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The human dimension: how behavioural sciences can help address plastic pollution in the environment

Sabine Pahl, School of Psychology

October 2017

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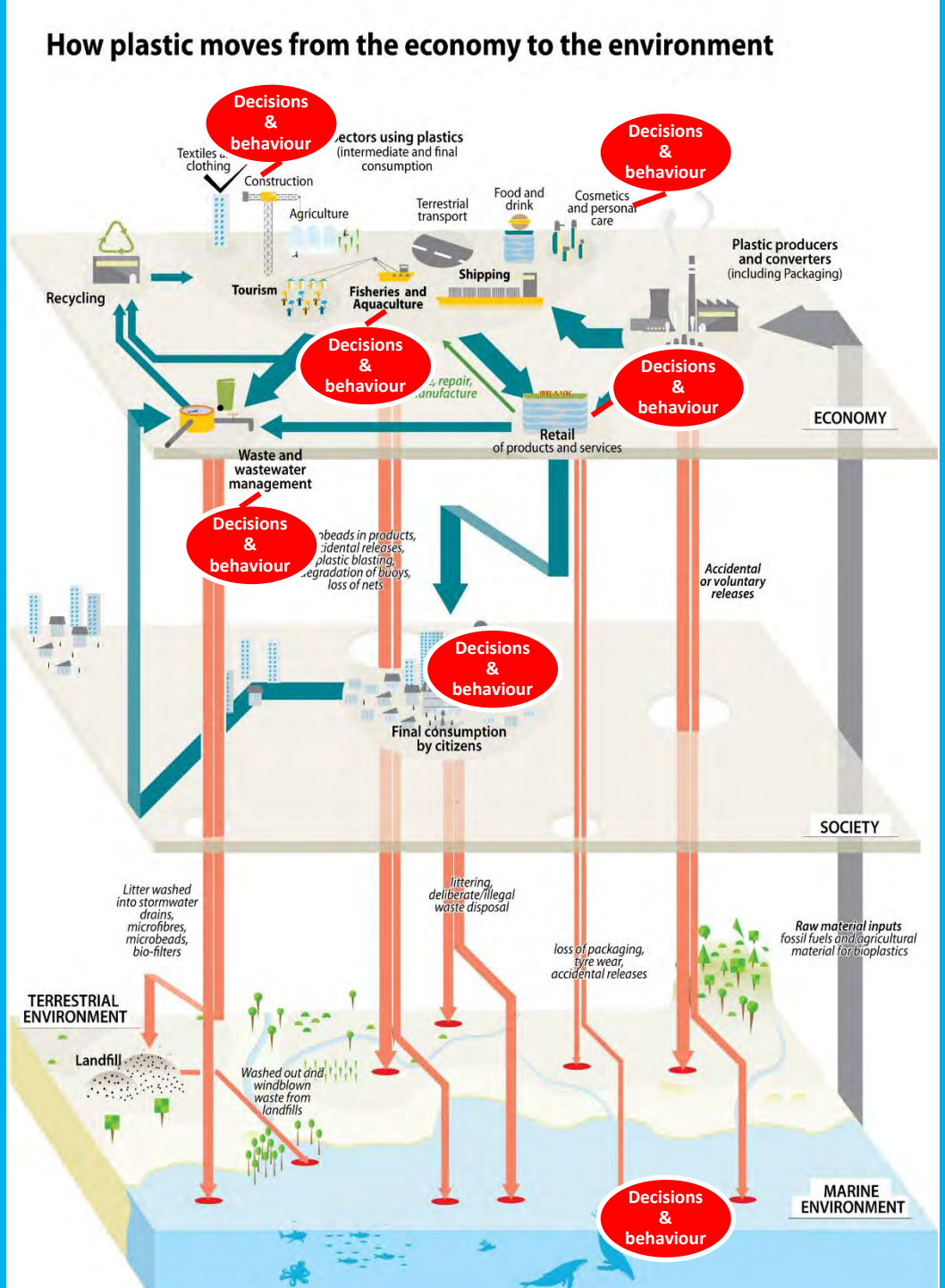
Key messages

- People's decisions and actions are causing plastic pollution
- Understanding perceptions and behaviour holds the key to reducing plastic pollution
- Systematic and rigorous behavioural **research** can inform change
- Let's work together!



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Decisions & behaviours are everywhere

Credit: GRID-Arendal and Maphoto/Riccardo Pravettoni

http://www.grida.no/resources/6908

Why psychology / behavioural sciences?

