extraordinary for a client, and tell us about that.

MN: Some recent work for a combination of companies actually: Porter Novelli, which is a communications company that was working with Panasonic, and I can talk about this as it was recently published in The Verge, which is an affiliate of Vox. Panasonic had created headphones for Technics, with really great audio quality, and that's what they take pride in, so the question is how does audio quality relate to emotion and health overall? Especially during these times when we have all moved to Zoom - I mean here you and I are having a conversation on Zoom and we're relying on good microphones and speakers so we can hear each other, but when that doesn't go well it's frustrating - so they tasked us with looking at stress, and how audio can affect the stress in our lives. We designed a study where people had headphones on and the audio was either good quality or poor quality, and they were listening to essays and then they had to answer reading comprehension questions after they'd heard it, and of course the people who had poor audio were answering worse because they didn't get all the info, but also their stress levels went up, so it was really affecting them emotionally.

We also flipped it so they had to speak into a microphone, and there was a recording which asked them to repeat what they said, like when you're talking to a SmartSpeaker and they say 'I'm Sorry, I didn't Catch That, can you repeat that?' So they had to hear that over and over again, and that experience of not being heard really raised stress levels, and it brought out how important high quality audio is to your mental wellbeing, especially in these days when we're using it all day - we spend half the time on Zoom or Teams saying Can you hear me, did the video go out, is my microphone working OK?

NT: Absolutely - so what was this used for, was it to help with their communications to sell the idea of very high quality audio?

MN: That particular study was more about this piece that they wanted to write up for Vox - but we often use this type of study to show the efficacy of one product over another, to show that one product in some particular way is performing better than another - for your mental wellbeing or stress levels or whatever. In that particular study we not only measured their heart rate, skin conductance and facial EMG, but we also looked at their answering of the questions, how well they performed, and did some psychological measures. People always think about EEG but in some cases we find that it's better and more accurate to be able to use psychological measures of emotion, in particular using validated scales for stress and emotion, or POMS (Profile Of Mood States) - being able to use those sort of tools can be very informative and very easy to do; can be done virtually; people can fill out answers online or on a smartphone, and get there that way.



Case Study 2
Those Perfume Ads

NT: Can you give me either a case study for the consumer product development side you described, or just talk about the use cases for that side more?

MN: Yes, we do quite a bit of work on fragrance, I think people forget how important it is, but whether it's a spray you have in your house or whether it's that shampoo... We do a lot of work for the people that create the ingredients for these products as well as the end producers, like a large FMCG company that incorporates those fragrances - to make sure on a couple of things. The biggest is what we call brand harmony - the idea that the consumer experience matches what the brand is saying. We actually did a project about 2 years ago right before lockdown, a group of people (scientists) at Pangborn (a sensory science conference), where we compared people's experience of smelling fine fragrance with the ads that they have for those fine fragrances. Everybody's familiar with those perfume ads - they're usually kind of weird, right?! - and they don't make a lot of sense, they usually have some celebrity in, but they're supposed to be emotional, right - they're emotional fragrances! But if that emotional experience that the brand is portraying doesn't match your experience when you go into the store and you spray the sample on that little sheet and you sniff it... that's bad. All the research actually shows that if it's not congruent it actually decreases the chance of you liking it, purchasing or repurchasing it.

We set out with this group of scientists who measure the difference between the experience and advertising of perfume, so we used HCD's emotional mapping tool, using physiology to show that the experiences did not match, where the ad was in this emotional space of being more positive or more exciting maybe, but the perfume itself was seen as more relaxing for example, and if there's a huge

HCD Partners with Vesta for Neuroscience Suite Launch *Apr 1 2021*
In the US, online community software platform Vesta has partnered with applied consumer neuroscience company HCD Research, to create a suite of emotional and psychological research tools to capture non-conscious feelings.

DRNO Timeline

Perfume ads don't make a lot of sense, they usually have some celebrity in, but they're supposed to be emotional, right?

disparity between the two then it's going to decrease purchase.

NT: It's difficult to imagine any fragrance matching some of those ads to be honest...

MN: [laughing] That's why it was a fun example!

The Future:

NT: What does HCD have planned and in progress now, and indeed what's happening in neuroscience more generally?

MN: For HCD we've been working a lot on different technologies, for example using AR to find ways to measure people in context - a huge space to take into consideration. In particular for consumer product innovation, R&D people have always focused a lot on the product itself: for example 'This new ingredient does x, y and z', but what's perhaps more important than dealing with the new ingredient is how the consumer's perceptions are shaped by context. All these new technologies we have help to create context, whether it's AR, VR, smart speakers or whatever - and thinking about the psychological drivers and the mathematical and statistical transformations we can do. We have a wealth of information, how can we bring it all together to make a model for digital behaviour - advanced statistics, maybe Bayesian or neural network approaches. But really doing better science; keeping up with the techs; and always being open to doing better.

NT: A lot of that is to do with advances in consumer tech that you're working with. Is there anything that's more to do with what's happening at the leading edge of *academic* thinking on neuroscience that's influencing what you do? I'm sure there is!

MN: Well the two can come together. Rather than talking about using neuroscience to measure consumers, which is what we've been talking about, we can look at consumer-accessible neuroscience: we're seeing a lot going on with people buying their own personal EEG headsets for wellness. Elon Musk is putting a lot of money into this; FaceBook is putting a lot of money into this. While there are some concerns over the validity of some of these approaches, the idea of consumer-accessible neuroscience pushes the technology, so while I have some concerns over the validity of it, for health & wellness, what I do like is that money is being put into developing the technologies and making them more consumer-friendly.

So think about things like fNIRS, which is in between EEG and MRI, having that more accessible so that it doesn't have to be $100k, but maybe a lot more affordable and wearable so people can use it in different situations - pushes the tech in a good direction which will be more usable in our type of research. So for example if fNIRS were to be more accessible, or even with improvements in the algorithms available for EEG, it just opens up more doors for us to do more research, right - having more choices in methodology. It's important to have a lot of tools in your toolbox because we're met with different research situations all the time, whether we're measuring a mother bathing a baby in the bathtub, or an ad on TV, these are different situations and you need different tools for that, so having more options, to get more accurate or more interesting data.

NT: It sounds like [these devices might give you] the option of having more quant data fed back to you, maybe from a panel of people, continuously... is that a dream?

MN: Maybe not my dream exactly. [Mine is] Definitely a lot more small scale quant - I mean I want everything to be quant in the sense that it's robust, but when it comes to larger data like tracking and collecting consumer data I think it is valuable, and as I said before being able to put all these sources of data together to create an overall picture gives us a lot more insight, which is why we always say 'You can't rely on one tool' - you need to continue to do surveys, to give this whole picture, to really understand the consumer.

NT: Do you have a motto?

MN: I always say 'Prove It' - you can see it on the screen here behind me. And it's kind of been my manifesto since I joined the consumer research agency field, as you say. I went to my first meetings in this area and I scoffed at some of the outlandish claims people made, so I've always said 'Prove It' - if you're going to make this claim that your tool does something, prove it to me, show me the data and explain where you're coming from. We're always very open, we don't have any secret or proprietary algorithms because we have nothing to hide. When a client asks you 'Well how do we know this is real?', it shouldn't be hidden behind some sort of 'score', it should be very easily explainable. ■

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We have a wealth of information, how can we bring it all together to make a model for digital behaviour?

Partners Add Patient Voice to Patient Data *Apr 20 2021*
US and Canada-based recruitment specialist Rare Patient Voice (RPV) and patient-level data and insights provider Clinakos have announced a partnership.

April 2021

VIDEO PODCAST
in conversation:
PEDRO ALMEIDA

This is an abridged version - watch the whole interview, including more on Pedro's entrepreneurial beginnings and discussion of MindProber's agency partnerships, at www.mrweb.com/mrt/pedroalmeida.htm

Interview by MrWeb's Nick Thomas

PEDRO R. ALMEIDA,PHD
FOUNDER & CEO MINDPROBER

Pedro is a professor in the field of cognitive and affective neuroscience (biosocial psychology, statistics, and research methods) at the University of Porto and has combined his scientific career with consultancy in market research before founding MindProber.

Parents

PA: Both my parents are first generation university graduates from Portugal. My mother graduated in history - so social sciences. My father, from a farming family, studied as an electrical engineer and in his work was responsible for technical development of medical devices - hence my love of instrumentation. When I was young he was teaching me how to do circuits, parallel and series, etc. So I've always wanted to be like my father, always wanted to be an engineer, but with a passion for social sciences - my mother taught me a lot of History.

Further&Further Expands North American Team *Apr 21 2021*
Immersive research firm Further&Further has added four new members of staff to its North American team, including former Synovate CFO Richard McQuarrie as Finance Director; and says it plans to double in size.

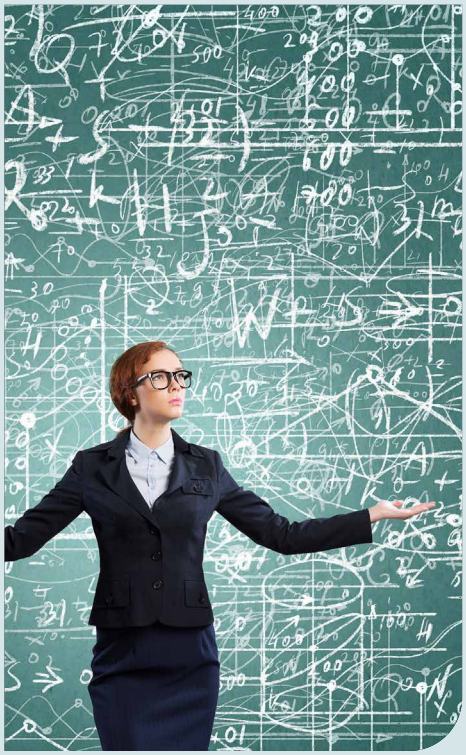
DRNO Timeline

I went on to study psychology, actually cognitive neuroscience - but then very much focused during my PhD on physiology and signal processing, with an engineering component: as much of an engineer as you can be when you're a psychologist! So basically I'm as much a mixture as I can be of those two profiles. And of course my parents are sons of the Portuguese revolution so they're very liberal and I inherited those sets of values too.

My mother moved very early into management, she directs a public school, has been a director for some decades now - a 24/7 job. Being a professional was always a big part of who my parents were, and that translated into a big part of me and how we do our jobs at MindProber (MP) - a big part of our lives.

NT: Anything entrepreneurial in the family?

PA: Not really. If I go back to my grandfather from my mother's side, he was a goldsmith and had a business making and selling jewellery, but that's about it.



Academia

PA: My basic degree is social psychology - what became behavioural economics. I did a Master's degree and my internship, then I stayed on with that company as a consultant - it was an MR company and I started doing political polling, in 2005-6, while at the same time working as a research assistant at what was then the psychophysiology lab and is now the Neuropsychophysiology Lab at the University of Porto - my first work in cognitive neuroscience.

[Later] I reached an agreement with the lab and said 'Let's try to fund the lab by going into businesses who would want to use the facilities and the knowledge we have. We worked with the air force, looking at people piloting drones and whether they were being cognitively overloaded or not, using an EEG - looking for what reduced that load as much as possible. Then we thought OK there might be a market here in Portugal for applied cognitive neuroscience, so we started a small company called ANR - Applied Neurobehavioural Research, which we wanted to be a Portugal-focused business.

> It took me ten years to learn how to not say things - how to not start talking scientific jargon!

...We failed miserably because we knew nothing about business, our offering to the market was just not scalable, we had no business acumen. It took me ten years to learn how to not say things - how to not start talking scientific jargon! We would enter a meeting and start talking it and they wouldn't understand 90% of what we said, and then we would ask them for 100k to do something, and they would say [a very abrupt] No. We had to do that learning.

Skin Job

NT: Why is Galvanic Skin Response or GSR the main thing you do at MP, almost the sole focus?

PA: GSR was not what we thought we would be focusing on. My background is EEG, the thing I had most experience of, and the technique which comes from EEG called Event Related Potentials - if you search my academic profile it's around these. The first thing we thought about for MP was scalability - can we scale with EEG? There are some companies that sell wireless EEG sets and we tried a bunch of them, but the signal we were getting out of that was not lab quality, it was heavily filtered so we lost some of the components of the signal.

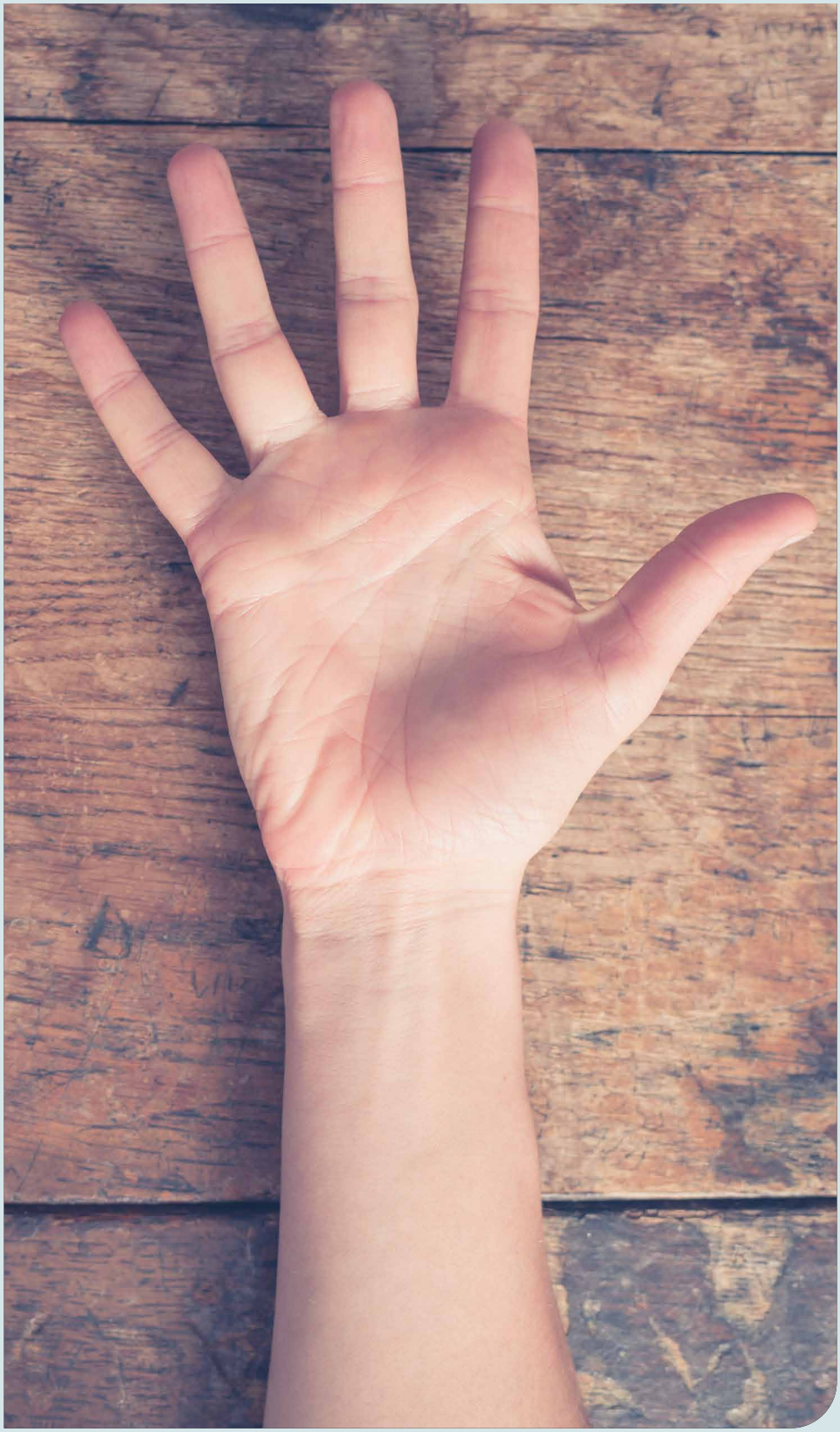
NT: ...because it was wireless?

PA: That and other things. If a person in an EEG setting starts moving a lot the signal gets all jittery and you can't make sense of it. The signal-to-noise ratio of an EEG is low - what's interesting vs what is not, so this needs a very, very clean signal to get something out of it. If you're using it with people in their homes you will really need to filter the signal - 'I'll just remove everything that seems uninteresting'. Most companies which do this filter the signal so much that it looks really nice, but then there's nothing there. So, this is really challenging. Also, it's very expensive to scale - and also we couldn't replicate some of the things we were seeing on the fundamental literature on EEG and emotion so we decided not even to think about this.

We thought about signals that can be scalable and those are Heart Rate and Electrodermal Activity (EDA) - the latter is a pure measure of sympathetic nervous system activity. When you start getting nervous you sweat from your hands, so EDA looks at those micro-sudation patterns. In our sensors there are two electrodes which can go on the fingers or on the palm of the hand and you measure

Tobii to Spin Off Dynavox Arm, Group CEO to Step Down *Apr 29 2021*
Eye tracker developer Tobii is preparing to spin off its Dynavox arm, which develops speech generating devices, eye trackers and eye gaze/eye-controlled devices for people with disabilities and special needs. Along with the spin-off, Group CEO Henrik Eskilsson says he intends to step down.

April 2021



the resistance between them. When you sweat the resistance becomes lower, which is what we call conductance - so when something excites you, you produce a GSR which is basically a difference in the resistance of the skin.

The first versions of our devices actually had Heart Rate (HR) sensors so we would also measure HR from a sensor called a plethysmograph: the problem is we got lots of data but we couldn't replicate anything from the literature that we were seeing. We were calibrating the metrics: for example showing people videos like Schindler's List which are known to be highly emotional. EDA showed these reactions very, very well and was replicable (i.e. we would look at several samples and the results would hold) - so we trust this and can go to the market and sell it - but we couldn't get this with HR.

I'm not saying that it can't be done, even with EEG, I'm just saying that maybe we were not smart enough to do it, and maybe there are consumer neuro companies who have the algorithms to do it - we don't, and we don't want to be selling something on which we're not completely certain, so we just stripped the HR component from our sensor. [There is one company who use the MP system and they have HR - we have integrated a HR sensor for them - they get HR data and they do whatever they want with the signal but not through our platform.]

NT: To be clear, from GSR you get a single metric, right - whereas from EEG for example you might get different measures at the same time from different parts of the brain?

PA: Yes and No. On the one hand 'Yes' - if you are doing EDA, what you will get is a measure of emotional arousal second by second, and 'No' because what our platform does is it allows you to mix that EDA with other data. So for instance if you are watching a football match you'll have a second-by-second engagement record and you can mix that with every time a

DRNO Timeline

Sports Data Firm Genius Buys Second Spectrum
May 10 2021
Sports data technology company Genius Sports has acquired AI-powered sports data tracking and visualization solutions provider Second Spectrum, for $200m.

logo is exposed or when people see this ad, or hear this commentator. So you can ask 'How is this commentator ranking in engagement vs that one?' - what should I use, what should happen when there's a boring moment in the game, who should be talking, where should I place main sponsors? You can overlay that measure of engagement on those other metrics and make sense of them, and that's all we do but I think it's a lot - there's a lot of value in it.

NT: Do sensors go on the hand because this is the loudest and clearest signal? Would you get the same signals elsewhere on the body?

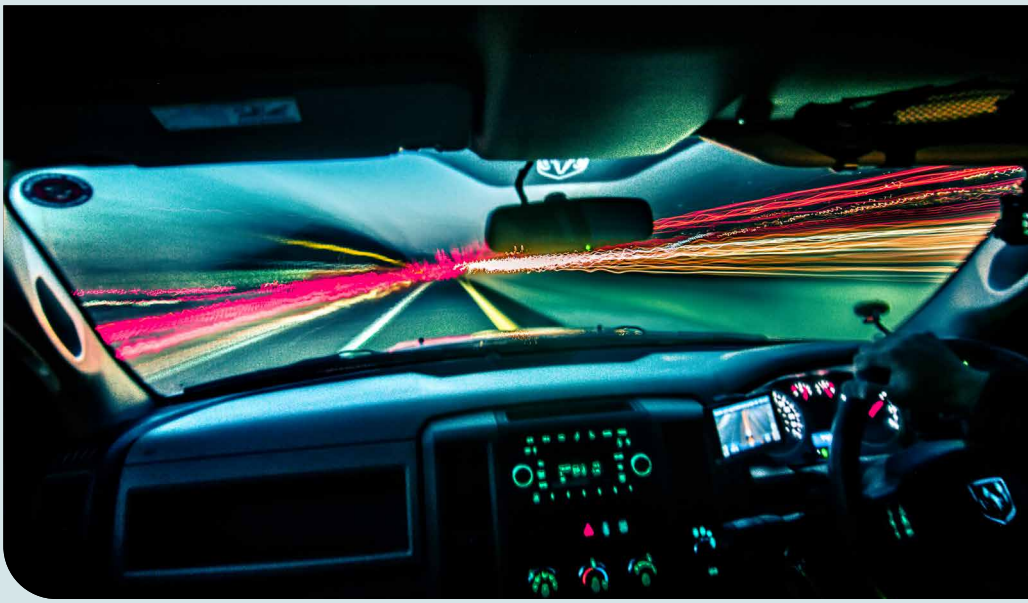
PA: What you need is a big density of eccrine sweat glands - there are a couple of places where you have this big density, the hands and the feet - so [obviously] we chose the hands! Now most sensors have wires, and we wanted to build our sensor in a way that there are no wires, because we send it to people's homes and they'll break the wires, so it needed to be one piece - this goes on your hand and after a few moments you won't even feel that you have it on. We want people to forget that they're taking part in the study, and usually were looking at long format content, so people do.

> If you are watching a football match you'll have a second-by-second engagement record and you can mix that with every time a logo is exposed or when people see this ad, or hear this commentator

Where GSR is Best

PA: We thought we were going to be a scalable copy testing biometrics platform, which is everything we did not become actually, and the reason is because honestly there are a lot better solutions for this than just using EDA. The EDA time resolution is slow and variable (it can take 2-4 seconds to respond and then the response lasts around 7-8 seconds), so for short format content, it's very hard to pinpoint exactly what is creating that response. Facial coding mixed with eye tracking for this is more powerful and much more scalable.

So where is our sweet spot? In long or very long format - no-one else can actually synchronise the data with (long-format) live events, so we started building our platform to be a sort of engagement currency for long format content. You know how many people are watching each second of the show but you actually don't know how involved people are with watching: you can overlay this analytic on other data, eg how many people are watching, and it'll give you a better picture of not only how many and who, but actually how involved they are with the content.



Case Study: On the Circuit

NT: Pick a recent project where you've had a lot of success with this, and give us an outline.

