International Conference on Environmental Psychology

4 – 6 September 2019
University of Plymouth, UK
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WELCOME TO PLYMOUTH

With a rich marine and maritime heritage and a hand in some of Britain’s most famous events, a city as steeped in history as Plymouth has many stories to tell.

It is Britain’s Ocean City, a lively and authentic waterfront community with a distinctly European feel created by the many marinas, restaurants, alfresco pavement cafes and waterfront bars, historic buildings.

Nestling between the sea and rivers on three sides, the dramatic wild expanse of Dartmoor on the fourth, and a heritage that holds a powerful place in English and world maritime history. A city with the sea at its heart, the major shopping centre is just a ten minute walk from the waterfront.

Take a walk along the cobbled streets of the Barbican and find yourself transported back in time, to history altering moments such as Sir Francis Drake victory over the Spanish Armada, the departure of the Mayflower carrying the Pilgrim Fathers in search of the New World, and explorers Scott of the Antarctic, Captain James Cook and Charles Darwin setting sail – all of which took place right here in Plymouth.

Plymouth has a strong bond with the armed forces and its naval history runs deep. There is no better example of that than the Royal William Yard, an impressive and imposing example of the city’s military prowess and the largest collection of listed naval buildings in Europe.

In addition to its impressive natural setting, Plymouth is the cultural capital of Devon and Cornwall with major events including the annual British Firework Championships and Flavour Fest, theatres, galleries and performing arts providing an eclectic cultural experience to add to the laid-back lifestyle.

With real character and personality and a scale which makes it really easy to get around, you can totally immerse yourself in Britain’s Ocean City.
On behalf of the organising committee we are delighted to give you a very warm West Country welcome to the 2019 International Conference of Environmental Psychology ‘Protecting People and Planet through Social and Behavioural Science’ co-hosted by the School of Psychology at the University of Plymouth and the European Centre for Environment and Human Health at the University of Exeter, and organised under the auspices of the International Association of Applied Psychology (IAAP) Division 4.

Many of the world’s biggest threats and challenges are caused by human decisions and behaviours, and environmental psychology is uniquely placed to support individuals and policy makers tackle these challenges. While developing exemplary science in the lab remains a foundation of our discipline, there is also an urgent need to get ‘out of the lab’ and engage directly with the real world problems we face.

With over 350 participants from 30 different countries, ICEP 2019 brings together not only many of the world’s leading environmental psychologists but also leading scholars and practitioners from disciplines such as landscape architecture, environmental economics and environmental policy. We need to learn from each other and work together across disciplines if we are going to slow the rate of environmental degradation we are causing, adapt to the damage already done, and instigate programmes to help rectify the situation. If not us – then who; if not now – then when?

We hope you have a productive and enjoyable conference.

The Local Organising Committee

Sabine Pahl & Mat White

University of Plymouth: Sally Bishop-Hawes, Shannon Heaney, Annabelle Lobb, Gavin Miller, Isabel Richter, Sohvi Nuojua, Francesca Tirotto, Julie Goodhew

ECEHH University of Exeter: Sophie Davison, Lewis Elliott, Alexander Smalley, Anastasia Voronkova.

Plymouth Marine Laboratory: Elizabeth Gabe-Thomas

A big Devon shout out to say thank you to the following:

Steering committee
- Dr Adina Dimitru, University of A Coruna, Spain
- Professor Ricardo Garcia Mira, University of A Coruna, Spain
- Professor Terry Hartig, Uppsala University, Sweden
- Professor Wesley Schultz, California State University, USA
- Professor Linda Steg, University of Groningen, The Netherlands
Scientific committee

- Cecilia Bergstad, University of Gothenburg, Sweden
- Marino Bonaiuto, Sapienza University of Rome, Italy
- Christine Boomsma, Leiden University, Netherlands
- Giuseppe Carrus, Sapienza University of Rome, Italy
- Tony Craig, The James Hutton Institute, United Kingdom
- Lewis Elliott, ECEHH, University of Exeter
- Pablo Olivos, University of Castilla-La Mancha, Spain
- Sarah Payne, Herriot-Watt University, United Kingdom
- Wouter Poortinga, Cardiff University, United Kingdom
- Isabel Richter, University of Plymouth
- Karin Tanja-Dijkstra, Saxion University of Applied Sciences, Netherlands
- Kayleigh Wyles, University of Surrey, United Kingdom
CONFERENCE INFORMATION

The University of Plymouth campus is situated in the centre of the City, just a 5 minute walk from the Train Station. The city centre is a 5 minute walk from the campus and Plymouth Hoe and Barbican just a 10 – 15 minute walk.

All maps can be found in the maps section of the handbook.

Programme
This is available in different formats to cater for different preferences. The online programme is available here: https://icep2019.exordo.com/programme. The overview and detailed programme are also available for download from the conference web-site under Conference Programme: https://www.plymouth.ac.uk/schools/psychology/international-conference-on-environmental-psychology
A few printed conference books will be available at the conference desk for consultation, and screens will display each day’s programme there.

Conference Venue
The ICEP 2019 Conference will be taking place in the Roland Levinsky Building which is situated at the heart of our main campus. All delegates will be required to register on the Ground Floor of the Roland Levinsky Building to collect their conference information on arrival. All conference sessions will take place in the Roland Levinsky Building.

Registration and Information Desk
Located on the Ground Floor of the Roland Levinsky Building, the Registration and Information Desk will be open throughout the conference from 08:30 – 17:30 daily. Members of the University of Plymouth Events Team will be on hand to assist with information about the conference and general information about Plymouth throughout the event.

Student helpers wearing ICEP t-shirts will be available to help with directions, programme and poster questions, audio-visual, computer and room issues.

Campus Wi-Fi
Visitors to the conference can enjoy free unlimited internet access across the campus. Simply select “Guest Wifi UoP” on your Wi-Fi enabled laptop, tablet or phone to enable you to access whilst on main campus. Some delegates may be able to access the internet via their Eduroam account.

Scientific Session Protocol: Recording and social media
It is generally accepted to photograph aspects of presentations for own personal use (similar to taking notes). However, please check with the authors if you are planning to share content via social media or in any other way, and watch out for no twitter signs on slides. This applies especially where authors are presenting unpublished data because it could undermine their chances of publishing the work. Please also ask authors if you wish to audio or video record any of the information presented during oral sessions or on posters.
Having said this, we are very keen to have a conversation on social media using #icep2019 and our tag @icep2019. Please share your own thoughts, observations and comments there with the ICEP community, and post snapshots of the conference as long as the authors agree to it.

**Oral Presentations and IT requirements**

Due to the high number of submissions we have had to (unfortunately) limit speakers to just **15 minutes, including questions**. Timings will be controlled by the session chairs that are named in the programme (usually the last speaker in the session – unless a pre-arranged symposium has already identified a chair).

All University of Plymouth classrooms and lecture theatres are equipped with Windows 7, running office 2010 including PowerPoint, data projectors with a VGA connection, power point clickers and full internet access, the lecture theatres are also equipped with lectern and roving/lapel microphones. If you wish to use your own laptop or MAC please ensure you have agreed this with the organising committee prior to the conference, as some devices including MAC’s can be problematic when connecting in the classrooms.

**Please report to the Registration and Information desk with your presentation on a USB memory stick as soon as possible** where a member of staff will take a copy of your presentation and pre-load this onto the computer in your presentation room ahead of your session.

**Poster Presentations**

On arrival please bring your poster to the Registration and Information desk, where you will be provided with poster board fixings to mount your posters on their designated numbered board, which will be displayed throughout the conference in the Crosspoint area on the ground floor of the Roland Levinsky Building.

Posters should be on display for the duration of the conference, and presenters will be required to stand by their posters during the allocated poster session on **Wednesday 4th September between 15:00-16:00**. There will also be the opportunity to look around the posters and talk to presenters during all tea, coffee and lunch breaks as they will take place in the same location.

**All poster boards can mount A1 landscape and A0 portrait poster only**; please adhere to these sizes when printing your posters as any larger sizes will not fit on the boards.

**Refreshments**

To enhance networking opportunities, drinks, snacks and buffet lunches will be provided on the ground floor of the Roland Levinsky Building on each day of the conference. Seating is available in the café area located on the first floor of the building. Additional café facilities are available on campus.
Access
There are toilets and disabled toilets located on each floor of the building. Lifts and staircases are available to all floors and Roland Levinsky Building Lecture Theatres all have wheelchair access.

Fire exits are through the main entrances/exits to the building. There are also a number of emergency exits on the ground floor, please follow the green and white signs to the nearest exit in the event of a fire alarm sounding.

The fire rendezvous points for the Roland Levinsky Building are as follows: for the WEST side of the building – congregate at Smeaton Building east end (facing Scott Building). For the EAST side of the building – congregate at LINK South West End. People with disabilities should, if possible, exit to the North side of the building in order to avoid the steps.

Smoking is prohibited in all common use areas such as classrooms, laboratories, offices and lecture theatres. Smoking areas are located outside all buildings. It is prohibited to smoke within 5 metres of a building.

All security personnel are trained first aiders; please contact the registration/information desk in the first instance if you require assistance.

Health and Safety Information
If you have an emergency and need to contact someone during the conference, here are some useful numbers:
University of Plymouth Main Reception: 01752 588444
First Aid & Lost property (Security): 01752 588400
On-site Pharmacy (Boots): 01752 224503

Photography
There will be instances throughout the conference when the University of Plymouth official photographers will be taking pictures for PR and marketing purposes including the IAAP and ICEP websites. In some instances you may have been asked in advance for your permission, and in others you may be asked on the day. If you do not wish to appear in any photographs please make this known to the photographer or the conference organisers.

Cash Machine
There is a free to use ATM situated just outside the Roland Levinsky Building, which is available 24 hours a day. In addition there is a Santander Branch in the Smeaton Building.

Car Parking
At the University of Plymouth, we are serious about sustainability. In line with our green travel plan, we encourage people to find alternatives to using cars (unless it is essential due to mobility issues). Parking on campus is highly restricted.

If you are a blue badge holder we will endeavour to offer parking at all times, please let the Registration and Information Desk know on arrival.
There are plenty of car parks in the city centre within walking distance of the University. A full list and maps are available from the Plymouth City Council website. The nearest are Plymouth Train Station, Mayflower House Court, Mayflower Street East and Regent Street. Your hotel may offer parking at a reduced rate, please ask your individual accommodation provider for further information.

**Local Transport**

Plymouth is a compact city and therefore easy to walk to various destinations during your stay. Hackney Carriage Taxis are available at the Train Station and around the City Centre and local buses are frequent. Please ask at the Registration and Information Desk if you require further information about buses, taxis or the Plymouth Park & Ride service.