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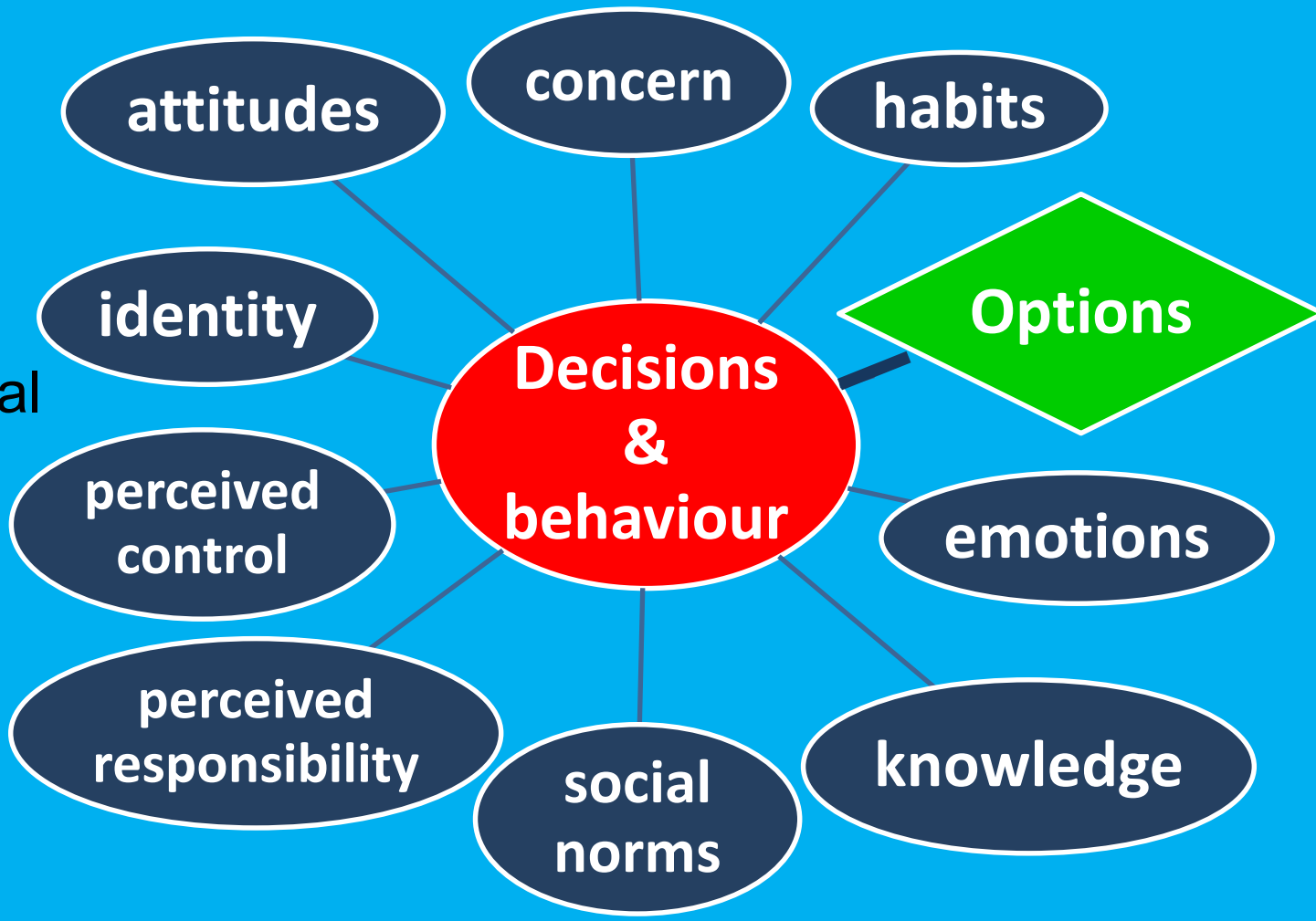
Predictors of decisions and behaviour from the psychological literature

Perceptions are important



Pahl & Wyles, Analytical Methods, 2017

See Fischhoff, 2011, Applying the science of communication to the communication of science, Climatic Change

Methods in psychology & behavioural sciences

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Analytical Methods

TUTORIAL REVIEW

CrossMark

Cite this: DOI: 10.1039/c6ay02647h

The human dim
research metho
the environmer

S. Pahl*[ab] and K. J. Wyles

The present paper illustrates the b
these may be applied to the issue
and we need to understand the h
paper and follow from the key ob
pivotal to the issue of primary a
behaviour can be subject to syst
measurement and statistical anal
novel, in-depth insights; (3) be
quantitative cross-sectional appr
the role of perceived risk, values,
compare randomised groups ar
unique to research with peopl
regulation, education programm
and behaviour and then evaluat
standardised tools and protocol
infancy and a number of importa

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www.rsc.org/methods

1. Human perception and behaviour can be subject to systematic and rigorous scientific study, using theory-based hypothesis testing, measurement and statistical analysis;

2. Qualitative methods can explore new areas of research and provide novel, in-depth insights;

3. Best practice and recommendations exist for measuring social data;

4. Quantitative cross-sectional approaches can test how important social factors are for key outcomes (*e.g.*, the role of perceived risk, values, social norms for behaviour);

5. Experimental quantitative approaches can compare randomised groups and study cause–effect relations;

6. Certain limitations and challenges are unique to research with people;

7. Communications and interventions (*e.g.*, change campaigns, new regulation, education programmes) should be developed based on scientific insights into human thought and behaviour and then evaluated systematically;

8. Social researchers should work towards developing standardised tools and protocols;

9. Social research on microplastics and its determinants is in its infancy and a number of important research questions remain to be addressed.