PA: OK. The two most common applications of our data are on the production side and on the commercial side, so I'll give you an example where we're using it for both, without revealing the client. This is a multi-season ongoing data collection study, so they've always renewed the contract and it's ongoing. Let's say I have a motor racing event, and I want to improve production decisions to engage my fans, including which camera angles work. So I have a new camera angle, say here [taps side of head] and it's called Cockpit View let's say: is this producing impact and in what instances? What we need here is a lot of data so we can't just have one instance - lots of things are happening - is it the person in first place or not, is anyone screaming in the background (and who?), is it a very exciting moment of the race, or not - so what you will need is lots of instances, so we would look to

Walnut Adds Five to UK Team
May 13 2021
UK-based insights firm Walnut Unlimited has taken on five new recruits, including Elisha Temminck and Alex Banks as Associate Directors.

May 2021

For example whenever there's a dull moment, this person needs to speak; this camera angle works but only when it's the person in second place not first position

collect data across lots of races so you can isolate the effect of this camera angle. You can then start to build a knowledge base of what works and what doesn't, and feed that into the business: for example whenever there's a dull moment, this person needs to speak; this camera angle works but only when it's the person in second place not first position - so you can begin to understand the nuances. This is one of our most successful uses - ongoing monitoring, understanding exactly what's working and then feeding that back into the business.

So I've talked mostly about the production side, but there's also the commercial side - eg showing that people are very involved with official sponsors. If you have an official sponsor they should have brilliant positions on the content: you'll want to show if you're selling the media rights that you are getting people really engaged when they are watching the official sponsor.

NT: Do you present any of that data to them live, in a dashboard so they can adjust cameras while they're in action, or is it project based?

PA: It's one or two business days later: data can be processed in real time but what we find is that it's very, very hard to digest this data and to react to it in real time, so we use computer vision to tag every time that this camera angle was shown, and compare with the engagement. We do have real-time feeds but we use them for other things.

One respect in which we have been evolving towards real time: we felt there's an opportunity not only for engagement with TV / media, which is something the market is asking for, but tracking when people actually do something, activate, around key moments. So we're also modelling to predict Twitter activity. For instance, in a match, people start fighting! - and you see an engagement response so you know that is interesting to people, and then one minute after you'll see an increase in Twitter volume. So we've started building models from our data to external data sets - we understand we can use this data in real time to give people doing campaigns on second screens a competitive advantage.

NT: Are you doing a lot of interpretation of the data for clients, on the whole, or do you have clients who like to see the raw feed, as it were..?

PA: It will depend very much on the client. We have some who are completely hands-off, even some end clients, So we usually partner up with agencies, when there is some data crunching that needs to be done, and the agency will be an intermediate, so we feed them the data and it goes through a report to the end client, but on the other side we have some end clients who actually like to go to the platform, and we've got all those dashboards with the impact on the brand... Some clients what they do is they just export the data in an Excel file and have their own way of analysing it.

We find there's a lot of handholding in the beginning, even with agencies, and we want to teach them how to work with the fieldwork platform, with our user research platform, then they become more and more independent, they look at the data and get their own results. We've been working a lot on the platform to actually allow you to Not ask us a lot of questions - so you can just see the analytics going. Basically after a few sessions clients sort of become independent - there's no secret there.

DRNO Timeline

Truthify Gets Patent for Emotion-Optimized Ad Tech
May 17 2021
New York-based consumer emotion analytics platform Truthify has been granted a US patent for its 'emotion-optimized' advertising technology.

The Future

NT: Do you think you'll stay focused on GSR because that's the one you've found most robust, or are there other things you might add into your own mix?

PA: Integrating sensors and other peripherals is easy, we have the infrastructure to do that - our latest agency partner have integrated Heart Rate - and they're a very, very well-known consumer science-focused media company, and so we're very sure that they know what they're doing and have better algorithms than us, so we give them our data and know they're doing a very good job. As a business, at MP, what we are trying to do is increase the number of business objectives that you can actually tackle using GSR, from using a real-time measure of arousal - we're very focused on advancing the theory that EDA can be a currency for media engagement, and there are lots of applications for this, so there's TV but there's less obvious applications like podcasting - we have worked with podcasting clients, with radio clients, and of course you can't get that from eye tracking for instance, not for audio - so we have a sort of trans-platform measure of engagement. You can compare across audio and TV, so if you figure out how to scale EDA measurement and synch it with media content, that opens up a realm of possibilities - media measurement, media activation, real-time activation / second screen activation...

We're very focused on advancing the theory that EDA can be a currency for media engagement, and there are lots of applications for this

NT: How do you see the niche for neuro techniques within MR developing?

PA: I think it will grow a lot. I think companies who actually use neuro techniques have very smart people running them, they're very knowledgeable. Sometimes there is the temptation to just say Yes to requests - it's revenue and it's a big client so I'll just say Yes, but if players in the sector can resist that... Everyone should be aware of what the abilities of these techniques are, so we do things where we can actually produce responses, and if people are creative enough, we can expand the number of things that we can tackle. To the best of my knowledge, at MP we're doing what we're doing in a way that lets me sleep at night - we have one trick, a one trick pony with one measure of arousal, so let's expand what we can do with that. If you're an expert in facial coding, let's expand what we can do with facial coding - eg in cars because it's super-important to know if you're falling asleep, they've identified an application for it - and I think that's the way to expand the market, rather than just inventing things we can do.

When people enter MP, one of the things we say is that we have a very transparent approach

Motto?

PA: 'No Bullshit.'

I think I've already sort of alluded to that: when people enter MP, one of the things we say is that we have a very transparent No Bullshit approach, and we operate that across the entire business. Everyone in MP knows the financial situation of the business, everyone's in the same boat; I won't say that we're selling more than we are or less than we are, and we enforce this across every level of the company. With investors, if there's bad news there's bad news; if there's good news there's good news; including in our conversations with clients. We're a no-bullshit company - and that has worked so far. ■

Tremor to Roll Out UnrulyEQ Across US and Canada *May 17 2021*
Video ad targeting firm Tremor Video is rolling out its UnrulyEQ suite of audience and psychographic intelligence solutions to clients in the US and Canada. The suite uses facial coding and survey-based techniques to help advertisers across CTV and video reach and engage audiences.

May 2021

INTERMISSION

Neuro-trivia compiled by Nick Thomas, MrWeb

Lies & Statistics

According to Wikipedia 'a polygraph, popularly referred to as a lie detector test, is a device or procedure that measures and records several physiological indicators such as blood pressure, pulse, respiration and skin conductivity while a person is asked and answers a series of questions. The belief underpinning the use of the polygraph is that deceptive answers will produce physiological responses that can be differentiated from those associated with non-deceptive answers.'

However, it notes that 'assessments of polygraphy by scientific and government bodies generally suggest that polygraphs are highly inaccurate, may easily be defeated by countermeasures, and are an imperfect or invalid means of assessing truthfulness'. This is partly because 'the physiological reactions that distinguish lies may also occur in innocent individuals who fear false detection or feel passionately that they did not commit a crime, and the standard format test involving control questions and a 'probable lie test' is biased against innocent subjects [and in favour of clever or well-prepared liars].

Also from Wikipedia:

In the Middle Ages, boiling water was used to detect liars, as it was believed honest men would withstand it better

American psychologist William Moulton Marston, who styled himself the 'father of the polygraph', is perhaps more notable as being the creator of the comic book character Wonder Woman.

New approaches improving accuracy?

According to a BBC article published in the last month (https://www.bbc.co.uk/news/business-60153129), a team led by Prof Yael Hanein and colleague Prof Dino Levy at Israel's Tel Aviv University have developed a new approach and identified two types of liars: 'those who involuntarily move their eyebrows when they tell a fib, and those that cannot control a very slight lip movement where their lips meet their cheeks'. The article suggests that the software 'can now detect 73% of lies' - and rising, and Prof. Levy notes: 'It's very, very hard for you to conceal a lie with this technology'.

The BBC also notes that a high-tech system called EyeDetect, developed by Utah-based firm Converus, focuses on involuntary eye movements to detect lies and claims to provide 86-88% accurate answers within five minutes, to clients in more than 65 US law enforcement agencies and nearly 100 worldwide.

In Use Today...

A company called Lie Detectors UK offers tests from £399 by qualified members of the American Polygraph Association and UK Polygraph Association, to help clients with problems including:

*Infidelity Test or relationship dispute
* Theft / Fraud Case
* Proof of Innocence Test
* Employee Test
* Business Dispute Resolution.
Website: liedetectors-uk.com

Here's MindProber's Pedro Almeida on whether it's possible to use GSR to check honesty in survey responses:

You actually can't. The best known protocol around lie detection is the 'guilty knowledge test'. These are very standardised protocols, where you understand how people are reacting to some questions where they should know the answer, vs other questions where they don't know the answer.

I'll give you an example: the way the guilty knowledge test works, and this was popularised in the 50s - let's imagine someone robbed a bank, and the witnesses know that the someone who robbed the bank was driving a yellow car, they stole 50k and they were wearing a blue shirt - the police know this because they interviewed witnesses; and the person who did it knows this. So let's imagine that I suspect that you are actually the person who robbed the bank: I'll hook you up to the polygraph and I'll start reading you information, I'll say 'the robber arrived in a red car…a yellow car… a green car; then I'd say 'he stole 100k, 50k, 200k; 'blue shirt, red shirt, green shirt' - and because you know [which is correct], you'll have a specific reaction to what's called the knowledge information.

... so as you see that's a very standardised approach, and even there you have a very high rate of false alarm / false positives. Bring it back to whether someone is lying or not when they answer a survey, and you see their emotional response when they answer a question - does that mean that you're lying; or does it mean it reminded you of something that happened in your childhood; does it mean you're just incredibly emotionally involved? So you can't use it, it's too non-specific to actually be used for that. Lots of people have asked us to do it! When we talk to a new client we are often asked and we say 'No, we can't do that'.

CHALLENGES AND SOLUTIONS IN MEDIA IMPACT MEASUREMENT

OAAA Recommends Impressions-Based System for OOH *May 20 2021*
The Out of Home Advertising Association of America (OAAA) has launched guidelines recommending a move toward an impressions-based measurement system, providing both forecast and reconciled-as-delivered daily impressions.

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As media become increasingly heterogenous, measuring impact on the target audience is decisive for brands, content producers and broadcasters to remain relevant. MindProber is devoted to understanding audiences' emotional engagement, and the effect on their behaviour. By deploying large-scale consumer panels with proprietary biometric sensors and mobile apps, the company runs media monitoring sessions with panelists at home to increase validity and precision while remaining non-intrusive. The Physiological Analysis of Live Media (PALM) has been key to clients' decisions about ad efficacy and spend, and is well-positioned to become a media valuation currency.

MindProber, Nuno Dias, PhD

Nuno Dias, PhD is the co-founder and CTO of MindProber. He is an electronics engineering professor at the Polytechnic Institute of Cavado and Ave and expert in biomedical engineering, computer science, and artificial intelligence. Nuno is also a visiting scholar at Penn State University, PA, USA.

Audience Emotional Engagement with Media Content

The measurement of audience ratings has seen an important evolution in recent years, as a result of the multiple digital channels and consumer platforms available. In this new scenario, the number of TV viewers lost relative importance. This has led content producers and broadcasters to apply alternative methodologies to test the impact of content on the consumer.

Linear television is not likely to become obsolete or insignificant. However, to remain relevant, broadcasters and traditional distributors should support their business models in creating and developing content that is increasingly optimized for the target segments, effectively presenting advertising and increasing the engagement of viewers.

According to the Advertising Research Foundation (ARF), engagement is the level of interest, attention, or involvement aroused by a marketing stimulus. It can be expressed nonconsciously as observed by the body's response (e.g., as measured by peripheral psychophysiological responses) at the time of exposure. Impact may be seen as the effect of those stimuli on the perception of the target audience.

According to Calder and Malthouse's Media Engagement and Advertising Effectiveness *(Calder & Malthouse, 2015)*, the effectiveness of an advertisement depends not only on the brand being advertised and the quality of the ad itself, but also on its execution characteristics, such as the size of the content and the context in which it is made available. The authors explain that the media cannot be treated merely as a passive vehicle through which consumers are exposed to content simply because they are viewing them. In this sense, the "real impact" on the consumer will have to

Tobii Pro Adds Mobile Eye Tracker for Ad Research *Jun 8 2021*
Tobii Pro, which provides eye tracking solutions and services to understand human behaviour, has launched a mobile capability for marketing and advertising research conducted through its Sticky self-service online platform.

May-Jun 2021

be a combination between the ad itself and the context generated by the media where it is broadcast. The impact of context is key for the assessment of ad efficacy.

Complimentary to the audience ratings, content impact and optimization have been studied exhaustively through focus-group meetings and quantitative surveys targeting consumers' recall, opinions, and willingness to see, among others. The usage of neuroscientific methods has gained acceptance although its mass use was limited until recently. Moreover, these studies were mostly run on small-scale panels due to the need for expensive laboratory equipment.

MindProber (MP) is devoted to understanding how audiences emotionally engage with media content, and how much it accounts for their consumer behaviour. Notably, MP managed to move away from the traditional lab-based approach of consumer neuroscience and increase experimental validity by deploying large-scale consumer panels performing media monitoring sessions at home. MP developed its own biometric sensors and mobile apps with the purpose of turning the home collection of galvanic skin response (GSR) and heart rate (HR) broadly accessible and accurate.

So what are the key tools and approaches, and which needs do they address?

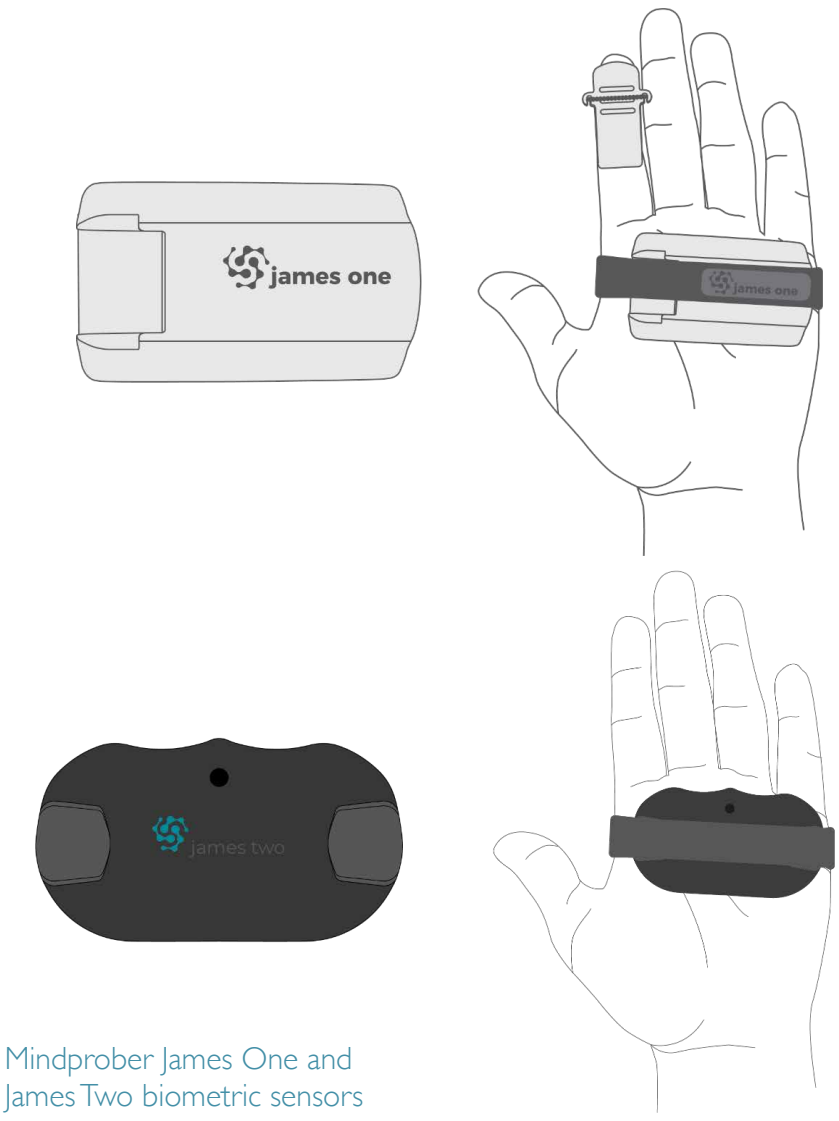
Media Monitoring Sessions

MP offers 2 main types of media monitoring sessions: Live Sessions for content being broadcast on TV, radio, or any digital media; or Digital Sessions in which the content is made available through the MP platform (in a secure media player only accessible to designated panelists). Digital Sessions are a better fit for content pre-test and are more flexible in terms of viewing schedule (panelists often have a one week period to watch the content). Although Live Sessions are usually applied to live content, panelists may be instructed to watch a specific piece of content on an explicit date and time (Directed Viewing mode) or they may be free to watch whatever they prefer (Free Viewing mode). For instance, panelists may be free to watch any TV channel on their cable network.

Our partners and clients looking for media valuation and ad real estate support their decisions mostly with the results of Live Sessions (Just Eat Takeaway.com case study), in both Directed and Free Viewing modes.

Biometric Sensors

As a ResTech company supported by neuroscientific evidence, MP has been developing experimental methodologies



Mindprober James One and James Two biometric sensors

QPharma Launches Neolytica Healthcare Analytics Firm *Jun 8 2021*
In the US, life sciences sector medical, commercial and compliance company QPharma has set up Neolytica, an analytics business using techniques including natural language processing, AI, facial recognition and chat bots.

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that make it possible and valid to collect peripheral psychophysiological signals such as GSR and HR outside the lab. MP is genuinely open to integrating on its platform any biometric device that proves to be accurate, as long as its specs fit the needs of the experimental design.

Securing Biometric Data Validity

The excessive movement of a user might be detrimental to the data being acquired from biometric devices. Although this holds true in any experimental environment, the ability to sense movement when sensors are used in less controlled environments (e.g., at home) is decisive for the researcher. Since natural user behaviour is key to the ecological validity of the experimental design, knowing when your data is likely to be corrupted with movement artifacts is more suitable than instructing users to stop moving. However, a careful sensor design (e.g., miniaturization and avoiding loose parts such as wires) and larger consumer panels (let statistics work for you) may circumvent this risk.
Signal quality is paramount when choosing a biometric device. Though it naturally depends on the electronic circuitry designed by its development engineers, user instructions and adequate training are as imperative for successful data acquisitions. The goal here is not to teach any technical background but let your panelists understand what is expected from them when using a new device.

Check in advance how you can get the data. Access to continuous and individual raw data is desirable as well as the interface to read it (wired or wireless data transmission). The experimental approach may also require the verification of other specs such as battery life and the internal memory capacity.

Although there are multiple biometric devices available in the market, MP has identified an unaddressed market opportunity, namely the lack of a psychophysiological activity monitoring solution that is accurate, flexible, and truly user-friendly. MP decided to develop a sensor that needs no technical knowledge from the user and is compatible with large-scale (panels with hundreds of users) and long data collections from people's homes.

MP developed a psychophysiological sensor, James One, featuring both GSR – collected on the palm of the hand, and HR - preferably on a fingertip. James One provided thousands of hours of data matching the high quality of reference laboratory devices *(Silva Moreira, Chaves, Dias, Dias, & Almeida, 2019)*, but with new ideas and after constant listening to user feedback we now have James Two, a step forward in terms of miniaturization and ergonomics.

James Two and the Mobile App

James Two is still able to acquire high-quality GSR, HR, and motion data, and features very stable Bluetooth communications with the MindProber Media Test App for sending data. It is a personal and non-transmissible sensor that identifies the user, that is, the panelist, at the mobile App. It makes user

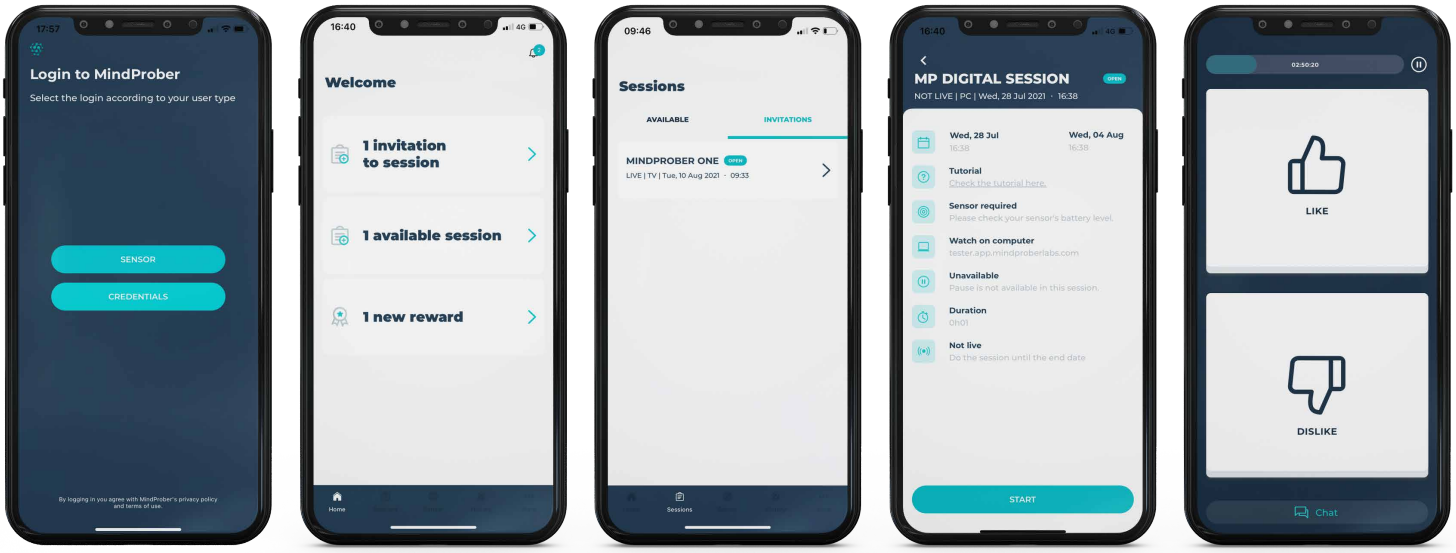

Fig 2: Mindprober MP media test app

'Nudging' Partnership for Belgian Firms *Jun 14 2021*
Belgian companies One Inch Whale and Color Navigator have launched a joint venture, Research & Visual Nudging, which will combine insight techniques with the patented Color Navigator system to enhance services including predictive intelligence and neuromarketing.

authentication very easy because it is safe and works as the mobile app credentials. Although legacy authentication is also available - using regular credentials such as username and password, users are encouraged to log in to the App with James Two.

James Two doesn't have buttons or a display. It is completely and transparently controlled by the App. Once the user authenticates in the App, accepting invitations and participating in media monitoring sessions is straightforward. Data collection runs smoothly. Besides the biometric and motion data, the App also collects declarative responses from the panelists, who can mark any moment in the content as salient by using either the Like or the Dislike button (Figure 2). These add the valence dimension (positive/negative) to the level of activation provided by the GSR. An in-app survey tool is also available. If selected in the session setup, it triggers post-session questionnaires with several question types available: single/multiple-choice; open-ended; scale questions; and matrix questions, among others.

