

Theme session B

Predictably Irrational – a new scientific research field for the science underpinning marine-resource management

Conveners: Sarah B.M. Kraak and Dorothy J. Dankel

Why are fish stocks overfished? Why can fisheries regulations be ineffective? How could the Discard Ban be optimized for compliance? These are examples of questions scientists and managers ask themselves today in fisheries. Little known to the fisheries and ICES communities are the tools, methods and experiments of behavioural science, which could give insights and innovations in fisheries management. The aim of our “small session on a novel topic” was to introduce the topic to the ICES community and demonstrate the usefulness of behavioural science. In order to increase the salience of the findings in behavioural economics for the audience we decided to illustrate them with experiments on the audience during the session. In addition we planned a debate and discussion with the audience on paternalism and the ethics of applying behavioural-economics findings.

We received an overwhelming number of submissions (for a novel topic), namely 17, which were all of good quality and were all accepted. There were three withdrawals for various reasons (including a Turkish student who was forced to cancel due to the coup attempt and the consequential lock-down on academics by the ruling administration), and one author decided to make his point through the Wednesday-evening Game Session instead. In all, the session comprised one poster, 10 talks, the interactive session with live experiments, and the debate/discussion on the ethics of nudging.

During the poster session (conveniently Tuesday, the evening before the Theme Session) the poster by Dorothy Dankel (University of Bergen) already attracted a lot of attention to the entire topic of the session. The poster contained several illustrations of nudges, interactive items such as surveys, and the presenter in a John Pope-inspired poster-dress was extremely capable of arousing the interest of the audience to the topic. It was well-deserved that she won the award for best poster.

The session started on Wednesday morning with a talk by **Mike Fitzpatrick** (Irish Observer Network) introducing the complexity of the topic once more, in a humourful way: *“I’m an Irishman who went out drinking with some Icelanders last night before my early 08.30 talk this morning, proving that I’m both predictable and irrational.”* Mike also introduced the concepts of *satisficing* and *heuristics* (mental shortcuts) as part of Herbert Simon’s work *Bounded Rationality*, and the fact that in fisheries science there is a high cognitive burden which leads to cognitive bias (e.g. false consensus effect, loss aversion, implicit association bias, etc.). This was followed by a presentation by **Nathalie Steins** (IMARES) et al. about a pilot study on catch-quota management in the Netherlands; the incentive provided by extra quota did not have the effect anticipated by the natural scientists, and this could only be understood after the social scientists talked with the fishers. IMARES is one of the few national institutes of the ICES Member Countries that employs social scientists in-house, but there is still work to do to integrate the social science with the fisheries science in Stage 0 of projects, as evident in Nathalie’s talk where the social science came in at the end stage of the project to figure out “what went wrong.”

The next talk was by **Cecilia Hammarlund** (AgriFood Economic Centre, Lund University) who discussed revenue target behaviour among fishers. Cecilia analysed data from the cod fishery of the Baltic Sea from 2011-2013 to elucidate how much revenue per haul the fishers have received, and how this affects their behaviour as “target earners”. These types of analyses have been done with taxi drivers in the past to see what effect an increase in cumulative revenues has on the probability of returning to port. Cecilia reported that the number of hours worked did positively correlate with the amount of revenues.

Andries Richter (Wageningen University) evoked Nobel Laureate Richard Feynman in his presentation with an altered quote, “I cannot control what I can’t understand”, as a metaphor for the scientific and managerial need to understand fisher behaviour. Richter and colleagues in Norway conducted some lottery experiments to try to “open up the black box of fisher behaviour” and answer the question “What is driving fishers’ investment?” Andries presented a summary of these experiments that show fishers think a level playing field is very important to them (under- or unreported labour is not acceptable) and that the reason most fishermen comply with regulations is not the fear of fines, but because they care about stock development. In this case, Norwegian fishers (98% in the experiment were men) are not operating under a classic “tragedy of the commons” scenario. A discussion also started as to how CCTV (closed circuit television, “you are being watched”) affects the social norms of fishermen. Andries said “We’re getting better at understanding behaviour, but we are just not there yet.”