Exploring perceptions of microbeads

Basic UK media analysis

Figure 5.4. *Frequency of newspaper articles with the terms 'micro plastics' and 'micro bead' within the UK newspapers.*

Small-scale qualitative research

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Qualitative in-depth study exploring responses to **microbeads** in cosmetics comparing beauticians, environmentalists, students; 'experiential'

Anderson et al., Marine Pollution Bulletin, 2016

Exploring perceptions of microbeads

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Reaction to extracted polyethylene microbeads

	Beauticians	Students	Environmentalists
First reaction	*"Is that how much plastic would be in one bottle? **Oh my god** that's like almost half of it"*	*"I just don't think it's very good for your skin… just seems a bit fake"; "It's weird"*	*"**Oh my god** that's the amount of granules in each of these"; "**Oh my goodness**"*
Thoughts on impact	*"**it's quite dangerous** like for the like world around us basically"*	*"**Does it** physically harm the fish? Obviously I know it's in their stomach but **does it** like poison them or something?"*	[already talked about impact before they saw extracted polyethylene]

Anderson et al., Marine Pollution Bulletin, 2016

Exploring perceptions of microbeads

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Reaction to extracted polyethylene microbeads

	Beauticians	Students	Environmentalists
Own behaviour	*"well I wouldn't say to you I'm not using them anymore **but**…"*	*"**don't want to use it again**"* *"I have one at home, I **feel really bad now**"* *"**I'll just go back to** face washes that don't have the plastic in them"*	[already extensive discussion before they saw extracted polyethylene]
Competing issues ('limited pool of worry')			

Understanding these perceptions and "mental models" is crucial for developing effective communications and solutions

Anderson et al., Marine Pollution Bulletin, 2016

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Large-scale quantitative research

Marine Litter in European Seas - Social Awareness and Co-Responsibility

MARLISCO
Stopping Marine Litter Together

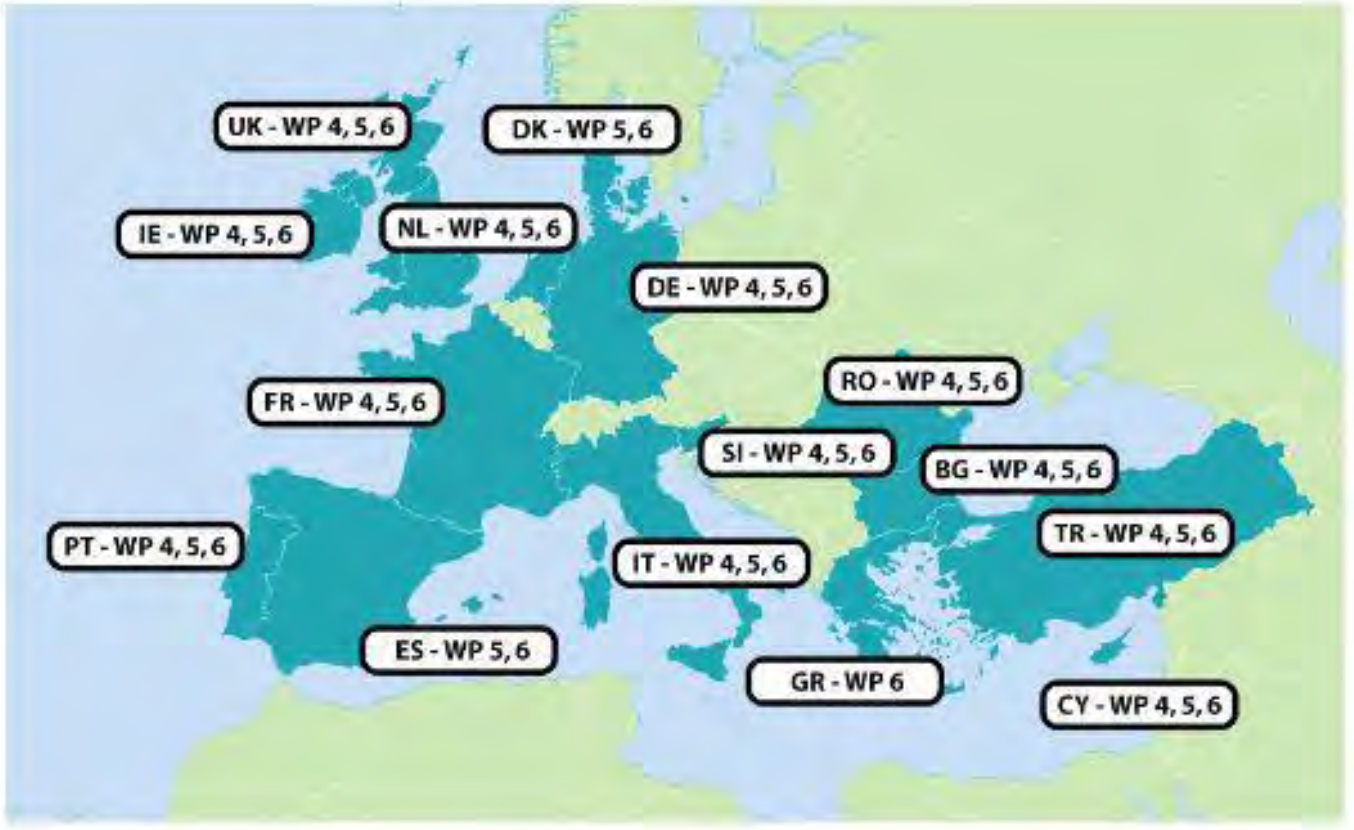
Partners from academia, local/regional government, NGOs, plastics industry, communicators and educators