MP acknowledges that biometric data security and privacy are sensitive. Data confidentiality and user privacy are at the top priority. The app does not store any data and they are sent to MP's secure databases as fast as possible. Simplicity and usability come next on the priority list. The App guides the user through all the steps of setting up James Two properly on the hand palm, connecting it to the App, and starting a media monitoring session. On average, users are 4 to 5 clicks away from starting a session.

Physiological Analysis of Live Media (PALM)

PALM is a tool that measures content's ability to promote emotional engagement with an audience. Impact metrics include all the client's own content previously monitored, and overall data for different media, channels, time schedules and segments.

Fig 3: Client engagement report

After data collection, data processing takes place. In the **analytics platform**, the data received from each user is automatically screened for validity, both in terms of data quality (dependent on sensor placement on the hand and good skin contact) and content viewership (audio content recognition is applied to identify the content that the panelist is consuming). Then, a pipeline of processing methods run for data alignment, GSR decomposition into tonic and phasic activity, data aggregation and segmentation, engagement metrics calculation, and benchmark updates. In less than 24 hours, the session results are ready for client analysis. **PALM** includes 3 main data analysis tools: **Engagement Report, Events Tagging Toolbox, and Studies Tool.**

Engagement Report

In the Engagement Report (Figure 3), clients may analyse: the aggregated biometrics timeline which results from the second-by-second average GSR activity of all users that watch/listen to the content; the average dial (valence) timeline at one second rate; and the affective space which combines the arousal level and the valence in a single plot. The three plots get animated synchronously with the media content on the player. Here clients start exploring audience engagement at the one second scale and easily identify high and low engaging moments in the content.

Events Tagging Toolbox

After data exploration, the Events Tagging Toolbox enables the researcher to perform an event-based analysis about the most relevant moments and dig deeper into the content analysis. These may be commercial ads in the breaks, instants when logos or banners are on screen, stimulating camera angles in motorsports, key scenes in a movie, the performances in a talent show, or the title-winning lap of a race car driver! Each relevant moment may be selected on the engagement timeline as a new

M&C Saatchi Opens 'Precision' Marketing Sciences Unit *Jul 9 2021*
In Australia, M&C Saatchi has launched a marketing sciences practice called Precision, which will work with clients and support a group-wide learning and development program to increase 'data fluency' among the group's employees.

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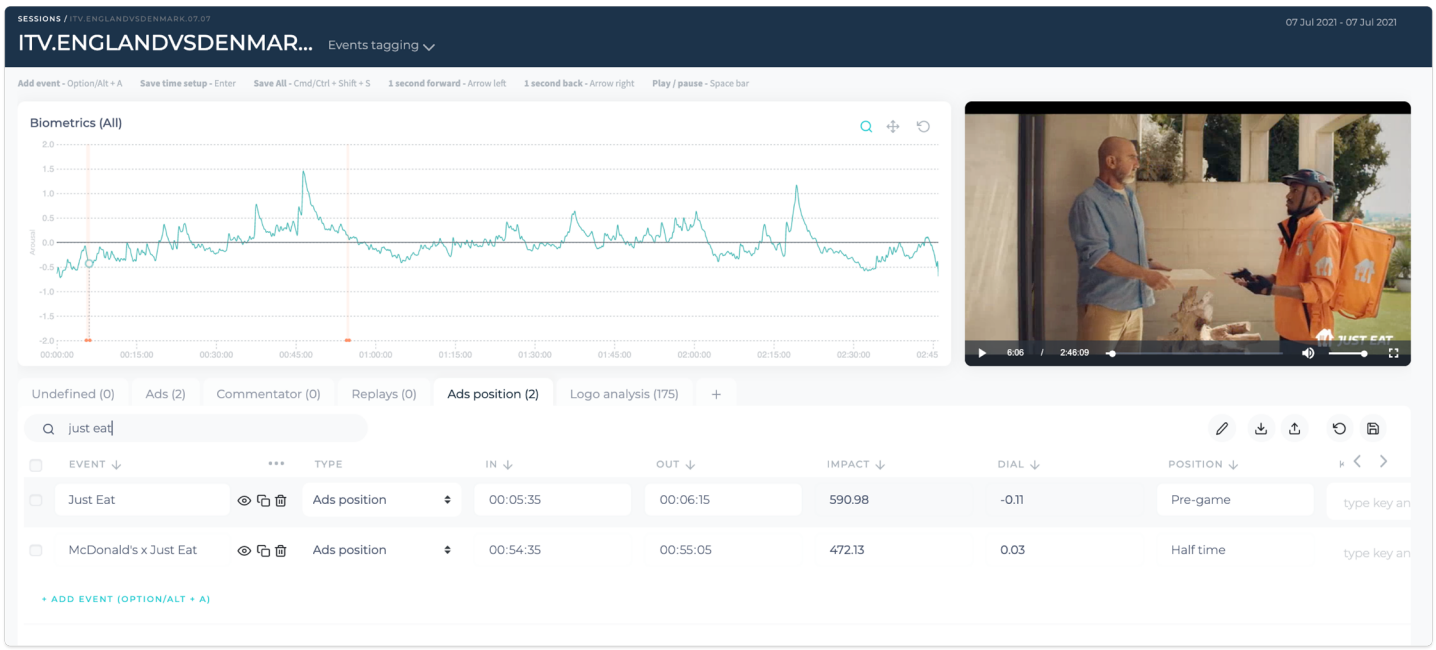


Fig 4: Event Tagging Toolbox

event (Figure 4). The name and type fields help to describe events in greater detail and are instrumental for an inter-session event analysis on Studies Tool. Alternatively, new events may be added individually to the list (specifying time in and time out values) or added in bulk from a text file upload. Intra/Inter-session event comparison is based on the IMPACT and DIAL scores, which are aggregated averages of the GSR phasic component for the interval; and of the valence values, respectively.

Studies Tool

Our clients and partners often care about how their content compares with competitors. They run media monitoring sessions to specific shows and want to understand how these compare with the benchmarks. Studies Tool puts in perspective the Impact and Dial scores of all events (defined beforehand at the Events Tagging Toolbox) across sessions, grouping them by specific dimensions, such as session name, break number or order in break, brand, and length, among many other dimensions.

We are immensely proud of the work we have done so far and happy to call some of the world's most innovative media owners, content creators, and sports leagues our partners and clients. The team is constantly improving our media testing technology by listening to their needs and working on making our engagement metrics a key component in every part of the media value chain.

Learn more and give us your feedback at www.mindproberlabs.com.

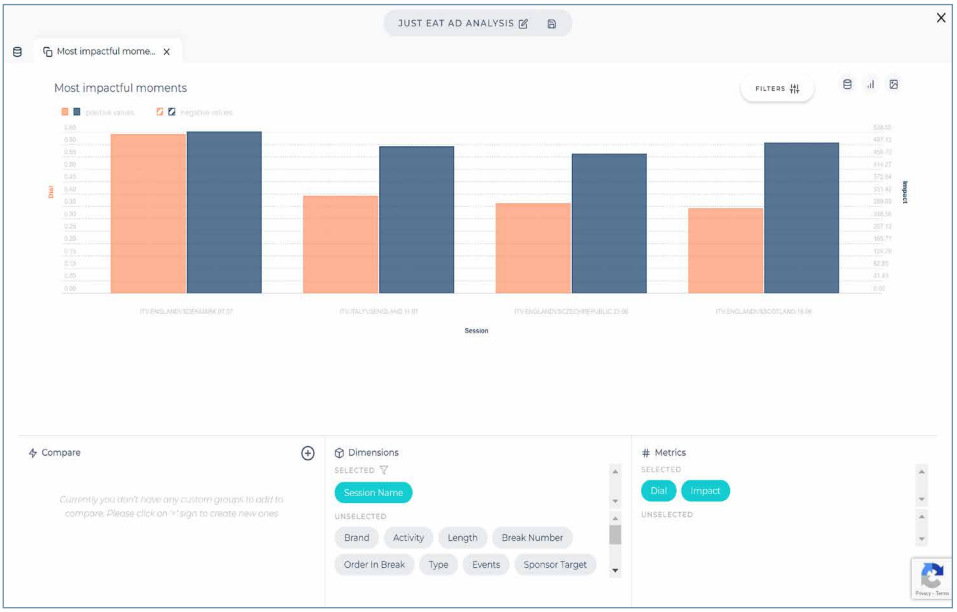
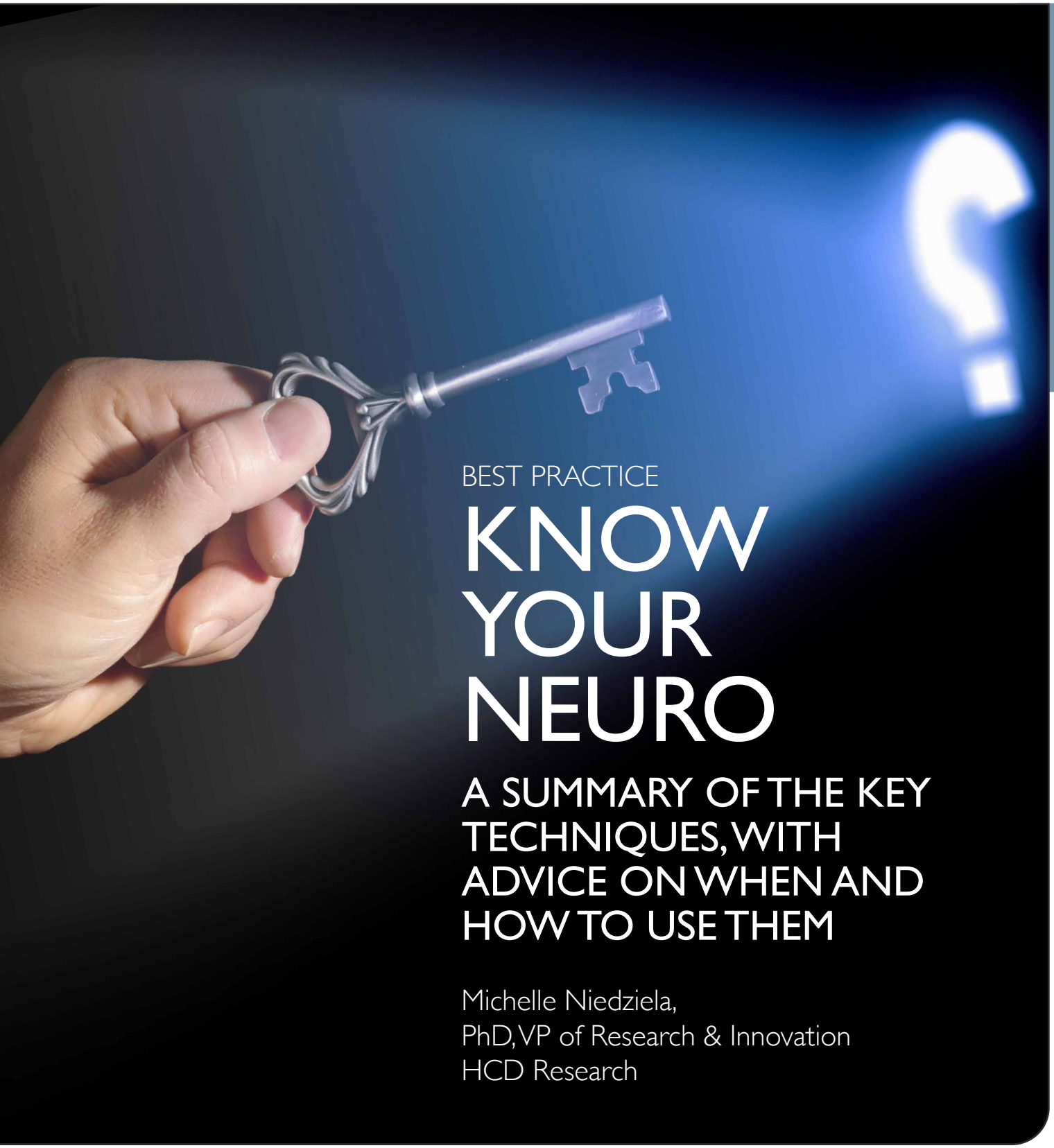


Fig 5: Studies Tool interface for inter-session analysis

ZoomInfo to Buy Conversation Intelligence Firm Chorus
Jul 13 2021
US-based business data firm ZoomInfo is to acquire 'conversation intelligence' platform Chorus.ai for $575m in cash.

July 2021



BEST PRACTICE

KNOW YOUR NEURO

A SUMMARY OF THE KEY TECHNIQUES, WITH ADVICE ON WHEN AND HOW TO USE THEM

Michelle Niedziela,
PhD, VP of Research & Innovation
HCD Research

DRNO Timeline

New Funds for Facial Recognition Firm Clearview AI
Jul 28 2021
In New York, facial recognition start-up Clearview AI has raised $30m in a Series B round of funding, which values the company at $130m.

Neuroscientific approaches have become increasingly important in understanding how our bodies respond emotionally and physically to experiences, while helping researchers better understand unconscious motivators and emotional reactions. Real and thoughtful applied neuroscience is about using the right combination of sensitive measures from psychology and neuroscience in the most appropriate ways.

Consumer neuroscience, also known as neuromarketing, has seen its fair share of difficulties, ranging from a push of pseudoscientific claims to outlandish, unrealistic costs. Most of its troubles can be attributed to a misunderstanding of the science combined with a reliance on trusting researchers who push the limits of the tools and technologies. In this article, we hope to give some guidance on what consumer neuroscience is (and isn't) as well as best practices for adding it to consumer research.

Each tool within consumer neuroscience has its strengths and weaknesses depending on where and when it is applied, and leads to different understanding of the consumer experience . The key to using them successfully lies in using the right tool for the right research question.

The key to using consumer neuroscience tools successfully lies in using the right tool for the right research question.

The Neuro-Toolbox

Researchers interested in using neuro-tools are often looking to uncover implicit or non-conscious emotional reactions from consumers. Given the complex nature of emotion, finding a comprehensive methodology to measure this phenomenon is challenging. Although the literature lacks a definition of emotion, multiple components such as physiological arousal, motivation, expressive motor behavior, action tendencies and subjective feelings have widespread acceptance *(Scherer, 2005)*. Yet, the information collected from these tools, especially when used as a singular measurement, is limited and can only emphasize specific components of the overall experience which result in an emotion.

Certain consumer experiences may be better captured by physiological and behavioural measures of the autonomic nervous system (ANS) than by traditional sensory surveys. **Physiological** measures have been used extensively to capture responses of the

Forsta and Watermelon Combine CX Expertise *Jul 30 2021*
Customer experience (CX) and research tech company Forsta has announced a partnership with CX and insights specialist Watermelon, to deliver CX expertise, methods and technology via Forsta's CX platform.

July 2021

Michelle Niedziela, PhD, VP of Research & Innovation, HCD Research

Michelle Murphy Niedziela (PhD; @hcdneuroscience) is a behavioral neuroscience expert in neuropsychology, psychology and consumer science. Experienced from academia (Monell Chemical Senses Center) and industry (Johnson & Johnson, Mars Chocolate) in R&D of innovation technologies and methodologies for consumer research. As VP of Research and Innovation at HCD Research, Michelle focuses on integrating applied consumer neuroscience tools with traditional methods used to measure consumer response.

The 'gold standard' techniques are fEMG (facial electromyography), HRV (heart rate variability) and GSR (galvanic skin response)

ANS to various types of stimuli such as film clips, personalized recall of specific situations, and odours. Among these, the "gold standard" techniques - fEMG (facial electromyography), HRV (heart rate variability) and GSR (galvanic skin response) - have this title due to their simplicity and direct correlation to what they measure. One regular use of such measures is to examine the processes related to cognition and emotion evoked during media exposure *(Bolls et al., 2019; Potter & Bolls, 2012; Ohme, et al., 2011)*; while dynamic physiological responses measured over time have been studied widely for their role in the emotional experience *(Ellsworth & Scherer, 2003)*. For example, increases in GSR are directly and positively correlated to increases in arousal, HRV is directly correlated to changes in attention and relaxation, and fEMG is directly correlated to changes in emotional valence (positive or negative emotional response).

Two other techniques, EEG (electroencephalography) and fMRI (functional magnetic resonance imaging), are more consistent with stereotypical neuroscience research, measuring brain activity more directly. An EEG is a non-invasive method to record the electrical activity along the scalp for measuring brain states *(Nunez and Srinivasan, 2006)*. fMRI is a neuroimaging procedure which is frequently associated with exploring memories through brain activity, and works by measuring changes in magnetization between oxygen-rich and oxygen-poor blood *(Singleton, 2009)*. While these tools have been wonderful in academia, their application in industry research is often plagued with improper research design. For example, extrapolating emotional conclusions from EEG or fMRI work typically requires evoking the reactions, not passive measurement. This step has often been skipped in industry, making the conclusions hazy at best and totally false at worst. Further, fMRI studies are notoriously expensive and difficult to perform in the confines of consumer research. Additionally, product quality varies, mostly differing in the number and quality of electrodes used. Cheaper EEG headsets can be exceedingly unreliable, usually because of poorer signal, and thus make it more challenging to analyze already difficult-to-interpret results. Research on cognition within neuroscience, whether using fMRI or an EEG, does not have the capabilities of peering into an individual's thoughts. Like most neurotechnology, information or scans from an fMRI are not to blame for the exaggerated findings researchers are reporting. Researchers, as well as those peer-reviewing new studies, must be held accountable for ensuring limitations and improper use of certain tools are highlighted so readers have clarity on every method's purpose and value.

More **behavioural** measures such as eye tracking (direct measure of gaze behaviour), and implicit reaction measures are directly correlated with association and may be useful to explore reactions that consumers have difficulty self-reporting (i.e., what visual is most attractive or what concepts fit

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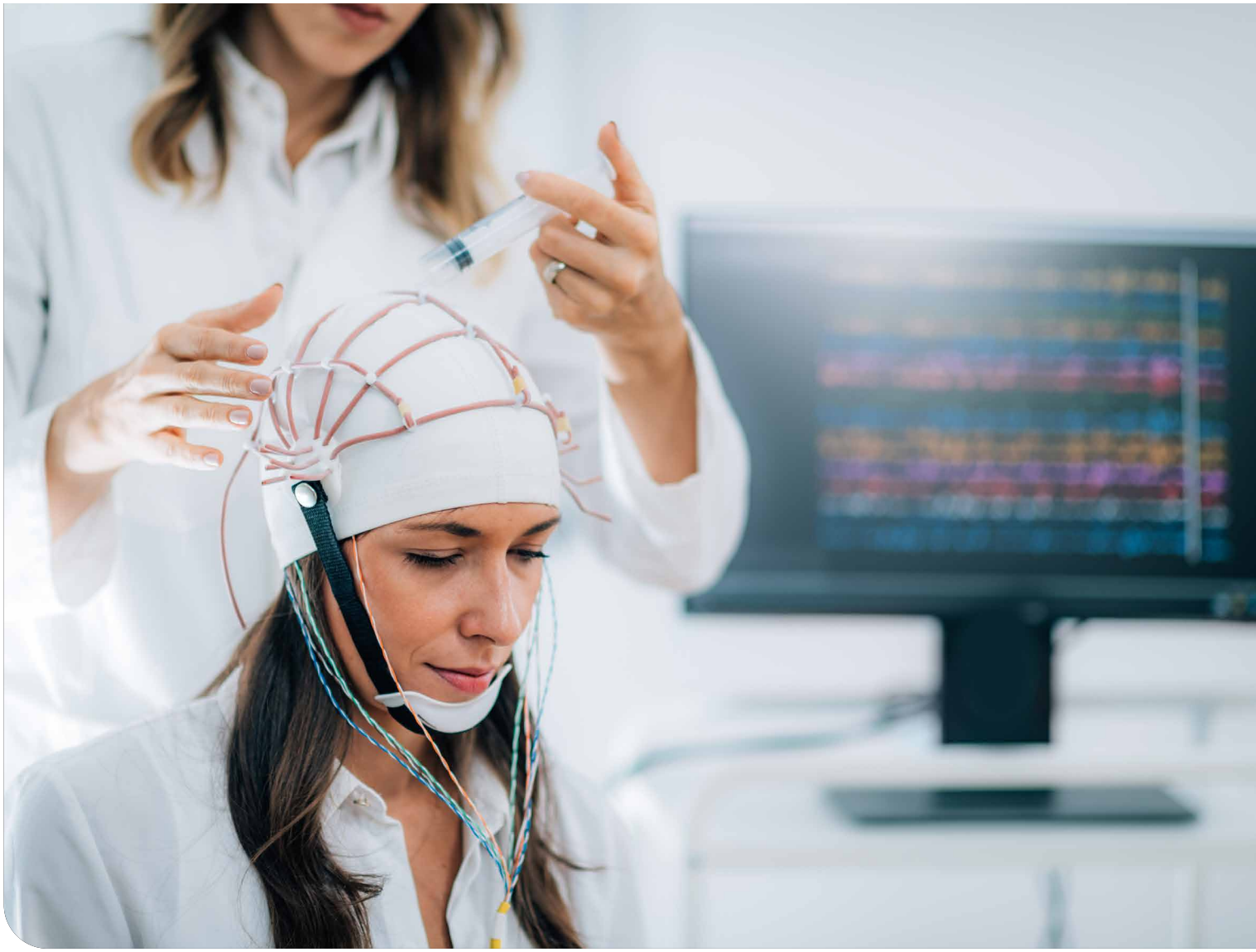
Growth Funds for Sensory Data Firm Aromyx *Aug 2 2021*
Aromyx, which has developed technology to digitize and quantify the information from sensory receptors in the human nose and tongue, has raised $10m in a Series A round. Funds will help increase capacity and automation capabilities, improve AI algorithms, and expand its lab and software teams.



the brief best). However, eye tracking and implicit reaction are slightly less reliable because of misinterpretation and misuse. Far too often, eye tracking behavior is attributed to attention, even 'though it is possible to look at something but not be paying attention. Similarly, improper design in implicit reaction studies also makes results less reliable.

Another popular neuro-tool, facial coding, is easy and cheap to use, but not nearly as useful as it is sold to be. Proponents often neglect to reveal facial coding's limitations, like socially driven reactions, dropout rates, interpretations, etc. A study from *Soussignan & Schall (1996)* revealed facial responses are flexible and able to reorganize to accommodate different situations and support the emotional and communicative functions of human facial behaviour. Meaning it is not always clear whether you are measuring a true emotional reaction or simply a mirrored response to some other influencing factor.

Once again, it's important to note that

It is perfectly reasonable to use any one of these measures as long as you are clear on all the limitations AND use them properly

ARF Issues Identity Resolution Sector Guide Aug 3 2021
In New York, the Advertising Research Foundation (ARF) has issued an analysis of the current state of the identity resolution industry, to help 'demystify' solutions and practices and provide the ad and marketing sectors with information about providers.

