

Institution: University of Warwick		
Unit of Assessment: C17 Business and Management Studies		
Title of case study: Enhancing public understanding of Behavioural Science		
Period when the underpinning research was undertaken: 2010 – 31 December 2020		
Details of staff conducting the underpinning research from the submitting unit:		
Name(s):	Role(s) (e.g. job title):	Period(s) employed by submitting HEI:
Nick Chater	Professor	01/08/1996 - 30/09/2005; 01/09/2010 - Present
Neil Stewart	Professor	29/09/1997 - Present
Gordon Brown	Professor	01/09/1994 - Present
Ivo Vlaev	Professor	01/05/2014 - Present
Period when the claimed impact occurred: 2013 – 31 December 2020		
Is this case study continued from a case study submitted in 2014? N		
1. Summary of the impact (indicative maximum 100 words) <p>The past decade has seen a dramatic increase in the practical, systematic and transparent use of behavioural science to create better outcomes for people and society. Professor Nick Chater and colleagues at the University of Warwick have played a significant role in driving this change, by enhancing public and professional understanding of, and engagement with, behavioural science. Over the assessment period, their research underpinned a long-running Radio 4 series reaching more than 1,500,000 listeners, a popular Massive Open Online Course (MOOC) with 97,000 learners and a prize-winning Penguin book, which has been read by people from all walks of life around the world. The body of research has informed the work of the Behavioural Insights Team, the Climate Change Committee and Decision Technology – a spin-out which has applied scientific insights to address challenges for organisations such as EDF Energy, British Gas and Deliveroo. Through these activities, the research has helped policymakers, executives and members of the public make better decisions about multiple aspects of everyday life, from business and finance to climate change and health.</p>		
2. Underpinning research (indicative maximum 500 words) <p>Behavioural Science uses experimental methods to study individual behaviour in order to understand people's beliefs, values and choices, and how these shape human relationships, enable the creation of complex organisations, and impact consumer and financial markets. Professor Chater has pioneered the analysis of high-level cognition through the lens of basic cognitive processes of perception, memory and motor control. This work includes explaining human reasoning as 'intuitive probability theory', the creation of sampling-based models in judgement and decision making, and the idea of the brain as a 'comparison machine', to explore the implications of the relative nature of the mental representation of probability, utility and time. He has argued that cognition is improvisational, and not based on stable beliefs or preferences. Contrasting with the idea of deep, stable, inner mental traits, Professor Chater terms this the "mind is flat" perspective.</p> <p>Prof. Chater argues that the mind improvises judgements and decisions by sampling memories from recent experience, providing a fundamental reinterpretation of existing concepts of how the mind operates. His 'decision-by-sampling' theory, developed with colleagues at Warwick, explains the classic finding that losses loom larger than gains in our minds (3.1), potentially leading to excessive caution in risky environments. Moreover, when choosing between complex options (e.g., houses, pensions), sampling operates over features, favouring one option or</p>		

another – the brain cannot evaluate an option as a whole. Depending which features are sampled, people will make different choices. Using a new experimental paradigm, value psychophysics, Chater and colleagues show that choosing causes the oversampling of positive features; and rejecting induces oversampling of negative features, with the paradoxical result that people can choose and reject the same item (3.2), as outlined in *The Mind is Flat* (pp. 118-123). The sampling model predicts highly unstable judgements, whether of loudness (3.3), pain (3.4) or monetary value, depending on the recent sample to which an item is compared, leading to wildly unstable perceptual experiences and financial choices (3.1, 3.5). Choices can, for example, reverse when irrelevant options are added, where these options affect the sample drawn from memory (3.6). *The Mind is Flat* broadens this viewpoint to argue that improvised extrapolation from previously encountered examples, rather than through principles, grammars or theories (3.7).

