REF2021

Institution: Queen Mary University of London

Unit of Assessment: 5

Title of case study: A New View of Decision-making: Delivering Innovative, Evidence-based Policy across Government Departments via Novel Research Hubs

Period when the underpinning research was undertaken: 2010 - present

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:
1) Magda Osman	1) Reader in Experimental Psychology	1) 01/01/2010 - present

Period when the claimed impact occurred: 04/02/2016 - present

Is this case study continued from a case study submitted in 2014? N

1. Summary of the impact (indicative maximum 100 words)

Understanding the complex process of decision-making is critical to designing policy that effectively encourages behaviour change. Osman's research on decision-making behaviour at Queen Mary has driven multiple UK government departments to change the way they gather and use data to create evidence-based policy. Established under her direct influence, Osman's behavioural studies led to the creation of new 'Research Hubs' in government, which have informed policy agendas at the Food Standards Agency, Department for Business, Energy and Industrial Strategy, and Department for Environment, Food and Rural Affairs. The new policy generated by these Hubs has helped incentivise uptake of a new national registration system designed to encourage businesses to comply with food standards and inform high-level risk management decisions pertaining to product safety in the home. Overall, the Hubs have cemented the significant value that a dual academic and evidence-based policy process holds for governmental policymakers, businesses, and the general public. More recently, Osman's research has informed the government's response in managing people's behaviour during the current COVID-19 pandemic, particularly focusing on the uptake of contact tracing apps.

2. Underpinning research (indicative maximum 500 words)

Understanding the determinants of behaviours and decisions is a crucial task for good governance. Specifically, understanding how people make real-world decisions in complex and often high-stakes situations, and when faced with conflicting messages and incomplete, noisy data, is essential to encourage behaviour change for public good. This has been particularly evident when encouraging people to adopt different behaviours during a global pandemic.

Dr. Osman's research at Queen Mary has changed understanding of how people make complex decisions. In behavioural sciences, the well-established 'nudge' programme developed by Thaler and Sunstein (2008) suggested that people make decisions that are best for themselves or society, with the subsequent rewards being the key predictor of their choices. However, Osman proposed that this model was too simplistic and suggested a new way to consider decision-making behaviour in real-world contexts [3.1]. Osman suggested that seemingly poor, incoherent or inconsistent decisions are the result of people paying attention to different information at various stages of the decision-making process. She conducted a meta-analysis of 111 previous case studies on the outcomes of the 'nudge' programme in supporting better decision-making in applied social policy (for example, encouraging pro-environmental behaviours, healthy eating, or saving for retirement) [3.2]. Osman showed that many studies lacked information essential for any meaningful analysis of their effectiveness. Supported by her experimental findings, she thereby developed a more nuanced 'choice-execution model' to better explain the decision-making process [3.3, 3.4].

Specifically, Osman argues that there must be consideration of what people pay attention to at different stages of this process. In a series of experiments [3.4] she showed that, regardless of whether choices impact physical or mental effort, two things matter: when we make choices about future outcomes (prospects) we base this on the highest reward we will receive, but when it comes to enacting those choices, we base our decision on the amount of effort that must be spent and often ignore rewards [3.4]. This research provides empirical evidence for the choice-execution model and helps to explain a variety of human behaviours that may appear irrational (such as why people may commit to an action but fail to follow through).

In 2015, Osman combined experimental and computational modelling to show that people are also sensitive to the type of feedback and rewards they receive. She showed that the simpler the presentation of feedback and reward, the more control people feel they have and the better the decisions they make in simulated real world decision-making situations. Osman concluded that people perform a fine-grained analysis of goals, feedback, and incentives to make optimal decisions in complex and highly uncertain decision-making contexts [3.3].

More recently (2020), Osman analysed global data used to inform models of risk and uncertainty on COVID-19 infection, morbidity and potential testing biases [3.5-3.6]. She identified the public attitudes towards the pandemic required in planning the technical and behavioural challenges of ensuring 'track and trace' apps are accepted and used at a population level. Osman and colleagues recommended improving on best current contact trace and symptom screening apps using a Bayesian network to minimise data transmitted to a central server. Consequently, such an app would be far more agreeable to people concerned about privacy [3.7].