August 2021

any shortcomings of the approach are not the fault of the measures. It is perfectly reasonable to use any one of these measures as long as you are clear on all the limitations AND use them properly. Ultimately, no one tool will cover all research; therefore, we must be willing to accept that certain tools are better at collecting specific types of information over other tools. Different research questions and settings require different methodologies and technologies. However, the research marketplace for applied neuroscience can be a murky place.

Best Practices

While it's great to be on the cutting edge of technology, it's also important to take a step back and think about the goal of your research. We suggest following a few rules/guidelines to help decide how to use neuroscience in your research:

1. **Start with the research question or goal.**
   While it is often attractive to passively measure consumers in a naturalistic environment, and exploratory research can uncover interesting findings, to get the most actionable results, consider the research question or goal. Starting with the research question will help guide the scope of the study and the approach of the method. Understanding the "who, what, when and where" of the research helps to set parameters. For example, asking the client what they ultimately want to demonstrate with the research determines which tool best provides that specific answer. EEG would be a great option to show navigational difficulties, while implicit reaction would be a better option when exploring consumer perceptions of a brand.

   Often, the research question includes action standards, which also help determine the best approach. Action standards are the performance criteria used to determine whether a product has succeeded and should be decided on before the research begins. For example, success criteria may require that the tested product outperforms a benchmark product on key elements (such as liking, purchase intent, and being perceived in a specific way or creating a specific emotional state). This helps in reporting results in a meaningful

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Funds for Customer Success Intell Firm CompleteCSM *Aug 5 2021*
In the US, customer success intelligence specialist CompleteCSM has closed a $500k round of seed funding, which it will use to deepen partnerships with pilot customers, integrate with tech partners, and read its biometric, emotion and sentiment data.

and actionable way for clients to make real business decisions based on the data.

2. **Always use the right tool for the right question.**
Once you have the right question, it can be a lot easier to choose which research tool will best provide an answer. This is a much more productive and cost-efficient approach than starting with a tool and looking to apply it somehow. For example, if your research question is about whether a new fragrance helps to suggest that the product is more "spiritual", facial coding will not be able to help you, but implicit reaction may be able to help. This is why it is important that your research provider be "methodologically agnostic." Or as we often say, a widget salesman is going to sell you a widget and not something else. If the research provider is a "one trick pony", or only has one methodology to offer you, they may not be trying to tell you about the limitations of that method.

3. **Build a story with multiple research points.**
Neuromarketers often try to say that consumers' cognitive responses can't be trusted and that neuro measures are somehow more truthful. Neuro measures are not a replacement for cognitive or more traditional measures: they don't answer the same questions. Instead of trying to make neuroscience data stand alone, supplement current research with additional insights from neuroscience and psychology. By integrating the data (either in story or through statistical modelling), it is possible to make better and more actionable, informed conclusions and interpretations.

If you can just ask someone, then just ask them

4. **Keep it simple.**
It's our firm belief that if you can just ask someone, then just ask them. No need for complicated or expensive tools. If the question is about liking, for example, you are much better off simply asking consumers if they like the product. Consumers are actually quite reliable at knowing whether they will purchase something or if they like something. So really that's not what the technology should be used for and it is, in fact, not great at doing such. Neuroscience and psychological methodologies should, instead, really be used for measuring items beyond liking to better understand the drivers of liking and to add something synergistically to traditional measures.

Technologies continue to improve and become faster, better and cheaper. There is no doubt that there will be increased use of neuro-methodologies in the future of consumer and market research. But with great technology comes great responsibility.

More research will be needed to continue to validate new methodologies and theories and at HCD we will continue to test all new (and old) technologies for reliability and validation, ensuring that the right tool is used for the right research question. ■

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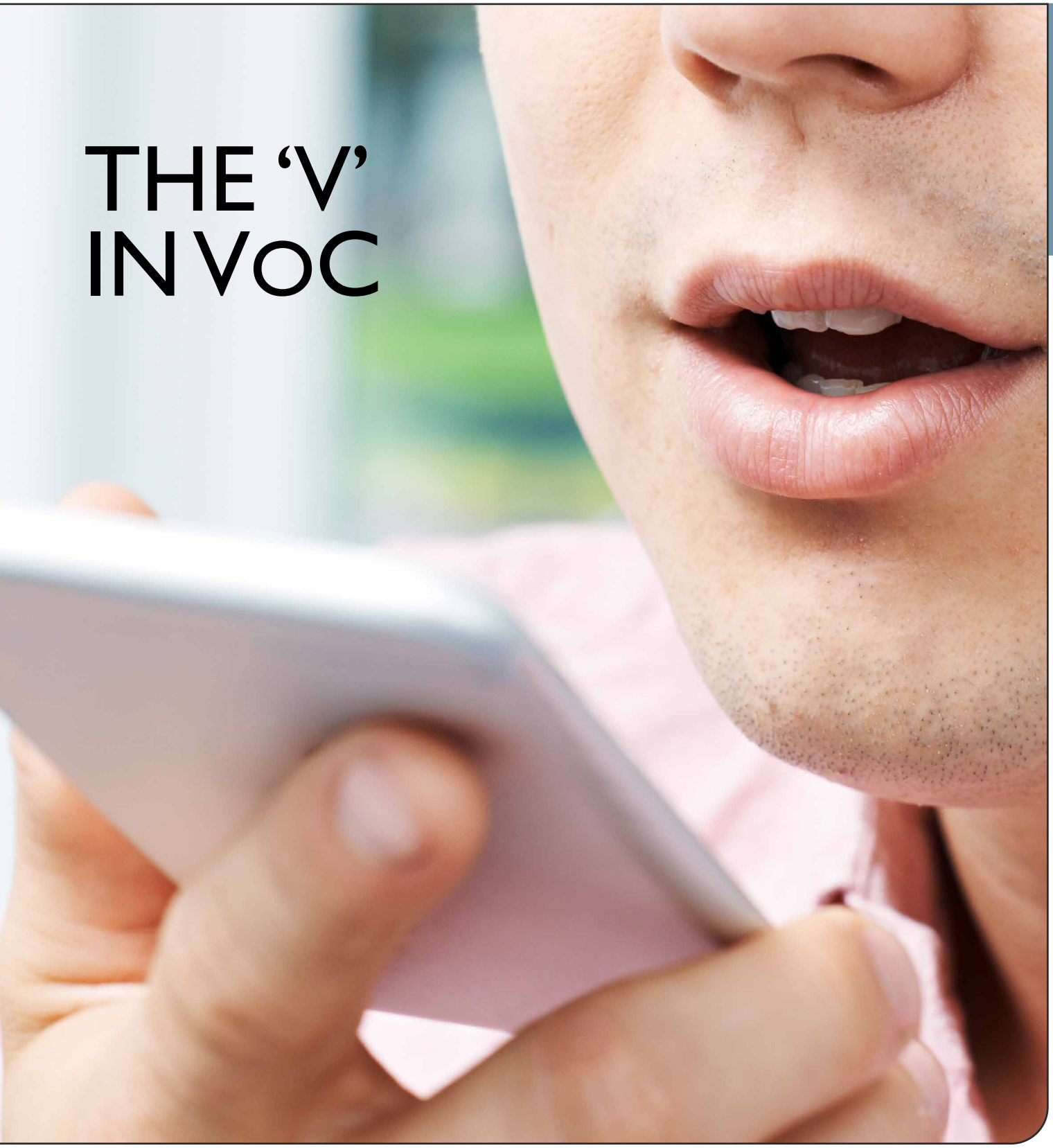
Phoenix MI Buys Research-based Ad Agency Communicus *Aug 5 2021*
In the US, advertising and brand specialist Phoenix Marketing International (Phoenix MI) has acquired research-based consultancy Communicus, which provides insights into how ad campaigns build brands and motivate purchasing. Terms of the deal were not disclosed.

August 2021

THE 'V' IN VoC



Bland Named Walnut MD *Aug 10 2021*
In the UK, insight business Walnut Unlimited has promoted Chris Bland to the role of Managing Director, overseeing the day-to-day running of the agency. He takes over from Jane Rudling, who will continue in her role as Head of Unlimited's Insights & Analytics division.

DRNO Timeline

Why talk up the value of the Voice of the Customer, and then not listen to their actual voice? Collecting and analysing voice response and the emotions behind it improves response rates, deepens understanding of motivation and drivers of behaviour, and helps spot trends you'll otherwise miss altogether, says Mike Page, co-founder & CEO of British firm Phebi (pronounced as in the name "Phoebe"). Based on an interview with Nick Thomas.

Swapping in a voice discussion instead of a quant, typed survey has many advantages: respondents prefer it and are more likely to take part in the first place; it opens up new options where people wouldn't be able to respond at all; and it gives insights into the way people say things which typing never will, from repetition of words to emphasize a point to the very different emotions that sometimes sit behind the same words.

Range of applications

Voice analysis has a very broad range of potential applications, both within the insight space and outside: there are whole other areas where we at Phebi believe we can best deliver solutions based on sound. We want to focus on the potential of voice because it's nigh on impossible to do everything well: better to work *with*people who do other things, like VoxPopMe for example for video. Our contention is that voice is more ubiquitous, you can get insight in many more use cases with voice than you can with video - and similarly we're not experts in biometrics, but we do work with people who are.

Increase response rate

This is one reason why people choose a voice solution, along with better answers (see the next sub-heading). Clients who are struggling to get people to answer surveys on a particular topic see this as an alternative, and the pandemic was a great time to try this technology to see if they could use it quickly and cost-effectively. For example in healthcare: more convenience for the patient, more engaging for the (often over-researched) physician. On a study where we partnered with Rare Patient Voice, respondents were given the option to use voice and more than half of them chose to do so - a video never gets take-up on quite this scale. It also makes the collection very easy - you've got one self-serve platform which can apply to your qual, your quant etc..

More insights than text

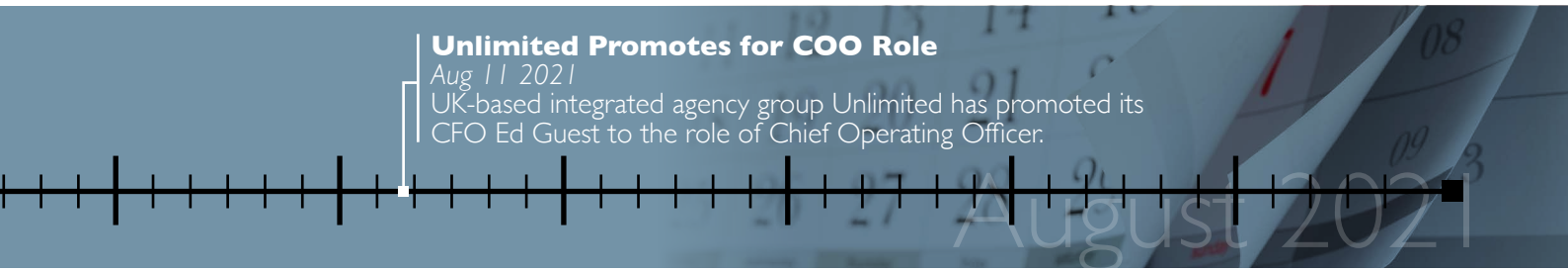
A second benefit: spoken responses are typically 4-5 times longer than typed ones, and the underlying nonconscious emotion can be better derived from voice than from text - it's not just what people said but how they said it. Even before adding specific emotion analysis, there are things voice responses will tell you that typed won't. An example is repetition - you don't generally repeat yourself when you're typing but the fact that you do when you're speaking, and the phrases you end up repeating, can be crucial. If you give a 30-second answer and there's something that's really important to you, you are likely to say parts of it two or three times. For example Phebi worked on a study in the US for a provider of telehealth services: the messages were generally very good, and from typed responses that might have been it, but in voice response we noticed people coming back repeatedly to a key thing they needed, and it seemed that the more hands-on help an individual needed the more anxious they were. They were using the same words to describe it, but in voice responses they repeated it more. That's the kind of nuance that comes in, and we've developed techniques to ensure it's picked up.

Even before adding specific emotion analysis, there are things voice responses will tell you that typed won't. An example is repetition

Similarly, we worked on responses to the launch of a new drug and were able to identify a significant difference between older and younger doctors in anxiety in prescribing this particular medication: no other element of the project had spotted this, so the client was able to go back and get some real insight into that.

What's possible and how does it work?

Phebi's current offer works with three types of spoken data, and in each case can now



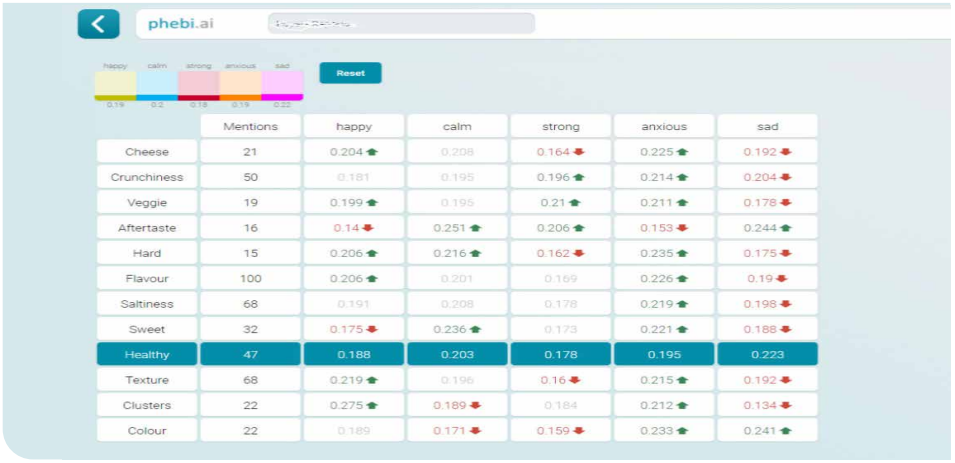
be managed by Phebi's customers. There is a survey plug-in, for collecting and analysing quant open-ended responses and adding qual flavour; the ability to upload recorded interviews, videos and so on and have them instantly analysed for content and emotion; and Phebi Live, where you can literally dial Phebi in to a conversation and it will analyse words and emotions while people are speaking.

For the middle option, when content is uploaded the analysis is available more or less instantly after the files have been processed by Phebi, at a speed faster than normal playback. As an example, on a recent project we wanted to learn about interaction with digital in-home assistants like Alexa: the client wanted to know any time someone in this household talked with Alexa, what were they doing right before and after - and you don't want to trawl 900 hours of audio for it, but by uploading it to Phebi you can search through it very, very fast and just pull out the relevant moments.

Phebi operates by training existing software packages and models to work in a new way. For full language transcription we use Mozilla DeepSpeech, probably the best still, along with other packages like Microsoft, Google or Amazon, then we train and customise the models to identify specific words for whatever specialist area we're working in. For example, with a lot of call for healthcare research our versions can recognise drug names, brand names and specialist medical vocabulary. Typically we do this by uploading a sheet of words and then testing its understanding of them, giving confidence levels for how likely each is to be properly recognised in context.

Another good example of context-specific spelling is very close to home: we're Phebi - pronounced 'Phoebe' - and any basic language program will spell it as the latter, so the model has been trained to recognise our correct spelling.

It's actually a plus for our emotion



	Mentions	happy	calm	strong	anxious	sad
Cheese	21	0.204	0.208	0.164	0.225	0.192
Crunchiness	50	0.181	0.195	0.196	0.214	0.204
Veggie	19	0.199	0.195	0.21	0.211	0.178
Aftertaste	16	0.14	0.251	0.206	0.153	0.244
Hard	15	0.206	0.216	0.162	0.235	0.175
Flavour	100	0.206	0.201	0.169	0.226	0.19
Saltiness	68	0.191	0.208	0.178	0.219	0.198
Sweet	32	0.175	0.236	0.173	0.221	0.188
Healthy	47	0.188	0.203	0.178	0.195	0.223
Texture	68	0.219	0.196	0.16	0.215	0.192
Clusters	22	0.275	0.189	0.184	0.212	0.134
Colour	22	0.189	0.171	0.159	0.233	0.241

measurement that it's not dependent on getting the words right anyway - it picks up the mood regardless, even without understanding the language - in this respect it's very different to nlp (neuro-linguistic programming).

Emotional resonance

So how does this work? When a transcript is produced the system layers over it with colours indicating emotion: at present five standard emotions which are 'strong', 'calm', 'anxious', 'happy' and 'sad' - again, based on existing science, but we've trained the software using TensorFlow and developed our own emotional resonance measure working in real time on GPUs. Every three seconds, the software detects all of the emotions in that segment with intensity scores and confidence intervals, and this data is timestamped to the relevant words in the transcript.

This works in situations where analysis of words themselves doesn't. For example, on a recent study for PepsiCo we looked at views of new ideas for snacks: this is a difficult one because everybody who discusses them is using the same words - salty, crispy, crunchy - and for some people 'salty' for example might be good and for others bad, so it's not down to the words they're using - it's down to their sentiment when they said them. The emotional resonance score was able to predict which would be successful. Figure 1 shows positive and negative responses for each snack, and these and an average were used to find a winner (in this case Cool Ranch) - instantly. This got clients really excited because it's predictive of other types of analysis and it's literally that quick - it's a good way to look at data - by comparing the emotion without direct reference to the words.

In another project last year, Washington State University (WSU) and their School of Communications were looking at Joe Biden's first speech to Congress, and wired up a number of Democrats and Republicans to see how 'rewed up' - good or bad - each were when he addressed a number of topics. Phebi tackled it differently, comparing what Biden was saying and what emotions were in his speech, to the responses - and did this using a live stream directly from YouTube. Now WSU have Phebi on their desk so they can use it for other politicians and the way they talk.
Technology for filtering out background noise, and audio quality tech, are constantly improving, making our job easier and results more accurate. One challenge we still have very occasionally is that people record answers with the TV on in the background and the transcription picks up dialogue from it! You'll think 'That's a very odd thing for them to be saying... Put your hands up or I'll shoot you'. It picks up stress levels from the TV too.

DRNO Timeline

Contentsquare Buys Product Experience Firm Hotjar
Sep 2 2021
Digital experience analyst Contentsquare has acquired product experience insights provider Hotjar for an undisclosed sum.

The Future

Version 3 of the software is currently rolling out, and is a totally self-serve model. Clients get a licence for it and use it DIY - no-one else has to be involved. Phebi Live has been running in early adopter mode for 3-4 months now, including a use case where a moderator dials Phebi into the discussion in real time. Agencies are finding Live a good way to demonstrate the software to their clients, they have a conversation with the client and Phebi tracks it, and they show it to the client afterwards along with their emotions - very often this is enough to get Phebi added into the study. With a Zoom call, the software just needs the call number and the access code and it'll log in and follow along.

Also exciting right now is our new partnership with Forsta: Phebi can be used to give a lift to practically every product they have - Decipher, Confirmit, Interview, video diaries - and we are working to contribute to all these. The partnership is obviously helping us scale, with exposure to different kinds of clients and different kinds of work already after two months - but also it's forced us to quantify and package it up more tightly, one of the challenges all tech companies face when they make the transition to being a (tech and) service company. With version 3 we can ask 'Do you want us to do some training, or would you just like to start going?' We have other partnerships too - with Askia, since the beginning, giving us a connection to Ipsos and the scale that comes with that.

Phebi began applying voice tech and AI to market research just as the pandemic started. Although market research budgets were affected as clients trimmed expenses, the adoption of Phebi has gone quickly across industries, especially health, and use cases, including quant, qual, UX and CX. We think that's due to a combination of things, mainly the ability to add some qual perspective to quant work without the fees usually associated with qual, and the ability to get a new type of insight without needing to learn and use an entirely new MR platform. V3 is already increasing the adoption rate as the ability to be full service means that now Phebi clients can gain the insights it delivers even more quickly. So, Phebi's combination of affordability, new insights and fast turnaround has growing appeal. ■

People record answers with the TV on in the background and the transcription picks up dialogue from it! 'Put your hands up or I'll shoot you'

Mike Page, co-founder & CEO, Phebi

Mike has over 20 years of experience in data-centric software and new technologies. He's a serial innovator responsible for devising a number of products. Before founding Phebi Mike was the Managing Director for Cognicient, a business intelligence technology company he co-founded focused on analytics and enabling the creation of research data marts.

Over the course of his career, Mike has held various executive positions including that of VP technology at Blue Ocean Market Intelligence, Director of Operations, Europe for Synovate, Global Account Director with SPSS and Global Head of Research Technology for Research International.

Mike is a frequent speaker at conferences in both the US and Europe.

Revenue Up 4% for US Insights 'Top 50' *Sep 3 2021*
Research revenue for the Top 50 US-based insights and data analytics companies rose 4% to $48 billion in 2020, even as overall US GDP contracted 3.5% during the global Covid pandemic, according to the Insights Association's Top 50 Report.

PUSHING BOUNDARIES:

WHAT DOES AUGMENTED REALITY (AR) LOOK LIKE IN MRX?

Kathryn Ambroze
Manager of Behavioral and Marketing Sciences, HCD Research

DRNO Timeline

MMR Group Expands to Amsterdam *Sep 10 2021*
UK-based consumer and sensory researcher MMR Group has opened an office in Amsterdam, where it has appointed former Flavors & Fragrances exec James Gater as Regional Head, Netherlands.

New technologies such as augmented reality (AR), are infiltrating the market research space. If used correctly, these technologies can add valuable insight into the drivers of decision making, as well as the overall consumer experience. Behind the shiny advances and upgrades within AR, understanding its fundamental use, with limitations and all, can help researchers to push the boundaries between naturalistic and controlled research.

As screens and technology continue to become more embedded in consumers' lives, from smart speakers to virtual family gatherings, the interactions of daily life have evolved into a metaverse. The recent pandemic exposed how individuals can still work, shop, share, and connect globally through virtual environments. Augmented reality (AR) is one of the leading technological advances, making it possible to visualize the world from both lenses by including virtual elements into a live view of a current, real-world space. Marketers recognize the value in blending the physical and virtual worlds in real time because it creates an immersive experience that allows consumers to interact digitally with anything from products to surveys. However, just like with any tool, marketers must have a strong grasp on both how AR works and when best to use it.

Adding to Reality…

AR is a form of mixed reality which aligns both real and virtual objects within the same dimensions of space and time *(Van Krevelen & Poelman, 2010)*. Most people associate AR with the visual environment changing: however, anything from sounds, smells, and visuals to vibrational movements can be part of the AR space. AR may overlay a video-feed of reality, share the real-world perception with transparent filters and/or project AR onto real displays *(Van Krevelen & Poelman, 2010)*.

There are many ways for consumers to experience AR because it enhances the natural current environment with the superposition of additional context, such as music or text (and can include any number of sensory environmental additions from audible to visual, smell, taste, and haptics). The displays can be projected via headpieces, smartphones, tablets, laptops, or projectors (such as flashlights, holographs, etc.). The versatility of AR inspires a lot of potential opportunities to better understand consumers by offering a comfortable way to enhance reality with sensations to communicate more information to the individual.