- Need-A-Cab 44 (0)1752 666222
- Towercabs 44 (0) 1752 252525
The International Association of Applied Psychology (IAAP) or Association Internationale de Psychologie Appliquée (AIPA) is the oldest international association of psychologists, founded in 1920. We thank the Executive Committee and the staff at the Operations Center of the International Association of Applied Psychology (https://iaapsy.org/) for the generous support they provided for ICEP 2019.

Deutsche Gesellschaft fuer Psychologie (DGPs) Fachgruppe Umweltpsychologie

The Environmental Psychology Section of the German Psychological Society used to run this conference under its previous name BCEP before it was handed over to IAAP. This group still sponsors the C. F. Graumann Lecture as the opening keynote address and we thank the Fachgruppe for nominating the speaker and supporting this keynote.

Sustainable Earth Institute

The Sustainable Earth Institute (SEI) is about promoting a new way of thinking about the future of our world. SEI brings researchers together with businesses, community groups and individuals to develop cutting-edge research and innovative approaches that build resilience to global challenges. It links diverse research areas across the University including science, engineering, arts, humanities, health and business. If you’re an academic looking for a connection to industry, an organisation looking for academic research support or an individual who is inspired to work towards a sustainable future then contact SEI to find out
how they can help. The SEI vision is to celebrate and recognise our complex, dynamic, and unique world - after all, good planets are hard to find.

We thank the Sustainable Earth Institute for sponsoring the energy-related stream of contributions at ICEP2019.

**Marine Institute**

Representing 3000 staff, researchers and students, the University of Plymouth's Marine Institute (MI) is the first and largest such institute in the UK. MI provides the external portal to an extensive pool of world-leading experts and state-of-the-art facilities, enabling the investigation of the relationship between the way we live, the seas that surround us and the development of sustainable policy solutions. MI is integrating our multidisciplinary expertise in marine and maritime research, education and innovation to train new scientists, engineers, policy-makers, artists, technicians and business managers of the future. The staff represented by the Marine Institute are housed within four University faculties (science and engineering, arts and humanities, business, health and human sciences) and form the broadest portfolio of marine expertise within a single institute in Europe.

We thank the Marine Institute for sponsoring the marine-related stream of contributions at ICEP2019.

**Palgrave**

Palgrave publishes award-winning research which changes the world across the humanities, social sciences and business for academics, professionals and librarians. We offer authors and readers the very best in academic content whilst also supporting the community with innovative new formats and tools. With offices in London, New York and Shanghai, and sales teams across 50 countries, we have a global reach. As part of Springer Nature, we are proud to uphold an unbroken tradition of over 170 years of academic publishing.

We thank Palgrave for their sponsorship.
Elsevier

Elsevier Early Career Poster Prize, sponsored by the Journal of Environmental Psychology
The Journal of Environmental Psychology, published by Elsevier, is proud to sponsor the Early Career Poster Prize at ICEP, Plymouth 2019.

We thank Elsevier for their sponsorship.
PRIZES

Elsevier Early Career Research Poster Prize

We are honoured to announce this year’s young researcher poster award, sponsored by the Journal of Environmental Psychology, published by Elsevier.

The total prize sum is £250 and £50 will be awarded to the five best contributions.

Early career researchers are defined as no more senior than 5 years from PhD award. **If you want to enter this competition please pick up the ECR visual from the conference desk and fix it in the top right hand corner of your poster board.** Posters submitted by will be evaluated according to the following criteria:

- Quality of research presented (novelty, rigour, methods)
- Structure and clarity (ease of understanding)
- Use of figures, pictures and other visuals
- Creativity and design (attractiveness)
- Potential to evoke discussion (the little extra, e.g. critical evaluation, theoretical advance)

To achieve a high level of objectivity, the posters will be evaluated by an independent poster evaluation committee consisting of representatives from a variety of universities, fields of research and career stages. Contact Isabel Richter (isabel.richter@plymouth.ac.uk) for queries. We are looking forward to an exciting poster session on Wednesday afternoon.

Photo competition (creative & fun)

Can just one image embrace your ICEP talk or poster? Whether it's connectedness to nature, citizen science or pro-environmental behaviour, the #ICEP2019 photo competition will put your creativity to the test! We want ICEP delegates to capture and submit images which embody their presentation at the conference, with prizes on offer for those which exhibit the most imagination, artistic flare, and humour. Pictures can be candid or choreographed and need to incorporate a relevant Plymouth scene.

And this for the small print:

- **Submissions will be judged according to how well they depict their chosen subject, and prizes will be awarded for three categories: most creative image; most artistic image; funniest image.**
- **The judging committee is a group of early career researchers at the European Centre for Environment and Human Health.**
- **Photos should be entered via email to Alexander Smalley A.J.Smalley@exeter.ac.uk with a short description of the project being depicted and location of the photo.**
- **Only one image is allowed per participant**
- **The image needs to include a relevant Plymouth scene (this can be outdoors, e.g., natural or built environment, or indoors, e.g., on campus)**
- **The image also needs to include the ICEP2019 logo in some way, e.g., by including the conference bag or showing it on your phone or similar.**
- **The competition is open to all, whether you’re a junior, mid-career or senior researcher, and it’s open to any topic**
- **The competition closes on Thursday noon (12:00) with prize giving at the conference dinner on Thursday evening (or we’ll find you on Friday if you can’t attend the conference dinner).**
CONFERENCE SUSTAINABILITY

Every care has been taken to ensure that ICEP 2019 is as sustainable as possible. From sourcing products with clear green credentials to ensuring that the majority of the food and drink on offer is both vegetarian and local.

Here are some of the measures we have taken to reduce our environmental footprint:

- **Name Badges** – both made from recycled materials and are recyclable. In order to make sure the badges will enter the correct recycling circuit, you are welcome to return them to the reception desk before you leave the conference.
- **Lanyards** – made from recycled drink bottles.
- **Conference bags** – made from natural unbleached cotton, please feel free to reuse them beyond the conference.
- **Notebooks** – made from rigid recycled 1000gsm kraft paper.
- **Pens** - made from certified sustainable timber from sustainably managed forests
- **“Bee Bombs”** – hand made in nearby Dorset, Bee Bombs are a mix of 18 British wildflower seeds, fine, sifted soil and locally sourced clay. The seeds are native species and designated by the Royal Horticultural Society as "Perfect for Pollinators". The Bee Bombs just need to be scattered onto cleared ground to create a wildflower meadow that will #bringthebeesback.
- **Conference handbook** – only digital copies of the handbook are available to delegates in order to limit printing.
- **Taste of the West** – where possible the food and drink on offer during this event is vegetarian and sourced locally within the South West. Delegates will receive a glass to use on the evening, to take home and reuse.
- **Refill Stations** – tap water in the UK is perfectly drinkable and we would like to encourage you to refill your water bottles at the refill locations below.
CATERING

UCSP provide local, sustainable and ethically sourced food. We choose to invest in our local South West producers and contribute to city wide initiatives to alleviate the lack of access of health food in the city by providing community access to our sustainable cafes and supporting small scale producers. We have been awarded the following accreditations:-

- Sustainable Restaurant Association Gold 3-star rating
- Green Gown Award, winning the Food and Drink category
- Are ISO14001 accredited
- 60% of all food and drink is sourced from South West suppliers

These accreditations have been achieved by ensuring:-
- We source from Plymouth markets, caught by crews attached to the Responsible Fisherman’s scheme
- All eggs are free range
- All milk is locally sourced
- A combination of food composting and food bank donations have contributed to a reduction in food waste
- Removed single use plastic bottled water from Hospitality only providing glass bottles or tap water in jugs / glass bottles.
- No plastic straws in use across Hospitality or any catering outlets
SOCIAL PROGRAMME

Tuesday 3rd September 18:00 – 20:00
Welcome Reception – Roland Levinsky Building

All delegates are invited to a drinks reception in the Roland Levinsky Building the evening before the conference programme starts, giving the opportunity to network and familiarise themselves with the conference venue. During this time the Registration and Information desk will be open should delegates wish to collect their name badge and conference pack. Following this we encourage people to make their own way down to the Barbican to visit one of the many restaurants in the area.

Wednesday 4th September 19:00 – 22:00
Ice-Breaker Reception – National Marine Aquarium

Taking place at the National Marine Aquarium, guests will have the opportunity to taste and sample a range of food and drink local to the South West, whilst listening to Devon’s own The Exmouth Shanty Men

The NMA is the largest public aquarium in the UK. The awe-inspiring exhibits, featuring marine animals from near and far, provide an environment that intrigues, inspires and motivates visitors to engage with their conservation messages. Pick up your glass and meander your way through Plymouth Sound, the Atlantic Ocean and the Great Barrier Reef exhibits and enjoy the delights of local West Country beers, ciders, wines and food.
Thursday 5th September – 19:30 – 23:00
Conference Dinner – Crowne Plaza hotel

Situated close to Plymouhts historic Hoe area, the Crowne Plaza hotel has some of the best views across Plymouth sound, the city and also reaching out to Dartmoor. For delegates who have pre-booked a conference package inclusive of the conference dinner, will be welcomed with a glass of bubbly on arrival, followed by a three-course dinner which will be served in the Mariners Suite on the ground floor of the hotel. Situated adjacent to the dinner room is a paid bar exclusively for the ICEP dinner guests. Be sure to bring your dancing shoes for our after dinner Ceilidh.
PLYMOUTH: BRITAIN’S OCEAN CITY
KEYNOTE SPEAKERS

Simon Bell, PhD

Simon Bell, PhD, is chair professor of the Chair of Landscape Architecture at the Estonian University of Life Sciences (Tartu, Estonia as well as Associate Director of the OPENspace Research Centre at the University of Edinburgh).

Professor Bell was originally a forester (BSc, Forestry, University of Wales) who took a master degree (University of Edinburgh), and PhD in landscape architecture (Estonian University of Life Sciences).

His main research interests are people and the changing landscape, especially perception, role in national identity and public participatory planning, outdoor recreation planning and design, Inclusive access design and management, especially in rural and countryside area, forestry landscape design, Soviet landscape heritage and identity.

Research and practice led him to projects in the Baltic States and thus to Estonia where he has been teaching and researching since 2005, taking over as head of department in 2009 and has been involved in a wide range of international projects.

Gisela Böhm

Gisela Böhm is full professor for psychometrics and research methods at the University of Bergen (UiB), Norway, and adjunct professor in environmental psychology at Inland Norway University of Applied Sciences (INN, Lillehammer).