3. References to the research (indicative maximum of six references)

- 3.1 **Stewart, N., Chater, N. and Brown, G. D. A.** (2006) Decision by sampling. *Cognitive Psychology*, Vol.53 (No.1). pp. 1-26. [doi:10.1016/j.cogpsych.2005.10.003](https://doi.org/10.1016/j.cogpsych.2005.10.003)
- 3.2 Tsetsos, K., **Chater, N.** and Usher, M. (2012) Salience driven value integration explains decision biases and preference reversal. *Proceedings of the National Academy of Sciences of the United States of America*, Volume 109 (Number 24). pp. 9659-64. [doi:10.1073/pnas.1119569109](https://doi.org/10.1073/pnas.1119569109)
- 3.3 **Stewart, N., Brown, G. D. A. and Chater, N.** (2005) Absolute identification by relative judgment. *Psychological Review*, Vol.112 (No.4). pp. 881-911. [doi:10.1037/0033-295X.112.4.881](https://doi.org/10.1037/0033-295X.112.4.881)
- 3.4 Winston, J., **Vlaev, I.**, Seymour, B., **Chater, N.** and Dolan, R. (2014) Relative valuation of pain in human orbitofrontal cortex. *Journal of Neuroscience*, Volume 34 (Number 44). pp. 14526-14535. [doi:10.1523/JNEUROSCI.1706-14.2014](https://doi.org/10.1523/JNEUROSCI.1706-14.2014)
- 3.5 **Vlaev, I., Chater, N., Stewart, N. and Brown, G. D. A.** (2011) Does the brain calculate value? *Trends in Cognitive Sciences*, Vol.15 (No.11). pp. 546-554. [doi:10.1016/j.tics.2011.09.008](https://doi.org/10.1016/j.tics.2011.09.008)
- 3.6 Tsetsos, K., Moran, R., Moreland, J., **Chater, N.**, Usher, M., and Summerfield, C. (2016) *Economic irrationality is optimal during noisy decision making*. *Proceedings of the National Academy of Sciences of the United States of America*, Vol.113 (11). pp.3102-3107. doi: [10.1073/pnas.1519157113](https://doi.org/10.1073/pnas.1519157113)
- 3.7 **Chater, N.** (2018) *The mind is flat: the remarkable shallowness of the improvising brain*. New Haven, Connecticut: Yale University Press. ISBN 9780300238723; **Chater, N.** (2019) *The Mind is Flat, The Remarkable Shallowness of The Improvising Brain*. London: Penguin. ISBN 9780241208779.

4. Details of the impact (indicative maximum 750 words)

Professor Nick Chater's expertise, underpinned by his research, led to his appointment to the advisory panel of the Cabinet Office's Behavioural Insights Team (BiT), a position he has held since 2011 (5.1). The BiT generates and applies behavioural insights to inform policy, improve public services and deliver results for citizens and society, across a range of policy areas. In collaboration with BiT, Chater developed, and currently delivers with colleagues, the twice-yearly 'Behavioural Science in Practice' executive education course at Warwick Business School, (WBS) (5.1), which applies behavioural science to real world challenges. With practical application, learning is translated to the workplace of participants.

Prof. Chater is also a member of the Climate Change Committee (CCC), an independent, statutory body established under the Climate Change Act 2008. The CCC advises the UK and devolved governments on emissions targets and reports to Parliament on progress made in reducing greenhouse gas emissions and preparing for, and adapting to, the impacts of climate change. Chater is the committee's behavioural science specialist, helping to guide the Committee's work to address the challenge of dramatically reducing emissions. A recent example of his contribution is a paper which outlines three behavioural principles related to how

people have adapted so rapidly to Covid-19, and how the UK might 'build back better' as it emerges from the pandemic (5.2).

Prof. Chater's influence extends to industry, via his behavioural science spin-out company, Decision Technology, which employs 20 staff. The consultancy has informed the corporate strategy and operations of numerous UK and international brands. Over the assessment period, clients have included EDF Energy, British Gas and Deliveroo (5.3).

The body of research has been communicated to a global public. As well as his long-running radio programme, MOOC and popular book, Prof. Chater is widely cited in the media. In the REF period, Chater was quoted or referenced 516 times, including 154 TV and radio interviews. He has written op-eds in *The Financial Times* (2019) and *The Guardian* (2020), and since 2014 has written 9 articles in *The Conversation*, with 350,314, reads (5.4).