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

[3.1] Osman, M. (2010). Controlling uncertainty: A review of human behavior in complex dynamic environments. *Psychological Bulletin, 136* (1), 65-86.
https://doi.org/10.1037/a0017815

[3.2] Osman, M., Radford, S., Lina, Y., Gold, N., Nelson, N., Lofstedt, R. (2018). Learning lessons: How to practice nudging around the world. *Journal of Risk Research, 23* (1), 11-19.
https://doi.org/10.1080/13669877.2018.1517127

[3.3] Osman. M, Glass, D. B., Hola, Z. (2015). Approaches to learning to control dynamic uncertainty. *Systems, 3*, 211-236. https://doi.org/10.3390/systems3040211

[3.4] Ludwiczak, A., Osman, M., & Jahanshahi, M. (2020). Redefining the relationship between effort and reward: Choice-execution model of effort-based decisions. *Behavioural Brain Research, 383* (112474). https://doi.org/10.1016/j.bbr.2020.112474

[3.5] Neil, M., Fenton, N., Osman, M., McLachlan. S. (2020). Bayesian Network Analysis of Covid-19 data reveals higher Infection Prevalence Rates and lower Fatality Rates than widely reported. *Journal of Risk Research, 23* (7-8), 866-879.
https://doi.org/10.1080/13669877.2020.1778771

[3.6] Fenton, N., Neil, M., Osman, M. & McLachlan. S. (2020). COVID-19 infection and death rates: the need to incorporate causal explanations for the data and avoid bias in testing. *Journal of Risk Research, 23* (7-8), 862-865.
https://doi.org/10.1080/13669877.2020.1756381

[3.7] Osman, M., Fenton, N. E., McLachlan, S, Hitman, G. A., Lucas, P. Dube, K, Kyrimi, E. & Neil, M. (2020). The thorny problems of Covid-19 Contact Tracing Apps: Finding the best way forward. *Journal of Behavioral Economics for Policy, 4*, 57-61.
https://sabeconomics.org/wordpress/wp-content/uploads/JBEP-4-S-7.pdf

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

As a result of her extensive research and expertise on behaviour and the decision-making process, Queen Mary's Dr. Osman has been called upon by multiple governmental departments to inform and design policy that effectively brings about behavioural change. Osman played a key role in establishing novel and highly successful 'Research Hubs' to inform policy on food regulation and product safety. She has also provided evidence and recommendations to the government on how to encourage uptake of contact tracing apps amidst the ongoing COVID-19 pandemic, a behaviour that is crucial to safeguarding public health.

Revaluating 'nudge'-informed social policy — and providing a more nuanced view

Over the past decade, governments around the world have used 'nudge'-informed social policies to drive behavioural change at a population level. However, Osman has highlighted that a different approach is needed, one that accounts for the complex relationship between reward and effort when people pursue particular goals or actions. In recognition of her expertise, Osman was invited to present a critique of 'nudge'-based policy at the House of

Lords [5.1]. This exposure resulted in Osman being head-hunted by Vanna Aldin, Head of Science and Analytics at the Food Standards Agency (FSA), for an 18-month 0.5 FTE secondment to the FSA starting in September 2017. In this role, Osman strengthened the FSA's social science capabilities and brought innovation to their evidence-based policy [5.2]. The secondment also brought academia and government closer together by creating a new dual academic and evidence-based policy process, resulting in new governmental structures in the form of Research Hubs.

Implementing the "highly novel" Research Hub model across UK government

Osman's research and collaboration has directly led to...	
The establishment of an innovative Research Hub at the Food Standards Agency (2017)	*Goal: to modernise regulation of UK food businesses*
The expansion of the Hub model to the Department for Business, Energy and Industrial Strategy (2019)	*Goal: to inform regulation of product safety and standards*
The Research Hub model being established or considered by other governmental departments, demonstrating its value, efficacy and future potential	*Goal: to further bridge the worlds of policy and academia*

Creating an innovative Research Hub at the Food Standards Agency (FSA)

In 2017, Osman established a Research Hub within the FSA to develop new policy based on the most up-to-date decision and behavioural science. This research-guided Hub directly informed the FSA's major change programme, 'Regulating Our Future', which seeks to modernise regulation of food businesses in the UK. Recommendations from the FSA Research Hub have substantially informed the content of three published white papers [5.3-5.5] on food industry regulation. The core recommendations of the white papers include: reducing reliance on punitive measures (e.g. fines and penalties) to decrease non-compliant business practices (e.g. poor food safety standards); and increasing efforts to align the goals of food businesses with those of local regulatory authorities. These goals can be achieved by promoting the value of compliance with safety regulations, which acts to limit the burden of regulation on local authorities while simultaneously improving business reputation — because food is stored, prepared and delivered to the highest standard.