Ganga Shreedhar (London School of Economics) was next up, and first posed the question “What is the role of imperfect monitoring?” Ganga has been working with theoretical models through the Extraction Dilemma Game (from the book [Rules, games, and common-pool resources](#) by Ostrom et al. 1994) to see the role of monitoring on common pool resources (such as fish). Ganga explained how monitoring networks differ by the amount of information they have on cheating and how they implement punishment. One of the results of these experiments performed in the lab with economics students at LSE was that a “bad start” (many instances of cheating and punishment) in the beginning can lead to bad behaviour later in the game.

Jenny Oates (WWF-UK) then presented the stakeholder project the [Celtic Seas Partnership](#) which has been funded from 2013-2016. This project has supported transboundary implementation of the EU’s Marine Strategy Framework Directive (MSFD) in the Celtic Sea area, including the UK, Ireland and France. This project has been a driver in facilitating reflection of the MSFD and common goals for fisheries among the thousands of stakeholder participants. A core element of the project is the concept of “fisheries Mediation” which focuses on building relationships between stakeholders for compliance of fisheries regulations. Thus the issues surrounding this core are: 1) adapting to legislative change, 2) gear conflict, 3) perceived imbalance of power, 4) general lack of trust. Jenny presented some results of the successful project that stakeholders have gained more confidence in policy and in some cases, there are demonstrable cases where trust has been built between stakeholders and policy-makers/regulators.

The next presenter was **Sebastian Uhlmann** (who kindly stepped in for his colleague Arne Kinds, [Institute for Agricultural and Fisheries Research \(ILVO\)](#)) to discuss “Are we missing anything important?” In Belgium, 77% of the landings is accounted for by beam trawlers, which have a significant impact on benthic ecosystems. The choice of fishing technique can

make a large difference both in terms of ecosystem impact and efficiency. To understand and identify the driver behind the decision to adopt and invest in new fishing technology, semi-structured open interviews are being conducted with fifteen Belgian fishers. Prior to the interviews, a possible set of themes that could underlie fisher attitude and behaviour were listed. An additional theme that frequently came up during the interviews was fishers' relationship with fisheries scientists and governmental bodies. This leads to an important question: how do fishermen perceive the scientific community? Is there distrust from the fishers towards scientists and governmental bodies? As the scientific community is reliant on the good relationship with fishers, distrust could hamper the will for cooperation. One result that Sebastian presented was the issue of trust with the scientists and their perception for the fisher-scientist dialogue as being 1-way communication or a more credible and legitimate 2-way "dialogue."

Discussion: Martin Pastoors and Dave Reid gave comments related to their personal experiences in science working with fishermen.

Then the session turned interactive. **Sarah Kraak and Dorothy Dankel** turned the audience into Guinee Pigs of experiments. Three experiments on choice architecture were carried out testing the decoy effect, the default effect, and the framing effect (for illustration, not with the methodological rigour needed for proper science). These effects were not confirmed in our tests. Furthermore, the false-consensus effect was demonstrated through a movie that was recorded during the first two days at the ASC, using 4 prominent ICES people as Guinee Pigs for the experiment¹. The sample size for this test was augmented by the people who had taken the experimental survey during the poster session as well as through the audience taking the survey during the interactive session itself. The false-consensus effect was confirmed. Results are shown at the bottom of this report.

Three talks followed, using the coin-flipping paradigm for measuring honesty under various experimental conditions. Under this paradigm it can be shown that when risk of detection is absent human beings tend to be slightly dishonest driven by monetary gain but rarely cheat to the maximum. **Moritz Drupp** (University of Kiel, Environmental, Resource and Ecological Economics) et al. showed in his presentation "Truth-Telling and the Regulator" that indeed fishers are slightly dishonest, and more so when primed by the EU-logo on the top of their surveys, but less so when the EU-logo is used to define the EU as a funder of science. Moritz also compared the fishermen's honesty results with those of the business students and found fishermen more truthful.

