

<b>Institution:</b> University of Plymouth		
<b>Unit of Assessment:</b> UoA4		
<b>Title of case study:</b> Integrating Psychology and Behavioural research into policy and environmental organisations for the reduction of marine pollution		
<b>Period when the underpinning research was undertaken:</b> 2010 - 01.11.20		
<b>Details of staff conducting the underpinning research from the submitting unit:</b>		
<b>Name(s):</b>	<b>Role(s) (e.g. job title):</b>	<b>Period(s) employed by submitting HEI:</b>
Sabine Pahl	Professor of Applied Social Psychology	2006 -01.11.2020
Richard Thompson	Professor of Marine Biology	2001 - present
<b>Period when the claimed impact occurred:</b> 2015 – 31.10.20		
<b>Is this case study continued from a case study submitted in 2014?</b> N		
<p><b>1. Summary of the impact</b> (indicative maximum 100 words)</p> <p>Marine litter is playing a detrimental role in modern life and changing human behaviour is essential to avoid it. In the past, policy makers addressing pollution have typically focused on evidence of harm. Pahl at the University of Plymouth (UoP) has integrated ground-breaking psychological research on marine pollution into science advice, thereby introducing knowledge of risk perception, risk communication and behaviour into UK policy (DEFRA), EU policy and the United Nations Environment Programme. In addition, UoP's evidence of the effectiveness and well-being benefits of marine litter schemes enabled local governments and charities to increase participation and leverage funds of over £700,000. Furthermore, UoP's evidence of the effectiveness of the Fishing for Litter scheme has led to new marine litter schemes in Hong Kong, China, Canada, the Pacific Region and Europe thereby increasing environmental action across the globe.</p>		
<p><b>2. Underpinning research</b> (indicative maximum 500 words)</p> <p>In 2010, Prof. Sabine Pahl started working with Richard Thompson OBE (Marine Sciences) and the International Marine Litter Research Unit (awarded Queen's Anniversary Prize 2019) at University of Plymouth (UoP). This research explored the integration of marine and psychology perspectives initially in the context of risks and benefits of visiting rocky shores. This research identified behaviours high in emotional benefit to visitors and low in risk to the environment, which should be encouraged (e.g., swimming, wildlife watching) as opposed to behaviours low in emotional benefit to visitors and high in risk, which should be managed (e.g., bait collection, fossil hunting). Continuing this focus on the interplay between exposure to natural environments and their potential degradation and pollution, the team then illustrated how degraded marine environments have the potential to undermine psychological well-being benefits derived from coastal visits, specifically showing that post-consumer litter has worse effects than fishing litter. The team then demonstrated in an experimental field study that beach cleans combine clear well-being benefits to humans (especially eudaemonic i.e., reward- and meaning-related well-being) with reducing litter in the environment – a benefit to nature [3.1]. This interdisciplinary research continued within the EU FP7-funded MARLISCO project (2012-2015), in an analysis of predictors of behaviour change and of marine litter education [3.2]. The team applied a behaviour change framework to marine litter education and demonstrated that</p>		

children changed their marine litter-related behaviour following an interactive event. This demonstrated the importance of psychological above sociodemographic factors in predicting behavioural intentions in a large-scale European social survey [3.3]. This approach was continued in the H2020 ResponSEABle project, which found changed attitudes and intentions in, for example, shipping trainees following an educational intervention. Supported by an Institute for Sustainability Solutions Research small grant, the team then focused on the emerging issue of microplastics and conducted a small-scale qualitative study on microbeads in cosmetics. This demonstrated how alarmed different groups of respondents were when they handled microplastics isolated from cosmetic products and how they spontaneously asked what they could do to improve the problem [3.4]. Subsequently, Pahl illustrated the breadth of research methods within social and behavioural sciences and how these may be applied to the issue of environmental microplastics to a wider interdisciplinary audience [3.5]. Of note, this is the first paper with a focus on behavioural / social sciences to be published in a Royal Society of Chemistry methods journal.