The first of the 'Food Standards Delivery Review' white papers [5.3] acknowledges the importance of Osman's research in providing "a strong evidence base of the current system's structure" — as required "to help inform proposed future improvements" [5.2]. The second white paper, commissioned by the FSA and authored by Osman [5.4], is "helping the FSA to better understand how business behaves," says Aldin (of the FSA), "and how regulators and enforcement bodies can support shifts in behaviour that raise compliance and increase consumer access to safe food" [5.2]. The third white paper [5.5] draws on Osman's research to address how an effective licensing scheme for new food businesses should be implemented. According to Aldin, the report has "been used by the [FSA's] Regulatory Compliance Division to inform future policy discussions for a new food business licensing scheme" [5.2].

Nathan Philippo, Head of Food Standards and Segmentation at the FSA, spoke to the distinct contribution that the white papers have had on public policymaking: "[The second white paper] informed our approach to providing tailored business advice as part [of] the FSA's new 'register a food business' (RAFB) online platform. The platform will become the FSA's default

registration pathway for new food business, [and] is being rolled out to over 300 hundred local authorities in the next few years" [5.6]. The online register impacts any business that sells, cooks, stores, handles, prepares or distributes food — from restaurants and takeaways to hotels, schools and care homes [5.7] — to ensure compliance with food law and, when fully in place, "is expected to handle the vast majority of the 60,000 new [business] registrations each year" [5.6]. As advised by Osman, the new register implements effective communication strategies to engage with new businesses — strategies that emphasise the benefits, rather than costs, of compliance with food law and regulations. All three white papers "have been critical in the ongoing development of [the] new online register," says Aldin [5.2], highlighting Osman's essential role in making this new public safety initiative as effective as possible.

Expanding the Research Hubs to the Department for Business, Energy and Industrial Strategy

Following the success of Osman's Research Hub in informing decision-making policy in the FSA, the Department for Business, Energy and Industrial Strategy (BEIS) were keen to replicate the process, viewing the Research Hub model as "a highly novel approach" that would "creat[e] additional capacity for expertise and academic scientific input to support evidence-based policy" [5.8]. In 2019, Osman was recruited to BEIS to establish a new Research Hub to inform regulation of product safety and standards. The Deputy Director of Science, Engineering and Analysis at the BEIS Office of Product Safety and Standards (OPSS), Wendy Middleton, attests that "Dr Osman's contribution has been essential…without her input we would not have been able to progress our evidence base for the Sanctions Policy team" [5.8] — the team responsible for imposing sanctions on businesses that breach product safety regulations. By playing a leading role in the creation and implementation of the BEIS Research Hub, Osman has directly shaped how the UK government gathers policy-supporting evidence and assesses risk [5.8]; this is impacting the risk analysis process in not only the OPSS, but local authorities across the UK.

Osman's research has also been critical in developing a new lexicon at BEIS that standardises key terms defining risk (incl., risk, uncertainty, product liability, utility, risk perception, harm, and risk tolerability). Phil Preece, Head of Risk and Intelligence at OPSS, says that "the lexicon will [become] the agreed language for terms associated with Risk…used throughout OPSS" [5.10]. At BEIS, Osman also led an internal evidence-gathering exercise to support a review of the 'Management of Risk in Law Enforcement (MoRiLE)' tool within OPSS. The tool is used to identify policy areas that require the most attention and then determine allocation of resources [5.9]. Osman designed and ran an exercise that tested the tool and presented the collected data in a report alongside critical recommendations on how to improve risk management prioritisation [5.10]. One core recommendation was to revise and simplify the content of the tool such that it is aligned with the agreed terms and definitions proposed in the new lexicon. "[This report] has now formed the basis of a working group that will incorporate [these] recommendations into a proposal for improving the prioritisation tool," says Preece. "An effective prioritisation tool is crucial in ensuring that OPSS is able to identify and target the most serious risks and threats relevant to our area of regulatory responsibility. The exercise and report that Osman prepared has played an essential role in achieving this aim" [5.10].