AR is a form of mixed reality which aligns both real and virtual objects within the same dimensions of space and time

Research Orgs Publish Data Ethics / Legal Guidelines *Sep 14 2021*
Professional associations ESOMAR and the Global Research Business Network (GRBN) have released two sets of guidelines - Primary Data Collection and Duty of Care - intended to strengthen the ethical standards framework available to their respective memberships.

Kathryn Ambroze
Manager of Behavioral and Marketing Sciences, HCD Research

Kathryn Ambroze is a behavioral neuroscientist with experience in consumer research and methodological innovation. She earned her bachelor's in Neuroscience and Business from Muhlenberg College and currently works at HCD Research as the Manager of Behavioral and Marketing Science, focusing on methodological development and innovation, and applying neuroscience and psychological tools to consumer and market research. Kathryn is also currently studying at the University of Pennsylvania pursuing her Masters in Behavioral and Decision Science.

Applications of AR

Integrating AR with qualitative research, such as a shop-along, allows for a full, uninterrupted experience of consumer decisions. Recently, HCD created a way to combine AR with consumer research with the development of fully mobile AR Surveys. These allow consumers to answer digital survey questions while simultaneously viewing the product or consumer experience through their device's camera in the real environment. This approach allows clients to gain in-context insights without disruption from external factors like an interviewer. AR Surveys also allows consumers to share their honest opinion in a non-intimidating way, so they do not need to feel embarrassed or uncomfortable replying to another individual. Innovative tools, like HCD's AR Surveys, modernize conventional consumer research in a way that feels familiar to consumers (in their own time and at their own locations) and helps empower the research with valuable insights.

Market researchers can also easily utilize AR for exposure to various stimuli without changing the physical environment. Using the AR system ensures each condition is presented uniformly from the same perspective, with the only variation being the item augmented into it. The changes can range from small adjustments to entirely new designs. Product development and concept testing can be brought to life via AR, providing an understanding of the item or concept in relationship to the natural environment. These conveniences streamline translating the improvement process while also saving time and energy in creating physical prototypes.

Insight into consumer preference is also easily assessed with AR research by readjusting the real-life location of the virtual item. The overlapping of the real and virtual worlds can help consumers easily manipulate locations around the house to see if rooms influence consumer responses.

> The versatility of AR inspires a lot of potential opportunities to better understand consumers by offering a comfortable way to enhance reality

Having the environmental context fit the participant's real lifestyle helps determine if a product or concept fits or disrupts established preferences. Pairing this AR approach with other additional qualitative or quantitative research methods allows researchers to further evaluate behavior and reactions to various stimuli from a new perspective.

Both HCD's AR Surveys and the programming of virtual products in a natural environment reveal opportunities that allow AR research to be completed remotely. Allowing participants to review and evaluate items or concepts in intimate environments, such as their homes. In-home use tests open up the conversation for a wide variety of personal products to be evaluated in a safe, familiar environment. These applications create a totally new form of research that avoids shop-alongs while still engaging consumers and giving a plethora of useful data to build upon.

Some Things to Remember

It should be noted that AR can have negative consequences if not correctly utilized. Since reality is being distorted to some degree, AR may cause individuals to be less vigilant in being aware of their surroundings and even distracted from reality. Warning signs or car horns can easily be confused with augmented features

DRNO Timeline

Wunderman Thompson Intell Launches Metaverse Study *Sep 17 2021*
Ad agency division Wunderman Thompson Intelligence has launched a new report called 'Into the Metaverse', which covers everything brand owners and their agencies need to know about the 'shared online worlds in which physical, augmented, and virtual reality converge'.

which could be detrimental for the safety of the participant and the research at large. Having a third party to supervise may be a helpful precaution; however, that is not always feasible. Informative concept forms and disclaimers should remind participants of the potential dangers, and participants should always be required to provide their informed consent prior to beginning the study.

Because of AR's presence on popular platforms, such as Snapchat and Instagram, the technology has become generally socially acceptable: however, concerns about privacy and data breaches must also be addressed when recruiting participants. These considerations not only help to develop a strong research design but also ensure the appropriate application of AR technology.

Concluding thoughts

Combining the technology of AR with other measures in tandem can elevate research exploration and help provide a better understanding of consumer perceptions towards an overall experience. While the use of AR is expanding rapidly in the market research space, to optimize its use researchers must be aware of how to properly employ the tool in practice. No one tool can answer every research question, which means market researchers must determine a strong combination of methodologies to best answer their specific question. Sorting through the technology, learning its limitations and evaluating its benefits, will help drive meaningful research and future innovations. ■

The overlapping of the real and virtual worlds can help consumers easily manipulate locations around the house to see if rooms influence consumer responses

Citations:

Van Krevelen, D. W. F., & Poelman, R. (2010). A survey of augmented reality technologies, applications and limitations. International journal of virtual reality, 9(2), 1-20.

Unlimited Group Hires Lab Leader
Sep 27 2021
British-based agency group UNLIMITED has appointed Simon Collister PhD as Director of its Human Understanding Lab.

September 2021

WEARABLE TECH - FIT FOR MRX?

Kathryn Ambroze
Manager of Behavioral and Marketing Sciences, HCD Research

DRNO Timeline

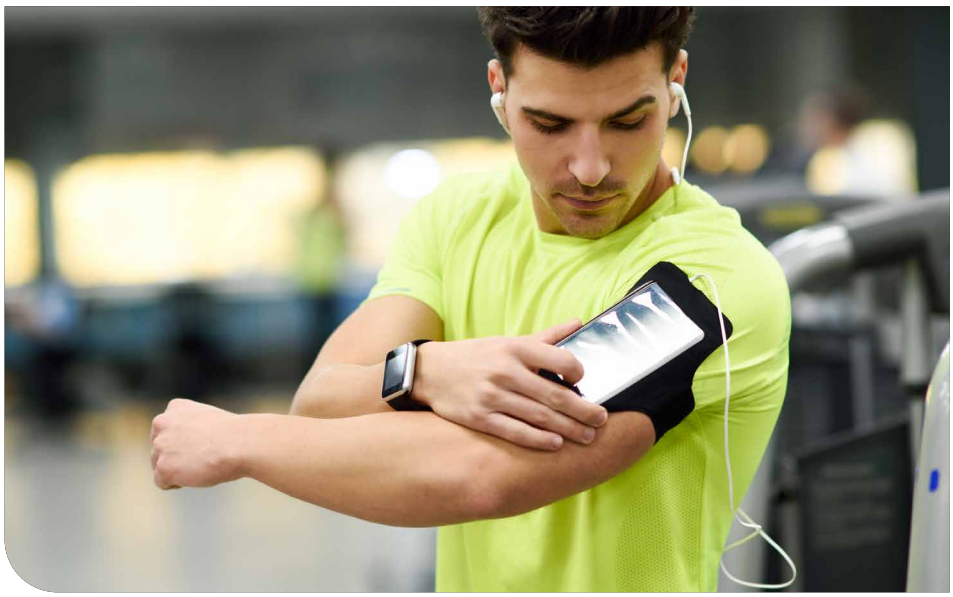
Senior Sales Hire for Sentient
Sep 27 2021
Behavioral science-based consumer insights firm Sentient Decision Science has appointed former System1 researcher Simon Wyld as SVP of Sales in its Sentient Insights division.

Wearable tech is everywhere, and offers great potential for collecting data, but how useful is it right now for answering specific research questions?

Market researchers are constantly looking to incorporate innovative and new solutions in technology to monitor physiological data. Wearable technology is one of the most popularized approaches for collecting activity from the body: however, the verdict on its utility in industry applications is largely subjective. In this article, we will review how wearable devices can work in research, as well as expose some often overlooked but important limitations of these technologies. By taking a critical look into wearable technology, market researchers can decide for themselves if a device's capabilities meet their standards to help uncover their specific research questions.

The Opportunity

Wearable technology, largely because of the promotion of smartwatches and fitness monitors, has become one of the most recognizable approaches for collecting body signals. Many of these products are easily available on Amazon and can provide a multimodal approach to capturing activity during virtually any experience. Often used to monitor health (such as heart activity and sleep patterns) and wellness tracking (like steps and even food intake), many people have incorporated wearable technologies into their private lives. With the public adoption and advances in noninvasive, portable technology, market researchers recognize the opportunity to easily integrate these tools into research. While the accessibility and ease of using wearables may be attractive, there are some considerations to address before going all-in on the technology. While it seems like the perfect solution to continuous measurements or deeper insights, researchers must be aware and cautious of its limitations. Behind the friendly interface a lot of careful design is involved, which keeps its execution consistent for consumers but may have impractical implications for research. Leading with the research objectives can help distinguish the real value, if any, wearable technology has for a project.



Quality Matters

Wearable technology is rapidly expanding, and the progress made in such a short span of time is impressive: however, while the sleek design gives a cutting-edge feel, it is important to remember not all wearables are created equal.

The technology, consumer-grade or not, is still only as good as the quality of its parts. Researchers should be aware of the quality of the sensors being used, since that has a direct impact on the signal collected. For example, most research grade (non-wearable) physiological sensors used for tracking heart rate changes over time rely on ECG (electrocardiogram) which is the most accurate and reliable measure. Wearable heart rate devices typically use

With the public adoption and advances in noninvasive, portable technology, market researchers recognize the opportunity to easily integrate these tools into research.

Behavioral Science Specialist BEESY Hires Two in NYC
Oct 7 2021
In New York, behavioral science insights agency BEESY has appointed Robert Sable as Senior Behavioral Associate, while Shlomit Jacobson joins as a Consultant.

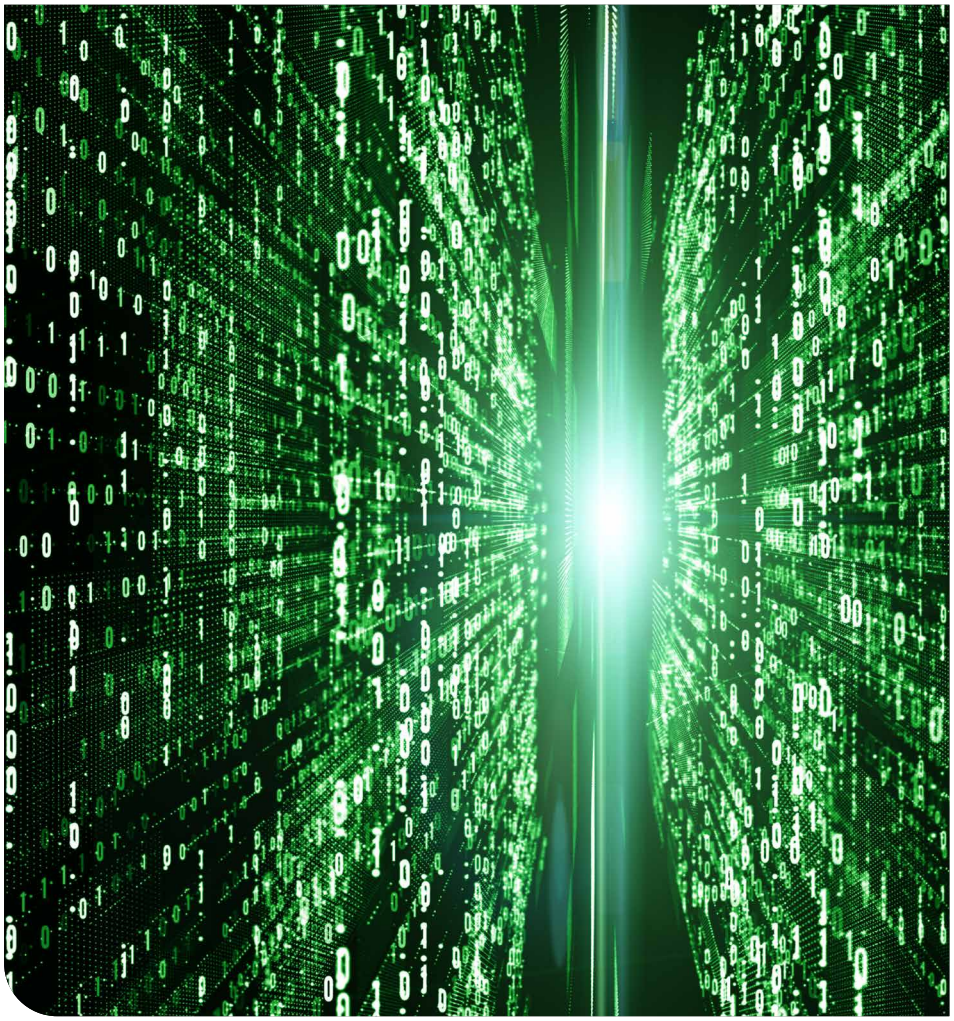
Sept - Oct 2021

PPG (photoplethysmography), shining light into the skin and measuring light scatter by blood flow, as an alternative to ECG, but PPG can present certain experimental design implications, including optical noise, sensor location, skin tone, etc. Generally, you get what you pay for, but even the highest quality, most expensive wearables available can have similar shortcomings.

As with all technology, the quality is often associated with the price. Researchers should recognize that consumer-grade devices are designed for consumers, and the data are not 'research-grade': therefore, a lot of the information is presented in a way that is digestible for the layperson. While appropriate for personal use, the adjustments (such as data smoothing) made for consumer-grade wearables may present issues in research settings due to lack of specificity.

The real world is a messy place, which can result in messy data

For example, gyroscopes are used in wearable technology to understand the object's location in space. If the gyroscope detects too much motion, it will pause the algorithm recording biofeedback measures, such as heart rate, in many consumer-grade wearables. This period, where the wearable stops collecting data, presents a huge gap in data recording and analysis, potentially missing valuable information during a consumer experience. If using consumer-grade wearable technology during market research, it is important to be aware of these caveats that can be detrimental to a research study if not understood.



Remember who is wearing the wearable

One of the biggest reasons for interest in wearables for consumer research is the appeal of being able to measure consumers easily in their natural environment. However, one of their biggest limitations is that the research will always be reliant on the participants' ability to appropriately use and wear the wearable. If the technology is tampered with, the signal and data quality will diminish. Having windows of time without data may involve missing key behaviors. Other data loss issues may present themselves if the battery life is inadequate. Having a longer power cycle can help mitigate issues with charging (and having less responsibility for logistical efforts can keep the participant more in-the-moment). Further, the true experience of the participant is a big assumption unless a camera is recording the participant. Participants may say and do different things, which can also jeopardize the learnings.

The real world is a messy place, which can result in messy data. Setting parameters to minimize ambiguity or confusion is a crucial step in the design process, but ultimately, researchers must decide if the noise from wearable technology will overshadow any meaningful responses.

CPO Hire and Founder's Sideways Move at Realeyes
Oct 15 2021
Video attention measurement and emotion analytics specialist Realeyes has appointed former Brand Networks CEO Dave Fall as Chief Product Officer.

DRNO Timeline

...the data is cleaned before the researcher even looks at it. Interval data is then impossible to collect because the output is already aggregated

Check the detail available, and read the data raw

Market research needs clear, measurable concepts to extract insights. When looking into wearable technology, it's important to consider its capabilities and the level of detail necessary to perform strong analyses. Some important considerations are listed below:

- **Space:**
  Make sure the data capacity of the wearable can fit the scope of the study.
- **Raw data:**
  The exporting capabilities often consist only of automated graphs. Access to tabular data is something that researchers should consider when vetting out different wearable products since this will directly impact the statistical analysis performed.
- **Aggregate adjustments**:
  Some wearable technology uses momentary, rather than continuous, measures to account for normal variance. By using sliding time windows or an average of beats, the data is cleaned before the researcher even looks at it. Interval data is then impossible to collect because the output is already aggregated.

It is easy to get swept up in the excitement of wearable technology; however, the data collected from this tool does not provide a comprehensive evaluation. Furthermore, misconstrued information can lead to overpromising or inaccurate results. Keep in mind the research question when deciding the technology under consideration. Will this device actually provide additional insights? By leading with the research question and using the appropriate methodologies to fill in the necessary gaps, researchers will find more success.

Don't fall for the rose-colored glasses

Wearable technology has infiltrated the field of marketing, providing additional information about how consumers respond to real-world experiences. However, the consumer experience of wearables is intentionally intuitive: designers keep the system as simple as possible to avoid confusion. Behind the sleek surface, wearable technology is complex and intricate. To optimize the use of these items, it is important for market researchers to understand what is happening in the process of data collection so the output can make sense. It is not enough to trust the algorithms behind these tools - researchers must explore how they are developed and validated to ensure its full value. Behind every algorithm is a human, and no human is perfect. Learn the inadequacies of the tool and decide if the shortcomings jeopardize the findings, or if they can be minimized by being paired with another measure. By reflecting on these concerns prior to the research, there is an opportunity to compensate for what the tool is lacking - or find a new measure that has a stronger approach.

Learn the inadequacies of the tool and decide if the shortcomings jeopardize the findings

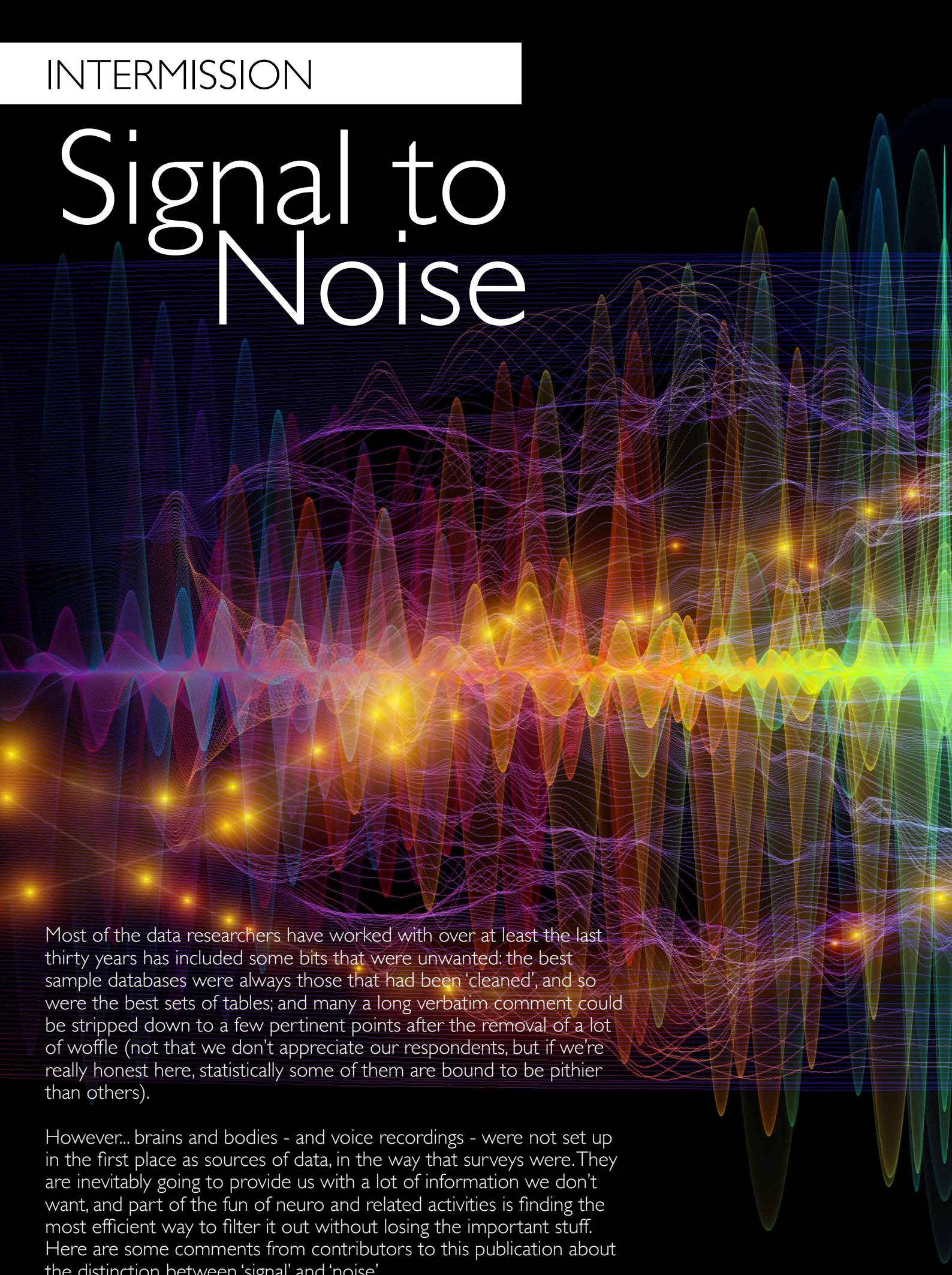
Are wearables 'fit' for MRX? Yes, no, and it depends. At the end of the day, researchers need to fully understand the problem they are trying to explore because the fanciest of wearables will not help if the data makes no sense. Be aware of the risks and limitations, and really reflect on what the recording is adding to the overall understanding of the research objectives. Being flexible and critical in the methodology and approach can help researchers use the right tool for the right question - with or without wearable technology. ■

HCD Debuts UX Product
Oct 18 2021
In Flemington, NJ, neuro-behavioral consumer researcher HCD Research has announced a new user experience product, HCD NeuroUX.

October 2021

INTERMISSION

Signal to Noise



Most of the data researchers have worked with over at least the last thirty years has included some bits that were unwanted: the best sample databases were always those that had been 'cleaned', and so were the best sets of tables; and many a long verbatim comment could be stripped down to a few pertinent points after the removal of a lot of woffle (not that we don't appreciate our respondents, but if we're really honest here, statistically some of them are bound to be pithier than others).

However... brains and bodies - and voice recordings - were not set up in the first place as sources of data, in the way that surveys were. They are inevitably going to provide us with a lot of information we don't want, and part of the fun of neuro and related activities is finding the most efficient way to filter it out without losing the important stuff. Here are some comments from contributors to this publication about the distinction between 'signal' and 'noise'

BRAINS

Michelle Niedziela

"Talking about the data you get from an EEG, people don't always realise that our brains are complicated. Your brain is 3 pounds of fatty mass here in your head which isn't very big, it's a small space, but you have 100 million neurons tightly packed into it, and 100 trillion connections between them, all in this tight space. Your brain is constantly active: there's no time when only 10% of your brain is active, it's 100% active all the time. But most of it is involved with keeping you alive - so when you put electrodes on your head you're still measuring all those things"

Pedro Almeida

"The signal-to-noise ratio of an EEG is low - what's interesting versus what is not, so you need a very, very clean signal to get something out of it. If you're using it with people in their homes you will really need to filter the signal - you think 'I'll just remove everything that seems uninteresting'. Most companies which do this filter the signal so much that it looks really nice, but then there's nothing there"

VOICES

Mike Page

"One thing that often goes unnoticed is how much more sophisticated microphones are these days - even in PCs: they seem to have realised they were falling behind phones and laptops and that audio is important. This laptop I have now is only 2-3 years newer than my old one but with that I needed to carry around a separate mike and/or headset. All of these things - … bit rate, noise cancelling, noise suppression, a nice microphone - make it easier for us to do the work that we do. That's not to say we don't suffer from poor sound quality sometimes - we do! - but it's more for example because we interviewed people in South Africa wearing masks in an air-conditioned room, using a phone sitting on a table, and that provided one or two problems. We're just starting one where we talk to people about using shampoo, and they'll be speaking in the shower!"