She is a member of the research groups ‘Decision, Intuition, Consciousness, and Emotion (DICE)’ at UiB and the environmental psychology group at INN. She is co-coordinator (with Endre Tvinnereim, UiB) of the ‘Climate and Energy’ module of the Norwegian Citizen Panel, an online survey panel at UiB. Her main research interests are risk perception and decision making in the context of environmental risks such as climate change, with a focus on the interplay between risk, morality, and emotion in responses to such risks.

A further emphasis is on research methodology with a focus on survey construction, experimental design, and multivariate analysis.
Susan Clayton PhD

Susan Clayton PhD, is the Whitmore-Williams Professor of Psychology and department chair at the College of Wooster, US.

Susan is a Conservation Psychologist who is interested in understanding and promoting a healthy relationship between humans and nature. Her interest in identity has led her to develop an Environmental Identity (EID) Scale to assess the degree to which the natural environment plays an important part in the way in which people think about themselves.

She has an applied interest in the psychology of justice, and the environmental challenges that present an important context for examining perceptions of justice. Currently, she investigates the impacts of climate change for psychological wellbeing, along with conducting research in zoos to investigate the ways in which environmental concern is constructed within a social context.

She is a past president of the Society for the Psychological Study of Social Issues, and is a Fellow of the American Psychological Association, the Society for Environmental, Population and Conservation Psychology, the Society for Personality and Social Psychology, and the Society for the Psychological Study of Social Issues.

Susan has written over 60 books, chapters, and articles including papers in the Journal of Environmental Psychology, the Journal of Social Issues, and the Journal of Applied Social Psychology.

She will be a lead author on the next assessment report from the Intergovernmental Panel on Climate Change.

Katrin Rehdanz

Katrin Rehdanz studied economics at the University of Hamburg, earning her doctorate in 2004. In 2007, she was offered a position as assistant professor within the Cluster of Excellence ‘Future Ocean’. Until 2012 she was leading the young researcher group ‘Valuing the Ocean’ within the Cluster.

Since 2016 she is managing director or the Department of Environmental, Resource and Spatial Economics and professor for environmental and energy economics. Katrin has a wide array of research interests revolving around the issue of ensuring sustainable well-being.

Her particular interests lie in the field of quantitative analysis using spatial explicit information and the valuation of non-market benefits and costs. She has published various articles in international journals and has been the principal investigator of a number of international and national third-party funded projects.
Dr Jiaying Zhao

Dr Jiaying Zhao, Assistant Professor and Canada Research Chair in the Department of Psychology and the Institute for Resources, Environment and Sustainability at the University of British Columbia.

She is the principal investigator at the Behavioural Sustainability Lab at the University of British Columbia, where they use cognitive principles to design behavioural solutions to address sustainability challenges.

Dr Zhao is currently investigating the cognitive causes and consequences of scarcity, what behavioural interventions to promote recycling and composting rates, what cognitive, motivational, and sociocultural factors shape the perception of climate change, and how to engage the public on biodiversity conservation. She has published over 40 journal articles including papers in Science, Psychological Science, Environmental Research Letters, Biological Conservation, Waste Management, Journal of Environmental Management, and Journal of Environmental Psychology.
DETAILED PROGRAMME

Titles & Authors, including symposium abstracts in chronological order (for other abstracts, see Book of Abstracts)

Wednesday 4th September 2019 | 08:30 – 17:30 | Atrium
Registration
The Conference Desk will be open every day between 8:30 and 17:30 for registration and queries.

Wednesday 4th September 2019 | 09:00 – 09:15 | Lecture Theatre 1
Welcome
Prof Judith Petts CBE (Vice-Chancellor University of Plymouth)
Prof Terry Hartig (President IAAP - Division 4)
Chaired by Prof Sabine Pahl & Dr Mat White (ICEP 2019 Hosts)

Wednesday 4th September 2019 | 09:15 – 10:00 | Lecture Theatre 1
Keynote 1: Prof Gisela Boehm, The emotional side of risk – a dual process model of environmental behaviour (DGPs C. F. Graumann Lecture)
Chair: Gerhard Reese

The psychological literature increasingly acknowledges the importance of emotions in shaping judgments and behaviours. This talk argues that emotions are not homogeneous; different emotions exert their influence in different ways. The main assumption is that the type of emotion that a person experiences indicates how the person evaluates a risky situation and which behavioural impulses the person is likely to experience. For example, hope and fear both indicate that a person focuses on potential future consequences. Behavioural responses resulting from hope or fear include mitigation, adaptation, and escape. In contrast, outrage and guilt are based on moral evaluations. Behaviours following from outrage or guilt include punishment and compensation. I will present a model that explains emotions from people’s underlying mental models and from a dual judgmental process operating on these mental models. The dual process contrasts consequence-focused with morality-focused evaluations that trigger different kinds of specific emotions and corresponding behavioural tendencies. I will present empirical evidence concerning the model, with a focus on studies on climate change. The results show that specific emotions and their underlying appraisals matter when explaining environmental behaviour, and that the question of whether emotions are rational or not is misguided.

Wednesday 4th September 2019 | 10:00 – 10:30 | Atrium
Tea/Coffee Break
Restorative potential of natural environments is lower for individuals who are professionally engaged with nature than for those who are not, nature’s beneficial effects of nature are more pronounced for depressed than for healthy individuals, and restorative outcomes of nature may run through different psychological pathways for children than for adults. In short: person factors matter for the both the course of restoration and the outcomes of restorative encounters with nature. This symposium aims to compose an overview of person factors that influence restoration outcomes, to improve knowledge on restorative outcomes as well as to advance restoration theory. The symposium will start with topics related to individual differences; the role of maladaptive thoughts in restoration outcomes will be discussed (presentation 1), as well as a more general outlook on the role of person factors on perceived restoration in the Global South (presentation 2). The symposium will end with looking at nature across the lifespan, looking at differential preferences for green space among the elderly (presentation 3) and differential effects of nature on children versus adults (presentation 4), a topic that will be continued in the second part of the symposium. Time is also allocated to an elaborate discussion after all four presentations have been presented.

001 Nature, stress recovery, and (mal)adaptive thoughts
Daphne Meuwese¹, Karin Tanja-Dijkstra², Jolanda Maas¹, Sander L Koole¹ (1. Vrije Universiteit Amsterdam, 2. Saxion University of Applied Sciences)

002 Tales from the Global South: people-related factors influencing restoration in urban parks of a megacity.
Jessica Felappi¹, Jan Sommer¹, Wiltrud Terlau³, Theo Kötter¹ (1. University of Bonn, 2. Bonn-Rhein-Sieg University of Applied Sciences)

003 Choosing a walk in nature or downtown? A mixed-methods study of cognitive and sensory preferences of outdoor places for walking in older age
Marica Cassarino¹, Eleanor Bantry-White², Annalisa Setti² (1. University of Limerick, 2. University College Cork)

004 Growing up: Naturally Happy? The benefits of nature for children.
Femke Beute¹, Agnes van den Berg¹ (1. University of Groningen)

005 Restorative effects in differently managed forests - A field experiment
Jenni Simkin¹, Ann Ojala¹, Liisa Tyrväinen¹ (1. Natural Resources Institute Finland)
Plastic is ubiquitous in modern society. While simplifying our daily lives, it places a tremendous burden on the environment. Understanding how society perceives plastic pollution is integral to effective management, communication and behaviour change. This symposium brings together (partly transdisciplinary) research on perception of plastic pollution, potential solution strategies, and related behavioural intentions. First, JS will present results of a qualitative expert survey in Germany and discuss the stakeholders’ problem perceptions and their views on agency and solution strategies. EGT will follow by presenting data on perceptions of the impact that plastic pollution is having on marine ecosystems in Svalbard, Norway. Her results emphasize the relevance of risk perception for behavioural intentions to reduce pollution. Next, IR will discuss an initiative to make Semporna, Malaysia, plastic free. She will present findings on citizens’ perception of plastic pollution and of the different intervention activities and perceived behavioural barriers and intentions. Focusing on microplastics pollution, NC will talk about the relevance of locality and discuss research on the interacting effect of perceived locality of the consequences (regional versus global) and collective identification on behavioural intentions. The panel will end with an audience discussion on theoretical and practical implications and future research directions.

006 Expert Views on Agents and Approaches to Plastic as a Systemic Risk – Results of an Expert Survey in Germany
Julia Steinhorst¹, Katharina Beyerl¹ (1. Institute for Advanced Sustainability Studies (IASS) Potsdam)

007 Perceptions of Arctic marine ecosystems and the impact of marine plastic pollution
Elizabeth Gabe-Thomas¹, Kayleigh Wyles², Nicola Beaumont¹ (1. Plymouth Marine Laboratory, 2. University of Surrey)

008 From Fascination to Conservation: Can marine wildlife tourism trigger responsible handling of plastic?
Isabel Richter¹, David Glassom² (1. University of Plymouth, 2. University of KwaZulu-Natal)

009 Polluting our region or our world? Perceived local versus global consequences of microplastics pollution, local versus global identification and intention to reduce microplastics
Nadja Contzen¹, Lise Jans¹, Russell Spears¹ (1. University of Groningen)

010 Plastic or non-plastic food packaging? An investigation of explicit and implicit attitudes to consumer adoption
Nicole Koenig-Lewis¹, Adrian Palmer², Laura Grazzini³ (1. Cardiff University, 2. Henley Business School, Reading University, 3. University of Florence)
Wednesday 4th September 2019 | 10:30 – 12:00 | Levinsky Room
Climate change and transition; transformation (Session 1)
Chair: Pettifor

011 The role of trust for climate change mitigation and adaptation behaviour: A meta-analysis
Viktoria Cologna¹, Michael Siegrist¹ (1. ETH Zürich, Institute for Environmental Decisions)

012 How do people spend money they save by behaving pro-environmentally? An experimental test of the indirect rebound effect.
Lieke Dreijerink¹, Michel Handgraaf¹, Gerrit Antonides¹ (1. Wageningen University & Research)

013 Why do people participate in grassroots-based sustainability initiatives? Diverging predictor patterns for users and volunteers
Stephanie Moser¹, Stephan Schmidt¹, Christoph Bader¹ (1. University of Bern)

014 Can high levels of attitude explain political activism? Examining the influence of environmental attitude and proactivity on environmental activism.
Anne K. Overbeck¹, Alexandra Kibbe¹ (1. Otto-von-Guericke University Magdeburg)