In July 2019, the team received funding from the Department for Environment Food & Rural Affairs (DEFRA) to evaluate the Fishing for Litter (FfL) programme. They evaluated the effectiveness and co-benefits of the project that aims to reduce amount of litter in the north east Atlantic. The effects on the participating fishers themselves was studied including their perceptions and waste-related behaviours (both at work and at home). The study was unique as it focused on the behavioural change of fishers, which reinforced that the scheme changes the behaviour of fishers and that this long-term behavioural change spills into their home life as well as at sea.[3.6]

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

- 3.1 **Wyles KJ, Pahl S, Holland M & Thompson RC** 2016 'Can Beach Cleans Do More Than Clean-Up Litter? Comparing Beach Cleans to Other Coastal Activities' Environment and Behavior.
- 3.2. **Hartley BL, Pahl S, Holland M,** Alampei I, Veiga JM & **Thompson RC** 2018 'Turning the tide on trash: Empowering European educators and school students to tackle marine litter' Marine Policy
- 3.3. **Hartley BL, Pahl S,** Veiga J, Vlachogianni T, Vasconcelos L, Maes T, Doyle T, d'Arcy Metcalfe R, Öztürk AA & Di Berardo M 2018 'Exploring public views on marine litter in Europe: Perceived causes, consequences and pathways to change' Marine Pollution Bulletin.
- 3.4. Anderson AG, Grose J, **Pahl S, Thompson RC & Wyles KJ** 2016 'Microplastics in personal care products: Exploring perceptions of environmentalists, beauticians and students' Marine Pollution Bulletin 113, (1-2) 454-460
- 3.5. **Kayleigh J Wyles, Sabine Pahl,** Lauren Carroll, **Richard C Thompson** Marine Pollution Bulletin 2019 Jul;144:48-60. 2019 May 10. An evaluation of the Fishing For Litter (FFL) scheme in the UK in terms of attitudes, behavior, barriers and opportunities
- 3.6. **Pahl S & Wyles KJ** 2016 'The human dimension: how social and behavioural research methods can help address microplastics in the environment' Analytical Methods 9, (9) 1404-1411.

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

Protecting marine environments, marine litter and microplastics have previously been the focus of the natural sciences. However, with plastics playing such a detrimental role in modern life, changing human behaviour is essential for mitigating further harm. UoP research into perceptions and behaviour change has resulted in policy action towards acknowledging the role of society and the realisation that these complex problems require interdisciplinary integrated analysis. Furthermore, their evidence has supported local governments and charities with their strategic aim of reducing marine litter. UoP research has put the human dimension and role of behavioural science approaches firmly on the agenda in the context of these marine environmental issues.

## **Integrating Psychology and Behavioural Approaches into policy**

### **a. United Nations**

Pahl's research has informed policy debates on finding effective solutions to environmental challenges. In 2015 and 2016, Pahl was one of two psychologists representing behavioural sciences in the Working Group 40 (WG40) on microplastics of the Joint Group of Experts on Scientific Aspects of Marine Pollution (GESAMP) which is sponsored by several United Nations Agencies. The first GESAMP WG40 2015 report included Pahl's review of risk perception and communication processes and the 2016 GESAMP WG40 report additionally included the role of behaviour change based on Pahl's research [1]. It concluded with the recommendation that the field needed behavioural science input in order to find effective solutions that integrate the human dimension into this environmental problem [5.1]. Pahl's review findings within the reports informed policy debate through the Food and Agricultural Organisation of the UN whose recommendations included strengthening education and awareness measures on marine litter by providing educational and outreach materials targeted to specific interest groups and range of ages to promote behavioural change [5.2]. In addition, the report informed a G20 Insights policy brief report [5.3] and Seafish, the UK public body which supports the seafood industry, who concluded that from a seafood industry perspective there was a need to influence human attitudes and behaviours to meaningfully reduce the sources of microplastic litter [5.4].

At the UN Environmental Assembly in Nairobi (May 2016), Pahl's research on the behaviour perspective was integrated into the resolution on marine plastic litter and microplastics, which was agreed by the 193 UN member states. Policy recommendations included improved governance at all levels as well as behavioural and system changes such as the promotion of measures to reduce plastic material use to ensure a more sustainable production and consumption pattern and encouraging governments to promote change in individual and corporate behaviour [5.5].

Pahl was invited back to the GESAMP group in 2020 and contributed a summary of the role of human decisions and behaviours in the plastics system [5.6]. This resulted in her leading a stocktaking exercise on all actions addressing marine plastic litter and microplastics funded by the UN Environment Programme (UNEP). This is the first time UNEP has run such an ambitious stock take using quantitative social science methods.