Goals

1. Raise societal awareness

2. Assess attitudes, perceptions, barriers

3. Evaluate changes associated with outreach activities (e.g., science communication events; school video contest)



Work towards ***solutions***; acknowledge ***system*** character

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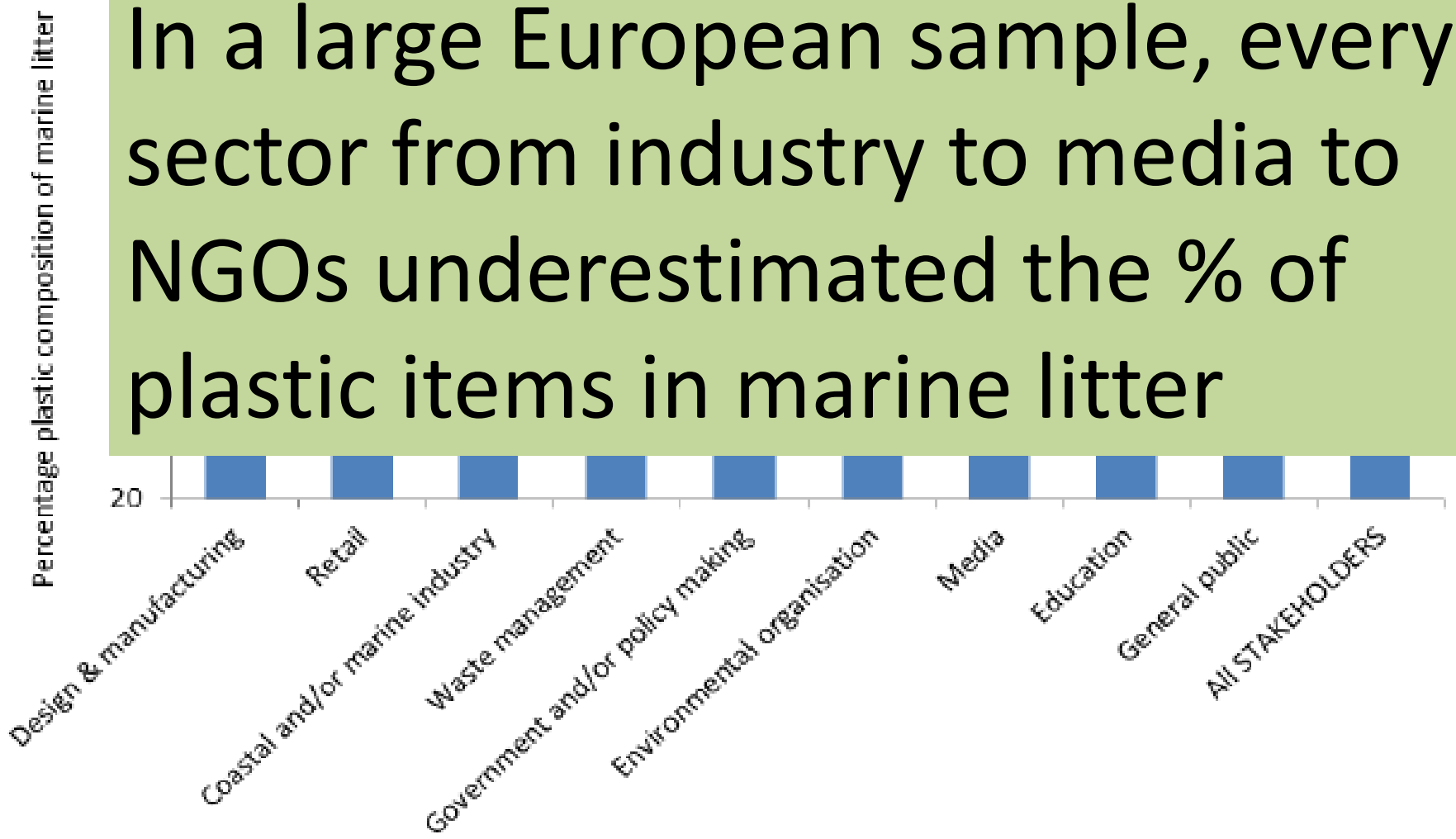
MARLISCO Surveys

Europe-wide, online, programmed and hosted by our technical office in Psychology at Plymouth University

Up to 5,000 responses

Perceptions - Plastics %

In a large European sample, every sector from industry to media to NGOs underestimated the % of plastic items in marine litter