Nick Thomas
(prompted by Mike's comments)

"I was fortunate enough in the '90s to do half a dozen interviews with businesses in Indonesia. On one occasion my taxi driver informed me we were about two minutes from the destination, a ceramics factory - on a dry road on a sunny day - when the most torrential tropical storm hit. At the end of the two minutes, the driver was unable to approach the respondent's office building due to flooding, but he was resourceful and eventually found a way to drop me at the back door. Inside, the respondent led me to the 'quiet' room for the interview - quiet as in away from other workers, but as it had some kind of Perspex skylight and the storm was not letting up, it was like trying to interview a member of Motorhead in the middle of a gig. There are only a limited number of times you can ask a quite senior and time-starved b2b respondent to repeat himself, and I reached it after a couple of minutes. The rest was mostly polite nodding and smiling, and of course my tape recording was useless. One for experience, and the rare Outcome Code 13: Act Of God."

SHOT ON TARGET?

MEASURING JUST EAT'S SPONSORSHIP OF EURO 2020

Funds for Behaviour Specialist Humanising Autonomy *Oct 25 2021*
London-based human behaviour understanding and prediction specialist Humanising Autonomy has raised $11m in a Series A funding round, for use in product development, growth in new sectors and expansion into new markets in Asia, Europe and North America.

DRNO Timeline

Just Eat Takeaway.com worked with MindProber to prove the value of their Euro 2020 football sponsorship in creating an emotional connection with viewers - and to understand that their ad placement in England's Euro 2020 matches was highly effective.

Last year Just Eat Takeaway.com (JET), the world-leading online food delivery company, worked together with MindProber to evaluate the sponsorship of UEFA's flagship football competition and aid their understanding of future media spend. As their research technology partner, MindProber employed the Physiological Analysis of Live Media (PALM), its full-fledged platform for biometric media testing. JET was able to identify the most impactful TV advertising real estate and get insights to take into upcoming campaigns.

About Just Eat

Just Eat Takeaway.com (JET) is one of the leaders in the online food delivery marketplace. With over 580,000 partners in 25 countries worldwide connected to its platforms, it connects consumers with a remarkable variety of restaurants. JET attribute their success to creating strong relationships with and between their customers and partners. Their story started a decade ago as a functional app that evolved into a disruptive data-fueled business platform. Today, they use innovative technology to create the ultimate, seamless, fast, and personalized takeaway experience.

Going Beyond Viewership Numbers

Euro 2020 sponsorship was JET's first cross-market fully integrated sponsorship activation in a major sports tournament. When it comes to valuing the sponsorship and commercial space, JET wanted to go beyond viewership numbers and frequency and understand the true emotional connection between the audience and their commercial messages.

Being groundbreakers in their own industry, JET recognized

MindProber as a media restech partner that could help them achieve this goal. Furthermore, they saw our PALM platform and dataset as a means of acquiring actionable insights and media impact metrics to support their sponsorship efficacy evaluation and future media spend decisions.

Audience Emotional Engagement: The Opportunity and Challenge

Sports and entertainment hinge on emotions. Tapping into the viewers' emotional engagement with media content and creating deeper connections is what brands strive to do.

Live sports broadcast events are a terrific opportunity for sponsors to work on building brand KPI targets. The right points of contact represent unmatched opportunities for advertisers like JET to connect with viewers and promote positive brand outcomes.

However, measuring emotional engagement with media content to determine the right touchpoints is not easy.

Neuroscience measures have so far involved a great deal of workforce, time, and clunky research equipment. Laboratory settings affect the consumer experience and the validity of the data; and there was no solution for acquiring biometric data at scale in real time, with declarative pre/post-survey data lacking the necessary second-by-second granularity.

Why JET Chose MindProber

As a data-driven company, JET identified how MP's solution could evaluate the impact of their Euro 2020 sponsorship at a deeper, emotional level, providing objective and comparable media impact metrics quickly and efficiently via its full pipeline and automated data processing platform.

Funds for In-Store Video Analyst Deep North
Oct 25 2021
US-based in-store video analytics firm Deep North has raised $16.7m in a Series A-1 round of funding, which it will use to make 'key hires' and to expand its services.

October 2021

Biometric data was combined with declarative responses collected from a MindProber owned and managed consumer panel, helping JET to:

- Review the emotional impact of each brand touchpoint and commercial activity - Euro 2020 broadcast sponsorship, full-screen ads, idents, and pitch-side ad banners
- Benchmark the data against direct and indirect competitors, and against MindProber's historical dataset
- Get insights into how sponsorship of major tournaments can drive additional engagement with their brand and create a best practice framework for future campaigns.

How JET Employed PALM

JET reviewed the emotional impact of their sponsorship and commercial activity around England's matches and the second semi-final during Euro 2020.

In total, 8 matches across 9 sessions were monitored on BBC (5 sessions) and ITV (4 sessions). Across the ITV sessions, three JET full-screen ads were tracked, alongside three JET idents. In addition to the full-screen ad and ident measurement, all pitch-side banners were identified via a computer vision algorithm and used as tags for the emotional timeline data. This allowed us to estimate how emotionally activated fans were each moment they were exposed to a Just Eat or Takeaway.com logo.

A panel of 100 fans from the MindProber UK consumer panel watched the matches live in their homes while their emotional responses were captured.

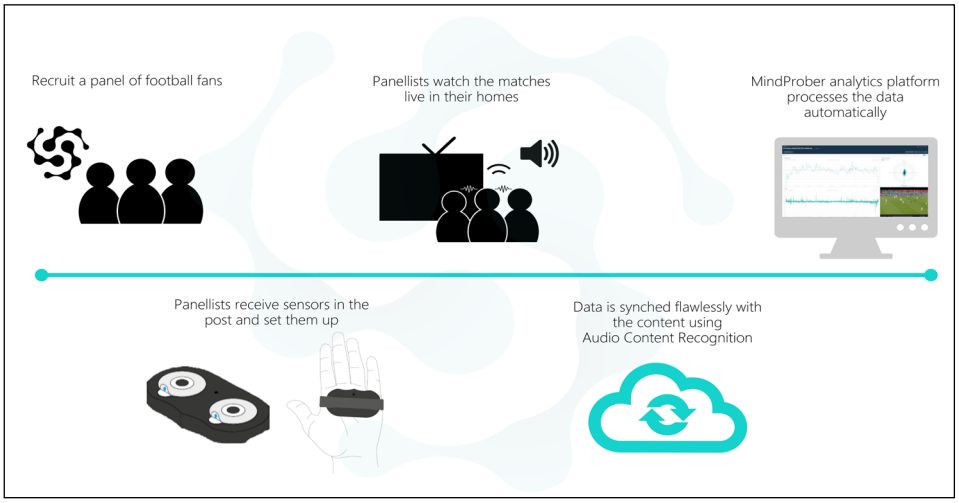


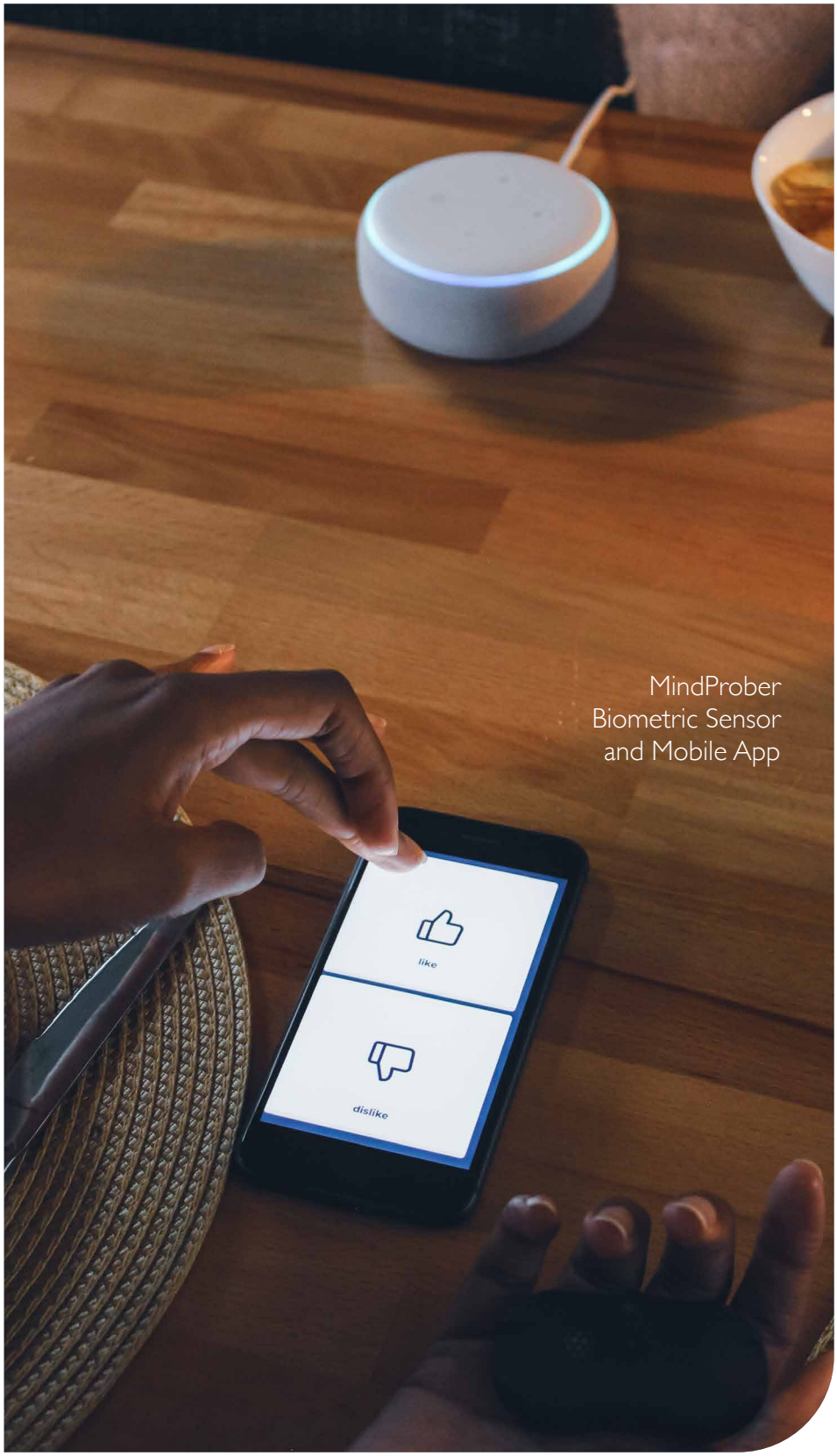
Fig 1. MindProber Methodology Diagram

Fig 2. MindProber Dashboard, Just Eat Takeaway.com engagement report

Fig 3. MindProber Dashboard, Just Eat Takeaway.com Studies Tool

DRNO Timeline

Smart Eye Acquires iMotions for $46.6m
Oct 26 2021
Swedish eye tracking technology firm Smart Eye has acquired Danish emotional response software measurement developer iMotions for $46.6m.



MindProber Biometric Sensor and Mobile App

MindProber Methodology

The emotional impact was measured by recording panelists' Electrodermal Activity (EDA) or Galvanic Skin Response (GSR) while they watched the matches live wearing the MindProber biometric sensor.

Besides GSR, we registered panelists' dial responses through the MindProber mobile app. After each match, panelists were asked to complete a survey (via in-app survey tool) covering the session and commercial activity.

MindProber Technology

MindProber's small, portable, wireless biometric sensor allows a non-intrusive panelist experience, while the mobile app captures the media content consumers are exposed to (via audio content recognition) and helps us gather survey data. Together, they enable us to recruit and manage panels with hundreds to thousands of panelists worldwide.

All data were uploaded to the MindProber analytics platform providing JET access within hours after each match. The platform automatically calculates the emotional impact value for each event and allows users to:

- Tag ad spots or editorial aspects with the Events Tagging Tool
- Upload metadata (e.g. ad logs, logo exposure tags) to characterize the content
- Compare, plot and benchmark all events across the content using the Studies Tool.

At all times, JET had the full support of our team in using the tools, interpreting the data, and understanding the metrics.

Acquisition, Recovery and Share Issue for Tobii *Oct 29 2021*
Eyetracking hardware and solutions firm Tobii has announced third quarter organic revenue growth of 26%, the acquisition of Belgian company Acapela Group, and the issue of SEK 250m ($US29.1m) worth of shares to help fund this and the earlier acquisition of Phasya.

October 2021

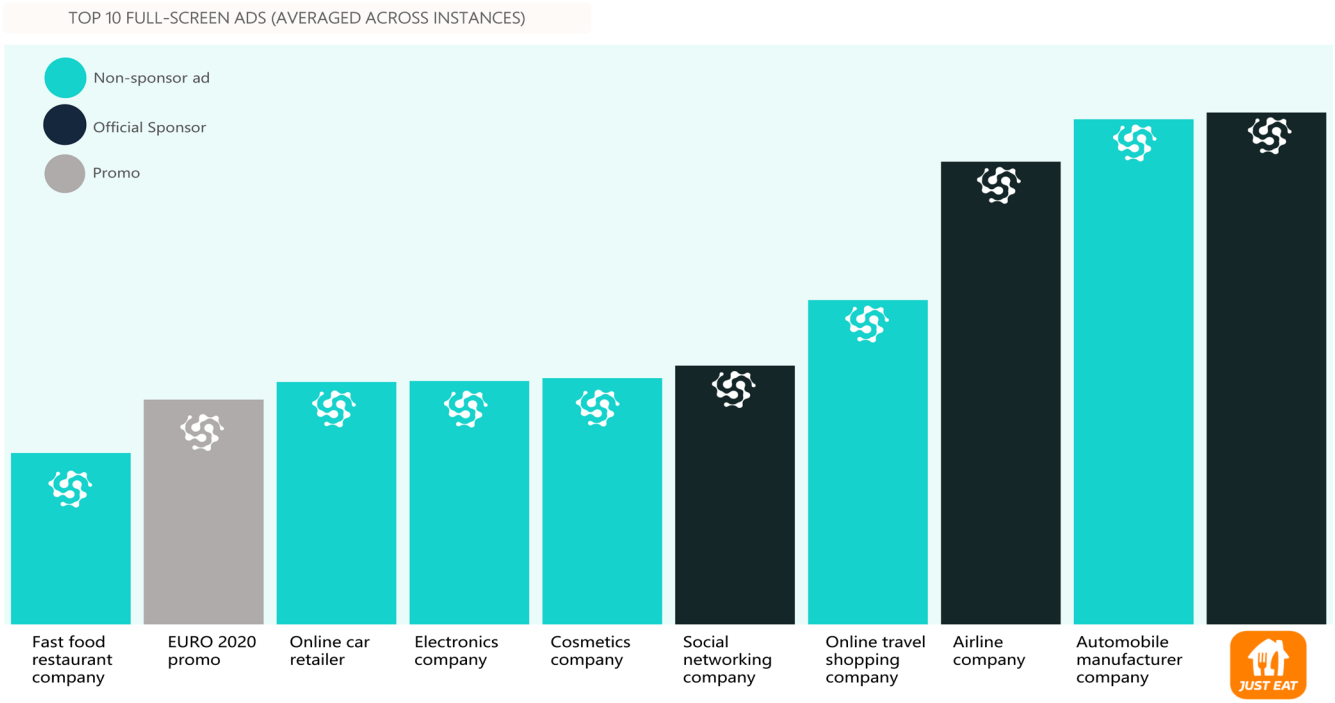


Fig 4. MindProber Just Eat Takeaway.com Full Ads Performance Chart

By looking at both individual games as the tournament progressed and holistically across the 8 matches, MindProber provided JET with a detailed report outlining learnings about their sponsorship.

JET key insights

The study allowed JET to determine (1) which break is the most impactful real estate when it comes to football sports events, (2) which position in the break promoted the highest impact, (3) what kind of commercial activity – full-screen ads, idents – was most impactful and (4) which logo positions where visible in the most impactful moments.

All commercial activity was benchmarked for impact vs. other brands present in the competition.

Learning 1 – Official Sponsors outperform regular ads

As we repeatedly see, premium integrations, like those that come with official sponsorships, outperform other commercial activity in their ability to promote an emotional response from consumers. In the case of the Euro matches, full-screen official sponsor (OS) ads had a 13% higher average impact than the remaining commercial activity. Out of the top 5 ads, 3 were OS. In this particular case, this suggests that priming consumers with brand exposures during matches is an effective way to boost their emotional response to the brands' commercial break activity.

Learning 2 – JET outperformed when looking at full screen ads

JET scored above the average brand on emotional impact. Their main ads were the most impactful full-screen ads with 34% higher average emotional impact than the average of all ads. Also, JET ads were in the top 3 most impactful ads in all matches.

Learning 3 - JET ads more impactful than competition

JET ads were more impactful than their direct competitors. They had a 14% higher average impact than the average impact of the competitor's main ads in the same sessions.

A closer look at the results shows a key to JET's success was its placement, with full screen ads being consistently placed at the most impactful breaks.

Learning 4 - JET most recalled brand on the Euro 2020 Final

When it came to brand recall, JET was the most recalled brand of the Euro 2020 finals. According to the post-

UK-Australian Probe Finds Clearview In Breach *Nov 8 2021*
Following the recent decision of Facebook / Meta to delete its facial analysis data, a joint probe by the UK Information Commissioner's Office and its Australian counterpart the OAIC has found facial recognition provider Clearview AI in breach of privacy regulations.

DRNO Timeline

survey data, JET's sponsorship was spontaneously evoked by 32% of the fans on the day following the matches. This was higher than the runner-up brand from a different sector (evoked by 21% of fans), and significantly higher than their direct competitor who shared position 10 with four other brands (9% of fans). In fact, JET's brand recall rose from the initial matches to the last. This again suggested an effective creative and superior ad placement.

Learning 5 - JET integrations overall visibility in the most engaging moments

When it comes to sponsor logos being visible in the most exciting moments, football is a game of luck. The rolling nature of the pitch side banners means that the brand that will be visible during the most exciting moments is random.

JET could see which were the most and least engaging moments with sponsor integrations among events like goal kicks, corner kicks, free kicks, counterattacks, shots on goal, goals, penalties, near misses, goal replays, etc.

We detected over 20,700 logo instances from 14 different OS brands. According to our ranking of how engaged the fans were when official sponsor logos were on screen, JET was in 7th place, in line with the average impact.

The brand that was lucky enough to sponsor some of the most engaging moments during Euro 2020 had a 14% higher average impact than the average impact value of OS side-banners across all matches. Given the random nature of side-banner visibility, this brand just happened to be on screen when goals were being scored. This shows that controlling when logos are visible, through smart placement strategies (like lower-third or picture-in-picture activations), is key to enhancing the value of campaigns.

Bonus insight

In addition to commercial activity, JET received insights into the most engaging player interview and the most engaging commentators. We will give you a hint: An English star winger and attacking midfielder and a Scottish former professional football player, respectively.

Play to Win - Improve media ROI

This project provided JET with invaluable insights into their Euro 2020 sponsorship. By identifying the most impactful advertising real estate (break, position in break) and commercial activity (full-screen ads, idents, pitch-side integrations), JET can now create a framework for future campaigns and sponsoring football events.

Our project with JET also leads the way to the integration of real-time engagement metrics into programmable advertising and dynamic sponsorship insertion technologies. Emotional metrics are highly predictive of real-world outcomes, e.g., Twitter traffic. Using emotion data provided in real time via API will allow brands to enter the conversation in the right moments and trigger synched on-screen and second screen campaigns. ■

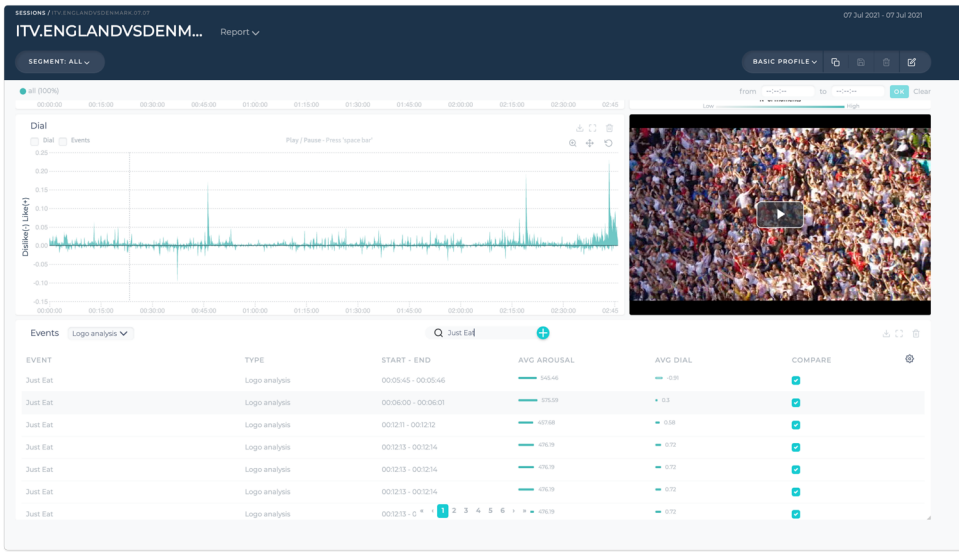
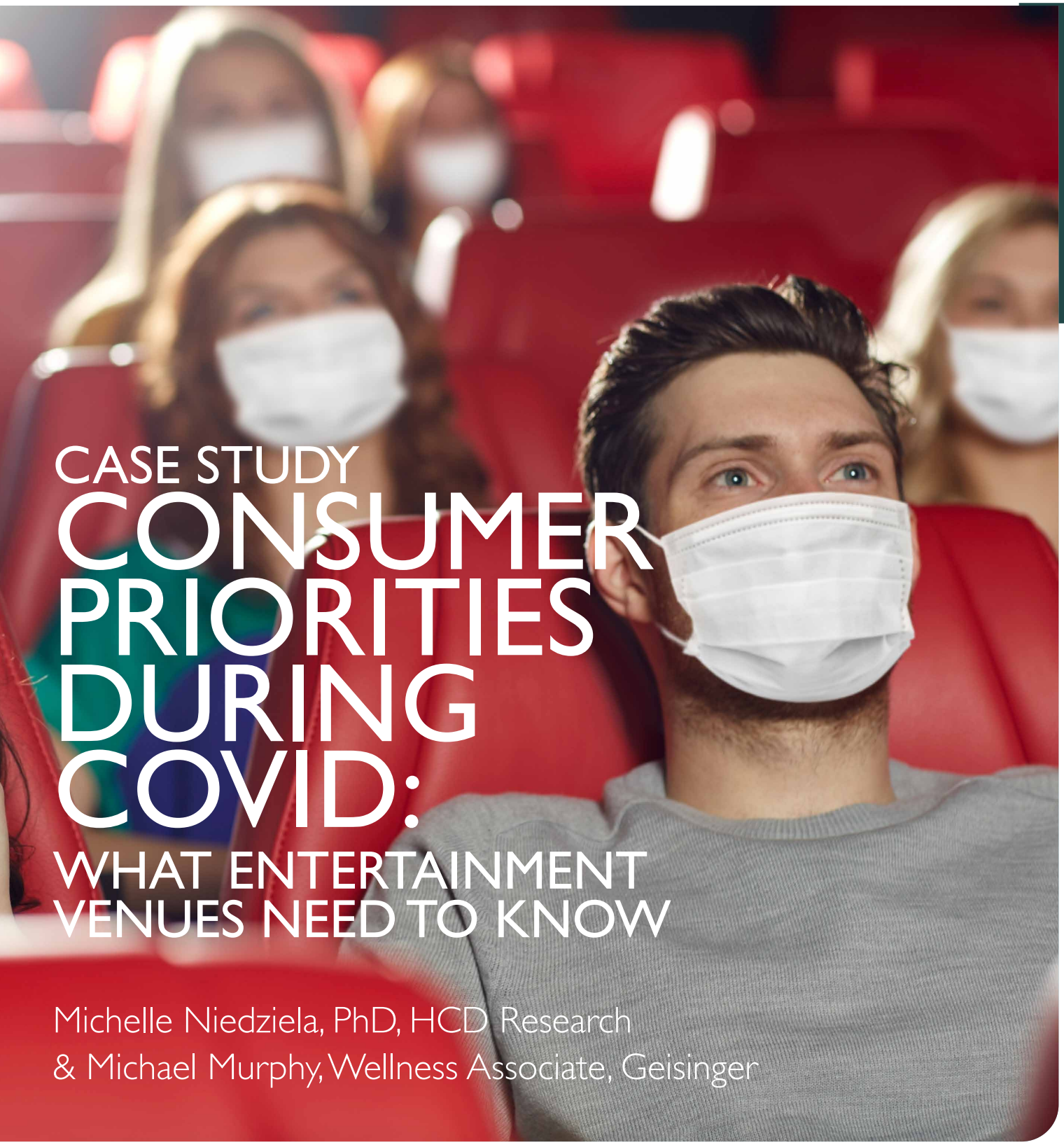


Fig 5. MindProber Just Eat Takeaway Events tagging toolbox

Visit the MindProber website to learn more about how our platform and true audience engagement impact metrics can help you improve media ROI. mindproberlabs.com

Affectiva Adds Sentimentality and Confusion Metrics Nov 12 2021
US-based facial expression technology provider Affectiva has enhanced its Emotional AI technology with the ability to measure 'sentimentality' and 'confusion' - providing deeper insight into how viewers feel about content.