015 Appealing attributes of low carbon innovations
Hazel Pettifor¹ (1. University of East Anglia)

Wednesday 4th September 2019 | 10:30 – 12:00 | Room 206
Energy
Chair: Werner

016 EnerGAware: Factors Affecting Energy Use in Social Housing Residents and Recommendations for Energy Behaviour Change Intervention Development
Rebecca Hafner¹, Sabine Pahl¹, Rory Jones¹, Alba Fuertes¹ (1. University of Plymouth)

017 Household Energy Use and Conservation: A Preliminary Study from Turkey
Ece Akca¹, Çağlar Solak², Büşra Yılmaz³, Melek Göregenli³ (1. Ege University, 2. Manisa Celal Bayar University, 3. Independent Researcher)

018 Can energy social innovations deliver Energy equality? Preliminary findings from the SMARTeES H2020 project
Giuseppe Pelligrini-Masini¹ (1. NTNU)

019 Does more knowledge about climate change result in lower carbon footprints?
Ferdinand Kosak¹, Sven Hilbert¹, Elisabeth Franz³, Barbara Alsu¹ (1. University of Regensburg)

020 Whose, flexibility? – Analysis of Austrian end-users’ perspectives on demand-side flexibility and potential conflicts of use with their own interests
Andrea Werner¹, Kurt Leonhartsberger¹, Susanne Schidler¹, Daniel Bell¹ (1. University of Applied Sciences FH Technikum Vienna)
021 Predicting meat consumption: The role of VBN, social norms and health concern.  
Ferdinando Fornara¹, Amanda Elizabeth Lai², Francesca Tirotto³, Annapia Sessa⁴, Stefano Pagliaro⁴ (1. University of Cagliari, 2. Norwegian University of Science and Technology, 3. University of Plymouth, 4. University of Chieti-Pescara)

022 Environmentally friendly meal composition and the influence of organic labels  
Angela Funk¹, Bernadette Suetterlin¹, Michael Siegrist¹ (1. ETH Zürich, Institute for Environmental Decisions)

023 The influence of salient environmental identities on organic food consumption  
Sandor Czellar¹, Leïla Rahmani¹, Valentina Clergue¹, Christian Martin⁴ (1. University of Lausanne, 2. Maynooth University)

024 MyFoodways©: An evidence-based mobile application to promote environmental-friendly and healthy meal preparation  
Vivianne Visschers¹, Vanessa Feck¹ (1. University of Applied Sciences and Arts Northwestern Switzerland)

025 Two Birds One Stone: The Effectiveness of Health and Environmental Messages to Reduce Meat Consumption  
Emily Wolstenholme¹, Wouter Poortinga¹, Lorraine Whitmarsh¹ (1. Cardiff University School of Psychology)

Individual and collective adaptation to environmental risks: The role of person-place relationships  
Chair: Ariccio  
Symposium convened by Silvia Ariccio and Marino Bonaiuto

Adaptation is a very important step for resilience and environmental risk reduction and psychological variables can be pivotal (van Valkengoed & Steg, 2019). This symposium discusses how person-place bonds affect adaptation, considering different places and aspects of the environmental risk issue. An international survey conducted by Quinn et al. demonstrates that sense of place importance for human adaptation depends on both place scale and kind of risk. Aiming to deepen how person-place bonds can be of different quality and not also of different intensity, Stancu et al. show how each residential place attachment style leads to specific flood coping behaviours. Lema-Blanco et al., instead, focuses on evacuation site choice and on motivations for attachment to it, finding that people preferably evacuate to places they feel attached to and that fulfill their basic psychological needs. Institutional solutions are sometimes proposed in order to increase adaptation, e.g., infrastructures and policies. Bertoldo et al. show how their acceptance depends on community shared meanings and informal knowledge, with a relevant role of factors such as local identity, previous experience, and trust. Catellani et al., instead, show how
communication framing and person-place bonds may affect the support for new place-protective policies.

026 How senses of place shape perceptions of social, environmental and overdevelopment risk
Tara Quinn¹, Francois Bousquet², Chloe Guerbois³ (1. University of Exeter, 2. CIRAD, Green Research Unit, 3. Nelson Mandela University)

027 The effects of place attachment style on flood risk adaptive behaviours
Alexandra Stancu¹, Silvia Ariccio², Marino Bonaiuto² (1. West University of Timisoara, 2. Sapienza University of Rome)

028 Place attachment needs as basic psychological needs: Their manipulation and effects on behaviours coping with natural environmental hazard
Isabel Lema Blanco¹, Silvia Ariccio², Marino Bonaiuto² (1. University of A Coruna, 2. Sapienza University of Rome)

029 Local science-society relations: the legitimacy of coastal flood risk information
Raquel Bertoldo¹, Séverin Guignard¹, P Dias¹, Alexandra Shleyer-Lindenmann¹ (1. Aix-Marseille Université)

030 Worth the risk? Message framing, place identity, and the evaluation of the economic consequences of environmental policies
Patriza Catellani¹, Mauro Bertolotti¹ (1. Catholic University of Milan)

Wednesday 4th September 2019 | 10:30 – 12:00 | Room 304
Evaluation of citizen participation: criteria, challenges, and publication (Session 1)
Chair: Hofmann
Symposium convened by Mathias Hofmann, Philipp Rollin, and Sebastian Bamberg

Citizen participation has become a mainstream tool in many modern societies to aid public decision-making (e.g., in urban planning), but also for involving large numbers of citizen in scientific endeavours (citizen science). While guidelines for conducting ‘good’ participation processes exist, they seldom fit perfectly: Particular circumstances make nearly every participation process unique. Hence, it is imperative to systematically evaluate each participation process -- in order to continuously ensure and improve quality during its course (formative evaluation), but also to solidify the conceptual basis for future similar processes (summative evaluation).

In this symposium we want to discuss theoretical and empirical contributions relating to:

• relevant evaluation criteria and their conceptual basis
• evaluation methods (experiences with different evaluation approaches, frameworks, or individual methods)
• current challenges arising from societal and/or technological developments
• best practice examples for different types of participation
• standards for the publication of evaluation results
031 Participation - a stepping stone for societies, a stumbling block for methodologies
Anke Bloebaum¹, Karen Krause¹, Stefanie Baasch³ (1. Otto-von-Guericke University Magdeburg, 2. University of Bremen)

032 A theoretical framework for the evaluation of massive digital participation systems in urban planning
Mathias Hofmann¹ (1. Technische Universität Dresden)

033 Procedural fairness as an evaluative yardstick of public acceptance: A case study of multiple stepwise participatory programs for developing a master plan for environment Sapporo Japan
Susumu Ohnuma¹, Miki Yokoyama¹, Shogo Mizutori¹ (1. Hokkaido University)

034 Nudgeathon for Encouraging Pro-Environmental Behaviour
Alina Mia Udall¹, Daniel Read², Umar Taj² (1. NTNU, 2. University of Warwick)

Wednesday 4th September 2019 | 12:00 – 12:45 | Lecture Theatre 1
Keynote 2: Prof Jiaying Zhao, How can behaviour science contribute to sustainability?
Chair: Sabine Pahl

A significant environmental challenge is that despite recent technological advancement, many sustainability programs and policies still lack a thorough understanding of human behaviour. Thus, there is an immense space in which behaviour science can contribute to the successful transition into a more sustainable world. In this talk, I demonstrate how psychological insights can be used to design behavioural solutions to address sustainability challenges. In a series of lab and field experiments, I designed and tested behavioural interventions motivated by the EAST framework (easy, attractive, social, and timely) to reduce water consumption, increase recycling and composting rates, and encourage public actions on climate change. These findings not only provide new insights on how psychology can contribute to sustainability, but also help inform the design and implementation of environmental policy.

Wednesday 4th September 2019 | 12:45 – 13:45 | Atrium
Lunch

Wednesday 4th September 2019 | 13:45 – 15:15 | Lecture Theatre 2
Restorative environments: Person factors and new perspectives on theory (Session 2)
Chair: Gatersleben
Symposium convened by Femke Beute and Eleanor Ratcliffe

Attention restoration theory (ART) and stress reduction theory (SRT) are consistently presented alongside findings regarding restorative environments. However, momentum is now growing to critically evaluate, develop, and offer alternatives to these two theories. This symposium builds on material covered in the preceding ‘person factors’ session. It uses that understanding to offer new perspectives on restorative environments theory that may explain not just if, but how, where, and for whom, certain environments can promote
restoration. First, Matt Stevenson focuses on attention restoration in the context of cognitive development in children. Second, Simone Grassini offers a critique of the construct of ‘fascination’ within attention restoration theory. Third, Birgitta Gatersleben and colleagues discuss how boredom may be implicated in experiences of built and natural environments. Fourth, Anna Bornioli and Mikel Subiza-Pérez propose a framework for examining restoration in built settings. We will reserve time at the end of the session for constructive discussion on how to progress these new avenues of theoretical inquiry.

Matthew Stevenson\(^1\) (1. Health Promotion Research, Steno Diabetes Center Copenhagen)

036 Behind the ART: the problem with the "effortless" soft fascination
Simone Grassini\(^2\) (1. NTNU)

037 Stress and boredom in nature and cities
Birgitta Gatersleben\(^1\), Isabelle Griffin\(^1\), Andrew Steele\(^1\) (1. University of Surrey)

038 Building the case for urban restoration: a step forward along an overlooked line of inquiry
Anna Bornioli\(^1\), Mikel Subiza-Pérez\(^2\) (1. University of the West of England, 2. BIODONOSTIA Health Research Institute)

039 Assessing the impact of small-scale interventions on the use of waterside areas: A case study in Plymouth, UK
Himansu Sekhar Mishra\(^1\), Simon Bell\(^1\), Peeter Vassilijev\(^1\) (1. Estonian University of Life Sciences)

Wednesday 4th September 2019 | 13:45 – 15:15 | Jill Craigie
Plastic pollution II: behavioural solutions to reduce plastic waste
Chair: Geiger
Symposium convened by Danny Taufik, Josefine Geiger, and Kayleigh Wyles

As a result of millions of tonnes of plastic waste being produced annually, our oceans and beaches are often a victim of this plastic pollution. A key question to address is how behavioural solutions can be developed which stimulates behaviour to reduce plastic waste. This symposium will discuss several potential behavioural solutions, from decreasing plastic consumption, to recycling behaviours and the role of public citizenship. First, Lea Heidbreder will present how a “window of opportunity” in the form of a fasting period can open people up for new experiences and decrease their plastic consumption. Silvia Ariccio will present how incorporating biospheric values into the design of disposable items can affect consumers’ pro-environmental intentions such as recycling. Josefine Geiger will present research on the relation between biospheric values and the perceived costliness of recycling and how this affects whether people will recycle. Danny Taufik will discuss how consumers view different types of bio-based plastic packages, and how packaging labels affect whether consumers recycle or compost the packaging. Concluding the session, Kayleigh Wyles will discuss a citizen science initiative to clean up litter on beaches, examining the impact this has on volunteers’ experiences and if this affects other plastic-related behaviours.
040 Fasting plastic – Two intervention studies to break habits of plastic consumption
Lea Marie Heidbreder¹, Manfred Schmitt¹ (1. University Koblenz-Landau)