N = 3748 European public and stakeholders

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Perceptions - Concern

Marine Litter in European Seas - Social Awareness and Co-Responsibility

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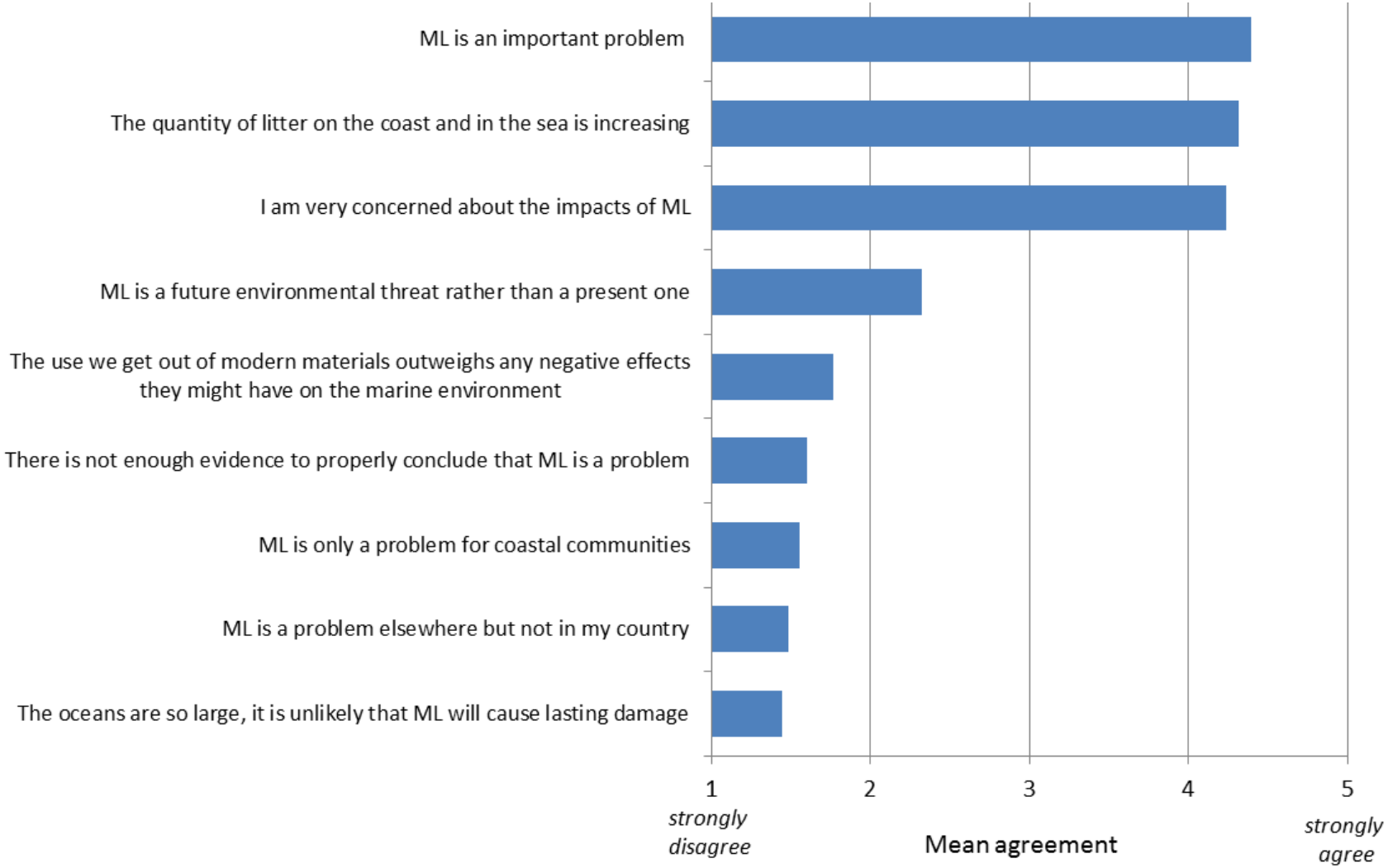

N = 3748 Respondents across countries and stakeholder groups

Predicting Behavioural Intentions

Marine Litter in European Seas - Social Awareness and Co-Responsibility

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Stopping Marine Litter Together

Table 3. Hierarchical Regression Analysis for Variables Predicting BEHAVIOURAL INTENTIONS (N=1118)

Variable	*B*
Demographics:	
Age	0.01
Gender (1=M, 2= F)	0.25
Education level	0.13
Accessibility & experience:	
Proximity to the coast 0-5km	
Proximity to the coast >5-20km	
Freq. of coastal visits	
Freq. notice litter at coast	
Psychological variables:	
Concern and perceived risk	
Responsible (self)	
Competent (self)	
Motivated (self)	
Responsible (general public)	
Competent (general public)	
Motivated (general public)	
Altruistic-biospheric value	
Egoistic value	
Social norm – important	
Social norm – support	
R^2	
F for change in R^2	
Model F	

$^{+}p<.10$. $^{*}p<.05$. $^{**}p<.01$. $^{***}p<.001$.