November 2021



CASE STUDY

CONSUMER PRIORITIES DURING COVID:

WHAT ENTERTAINMENT VENUES NEED TO KNOW

Michelle Niedziela, PhD, HCD Research
& Michael Murphy, Wellness Associate, Geisinger

Launch for AI-based Ad Testing Platform DAIVID *Nov 25 2021*
Ian Forrester, former Insight Head at video tracking platform Unruly, has launched an AI-powered ad research platform called DAIVID, which automates ad testing by using facial coding, eye tracking and computer vision data to predict human attention levels and emotions.

DRNO Timeline

Entertainment venues are yearning for consumers to return to pre-pandemic levels. But how can they attract consumers back into their events? HCD Research, using a combination of traditional and psychological tools, measured consumer needs and expectations for different event and entertainment venues. In our exploratory data analysis, we included a cluster analysis which identified groups within the data based on their similarities. This approach revealed key recommendations for venues looking to attract different consumer groups back.

Entertainment venues are among the industries hit hardest by the COVID-19 pandemic. Cancelled events left venues with massive losses, furloughs, and a recovery that could last into the next three years *(Nhamo, Dube, & Chikodzi, 2020)*. But how can venues attract consumers back into their events? Which COVID mitigation measures should night clubs, movie theaters and the like continue utilizing as public health guidelines begin to relax? Right now, the United States is in somewhat of a gray area: increasing vaccination levels are encouraging, but there is still a risk of catching COVID-19, including its potential variants.

While consumers are eager to return to such venues, some may prefer more safety measures (e.g. face masks and hand sanitizer) than those required on-site. In a survey of over 1,000 people from Croatia, Slovenia and Iran, measures like hand sanitizer availability and venue disinfection were perceived to be most important among respondents when attending sporting events *(Perić et al., 2021)*. Among respondents in Croatia and Slovenia, who were less impacted by COVID-19 relative to those in Iran at the time of publication, limiting food and beverage availability at sporting venues was perceived to be less important. If more venues better understood consumer priorities, they could better invest in COVID-19 mitigation strategies, which can be costly.

Our Study

In mid-July of 2021, we asked (n=250) gen-pop participants to rank COVID-19 mitigation measures at entertainment venues according to their perceived importance. Using HCD's MaxImplicit methodology, we started with a traditional MaxDiff exercise which illustrates strong predictors of what will influence respondents *(Orme, 2009)*. Then we measured the implicit associations respondents held between venues (e.g. movie theaters and concerts) and their attributes, such as whether they felt they were hygienic, crowded, and fun, using an Implicit Reaction Test (IRT, measuring reaction time to identify a match between the attributes and venues). These complementary measures helped to reveal gaps between consumer needs and venue perceptions.

ICO Announces Potential £17m Fine for Clearview AI *Nov 29 2021*
In the UK, the Information Commissioner's Office (ICO) says it plans to impose a potential fine of just over £17m on facial recognition start-up Clearview AI, and has also issued a notice to stop the company further processing UK citizens' personal data.

November 2021

1	**DEEP CLEANED** The venue is deep cleaned between events (e.g., sanitizing seats and surfaces).
2	**CLEAR PROTOCOLS BEFORE EVENT** The venue's health and safety protocols are clearly communicated before the event.
3	**CLEAR PROTOCOLS AT EVENT** The health and safety protocols are clear at the event.
4	**VENTILATION** The venue follows the CDC guidelines for indoor ventilation.
5	**SAFETY** The venue makes me feel safe.

MaxDiff Results

The MaxDiff revealed the top five consumer needs above. Interestingly, these needs highlight actions (e.g., deep cleaning and ventilation) that occur before arrival. In other words, they are not overtly visible at the venue itself. This implies consumers appear to prioritize trust and reliability indirectly.

In contrast with the top needs, the bottom five needs below largely involve specific and visible COVID-19 protection measures. These bottom needs are burdensome for consumers as well. Collectively, the MaxDiff findings suggest that consumers might be looking to place the onus of enacting safety measures onto the venues.

28	**STAGGERED ENTRANCE** There is staggered entrance to the event.
29	**LIMITED FOOD AND BEVERAGES** The venue will limit food and beverage usage (e.g., designated food areas and limited vending).
30	**CONTACTLESS PAYMENT** Payment is contactless at the venue.
31	**REQUIRED QUARANTINE PERIOD** The venue will require a quarantine period before attendance.
32	**INDOOR VENUE** The venue is indoors.

Eye Tracker Tobii Confirms Srivatsa as New CEO *Dec 7 2021*
Swedish eye tracking developer Tobii has confirmed that Anand Srivatsa will take up the position of Chief Executive Officer from this Thursday, 9th December. He replaces co-founder Henrik Eskilsson, who announced his intention to step down in April.

DRNO Timeline

Implicit Results

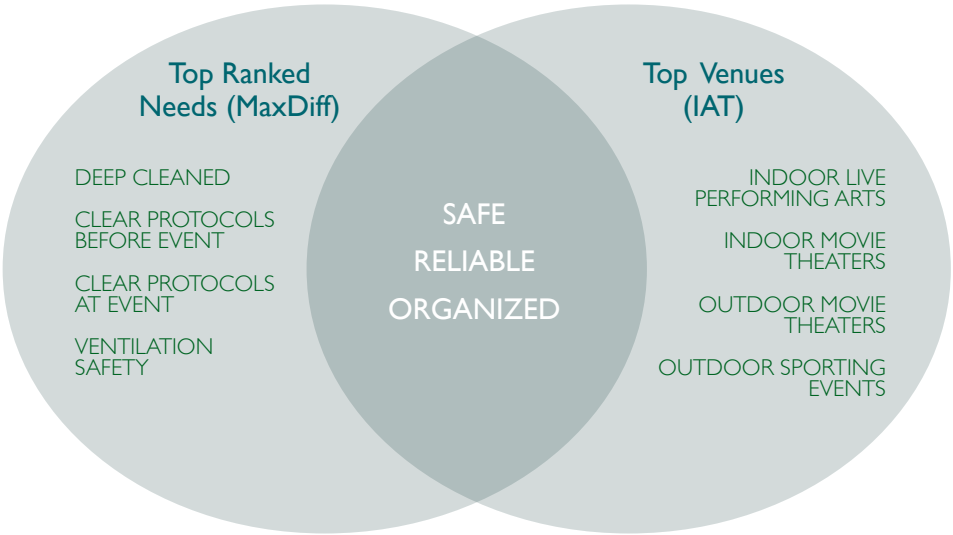
In the implicit portion of the study, respondents matched multiple pairings of venues (9) and descriptors (10), such as "movie theaters" and "organized." They revealed their association between the two by hitting the spacebar on their keyboard or touching the screen, depending on their device, when they felt the concepts were a match. A faster matching implies a stronger association. Respondents could also indicate a lack of association by simply not hitting the spacebar or touching the screen.

Below is a summary of the implicit findings in relation to the MaxDiff findings. The top consumer needs were that venues needed to be Safe, Reliable, and Organized, which were highly associated with indoor performing arts and movie theaters and outdoor movie theaters and sporting events. Other venues (Amusement Parks, Indoor Bars and Nightclubs, Indoor Music Concerts, Indoor Sporting Events, and Outdoor Multi-Day Music Festivals) were not able to satisfy these top needs, suggesting their efforts should be placed into communicating efforts toward those top needs.

Consumer Clustering

We used K-means clustering of the MaxDiff data as an exploratory data analysis approach for consumer segmentation according to similarity. The results (see chart top of p62) segmented into 3 distinct groupings, mapped according to two Dimensions which help summarize the key drivers behind the clusters, and each has a unique profile. The top three variables contributing to Dimension 1 include 1) I feel I will belong at the venue, 2) The experience feels luxurious, and 3) The experience is fun. For Dimension 2, they are 1) The venue makes me feel safe, 2) The venue will require a quarantine period, and 3) The venue is hygienic.

Even before summarizing the clusters by demographics, we can already see from the figure above that clusters 1 and 3 have some overlap. Cluster 2, however, is more of an "island" with little overlap with the others, consistent in the cluster profiles described below. From



Michael Murphy, Wellness Associate, Geisinger

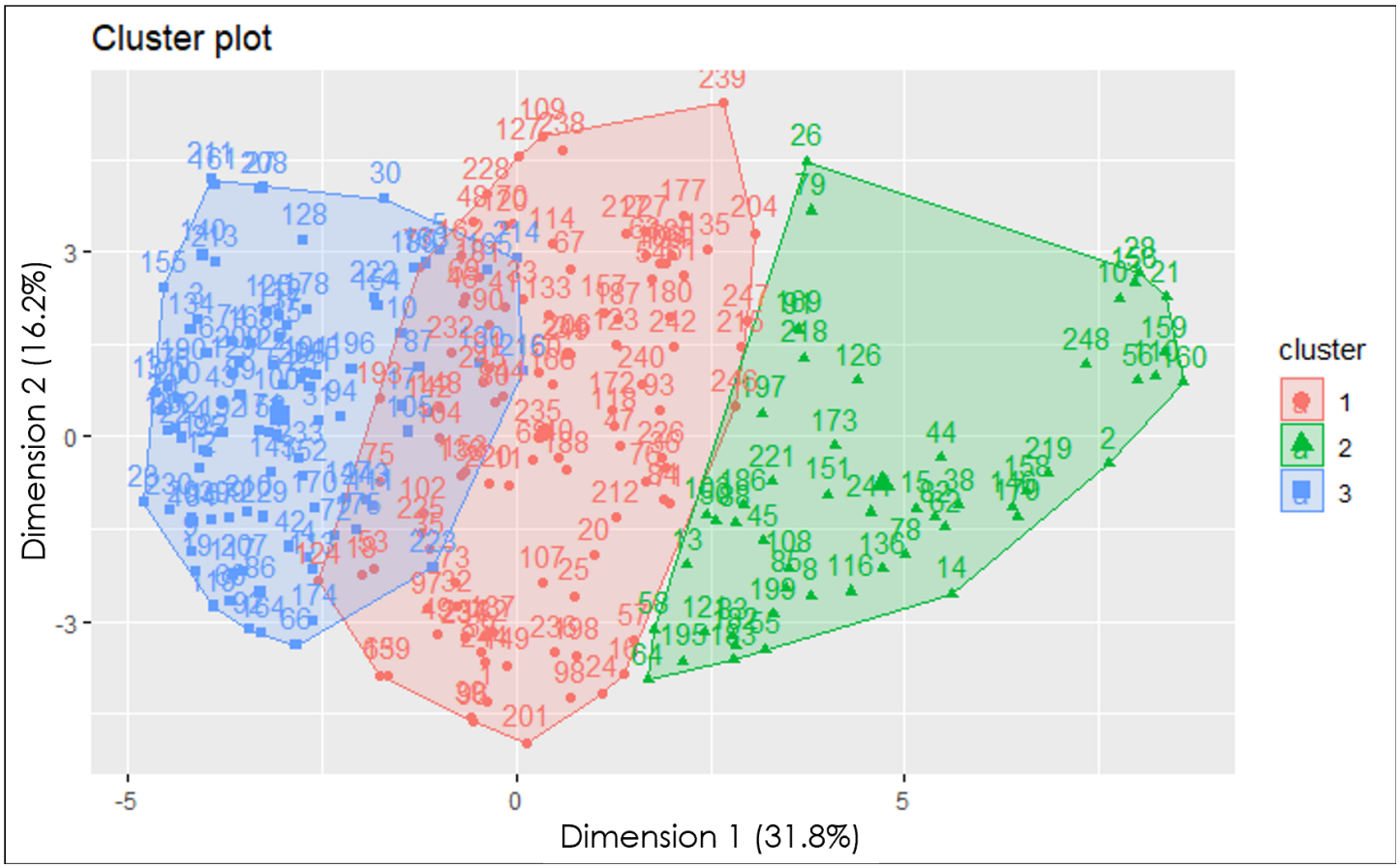
Michael received his BS in Neuroscience with a Health Studies Certificate from Dickinson College and recently completed his coursework in the Master of Behavioral and Decision Sciences program at the University of Pennsylvania. Michael rounded out his master's degree by completing a capstone project with HCD Research centered on consumer safety priorities at entertainment venues. He currently works as a Wellness Associate at Geisinger helping employees achieve their wellness goals.

Maxwell Rejoins Walnut Unlimited to Head Qual Team *Dec 8 2021*
Guy Maxwell has returned to insight business Walnut Unlimited as Head of Qualitative Research, after six years as Global Head of Qual Research at MMR. He replaces Lyn McGregor, who left in September and is now a consultant at Pollinate.

December 2021

Cluster Profiles

	Diverse Hesitant n = 104	Conservative n = 52	Vaccinated Liberals n = 93
	Even political distribution	~58% are Conservative	Relatively few Conservative people
	$^1/_3$ is not vaccinated and hesitant	$^2/_3$ are not vaccinated	85% have at least 1 vaccine dose
	Most diverse: $^1/_3$ is not White	83% White	13% Asian/Pacific Islander
	Evenly split among age groups	$^2/_3$ are 40–64-year-olds	$^2/_3$ are 40–64-year-olds
	Wants clear precautions at venues	Prioritize fun and freedom of choice	Wants clear precautions at venues; luxury is the bottom priority



India's Entropik Launches Eye Tracking Platform

Dec 23 2021

India-based emotion AI specialist Entropik Tech has launched a multi-platform eye tracking platform, which works on both web and mobile devices.

DRNO Timeline

left to right, the consumer groupings were dubbed according to their most distinctive demographics: 1) Diverse Hesitant, 2) Conservative, and 3) Vaccinated. Among the unvaccinated segments of the Diverse Hesitant and Conservative clusters, 94% and 77% of them were unsure or unwilling to get vaccinated against COVID-19, respectively.

Aside from vaccination, the other demographics that distinguish the clusters included political leaning and the top needs indicated in the MaxDiff. While the Diverse Hesitant and Vaccinated Liberals clusters prioritize clear precautions at venues, the Conservative cluster desires fun and freedom of choice. With these findings in mind, venues can consider which demographics they cater to - or want to cater to - and create targeted communications.

Actionable Insights

Overall, there are several key findings produced by this study. It is important to recognize, however, that 1) the COVID-19 situation is very dynamic, and 2) the survey was conducted in July 2021. Over time, the COVID-19 situation - and consumer needs along with it - will change. Four key insights are shared below. Collectively, they prompt entertainment venues to consider their perceptions, investments in COVID-19 protection measures, and target audiences. Without careful consideration of these areas, venues run the risk of failing to resonate with consumers. And while a "wait it out" strategy might be appropriate for some contexts, COVID-19 does not appear to be one of them, meaning venues should proactively fine-tune their strategies. ■

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KEY FINDINGS

The following venues should benefit by further highlighting safety, cleanliness, and clear protocols: Amusement Parks, Indoor Bars and Night Clubs, Indoor Concerts, Indoor Sporting Events, and Outdoor Multi-Day Music Festivals

Recently popular measures (e.g., contactless payment) might not be worth adding or keeping. Instead, building trustworthiness might be more worthwhile.

Venues should consider what populations they serve to better tailor their offerings. Key considerations include vaccination status and political orientation.

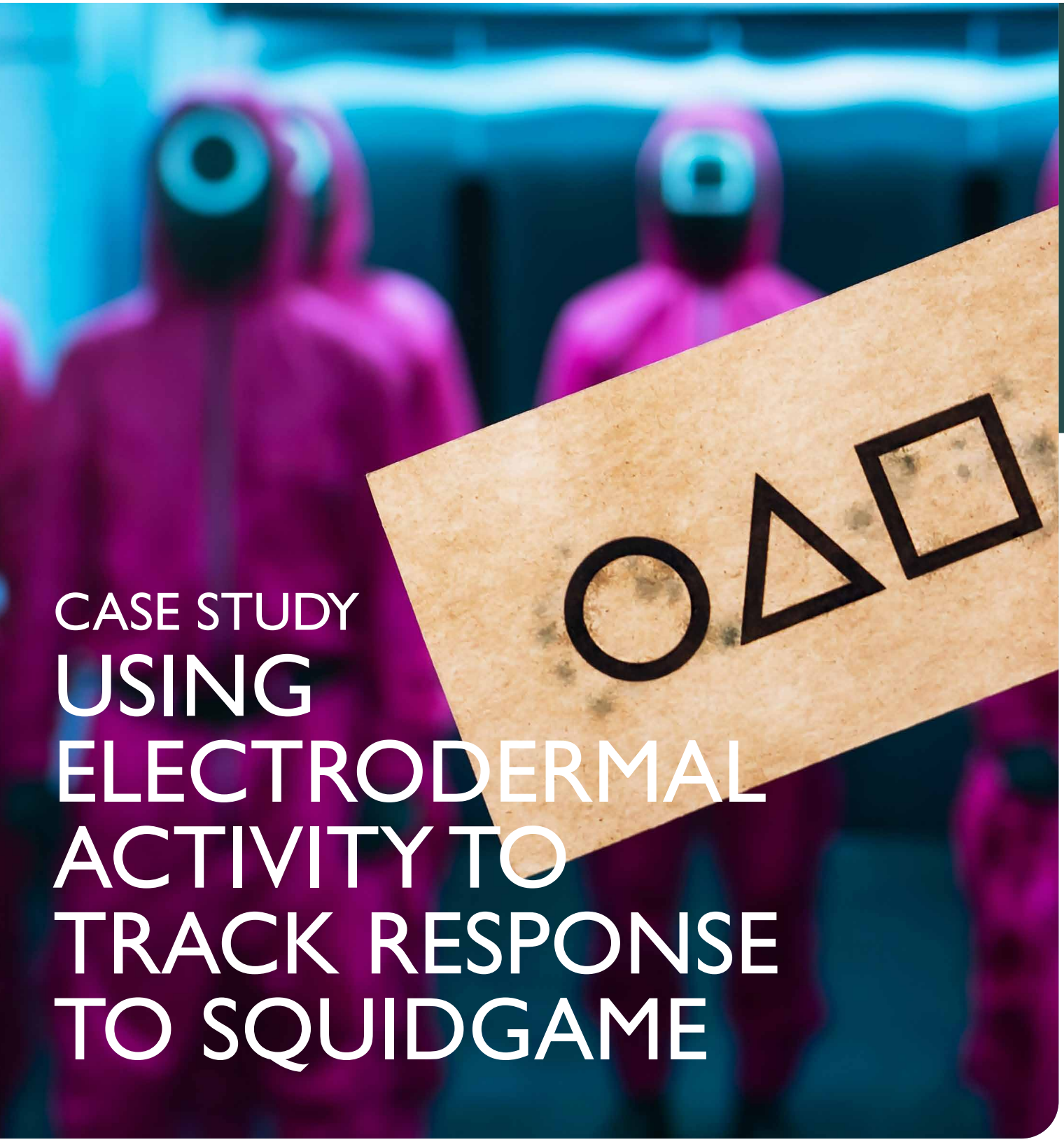
Despite the varying needs among segments, venues can balance their offerings to accommodate.

US Democrats Aim for Ban on 'Surveillance Advertising'

Jan 24 2022

In the US Congress, three Democrats have launched a privacy bill imposing a blanket ban on 'surveillance advertising', including the most common current forms of ad targeting.

Dec - Jan 2022



CASE STUDY

USING ELECTRODERMAL ACTIVITY TO TRACK RESPONSE TO SQUIDGAME

'Listening Exercise' for New Information Commissioner *Jan 28 2022*
In the UK, newly appointed Information Commissioner John Edwards has launched a 'major listening exercise', inviting businesses, organisations and individuals to provide details about their experiences of working with regulatory body the ICO.

DRNO Timeline

MindProber's Pedro Moreira looks at the company's use of electrodermal activity (EDA) to analyse the extraordinary success of the hit TV show. What worked best, and why?

[Spoiler Alert: this makes reference to surprise scenes etc.]

Pedro Moreira, PhD the Head of Research at MindProber.