041 Marketing for the future: claims and design can trigger consumption and pro-environmental behaviours
Silvia Ariccio², Marino Bonaiuto¹ (1. Sapienza University of Rome)

042 The paradox between the environmental appeal of bio-based plastic packages for consumers and their disposal behaviour
Danny Taufik¹, Machiel Reinders², Karin Molenveld², Marleen Onwezen² (1. Wageningen University & Research, 2. University of Groningen)

043 Good for the environment, but what about the volunteers? A multi-year examination of the impacts citizen science beach cleans have for the volunteers
Kayleigh Wyles¹, Sabine Pahl², Lauren Eyles³ (1. University of Surrey, 2. University of Plymouth, 3. Marine Conservation Trust)

044 The influence of biospheric values and perceived costliness on recycling
Josefine Geiger¹, Ellen van der Werff¹, Berfu Ünal¹, Linda Steg¹ (1. University of Groningen)

Wednesday 4th September 2019 | 13:45 – 15:15 | Levinsky Room
Climate change and transition; transformation (Session 2)
Chair: Muinos

045 A change would do you good! The impact of non-normative labelling of climate change on pro-environmental behaviour intentions
Christopher Jones¹, Lorraine Whitmarsh² (1. University of Surrey, 2. Cardiff University)

046 Nature in Your Face: Disruptive Communication to Trigger Societal Transitions
Erica Lofstrom¹, Christian Klöckner¹ (1. Norwegian University of Science and Technology)

047 Sustainability in a neighbourhood community: A qualitative research study on different stakeholder perceptions of participation possibilities within a selected neighbourhood in a German City
Ann-Katrin Knemeyer¹, Petra Schweizer-Ries² (1. Saarland University, 2. University of Applied Sciences Bochum)

048 Adolescents’ Perceptions of the Psychological Distance to Climate Change, Its Relevance for Building Concern about It, and the Potential for Education
Moritz Gubler³, Adrian Bruegger², Marc Eyer³ (1. University of Teacher Education Berne & University of Berne, 2. University of Berne, 3. University of Teacher Education Berne)

049 Green and protective backyards: predicting adaptive behaviors
Gabriel Muinos¹, Linda Steg¹ (1. University of Groningen)
In order to tackle environmental problems caused by climate change, a transition to more sustainable energy production is needed. Public acceptability is key for successful implementation of energy projects. It is therefore important to understand what drives public perceptions and acceptability of these projects. This symposium explores key theories, factors and processes related to perceptions and acceptability of a broad spectrum of energy projects, using multiple methods. Ulf Hahnel and Goda Perlaviciute will discuss the acceptability of geothermal energy and how people’s initial attitudes, values, and political ideology influence information acquisition and opinion formation regarding geothermal energy. Irene Maltagliati will present a study on how self-sufficiency and perceived responsibility explain acceptability of different hydrogen systems. Leonie Vrieling will discuss how trust in parties responsible for wind energy projects affects people’s emotions towards wind energy projects, in turn influencing acceptability of such projects. Bernadette Sütterlin will discuss to what extent risk perception and evoked affect are related to incidents caused by a fracking installation (human caused risk) versus by an earthquake (natural caused of risk). Darrick Evenson will present a study on public acceptability of fracking and how this is affected by people’s sense of place and proximity to the development.

050 The impact of initial attitudes, values, and political ideology on information processing and public acceptance of geothermal energy
Ulf Hahnel¹, Goda Perlaviciute², Kathleen Slatford², Philippe Voruz¹ (1. University of Geneva, 2. University of Groningen)

051 Acceptability of wind energy: the role of trust and emotions
Leonie Vrieling¹, Goda Perlaviciute¹, Linda Steg¹ (1. University of Groningen)

052 The effect of perceived naturalness of a cause on the evaluation of environmental hazards: The case of fracking
Bernadette Sueterlin¹, Michael Siegrist¹ (1. ETH Zürich, Institute for Environmental Decisions)

053 The role of space and place in shaping views on shale gas ‘fracking’
Darrick Evensen¹, Patrick Devine-Wright², Lorraine Whitmarsh³ (1. University of Edinburgh, 2. University of Exeter, 3. Cardiff University)

054 A review of reports from Dutch organisations on how to reduce residents’ energy use and choices for sustainable technologies at home
Marjolein Overtoom¹ (1. Delft University of Technology)
Wednesday 4th September 2019 | 13:45 – 15:15 | Room 207

Farming & land management

Chair: Johansson

055 Averting a “tragedy of the commons” in Maasai land: Exploring predictors of willingness to protect communal land among Northern Tanzanian pastoralists
Anna Rabinovich¹, Stacey Heath¹, Vladimir Zhischenko³, Francis Mkilema⁴, Aloyce Patrick⁴, Mona Nasseri⁶, Will Blake⁷, Patrick Ndakidemi⁸ (1. University of Exeter, 2. NM-AIST, 3. Schumacher College, 4. University of Plymouth)

056 Basic human values of farmers – motivation for change towards climate resilient agriculture
Jaana Sorvali¹ (1. Natural Resources Institute Finland (Luke))

057 Land managers: payments for ecosystem services, networks and social learning
Liz O’Brien¹, Bianca Ambrose-Oji² (1. Forest Research)

058 Climate change and livestock farmers’ concern of tick-born disease
Maria Johansson¹, Anders Flykt², Atle Mysterud³ (1. Lund University, 2. Mid Sweden University, 3. University of Oslo)

Wednesday 4th September 2019 | 13:45 – 15:15 | Room 303

Conservation (& valuation)

Chair: Handgraaf

059 Why do people (not) pay for nature conservation? Insights from representative surveys in Germany
Carolin Biedermann¹, Gerhard Reese² (1. Leibniz-Zentrum für Agrarlandschaftsforschung (ZALF) e.V., 2. University Koblenz-Landau)

060 Greenkeeper: an online toolkit for valuing the multiple benefits of urban green spaces
Sian de Bell¹ (1. University of Exeter, presented on behalf of the Greenkeeper project team)

061 Last chance for conservation: how travel can promote connection to nature and pro-environmental behaviour
Christy Hehir², Caroline Scarles¹, Kayleigh Wyles¹, Joseph Kantenbacher⁴ (1. University of Surrey, 2. Indiana University Bloomington)

062 Taking it home with you? - Pro-environmental Behaviour Change in a National Park Context and Spillover to a Domestic Context
Conor John¹, Lorraine Whitmarsh¹, Dimitrios Xenias¹, James Lawrence⁴ (1. Cardiff University School of Psychology, 2. Brecon Beacons National Park Authority)

063 The how and why of shorter showers: effects of construal level and real-time feedback on water and energy use
Michel Handgraaf¹, Anouk Griffioen¹, Gerrit Antonides¹ (1. Wageningen University & Research)
Evaluation of citizen participation: criteria, challenges, and publication
(Session 2)
Chair: Rollin
Symposium convened by Mathias Hofmann, Philipp Rollin, and Sebastian Bamberg

Citizen participation has become a mainstream tool in many modern societies to aid public decision-making (e.g., in urban planning), but also for involving large numbers of citizen in scientific endeavours (citizen science). While guidelines for conducting ‘good’ participation processes exist, they seldom fit perfectly: Particular circumstances make nearly every participation process unique. Hence, it is imperative to systematically evaluate each participation process -- in order to continuously ensure and improve quality during its course (formative evaluation), but also to solidify the conceptual basis for future similar processes (summative evaluation).

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- current challenges arising from societal and/or technological developments
- best practice examples for different types of participation
- standards for the publication of evaluation results

064 Evaluation of an open participatory process for socio-ecological transformation in a suburban district: challenges and perspectives
Jan Eickhoff¹, Maximilian Schmies¹, Marcel Hunecke¹ (1. University of Applied Sciences Dortmund)

065 Participation as a behaviour change instrument? Evaluation of citizen participation in climate change adaptation of four cities in Germany
Torsten Grothmann¹ (1. University of Oldenburg)

066 Evaluating Participant Engagement in an Environmental Citizen Science Project
Keren Kaplan Mintz¹ (1. Shamir Research Institute, University of Haifa)

067 Evaluation of children’s and adolescents’ participation in Education for Sustainable Development – insights into challenges and successful practices in Germany
Malte Nachreiner¹ (1. Hochschule Darmstadt)

068 Does participation in an urban living lab empower people to collectively develop sustainability solutions – and if yes, why?
Philipp Rollin¹, Sebastian Bamberg¹ (1. Bielefeld University of Applied Sciences)

Wednesday 4th September 2019 | 13:45 – 15:15 | Room 304

Wednesday 4th September 2019 | 15:15 – 17:15 | Atrium
Poster session with tea and coffee

This is the conference poster session over tea and coffee. Please see the poster abstract details between pages 230 and 261.
Please note that posters can stay up for the entire conference.
The increasing trend towards urban living has contributed to humanity largely no longer viewing itself as part of nature; with UK estimates suggesting around 74% of the population do not have a meaningful relationship with nature. Nature Connectedness, the sensation of belonging to a wider natural community is a counter to this with research providing evidence on its benefit to mental and physical health, wellbeing, and pro-nature outcomes. The construct is gaining popularity in the public consciousness, used by the media, charities and public bodies, and included in the recent 25-Year Plan for nature in the UK. The potential outcomes of connecting with the more than human world tie directly into understanding people-environment interactions, perceptions and behaviours; a component of the UN’s Sustainable Development Goals. Nature Connectedness could therefore be a driver for a happier, healthier, and sustainable future for all, even in largely urbanised societies. The symposia comprise four research talks that investigate Nature Connectedness. Research on the pathways to nature connectedness and its application is outlined before a nationwide Nature Connectedness intervention, a city-wide app-based intervention and a national survey that all demonstrate the effect on mental health, wellbeing and pro-environmental outcomes from Nature Connectedness are presented.