BBC Radio 4 series: The Human Zoo

The Human Zoo relates behavioural science to current affairs and everyday life, and was created by Professor Chater and journalist Michael Blastland, running for eight series on the BBC between 2013 and 2016. Chater was resident scientist throughout, devising and co-presenting each episode. The programme builds directly on Prof. Chater's research, explaining 'high-level' mental processes involved in judgement and decision making, especially as arising through improvisation based on past experience. The programme gave listeners a sense of the complex machinery that underpins our thoughts, experiences, and decisions. For example, the notion that losses loom larger than gains (3.1), leading to 'loss aversion,' which shapes individual consumer and corporate investment decisions, and which may magnify the instability of the stock market, was dealt with in episode 2, Series 1 and episode 6, Series 8 of The Human Zoo series.

On air, the show had an estimated 1,500,000 listeners, and it is continuously available on BBC Sounds (<https://www.bbc.co.uk/programmes/b036tbly>) (5.5). Prof. Chater also created the online Human Zoo Lab, with experiments, on topics ranging from risk taking, information seeking and visual attention, completed by over 6,000 individuals (5.6). Blastland confirms that "*Without his knowledge, credibility, and the astonishing access it gave us to research and other academics, we would have floundered. He featured in every programme and we often drew heavily on his own work - including one episode derived entirely from his thesis 'The Mind is Flat' for a programme recorded at the Cheltenham Science Festival [episode 2, Series 6]. New series on Radio 4 are extraordinarily hard to come by; series that run for several years harder still. We had a prime slot on a national network reaching a large audience for a subject never previously accorded such attention - and owe a huge part of that success to Nick Chater.*" (5.7)

The show's impact on public understanding about the improvised, unstable, nature of thought, was measured using a survey completed by 829 listeners. 85% stated that the show inspired them to look at related talks, articles and books; 70+% were inspired to take further academic study, such as degree, A-level, online course. in some aspect of the behavioural sciences. 52% stated the show changed their views on how the mind works "*completely*" or "*a lot*"; 93% confirmed that the insights from the show have helped them with study, their job, or life in general. Comments included: "*it helped with my confidence and changed my life*", "*it made me change the way I think about things*", "*it really made me think about my choices*", "*it completely changed the way I think*" (5.8).

Massive Open Online Course (MOOC): The Mind is Flat

The Mind is Flat MOOC was launched by WBS in September 2013, on the FutureLearn digital education platform. The course explores Prof. Chater's proposal that the mind is a spontaneous improviser of explanations and choices, not governed by hidden 'mental depths'. Topics include why we take risks and why we fear them, how people succeed or fail in working with others, and how we can understand biases in our own behaviour. The course has run 8 times since 2013 (the most recent being in 2020), with 97,000 learners enrolled, over 30,000 active learners

engaging in course content, and 9,000 contributing to on-line discussion. The course received excellent feedback and is Warwick's most subscribed MOOC **(5.9)**.

Comments from participants show increased engagement with behavioural science, with *fascinating, thought provoking, interesting, enriching, and inspiring* often appearing in feedback. One respondent stated that the course was *"stimulating, rewarding, challenging and satisfying..."* **(5.9)**. *"It leaves me wanting to learn more, much more, even the idea of embarking upon a degree course"*. In a post-course survey, 45% of completers said they would read books or articles on the subject, 75% that they would participate in another online course and 5% of completers indicated they would be taking a degree course to pursue their interest **(5.9)**. Learners frequently confirmed the course had changed their beliefs or understanding of the mind. One participant confirmed that *"This course opened my eyes and horizons and influences my future decision making"*, while others commented that *"It has certainly got me thinking about virtually every aspect of my life differently"*, and that it *"Gives me a fresh sense of the world around me... I feel richer for having gone through it"*. A member of the most recent cohort found that the MOOC provided *"a series of convincing arguments that challenged our understanding of ourselves and those around us as well as the world we thought we knew. I particularly enjoy the link to the experiment at the end of each week which reveals our longstanding biases and how behavioural science and economics approach these issues of human nature. The world has never been the same again after taking this course!"* **(5.9)**.