Spreading the Research Hub model to other departments as a widespread policymaking tool

A key legacy of Osman's research is that the unique Research Hub model has become, and remained, embedded in UK government. Demonstrating a long-term commitment to the model, both the FSA and BEIS have taken steps to secure the future of their Research Hubs, with the FSA recruiting a successor to Osman and BEIS making two additional appointments. More recently, the Department for Environment, Food and Rural Affairs has set up a Research Hub [5.2], and according to Aldin of the FSA, the model "is being considered in other departments [— including the Department for Health and Social Care, the Financial Conduct Authority and the Office of Gas and Electricity Markets —] as an innovative and cost-effective effort to bridge policy and academic research more closely in order to benefit both worlds" [5.2].

Informing government policy during the COVID-19 pandemic

Osman's research has informed the UK government's response to the COVID-19 pandemic, and her expert advice has been sought by several high-profile groups. Specifically, Osman produced new modelling of risk and uncertainty when estimating COVID-19 infection and death rates, and the population-level behavioural implications related to the uptake of contact tracing apps. As a result, Osman was personally asked to play an advisory and/or subject matter expert role on several occasions:

- She was invited by BEIS in March 2020 to provide "recommendations for what inferences can be made from [her COVID-19] analysis, and ways of improving contact tracing applications in the UK" [5.8]

- Asked to contribute to a policy brief raised at a meeting with the Scientific Pandemic Influenza Group on Behaviours, shared with the Scientific Advisory Group for Emergencies (SAGE), and submitted to 10 Downing Street for discussion [5.11]

- Asked to respond to questions that have since been circulated to chief analysts at the Department of Health and Social Care and Public Health England (PHE) [5.8].

Furthermore, Osman's research is informing a white paper that, when analysing public trust during the pandemic, found that behavioural responses and their economic costs are key factors in protecting against infection [5.12].

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

[5.1] Evidence that Osman gave a presentation to the House of Lords.

[5.2] V. Aldin. Head of Science and Analytics; Chief Economist. *Food Standards Agency, UK Government*. (testimonial letter, 18 June 2020). [Corroborator 1]

[5.3] Food Standards Agency. (2017). White Paper 1 report. *Brief review of licensing schemes*. https://www.food.gov.uk/sites/default/files/media/document/review-of-licensing-schemes-final.pdf

[5.4] Food Standards Agency. (2018). White Paper 2 report. *How can we make businesses more compliant? A comprehensive review of current literature.* https://www.food.gov.uk/sites/default/files/media/document/making-food-businesses-more-compliant.pdf

[5.5] Food Standards Agency. (2018). White Paper 3 report. *Food Standards Delivery Review: Report of Findings*. http://www.foodlaw.rdg.ac.uk/pdf/2018-FSA-Report-Food-Standards-delivery.pdf

[5.6] N. Philippo. Head of Food Standards and Segmentation. *Food Standards Agency, UK Government*. (testimonial letter, 30 August 2019). [Corroborator 2]

[5.7] Food Standards Agency. (2019). *'Register a food business' website*. (https://www.food.gov.uk/business-guidance/register-a-food-business).

[5.8] W. Middleton. Deputy Director of Science, Engineering & Analysis. *Office for Product Safety and Standards, Department for Business, Energy and Industrial Strategy, UK Government*. (testimonial letter, 13 July 2020). [Corroborator 3]

[5.9] Office of Product Safety and Standards. (2020). White Paper evaluation of the OPSS Prioritization tool MoRiLE.

[5.10] P. Preece. Head of Risk and Intelligence; Deputy Director of Science, Engineering & Analysis. *Office for Product Safety and Standards, Department for Business, Energy and Industrial Strategy, UK Government*. (testimonial letter, 18 November 2020). [Corroborator 4]

[5.11] R. Löfstedt. Head of the Government's International Best Practice Advisory Group. *UK Government*. (testimonial letter, 19 October 2020). [Corroborator 5]

[5.12] International Best Practice Advisory Group. White Paper on Public Trust during COVID-19 [DRAFT] (Research Brief – ICJU(20)025).