069 30 Days Wild: A Four-Year Review
*Miles Richardson¹ (1. The University of Derby)*

070 Nature Contact, Nature Connectedness and Associations with Health, Wellbeing and Pro-Environmental Behaviours
*Leanne Martin¹, Mat White², Anne Hunt³, Miles Richardson⁴, Sabine Pahl¹, Jim Burt³ (1. University of Plymouth, 2. University of Exeter, 3. Natural England, 4. University of Derby)*

071 The Pathways to Nature Connectedness: Applying Research in a UK Context
*Ryan Lumber¹, Miles Richardson¹, David Sheffield¹ (1. The University of Derby)*

072 A Smartphone App for Improving Wellbeing through Urban Nature
*Kirsten McEwan¹, Miles Richardson¹, David Sheffield¹, Fiona J. Ferguson⁴, Paul Brindley⁴ (1. University of Derby, 2. University of Sheffield)*

073 Perceived restorativeness of the landscapes, nature connectedness, and people’s living environments: How are they related?
*Seiji Shibata¹ (1. Sagami Women’s University)*
Many pro-environmental behaviors are heavily influenced by the context in which they are performed. In this symposium, we present research that investigates the influence of context factors on different pro-environmental behaviors, ranging from investment in new technology and participating in sharing activities to individual consumption and household behaviors. In the first talk, a discrete choice experiment determines relevant context factors that could support corporate investment in electric vehicles. The second talk takes a similar approach to determine potential supportive conditions for on-demand shuttle services as a flexible supplement of public transport. The third talk investigates car sharing-users in car sharing supportive and unsupportive contexts, and the roles of context and environmental attitude for car use reduction are discussed. The first three talks of the symposium thus relate to context factors regarding mobility infrastructure. The fourth talk shifts the focus to different contexts that individuals alternate between. It addresses the spillover of pro-environmental behavior change from work to home and discusses potential context factors influencing this spillover. The fifth talk addresses context variations that support residual waste reduction. Feedback on waste behavior is provided in different contexts, namely with or without a financial incentive to reduce waste.

074 Compete with an electric fleet — Context relevant factors and measures fostering e-car purchases in commercial fleets
Annalena Becker¹, Sebastian Bobeth², Ingo Kastner¹, Ellen Matthies¹ (1. Otto-von-Guericke University Magdeburg, 2. Otto-von-Guericke-University Magdeburg)

075 – ABSTRACT WITHDRAWN
On-demand ridesharing shuttles: a mobility service of the future?
Birgit Mack¹, Karolin Tampe-Mai² (1. Zirius, University of Stuttgart)

076 Is car sharing for environmentalists? The downside of car sharing-supportive conditions
Laura Henn¹, Florian Kaiser¹ (1. Otto-von-Guericke University Magdeburg)

077 Contextual drivers for spillover effects from a workplace dietary choice intervention to pro-environmental behaviours in the home setting
Caroline Verfürth³, Christopher Jones², Diana Gregory-Smith³, Caroline Oates³, Panayiota Alevizou¹ (1. University of Sheffield, 2. University of Surrey, 3. Newcastle University)

078 Reducing household waste
Ellen van der Werff¹ (1. University of Groningen)
Wednesday 4th September 2019 | 16:15 – 17:15 | Levinsky Room

Transitioning away from materialistic lifestyles: Pathways, potentialities, and problems.
Chair: Isham
Symposium convened by Amy Isham, Daniel Thorman, Natasha Parker, and Birgitta Gatersleben

The problematic effects of high-consumption, materialistic lifestyles on both personal and ecological well-being range from adverse impacts on mental health to catastrophic climate breakdown. In this symposium, we present research aiming to uncover ways of moving away from materialistic lifestyles, and instead promote more sustainable ways of living. This research displays a range of methodologies including surveys, qualitatively informed experiments, and longitudinal interventions by employing UK-based and international samples. Across our presentations, the variety of approaches will increase our understanding of the psychological correlates to changing behaviours relevant to materialism and consumption. These include; how situationally altering materialistic values and related levels of self-regulatory strength may be able to facilitate flow experiences; how social norm, commitment, and hypocrisy interventions may influence public acceptance of low consumption policy options and behavioural intentions; how promoting the pursuit of intrinsic goals to a predisposed materialistic cohort can lead to changes in values plus pro-environmental attitudes and behaviours; and how consumer identities predict the adoption of a range of environmentally relevant consumption behaviours. Together, the findings from these papers demonstrate that a variety of tools might be considered to support widespread behaviour change towards a society with low materialistic values and low-consumption lifestyles.

079 Promoting high-flow, sustainable lifestyles: Why are materialistic values problematic?
Amy Isham¹ (1. Centre for the Understanding of Sustainable Prosperity, University of Surrey.)

080 Public acceptance of low-consumption policy measures and behaviours: Comparing the efficacy of social norm, commitment, and hypocrisy interventions.
Daniel Thorman¹, Lorraine Whitmarsh¹, Christina Demski¹ (1. Cardiff University)

081 – ABSTRACT WITHDRAWN
Goals for Good: An Intervention to Decrease Materialistic Values, with Consequent Changes in Wellbeing, Pro-environmental Attitudes, and Pro-environmental Behaviours.
Introduction
Tim Kasser¹, Natasha Parker², Birgitta Gatersleben², Anat Bardi⁴ (1. Knox College, 2. University of Surrey, 3. Royal Holloway, University of London)

082 Consumer identities and sustainable lifestyles.
Birgitta Gatersleben¹, Patrick Elf², Ian Christie³ (1. University of Surrey)

083 #Flygskam vs #airtravel? Evaluating the impact of social media postings on travel transportation choices.
Jan von der Brelie¹ (1. University of Gothenburg, Department of Psychology)
Collective energy schemes such as peer-to-peer (P2P) energy trading are a promising means to address challenges resulting from uptake of decentralized renewable energy systems, such as balancing renewable energy supply and demand. Given the potential of the concept, a growing body of research has evaluated related techno-economic risks and benefits, whereas research from the psychological science angle is still lacking. This symposium will present some of the first studies to address this gap, through a specific focus on psychological and social aspects of P2P energy trading within a community setting. The five talks take in basic research on group processes and their application to the energy domain, experimental studies on individuals’ willingness to trade self-generated energy, large scale surveys on the structural and psychological factors fostering participation in P2P communities, and in-depth interviews with potential first movers revealing barriers and opportunities regarding the concept. Finally, the symposium incorporates research on the social benefits of P2P communities such as increasing group values and identity, thus emphasizing benefits beyond mere technological optimization. Overall, the symposium will provide insights into the psychological mechanisms underlying participation in collective energy schemes and will illustrate means to increase the uptake of related projects in practice.

084 Social identity formation and sustainable behavior and cooperation in the energy domain

Lise Jans¹ (1. University of Groningen)

085 Revealing decision-making processes in peer-to-peer energy communities

Ulf Hahnel¹, Mario Herberz¹, Tobias Brosch¹ (1. University of Geneva)

086 Consumer demand for blockchain-enabled peer-to-peer energy trading in the United Kingdom: An online survey experiment

Michael Fell¹, Alexandra Schneiders¹ (1. University College London (UCL))

087 The ways people talk about peer-to-peer electricity trading: A view to understanding the social psychological dimensions of P2P

Denise Wilkins¹, Mark Levine² (1. Microsoft Research, 2. University of Exeter)

088 Capturing values within peer-to-peer energy sharing systems

Lurian Pires Klein¹, Giovanni Allegretti¹, Luisa Matos³, Manuel Gameiro¹ (1. University of Coimbra, 2. Virtual Power Solutions)
Forests & people: Using environmental psychology to inform sustainable landscape design and policy

Chair: von Lindern
Symposium convened by Nerida Anderson, Kathryn Williams, Louise Eriksson, Nicole Bauer, and Eike von Lindern

Forests, whether in urban, rural or natural settings, play an important role in promoting the health of people, while also contributing to wider environmental and economic outcomes. Forests can contribute to air and water quality, store carbon, provide shade, shelter, food and fuel, provide habitat and promote psychological restoration and wellbeing. In this symposium the researchers explore human relationships with forests, showing how psychological concepts of perceptions, values, knowledge, beliefs and identity can inform forest design and policy. Researchers apply these concepts to explore human relationships with forests in diverse contexts. These include forests as a place of recreation, with a focus on outcomes for well-being, forests as a place of production, with a focus on behaviours that support sustainable forest management, and forests within a ‘risk landscape’, where bushfire and other events can affect the things people value. The studies are undertaken in four national contexts, reflecting shared global concerns. While the first four papers present new insights to how psychology can inform forest policy and management, the final paper explores how psychological knowledge was changed and applied within a public policy setting, offering insights for environmental psychologists seeking research impact.

089 Welcome to wilderness? Assessing the sense of wilderness in the Black Forest National Park

090 Socio-cultural forest monitoring: landscape and forest preferences of Swiss residents
Nicole Bauer¹, Eike von Lindern², Jacqueline Frick³, Marcel Hunziker¹ (1. Swiss Federal Research Institute WSL, 2. Dialog N – Research and Communication for People, Environment and Nature, 3. University of Zurich)

091 The role of knowledge, values and forest owner identity for private forest management in Sweden
Louise Eriksson¹, Clas Fries² (1. Umea University, 2. Swedish Forest Agency)

092 'I am a farmer not a forester'. Understanding landowner beliefs to encourage greater integration of trees in the rural landscape.
Nerida Anderson¹, Rodney Keenan¹, Lyndall Bull³ (1. University of Melbourne, 2. Lynea Advisory)

093 What can we learn from observing how psychological concepts are applied in environmental management?
Kathryn Williams¹, Andrea Rawluk³, Rebecca Ford¹ (1. University of Melbourne)
Sensory Environments Network Symposium: A range of research
Chair: Benfield
Symposium convened by Jacob Benfield and Antal Haans

Sensory environments encompass a huge range of research possibilities and challenges. Sensory rich environments are dynamic and ever changing, as are the users of such environments. The stimuli being studied are objective and physical while our measurement and assessment is subjective and psychological. Multisensory interactions lend themselves poorly to laboratory simulations and study while real-time, real world data offers complex relationships that are hard to quantify. In this symposium, researchers from five different countries and five research teams will present a range of studies on sensory environments including workplace design and privacy, discomfort with lighting, nocturnal perceptions of safety, urban tranquility, and simulated natural soundscapes. This session is designed to bring together sensory researchers from around the world in order to increase network size and engagement around these diverse topics.