Putting lots of aspects together – which are important? How good are they at explaining variance in our outcome? E.g.,

Sociodemographic factors,
access / experience factors and
psychological factors

N = 1,118 only general public respondents

Predicting Behavioural Intentions

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Model F	

$^{+}p<.10$. $^{*}p<.05$. $^{**}p<.01$. $^{***}p<.001$.

With all variables entered, the biggest predictors (β ≥ .10***) were **education level** (sociodem), **frequency of noticing litter** (experience) and **concern/ perceived risk, motivation, values and social norm** (psychological)

N = 1,118 only general public respondents

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Predicting Behavioural Intentions

Marine Litter in European Seas - Social Awareness and Co-Responsibility

MARLISCO
Stopping Marine Litter Together

Table 3. Hierarchical Regression Analysis for Variables Predicting BEHAVIOURAL INTENTIONS (N=1118)

	Model 1				Model 2				Model 3				Model 4				Model 5			
Variable	*B*	*SEB*	*β*	*t*	*B*	*SEB*	*β*	*t*	*B*	*SEB*	*β*	*t*	*B*	*SEB*	*β*	*t*	*B*	*SEB*	*β*	*t*
Demographics:																				
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F for change in R^2																				
Model F																				
†p<.10. *p < .05. **p < .01. **																				

Sociodemographic variables become less important as we add access/experience and psychological variables

It's important to go beyond sociodemographic descriptors. E.g., we cannot change age / gender, but we can change attitudes, perceptions, social norms…

N = 1,118 only general public respondents

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Assessing change

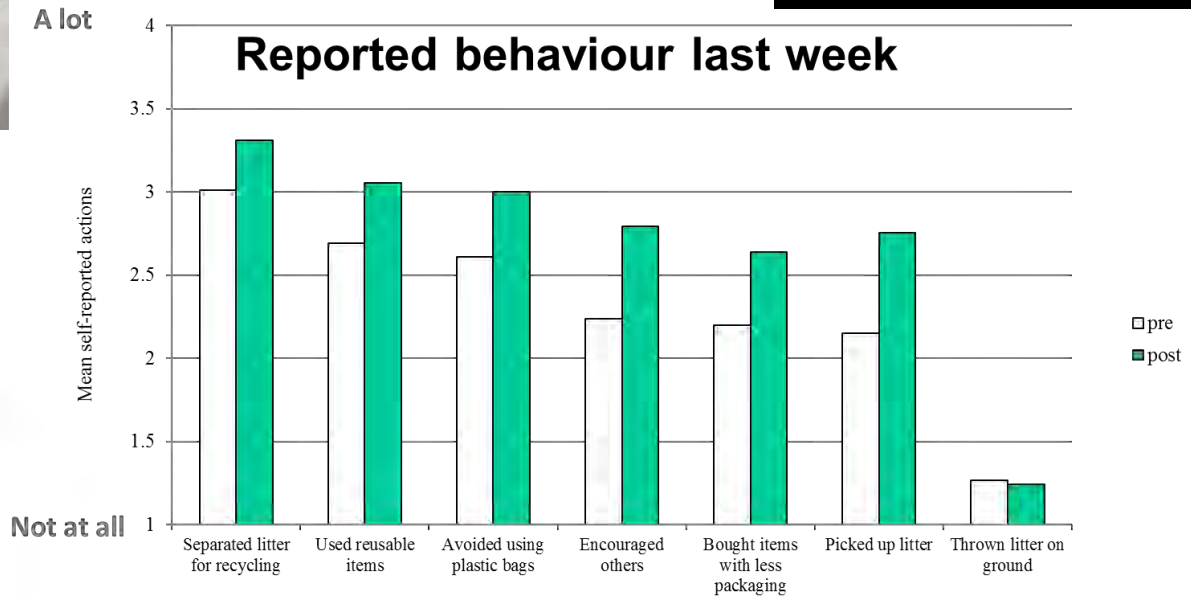
MARLISCO
Stopping Marine Litter Together