Subsequently, **Rudi Voss** (University of Kiel, Environmental, Resource and Ecological Economics) et al. showed that ICES scientists are slightly more honest than fishers, and even more so when they are primed to think of their professional rather than their private life. Rudi showed evidence from an post-experiment check on identity priming that scientists who self-identify with their professional career cheat less and differently than German fishers, who lie only partially. Sarah Kraak (Thünen Institut) et al. showed in a pilot experiment that whether students have been incentivised by a carrot or a stick may influence subsequent honesty, but this experiment has still to be carried out on a larger scale and with an improved setup. Management implications might be that a trade-off may exist between incentivising fishers to take up desired measures such as CCTV and subsequent levels of compliance.

¹ <https://youtu.be/9uiLvO32YiE>

Finally **Sarah Kraak and Nathalie Steins** defended opposing extreme positions in a debate moderated by Dorothy Dankel on whether nudging fishers towards sustainable fishing is ethical. Subsequently, members of the audience were very engaged in the discussion of the topic and many opinions were expressed. One specific comment from Dave Bengtson (University of Rhode Island) was on the ethics of scientists making decisions that directly affect fishers' livelihoods. The responsibility that ICES scientists have of setting TACs and giving advice on regulations is very much 1-way street with a clear asymmetry of power. Another topic was the heterogeneity of fishers, where large-scale fishing operations display a very different behaviour than small scale fishers. This should be taken account of in the various facets of science and advice-setting.

Because of the lively session and the positive feedback we are confident that the ideas presented are spreading in the ICES community. After the theme session, we have had discussions with a PhD student in Tasmania, who followed the session via Twitter. Dorothy has also had a UK fisherman, Ian Kinsley, phone her for a discussion on the importance of the theme session topic of looking at human behaviour in fisheries management. Ian also followed the session via Twitter! These positive post-ASC interactions make us feel that we have had a successful meeting and that there is all reason to continue developing new projects and ideas within our "BehavFish" community.

We express our gratitude to ICES and especially SCICOM who believed in this idea, trusted us, and encouraged us to think outside the box with our novel format.

Real-Time Experiments conducted in the Theme Session

1. In the decoy effect experiment the two treatments were (i) two options for a Journal subscription; (ii) three options for a Journal subscription of which the middle was a Decoy option. The hypothesis was that the presence of the Decoy would change the relative preferences of the people for the other two options (which were the same between the treatments). The null-hypothesis of no effect could not be rejected: in treatment i the numbers of people choosing the respective options were 11 and 1, whereas in treatment ii they were 21 and 2.
2. In the default experiment the two treatments were (i) a vegetarian meal as default with the option to tick a box for meat/fish; (ii) meat/fish as default with the option to tick a box for vegetarian. The hypothesis was that people's choices would be biased towards the default and that therefore in treatment i more people would choose vegetarian than in treatment ii. The null-hypothesis of no effect could not be rejected: in treatment i the number of people choosing vegetarian was 13 out of 26, whereas in treatment ii it was 6 out of 11.
3. In the framing experiment the two treatments were catch option tables with six catch options of which three options were present in both treatments and in (i) three lower options and in (ii) three higher options. The hypothesis was that the presence of lower options would bias people to choose a lower option relative to the situation with higher options present. The null-hypothesis of no effect could not be rejected. In treatment i the numbers of people choosing the 6 consecutive options were 6, 8, 9, **4**, **5**, and **3** respectively, whereas in treatment ii these numbers were **13**, **4**, **6**, 6, 1, and 3 (numbers for options in common are in bold).

4. The false-consensus effect was tested with two sets of questions. In each set, the people were asked to estimate the % of their colleagues with a particular opinion and then give their own opinion. The hypothesis was that people tend to think that a higher % of people agree with their opinion. The null-hypothesis could be rejected in both cases. The graphs below display the results. Actual numbers of people favouring the viewpoints were: 30 for balanced, 28 for selective, 26 for effort, and 39 for TAC.