094 A Longitudinal Study to Assess Whether Changes in Work Environment Predict Changes in Privacy Appraisal and Associated Outcomes
Clara Weber¹, Birgitta Gatersleben², David Uzzell² (1. ZHAW, 2. University of Surrey)

095 Is It Really That Uncomfortable? Reflecting on the Measurement of Discomfort from Glare
Steve Fotios¹, Michael Kent² (1. University of Sheffield, 2. Berkeley Education Alliance for Research)

096 Range Bias in Environmental Safety Appraisals: Stimulus Range Affects Absolute Agreement Not Consistency
Antal Haans¹, Steve Fotios² (1. Eindhoven University of Technology, 2. University of Sheffield)

097 What Makes a Tranquil City? Qualitative Analyses of Crowdsourced Data Regarding Perceptions of Urban Tranquillity
Eleanor Ratcliffe¹, Grant Waters², Julie Godefroy³ (1. University of Surrey, 2. Tranquil City; Anderson Acoustics, 3. Julie Godefroy Sustainability)

098 Anthropogenic Noise Source and Intensity Effects on Mood and Relaxation in Simulated Park Environments
Jacob Benfield¹ (1. Penn State Abington)
Research suggests that sustainable energy projects are generally more acceptable when the public is involved in decision-making. Yet, it is not clear when and under which conditions participation is most likely to increase public support. This symposium presents theoretical and empirical insights into when participation is most likely to have positive effects on acceptability, based on multiple methods (e.g. interviews, surveys and experiments). We discuss studies on hypothetical energy projects (e.g. a sustainable energy project in the University of Groningen) and realworld participation efforts (e.g. a wind energy development in King Island). The presented research covers different levels of public participation ranging from topdown governance to community participation across three countries, namely the United States, Australia and the Netherlands. The symposium unveils and discusses in-depth key factors that can influence the effectiveness of participation practices, such as the purpose of participation, the allocation of decision-making authority, perceived fairness of decision-making, etc. Additionally, the symposium emphasizes that it is necessary to take the time and effort that the public needs to invest in participation into consideration. These insights are crucial for realizing effective and socially acceptable sustainable energy transitions.

099 Unveiling the Public Participation Chain
Goda Perlaviciute¹, Lorenzo Squintani² (1. University of Groningen)

100 Social Identity Insights on Why a Community Vote on a Wind Energy Development Went Wrong in King Island, Australia
Rebecca Colvin¹ (1. Australian National University)

101 Effects of Influence over Decisions and Effort Investment on People’s Willingness to Participate in Decision-making on Sustainable Energy Projects
Lu Liu¹, Thijs Bouman¹, Goda Perlaviciute¹, Linda Steg¹ (1. University of Groningen)

102 Public Acceptability of Innovative Heating System in the Netherlands: the Perceived Role of Fairness
Crystel Hajjar¹, Nadja Contzen¹, Frank Hindriks¹, Linda Steg¹ (1. University of Groningen)

103 Laypeople associations with energy transition pathways in Norway and Germany
Rouven Doran¹, Gisela Böhm², Hans-Rüdiger Pfister³, Daniel Hanss⁴ (1. University of Bergen, 2. University of Bergen; Inland Norway University of Applied Sciences, 3. Leuphana University Lüneburg, 4. University of Applied Sciences Darmstadt)
Thursday 5th September 2019 | 09:15 – 10:00 | Lecture Theatre 1
Keynote 3: Prof Susan Clayton, Psychology and climate change: Making the connection
Chair: Kayleigh Wyles

This presentation will discuss the psychology of climate change. It will review the ways in which psychology can help to understand climate change perceptions, impacts, and responses, then describe the importance of people making a connection to the topic and how this might be promoted. Finally it will consider how psychology can play an important role in shaping societal attempts to cope effectively with the challenge of climate change.

Thursday 5th September 2019 | 10:00 – 10:30 | Atrium
Tea/Coffee

Thursday 5th September 2019 | 10:30 – 12:00 | Lecture Theatre 2
Restorative environments: Consolidation and extension in theory and empirical research (Session 1)
Chair: Staats
Symposium convened by Terry Hartig and Henk Staats

The continuing evolution of the restorative environments field necessarily involves both consolidation and extension. Movements toward consolidation include, for example, efforts to assess the reliability and validity of key findings and to more closely examine the restorative processes described in the body of theory being used. Extension includes, for example, work focused on new aspects of one or another restorative process as well as empirical work with new methods and/or new practical applications. The 10 papers gathered in the two sessions of this symposium exemplify both consolidation and extension, and the fruitful tension between these types of movement; questions raised by efforts to consolidate indicate possibilities for theoretical extension and needs for alternative methodological approaches, while new extensions raise questions about the suitability of bases for consolidation by revealing limitations of earlier theoretical and methodological approaches.

104 Stress-reducing effects of nature: A multi-lab replication of the Ulrich et al. (1991) study
Karin Tanja-Dijkstra¹ (1. Saxion University of Applied Sciences)

105 Appraising the psychological benefits of green roofs for city residents and workers
Kathryn Williams¹, Kate Lee², Leisa Sargent¹, Katherine Johnson¹, John Rayner¹, Claire Farrell¹, Rebecca Miller¹, Nicholas Williams¹ (1. University of Melbourne)

106 Implications for restorative environments theory of integration with an individual-level skill-based approach to the management of vulnerable adaptation resources
Freddie Lymeus¹, Per Lindberg¹, Terry Hartig¹ (1. Uppsala University)

107 How have we tested attention restoration theory?
Terry Hartig¹ (1. Uppsala University)

108 Effects on restoration when varying the meaning of an encounter with another person in nature
Henk Staats¹, Philipp Schneider² (1. Leiden University, 2. Utrecht University)
An essential requirement for encouraging more people to walk is ensuring they feel safe. Research is presented about how pedestrians make judgements of other people at night and whether they appear threatening or not. This addresses the question of how important it is to see another person’s face. Another aspect of pedestrian safety relates to how well they can be seen by drivers. Ongoing work into this area is presented that considers the potential role of road lighting in counteracting the negative effects of distractions on a driver’s ability to detect a pedestrian. The role of lighting is also examined in the context of cycling behaviour. Previous work suggests darkness significantly reduces the number of people cycling. An analysis is presented about the effect of lighting in encouraging people to cycle when it is dark. A further factor that discourages people from cycling is the need to interact with other traffic. Research using naturalistic driving data is presented about the communication methods used between cyclists and drivers. Finally, a broader discussion is presented about encouraging modal shift from car use to walking and cycling, that places an emphasis on focusing on travel goals rather than travel behaviours.

109 What are you looking at? The visual cues used to evaluate other pedestrians
Khalid Hamoodh¹, Steve Fotios¹ (1. University of Sheffield)

110 Exploring the Influence of Distraction on Visual Detection of Pedestrians
Steve Fotios¹, Scott Fox¹, Chloe Robbins¹, Richard Rowe¹ (1. University of Sheffield)

111 Does the presence of lighting encourage cycling after-dark? A big data approach
Jim Uttley¹, Steve Fotios¹, Robin Lovelace³ (1. University of Sheffield, 2. University of Leeds)

112 Cyclists and Car Drivers at junctions: how are intentions communicated?
Peter Walley¹, Yee Mun Lee², Oliver Carsten³, Jim Uttley⁴ (1. Transport for Greater Manchester, 2. Institute for Transport Studies, University of Leeds, 3. University of Sheffield)

113 Healthy travel: What lies under the radar?
Ian Walker¹, Gustav Bösehans¹, Bruno Osorio¹, Nick McCullen¹ (1. University of Bath)
(Almost) all quiet over one and a half years: A longitudinal study on causality between key determinants of private flood mitigation
Sebastian Seebauer¹, Philipp Babicky² (1. Joanneum Research Forschungsgesellschaft mbh, 2. University of Graz)

More nature, greener behaviour? Evidence from nationally representative surveys in England

Environmental attitude and connection with nature: A two-country comparison between France and Germany
Inga Wittenberg¹, Ghazlane Fleury-Bahi², Manuel Hefti² (1. Otto-von-Guericke University Magdeburg, 2. Université de Nantes)

Thursday 5th September 2019 | 10:30 – 12:00 | Room 206
Understanding overconsumption as a pathway towards sufficiency-oriented consumption
Chair: Henn
Symposium convened by Vivian Frick

Consumption levels in the Global North are severely overstepping planetary boundaries. They need to be reduced to a level the ecosystem can tolerate. In order to reduce consumption levels, more research on unsustainable consumption and its predictors is direly needed. Whereas determinants of pro-environmental behaviour have been examined rigorously by environmental psychologists, research on predictors of unsustainable consumption behaviour is still relatively sparse. In the symposium, we will focus on antecedents of overconsumption, which corresponds with sufficiency-oriented behaviour. Sufficiency-oriented consumption behaviour includes consuming less resource-intensive goods, acquiring smaller or less powerful goods, or using resources and resource-intensive goods and services frugally. In a review by Thøgersen (2014), antecedents of unsustainable consumption are summed up: basic human drivers (e.g. values, needs and wants), limitations (e.g. time resources, skills, self-control or cognitive resources), technology (e.g. increasing the availability of behavioural options) and dynamic aspects (e.g. habits, consumption norms, denial). In the symposium we will examine some of these antecedents in the context of overconsumption. The focus will lie on human needs and human values, denial, identity and time resources in the behavioural domains of nutrition, clothing, electronic devices and air travel.