Marine Litter in European Seas - Social Awareness and Co-Responsibility

Educational activities with 176 UK school children

Plastics % in ML

Hartley, Thompson & Pahl, 2015



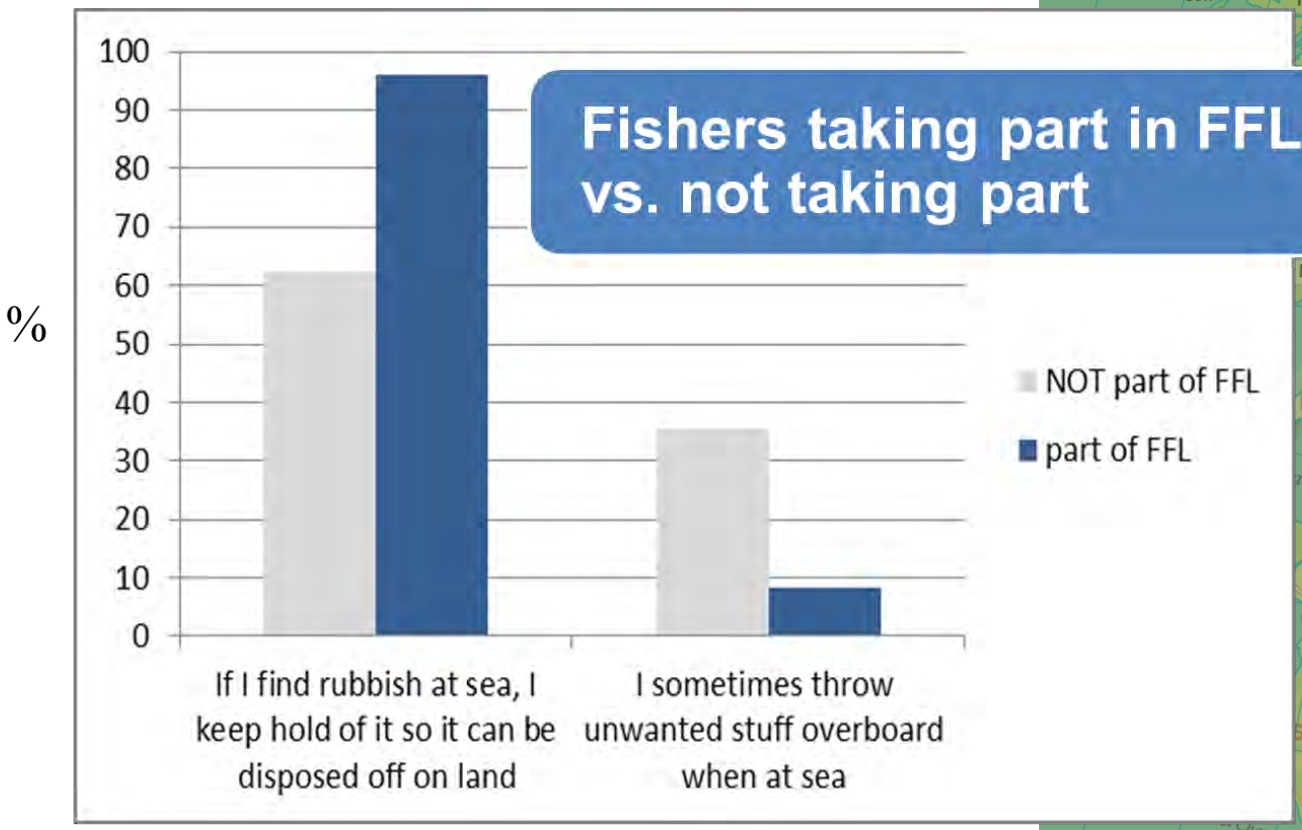
341 European school children who took part in a video competition on ML

Hartley, Pahl & Thompson, under review

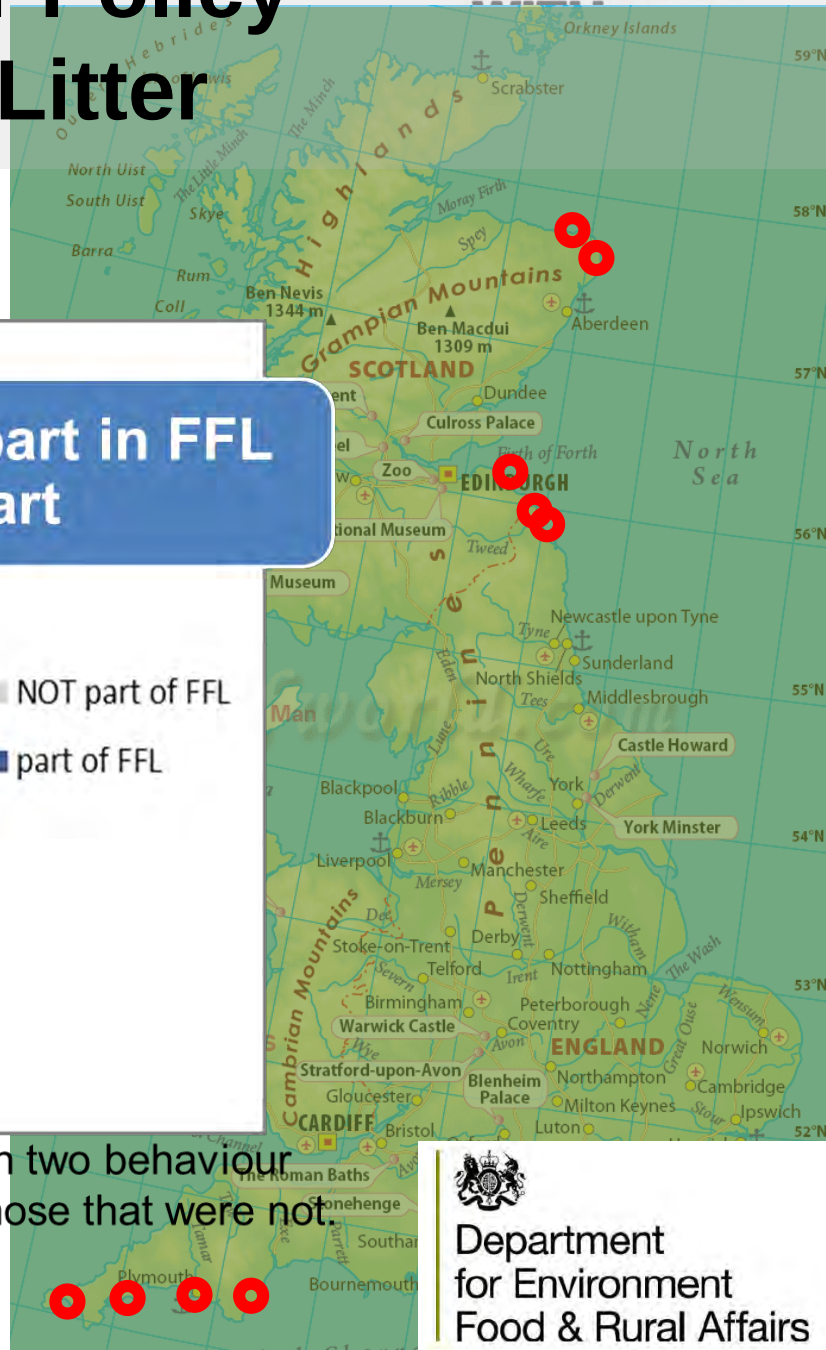
Evaluation for Policy
Fishing for Litter