Pahl's research resulted in the development of targeted messages to help reduce human impacts on the world's coral reefs. In 2017, Pahl contributed to a workshop on how to harness citizen behaviour to aid the protection of coral reef ecosystems, hosted by UN Environment World Conservation Monitoring Centre in partnership with UN Environment, Pierre-Yves Cousteau (CEO of Cousteau Divers), and Reef World Foundation. This workshop served to inform the UN Environment global campaign of citizen behaviour change and the International Coral Reef Initiative.

### **b. European Commission, the G7 and UK national level policy**

Previously, social and behavioural sciences had not been valued or considered within the European actions required to protect the marine environment. Pahl was appointed as vice chair to the European Commission's Science Advice for Policy by European Academies (SAPEA) group (2015-2019) and co-led an evidence review which resulted in recommendations that research efforts be directed towards the study of individual and collective behaviour. This report clearly emphasised the value of the Social and Behavioural Sciences and informed the scientific opinion of the EU's Chief Scientific Advisors. In addition, Pahl's contributions to the G7 Roundtable on Microplastics (Oct 2019) resulted in a strong recommendation that the field of behavioral sciences should be mobilized [5.7]. At a UK national policy level, UoP research was included in a Houses of Parliament POSTnote (2016) that stressed the important role of prevention and the co-benefits of pro-environmental action such as taking parts in beach cleans.[5.8]

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

- 5.1 **GESAMP (2016)**. "Sources, fate and effects of microplastics in the marine environment: part two of a global assessment" (Kershaw, P.J., and Rochman, C.M., eds). (IMO/FAO/UNESCO-IOC/UNIDO/WMO/IAEA/UN/ UNEP/UNDP Joint Group of Experts on the Scientific Aspects of Marine Environmental Protection). Rep. Stud. GESAMP No. 93, 220 p. In particular Section 6.9, p. 95-100 (content), p. 117 (conclusions). Available from <http://www.gesamp.org/site/assets/files/1720/rs93e.pdf>
- 5.2 **FAO (2017)**. Microplastics in fisheries and aquaculture. Food and Aquaculture technical paper 615 <http://www.fao.org/3/a-i7677e.pdf>. In particular, policy recommendation 14 pg 72
- 5.3 **G20 Insights**: Circular economy measures to keep plastics and their value in the economy, avoid waste and reduce marine litter [https://www.g20-insights.org/policy\\_briefs/circular-economy-measures-keep-plastics-value-economy-avoid-waste-reduce-marine-litter/](https://www.g20-insights.org/policy_briefs/circular-economy-measures-keep-plastics-value-economy-avoid-waste-reduce-marine-litter/).
- 5.4 **Seafish (2018)** <https://www.seafish.org/document/?id=cc093920-fbd4-4918-8060-98c2dc9d01bf>
- 5.5 **UNEP (2016)**, Marine plastic debris and microplastics – Global lessons and research to inspire action and guide policy change. United Nations Environment Programme, Nairobi. <https://wedocs.unep.org/handle/20.500.11822/7720>
- 5.6 **GESAMP (2020)**. Proceedings of the GESAMP International Workshop on assessing the risks associated with plastics and microplastics in the marine environment (Kershaw, P.J., Carney Almroth, B., Villarrubia-Gómez, P., Koelmans, A.A., and Gouin, T., eds.). (IMO/FAO/UNESCO-IOC/UNIDO/WMO/IAEA/UN/ UNEP/UNDP/ISA Joint Group of Experts on the Scientific Aspects of Marine Environmental Protection). Reports to GESAMP No. 103, 68 pp. In particular Section 2.4, p. 9-12. Available from <http://www.gesamp.org/publications/gesamp-international-workshop-on-assessing-the-risks-associated-with-plastics-and-microplastics-in-the-marine-environment>
- 5.7 **G7 France research Roundtable on Microplastics in the Environment Biomonitoring Issues and Socio-Ecological Challenges for Public Decision**. 2019 Available from <https://www.enseignementsup-recherche.gouv.fr/cid146216/atelier-plastiques-dans-l-environnement-dans-le-cadre-du-g7.html>
- 5.8 POSTnote Marine Plastic Pollution Published Sunday, Number 528 05 June, 2016 <https://post.parliament.uk/research-briefings/post-pn-0528/>
- 5.9 Testimonial, Arabelle Bentley, KIMO International Executive Secretary
- 5.10 Testimonial, Justine Millard, Head of Volunteer and Community Engagement