Pedro is also a postdoctoral researcher in quantitative methods and behavioral and neurobiological correlates of decision-making at the School of Psychology at the University of Minho.

What is electrodermal activity (EDA)?

[NOTE - the industry knows the signal as GSR - galvanic skin responses - which, as explained below, is not entirely correct, as GSR is a subcomponent of EDA]. Instead of providing a standard scientific approach, let's look at what EDA is through the lens of the emotional signature of the hit show Squid Game, and illustrate how we can approach it in media research.

Record-breaker

By all accounts, Squid Game was a massive hit for Netflix with record-breaking views and the generation of amazing side effects like the all-time high sales of white Vans sneakers.

But why is the show so successful? Of course, distribution and network effects do contribute to its virality, but what is it about Squid Game that explains the public's response?

Attention-grabbing Scenes

Doing what we do, we sought to test the emotional signature of the first episode of the show. As expected, we saw a very high emotional response throughout the episode. However, we wanted to probe deeper and understand which scenes are the most effective in grabbing the public.

When we looked at the Squid Game EDA timeline (Image 1), something stood out: it looked like people were getting disengaged at the beginning of the show (hint: they were not).

Of course, people were super excited when (spoiler alert!) the doll started shooting brains out. That is an incredibly important scene because, curiously, people who watched the show for the first time disapproved of the scene at the conscious (dial) level, while repeat viewers loved it, with both groups showing a high emotional response. This showed that the scene sinks into people's minds, and they come to embrace the cruelty of the show.

Acxiom Extends CCPA Rights to All US Residents *Jan 31 2022*
Data and marketing services company Acxiom has announced that it is extending the same privacy rights provided to California residents under the California Consumer Privacy Act (CCPA) to all US residents.

January 2022

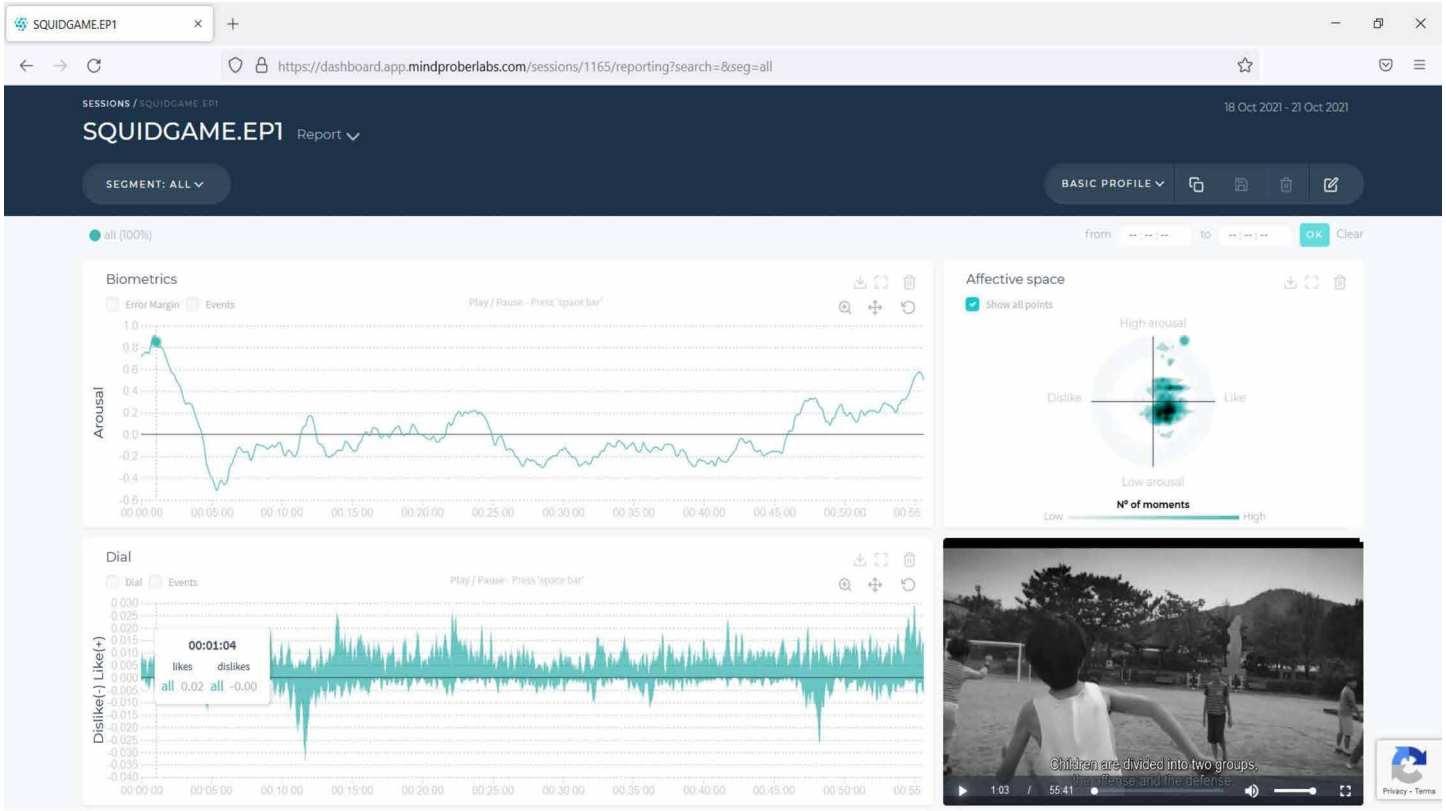


Figure 1: MindProber Engagement Timeline

This 'curious' EDA timeline, combined with the popularity of the show, seemed like the perfect excuse to use Squid Game to write a simple introduction to EDA for non-experts, and how to make sense of it in media research. So, what do we look at when we look at EDA in response to a show? And how do we plot it in our dashboard?

EDA Tonic and Phasic Components

Electrodermal activity is the variation of the electrical conductance (the opposite of resistance of the skin) in response to sweat gland activity. Think of the extreme scenario where you get very nervous and you can feel your hands sweating - EDA detects these changes at a micro level.

PRS IN VIVO Promotes for Head of Europe Role *Feb 4 2022*
Shopper and product experience consultancy PRS IN VIVO has promoted Nicole Duckworth to the role of Head of Europe and Global Commercial Excellence, with a seat on the Board of Directors.

DRNO Timeline

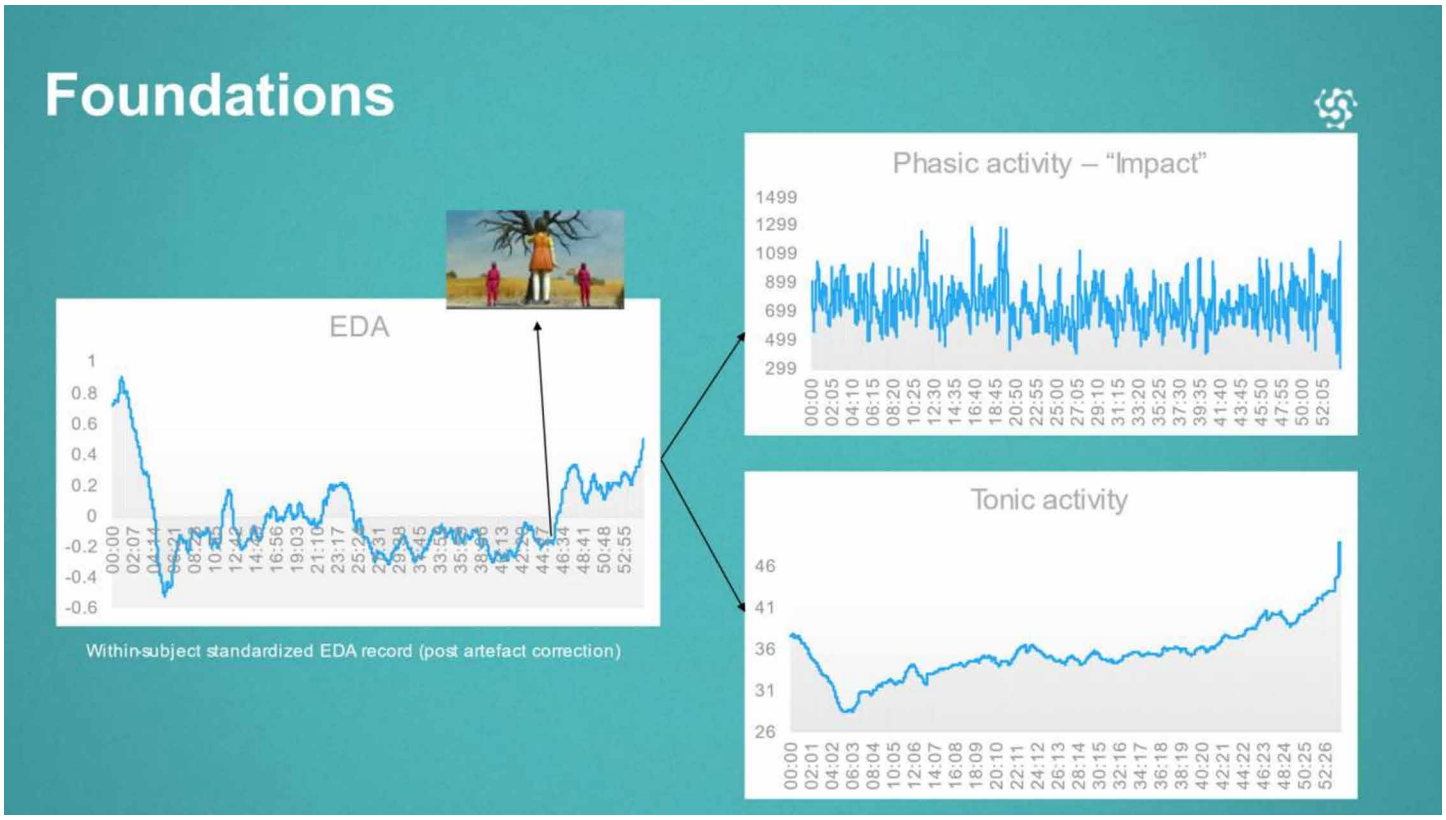
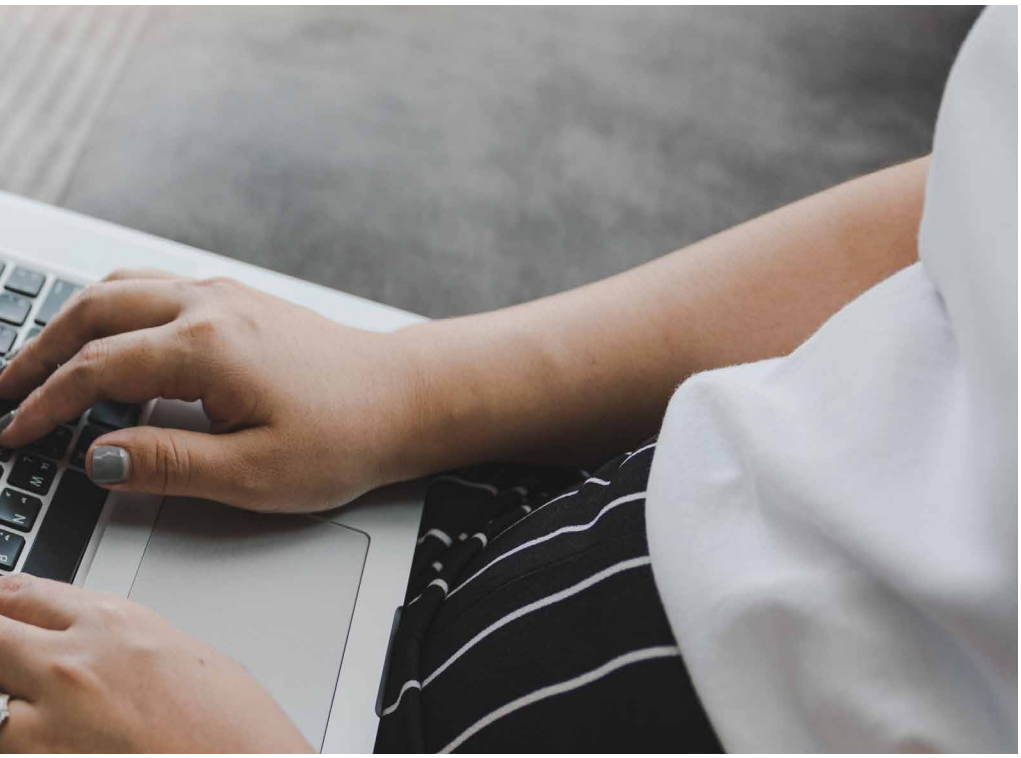


Figure 2: EDA tonic and phasic components, MindProber dataset



At a basic level, the EDA signal can be seen as a combination of what are termed tonic and phasic components. The tonic activity (Skin Conductance Level) is the very slow-moving component which, for our purposes, reflects the emotional tone of the viewer. The phasic activity (Skin Conductance Responses or Galvanic Skin Responses - GSR) is a faster component that may reflect electrodermal responses to external stimuli - these responses typically appear from 1-3 or 1-5 seconds after the stimulus and are measured in absolute units. The way we decompose the signals into these components (and this is standard in research) is by using what is termed a nonnegative deconvolution algorithm. We don't just look for peaks above a given amplitude, since this would fail to identify responses that overlap in time - a participant can respond to multiple stimuli in sequence without ever going back to a

Firms Link for Live Super Bowl Biometric Monitoring *Feb 8 2022*
Four insights companies - Ipsos, IVP Research Labs, Schlesinger Group and Shimmer Research - are partnering to provide live biometric monitoring and analysis for this year's Super Bowl.

February 2022

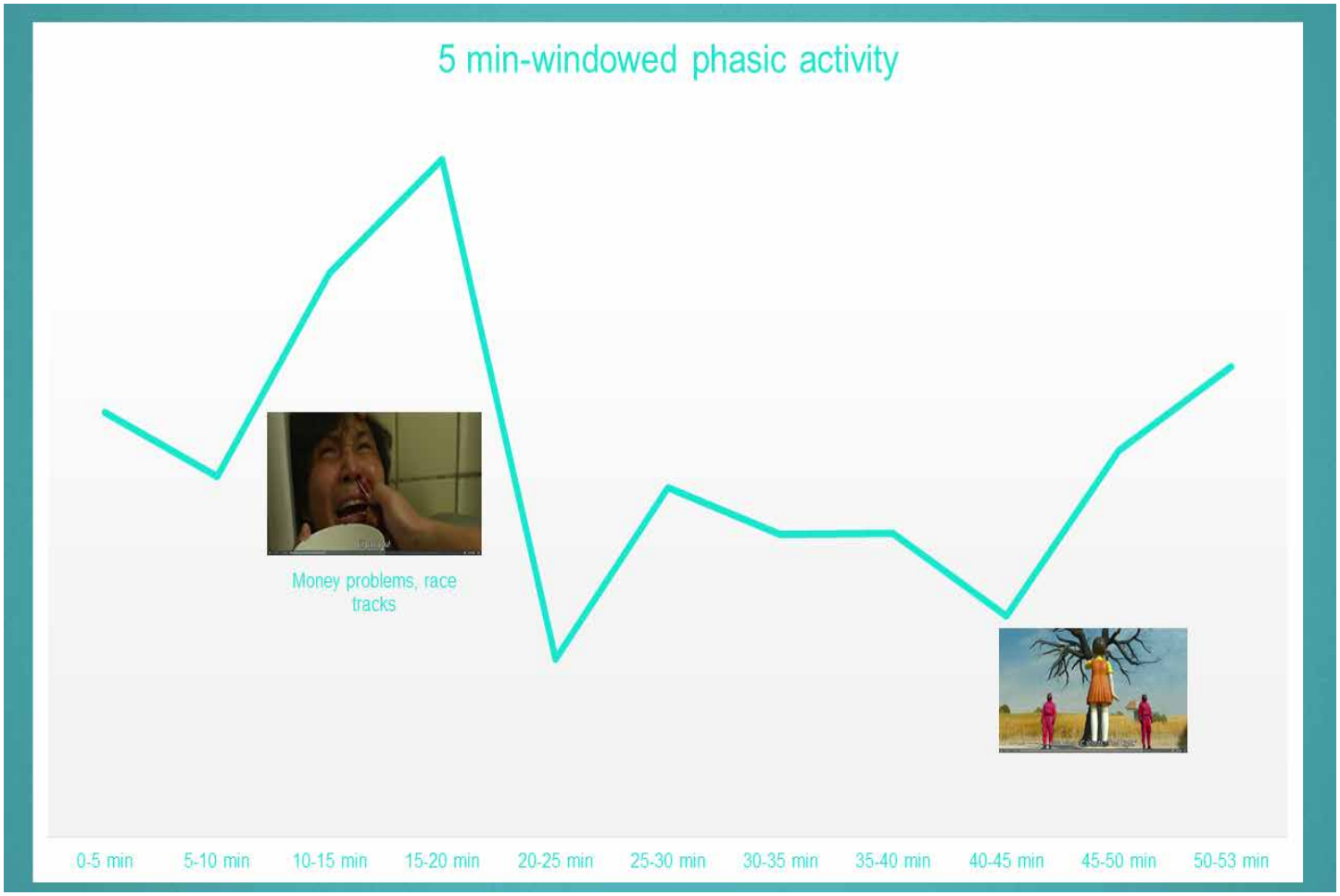


Figure 3: Phasic activity averaged into 5-minute blocks

baseline level. In addition, nonnegative deconvolution algorithms can be automated in a very robust way.

So, for our purposes, the timeline we get, which we standardize within subjects and call emotional arousal on our dashboard, can be broken down into the tonic and phasic components (Figure 1).

While both have been related to emotional arousal *(Moreira et al., 2018)*, we choose to use the standardized EDA as a measure of overall emotional experience, while using the phasic component as a more discrete measure of response to stimuli, or scenes, given that this is a good measure of event-related activity.

When we look at the Squid Game timeline, with the expectation around the show and people knowing what they were about to see, people start the show with very high anticipation. This causes them to be at a higher-than-normal baseline level. That is why (1) baseline correction is not perfect as a technique in these types of studies and (2) you should not use baseline-corrected (tonic) EDA to compare data across studies.

Figure 2 shows the phasic activity component averaged into 5-minute blocks. Here we see a slight reduction in GSR from the beginning of the show until minute 10, but these are still very high values compared to what we usually see in entertainment: although lower than the average of the episode, this block alone is still 48% above our benchmark.

What we see after this block, however, is that the scene where the tragedy of Seon Gi-hun's life starts to unfold and the first brutal scene at the race tracks toilets are key in grabbing viewers' attention (more than the doll scene itself) and then the show takes them on an emotional roller coaster that culminates with the revelation of what the game is all about (all while never losing the background emotional tone, as seen in the steady/increasing tonic levels after minute 5). What's awesome here is that not only do you see an amazingly executed cliff-hanger, but that the producers were able to insert a very early emotional block without which, we would bet, the fate of the entire series could have been different.

But back to our original purposes, by separating the tonic and phasic components, not only do we get measures that can be related to different psychological aspects (some of our clients refer to them as Sustained engagement vs. Spiked excitation), but that, via phasic response, you can get an absolute measure of emotional reactivity that may be used to benchmark and compare across events. ■

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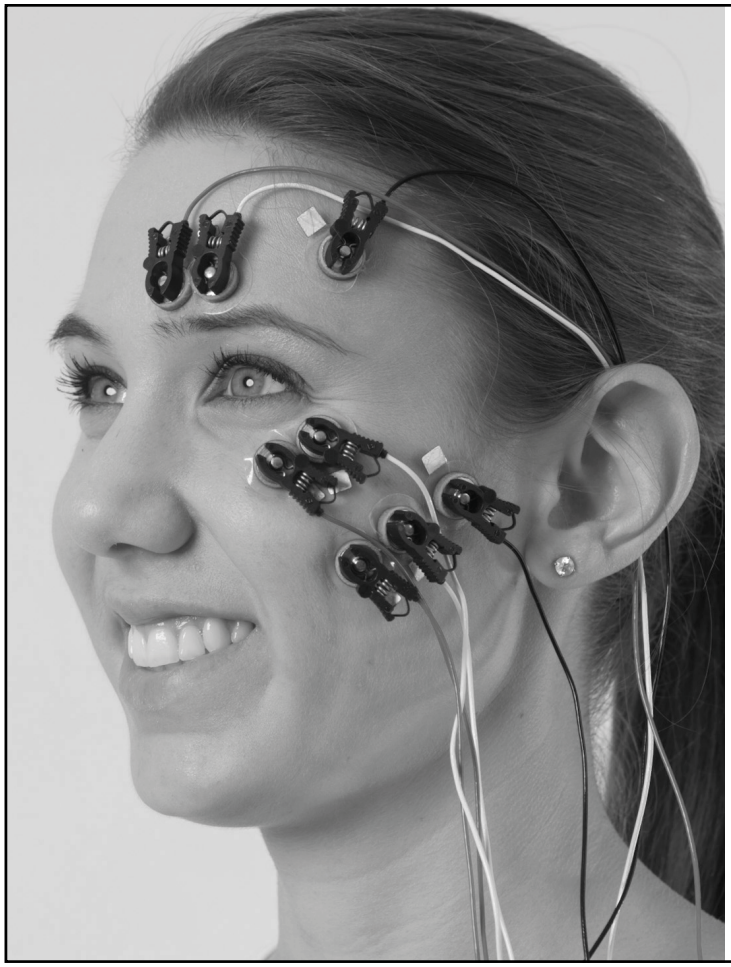

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BACKWORD

So that was 'Measuring Brains & Bodies', at last, and we hope you enjoyed it. As ever, it's been a great learning process for me, although in this case some of the words to learn were longer, and I was perhaps more conscious than ever of sometimes skating over the surface of things that run very deep. Nevertheless I hope we have achieved our goal of including more science, and more depth, than other research sector feature publications.

In this we were helped by two fantastic sponsor companies. Ana Jovanoski at MindProber and Cara Silvestri at HCD Research have managed contributions with a combination of efficiency and patience, and all the writers have real enthusiasm for their work and have delivered great content at speed, for which I'm extremely grateful. I hope none of them will mind if I single out *HCD's Michelle Niedziela* who has really made the whole thing possible by rapidly providing me some of the best and most extensive content we've seen in this series, and then being patient enough to work through it with me. Thank you all!

We've had some big compliments recently on the layout and look of the pdfs: we recommend *Chris Hayton*, chris@fullpointdesign.com, to you unreservedly.

Next we go back to Insights in the Mobile Age, due in May or June. Please contact us on **ads@mrweb.com** if you want to be a part of it - or indeed if you'd like to be in the next 'neuro' issue in about a year's time.

In the meantime, keep looking at DRNO (**www.mrweb.com/drno** if you're not already a subscriber to the MR world's daily paper). Thanks for reading - and please give us any feedback good or bad on **hello@mrweb.com.**

Nick Thomas,
MrWeb

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