RESEARCH

Surveys with 97 fishermen



Percentage of fishers who *agreed* or *strongly agreed* with two behaviour statements, divided into those that are part of FFL and those that were not.



Department for Environment Food & Rural Affairs

Beyond incentives and fines

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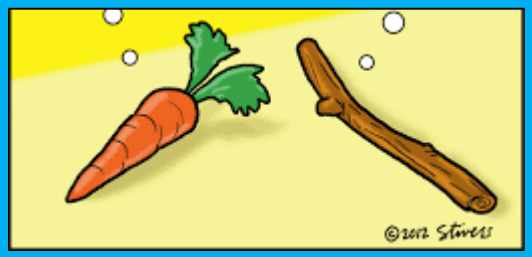

- Solution focus sometimes solely on policy tools, e.g. levies, fines or incentives
- **Extrinsic** (rather than **intrinsic**) motivations
- Fickle triggers for behaviour
- Also address **intrinsic** motivations for holistic change and long-term engagement
- Consider consumer perspective; convenience
- In line with recent 'popular psychology' publications on **nudging**, **behavioural insights** etc.
- Behavioural approaches compare favourably with traditional policy tools in terms of cost-effectiveness

WHY

HOW

Pahl, Wyles & Thompson, 2017, Nature Human Behaviour

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Key messages

- People's decisions and actions are causing plastic pollution
- Understanding perceptions and behaviour holds the key to reducing plastic pollution
- Systematic and rigorous behavioural **research** can inform change
- Let's work together!

New Project *Blue Communities*

The *Blue Communities* team will focus on case study areas in Indonesia, the Philippines, Vietnam, China and Malaysia, in areas designated as '[UNESCO Man and the Biosphere Reserves]' or marine parks. These 'science for sustainability' support sites provide an established, collaborative infrastructure in which initiatives can be developed and tested alongside the local stakeholders (e.g., renewable energy, fisheries, waste management, health & wellbeing).

Thank you

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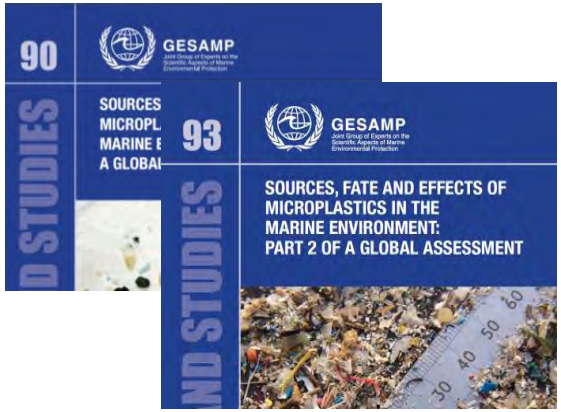
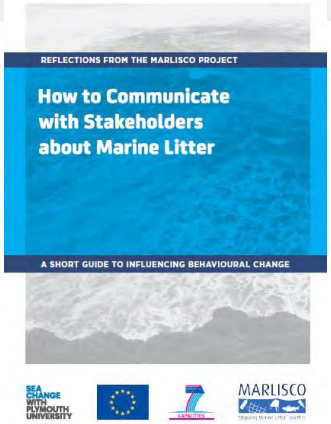
Bonny Hartley

Kayleigh Wyles

Lauren Carroll

GESAMP
Joint Group of Experts on the Scientific Aspects of Marine Environmental Protection





http://www.marlisco.eu/how-to-communicate-with-stakeholders-guide.en.html

Richard Thompson

Imogen Napper

Alison Anderson

Jane Grose

Matt Holland

https://www.plymouth.ac.uk/research/marine-litter

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