For some, the effect was dramatic: *"I was Global Business Development Director at Kantar in 2014, enjoying my role but intellectually unfulfilled... the Mind is Flat MOOC seemed interesting and I signed up. By the end I was hooked ... I wanted to continue learning more and opted for a part time MSc at UCL in Social Cognition. ... that has opened up new opportunities at work, with a new role leading development of our global Brand & Shopper offer...All catalyzed by a MOOC!"* **(5.10)**. In later iterations, 1/5 of participants enrolled after a positive personal recommendation.

Popular book: *The Mind is Flat*

Prof. Chater's Penguin book, *The Mind is Flat*, published in March 2018, building on the MOOC, saw wide acclaim. The book was well-reviewed in the popular press including in *The Spectator*, *THES*, *The Guardian* and *New Scientist*, and Chater wrote supporting articles in *The Observer*, and *Wall Street Journal* **(5.11)**, stimulating debate in the comments sections of the respective websites. The US Edition of the book won the 2019 Association of American Publishers PROSE Award, which recognise the very best in professional and scholarly publishing, for Best Book in Clinical Psychology. In The Human Zoo survey, 20% of listeners had also read *The Mind is Flat* and, of those, 47% agreed that it completely changed their view of the mind **(5.8)**. The book was also published in Spanish, French, Italian and Mandarin, with a Japanese translation underway, thus reaching a wide non-English speaking audience.

Also over the assessment period, Prof. Chater wrote and presented an episode of BBC Radio 4's Analysis **(5.12)**; talked at Cheltenham Science Festival, Also Festival, the British Science Festival and York Festival of Ideas **(5.13)**, and at the acclaimed Talks at Google (viewed 6,000+ times) **(5.4)**. He was a panellist on Radio 4's *Any Questions?* (April, 2020) on behavioural responses to Covid-19. As that crisis unfolded, he wrote articles informing the public about social distancing, psychological bias and political decisions, and a green future **(5.14)**.

5. Sources to corroborate the impact (indicative maximum of 10 references)

- 5.1 Behavioural Insights Team [website](#); Behavioural Science in Practice Executive Education course brochure.
- 5.2 Climate Change Committee [website](#) and 2020 research [paper](#) on Net Zero after Covid: Behavioural Principles for Building Back Better by Chater, N.
- 5.3 Decision Technology [website](#).
- 5.4 Media citations data sourced from Cision and Vuelio media monitoring platforms, and *The Conversation's* analysis dashboard.

- 5.5 Screenshot of BBC website with The Human Zoo episodes available to listen to.
- 5.6 Human Zoo Lab website analytics.
- 5.7 Letter from Michael Blastland (03 May 2019).
- 5.8 Survey data from participants.
- 5.9 FutureLearn MOOC information and participation data.
- 5.10 Email from Sarah Mitson (23 September 2019).
- 5.11 Media reviews: *Spectator* (03 April 2018), *THE supplement* (29 March 2018), *The Guardian* (22 March 2018), *New Scientist* (14 April 2018). Articles: *The Observer* (01 April 2018), *Wall Street Journal* (10 August 2018).
- 5.12 BBC Radio 4 webpage - Analysis episode written and presented by **Chater**, N. (November 2014, <https://www.bbc.co.uk/programmes/b04p7ygh>).
- 5.13 Warwick webpage article on Also Festival (July 2017), webpages of Cheltenham Science Festival (June 2015), the British Science Festival (September 2019) and York Festival of Ideas (June 2019).
- 5.14 Media articles: BBC Any Questions (20 March 2020); *The Guardian* (16 March 2020), *The Conversation* (16 March 2020), *The Telegraph* (05 June 2020), *The Financial Times* (01 December 2019).