Basic psychological needs in the context of climate change: Does social exclusion trigger climate change denial and serve as a societal barrier for sufficiency orientation?
Marlis Wullenkord¹, Josephine Träger², Gerhard Reese¹ (1. University Koblenz-Landau, 2. University of Koblenz-Landau)
119 Everything is just a click away. Digital environments and sufficiency-oriented consumption behaviour
Vivian Frick¹, Tilman Santarius¹, Ellen Matthies² (1. Technische Universität Berlin, 2. Otto-von-Guericke University Magdeburg)

120 You are what you (m)eat: Exploring meat related identities of Danish consumers
Louise Randers¹ (1. Aarhus University)

121 Money buys an SUV, while time fosters sufficiency? - The influence of working hours, income and available time on high-impact unsustainable behaviour and pro-environmental behaviour
Sebastian Neubert¹, Hugo Hanbury¹, Christoph Bader¹, Stephanie Moser¹ (1. University of Bern)

122 Is individual sufficiency-orientation reflected in less “stuff”? The example of electronic household devices
Laura Henn¹ (1. Otto-von-Guericke University Magdeburg)

Thursday 5th September 2019 | 10:30 – 12:00 | Room207
Natural environments & health
Chair: Heidenreich

123 Neighbourhood Greenspace and Health-Risk Behaviours: Results from a Nationally Representative Survey.
Leanne Martin¹, Sabine Pahl¹, Mat White³, Jon May¹ (1. University of Plymouth, 2. University of Exeter)

124 A pilot study of campus greenspace use by students at the University of California, Irvine
Miryha Runnerstrom¹, Nik Warren¹ (1. University of California, Irvine)

125 The Soothing Effect of Nature: A Cross-cultural Experiment on the Effect of Environmental Art on Relaxation
Bing-Tao Lee¹ (1. University of Cambridge (The Behaviour and Building Performance Research Team))

126 Healing in the Harvest: Indigenous Mental Wellness and Traditional Land-Based Food Practices in Subarctic, Canada
Nicole Spiegelaar¹ (1. University of Toronto)

127 (How) Do visitors of open air events adapt to heat stress? Exploring vulnerability, risk awareness and adaptive behaviour via interviews and behavioural observations
Anna Heidenreich¹, Martin Buchner¹, Annegret Thieken¹, Ariane Walz¹ (1. University of Potsdam)
Thursday 5th September 2019 | 10:30 – 12:00 | Room 303
Out of the lab and into the field: A behind the scenes perspective on conducting field research in environmental psychology
Chair: Lemmen

Symposium convened by Nieke Lemmen
Multiple method approaches will strengthen our confidence in environmental psychological research. Accordingly, it is critical to complement often used questionnaire and lab studies with field studies. Field studies have clear added value and strengths, such as a high external validity, but comes with challenges rarely discussed in publications. In this symposium, four speakers will talk about their experiences in designing and conducting different types of field studies, and discuss the benefits and challenges of field research and how to overcome these challenges. Nieke Lemmen will provide insights into how to control for multiple possible confounding factors, based on her experiences from a series of field studies conducted in a zoo. Wesley Schultz will discuss a large-scale field experiment and discuss how to respond to changing contexts in natural settings. Nadja Zeiske will talk about challenges related to accuracy, measurement and ethics approval, based on a series of seven field studies in everyday settings. Together, the different studies will provide important insights for designing field studies that will promote methodological progress in Environmental psychology.

128 Convince yourself to do the right thing: using self-persuasion to stimulate moral behaviour and care for monkey well-being among zoo visitors
Nieke Lemmen, Kees Keizer, Linda Steg, Thijs Bouman (1. University of Groningen)

129 Promoting Conservation Using Personalized Normative Feedback: Lessons from the Field
Samantha Mertens, Wesley Schultz (1. California State University)

130 The motivational impact of smart incentives to promote sustainable behaviour
Nadja Zeiske, Ellen van der Werff, Linda Steg (1. University of Groningen)

131 The effect of automation on pro-environmental behaviour: seven field studies
Niamh Murtagh (1. University College London (UCL))

132 The effect of nudging in promoting the consumption of organic fruits and vegetables
Kerstin Weimer, Richard Ahlström, Francisco Esteves (1. Mid Sweden University)
Thursday 5th September 2019 | 10:30 – 12:00 | Room 304
Adolescents and young people
Chair: Nayum

133 Exploring the impact of school-based environmental education on home practices
Victoria Circus¹ (1. University of Sheffield)

134 Testing the effect of environmental considerations in explaining adolescents’ environmental behaviour
Audra Balunde², Inga Truskauskaitė-Kunevičienė¹, Goda Perlaviciute³ (1. Mykolas Romeris University, 2. University of Groningen)

135 Different personality trait patterns of adolescents also mean different patterns of their pro-environmental behaviour
Mykolas Simas Poškus¹, Audra Balundė¹, Lina Jovarauskaitė³ (1. Mykolas Romeris University)

136 Student Flatshares – Determinants and Well-Being
Juliane Bücker¹ (1. Otto-von-Guericke University Magdeburg)

137 Predictors of Public Transport Use among University Students during the Winter: A Multiple-Group Structural Equation Modelling Approach
Alim Nayum¹, Trond Nordfjærn¹ (1. Norwegian University of Science and Technology)

Thursday 5th September 2019 | 12:00 – 12:45 | Lecture Theatre 1
Keynote 4: Prof. Simon Bell, Urban acupuncture: how a small change to a landscape can have a big effect on people’s health and well-being
Chair: Lewis Elliott

“Urban acupuncture” is a socio-environmental theory combining contemporary urban design with the concept of traditional Chinese acupuncture, using small-scale interventions to transform the larger urban context. The term was originally coined by Barcelonan architect and urbanist, Manuel de Sola Morales and developed further by Finnish architect Marco Casagrande. The concept reflects a move away from large-scale urban renewal projects towards a more localised, cheaper and community approach. “Tactical urbanism” is a similar idea but focuses more on temporary changes to the built environment, intended to improve local neighbourhoods and urban spaces. This movement was inspired by urban experiments including Cicloviá and Paris-Plages. The use of urban acupuncture/tactical urbanism as a quasi-experimental research approach has a short history, one of the earliest experiments being in Tallinn, Estonia where small interventions were installed at a derelict fishing harbour as part of Tallinn Capital of Culture in 2011. As a major part of the BlueHealth project, small interventions, some permanent and some temporary, have been installed in blue spaces in several cities: UK: Plymouth (Teats Hill, a park by the harbour), Estonia: Tallinn (Kopli Rand – an urban beach) and Tartu (Anne Kanal – an artificial canal), Spain: Rubí near Barcelona (Can Mortiz – a small stream and spring) and Portugal: Guimarães (Parque de Cidade – a park with a stream and pond). In each case the intervention was developed together with the local municipality, with different degrees of local community participation, some also as the basis for landscape architecture student projects and in one case partial construction by a NGO and volunteers. Before each intervention was installed a season of behaviour observations and a
survey of local residents was carried out. This has been (or is in the process of being) repeated after the installation in order to determine the impact of each. So far, the Plymouth intervention is the only one with complete before-and-after data. The initial results show it brings more people down to the water and has had a discernible impact on the way local inhabitants view the area. More activities are also being carried out. Early estimates of the other projects show similar impacts.

Thursday 5th September 2019 | 12:45 – 13:45 | Atrium
Lunch

Thursday 5th September 2019 | 13:45 – 15:15 | Lecture Theatre 2
Restorative environments: Consolidation and extension in theory and empirical research (Session 2)
Chair: Staats

Symposium convened by Terry Hartig and Henk Staats
The continuing evolution of the restorative environments field necessarily involves both consolidation and extension. Movements toward consolidation include, for example, efforts to assess the reliability and validity of key findings and to more closely examine the restorative processes described in the body of theory being used. Extension includes, for example, work focused on new aspects of one or another restorative process as well as empirical work with new methods and/or new practical applications. The 10 papers gathered in the two sessions of this symposium exemplify both consolidation and extension, and the fruitful tension between these types of movement; questions raised by efforts to consolidate indicate possibilities for theoretical extension and needs for alternative methodological approaches, while new extensions raise questions about the suitability of bases for consolidation by revealing limitations of earlier theoretical and methodological approaches.

138 Extending ART to explain creativity: Using thought probes to understand mind wandering in nature
Kate Lee¹, Kathryn Williams¹, Terry Hartig³, Katherine Johnson¹ (1. University of Melbourne, 2. Uppsala University)

139 Finding restorativeness in greenscapes, using GoogleMaps and GoogleStreetview
Robert van Dongen³ (1. Eindhoven University of Technology)

140 Future cities: Using virtual technology to design restorative residential neighborhoods
Pall Jakob Lindal¹, Terry Hartig³, Kamilla Run Johannsdottir³, Hannes Vilhjalmsson¹ (1. Reykjavik University, 2. Uppsala University)

141 Preference and restoration effects of nature and urban images: The roles of image properties and spatial information
Claudia Menzel¹, Gerhard Reese¹, Michael Schreiner¹ (1. University of Koblenz-Landau)

142 The impact of a micro-nature experience on sustained attention performance and arousal
Katherine Johnson¹, Timothy Doman¹, Keitaro Machida¹, Jonathan Januar¹, Kate Lee¹, Kathryn Williams¹ (1. University of Melbourne)
Regulating Pro-environmental behaviour
Chair: Webb

143 Implementation intentions and visual imagery in environmental behaviour: A novel theoretical approach on implementation intentions
Mariana Gaytan Camarillo, Alexa Spence (University of Nottingham)

144 Clearing Behavioral Costs with Attitude: The Attitude-Behavior Gap Revisited
Florian Kaiser, Alexandra Kibbe, Liane Hentschke (Otto-von-Guericke University Magdeburg)

145 Reverberation Effect of a Behaviorally Informed Institution
Dmitri Bershadskyy (Leibniz Institute for Economic Research)

146 Coffee-to-Go Cup Consumption and Self-Regulated Behavioural Change
Charis Eisen, Jana Katharina Köhler, Anna Keller, Daniel Hanss, Silke Kleihauer, Nathalie Wendorff (University of Applied Sciences Darmstadt)

147 Reducing Household Energy Consumption Through Self-Regulation and Habit
Dave Webb, Geoffrey Soutar, Marylene Gagne, Tim Mazzarol, Jillian Sweeney, Alexandra Boeing (University of Western Australia, Curtin University)

Thursday 5th September 2019 | 13:45 – 15:15 | Levinsky Room
The role of emotions in pro-environmental behaviour
Chair: Kaida

148 When guilt brings on positive change: Applying a network approach to attitudes in changing consumer behaviour towards plastic.
Maria Zwicker, Hannah Nohlen, Frenk van Harreveld (University of Amsterdam)

149 Collective action for forest protection is predicted by two emotional paths: Group-based anger and being moved
Helen Landmann, Anette Rohmann (FernUniversität in Hagen)

150 Understanding the psychology of denial towards reducing high-carbon behaviours
Susanne Stoll-Kleemann (University of Greifwald)

151 Predictors of worry about climate change across Europe
Thea Gregersen, Rouven Doran, Gisela Böhm, Endre Tvinnereim (University of Bergen, Inland Norway University of Applied Sciences)

152 Optimistic orientation facilitates pro-environmental behavior: A longitudinal study on quality of life and everyday behaviour
Naoko Kaida, Kosuke Kaida (University of Tsukuba, National Institute for Advanced Industrial Science and Technology)

Thursday 5th September 2019 | 13:45 – 15:15 | Room 206
Science, messaging and unintended consequences: Evidence and perspectives on climate change communication
Chair: Ogunbode
Symposium convened by Isabella Uhl-Hädicke and Charles Ogunbode

Climate change is one of the most pressing global challenges and radical actions are urgently needed to reach the Paris Agreement and limit global warming to 1.5 degrees. Communication that heightens public concern and mobilizes action on climate change is critical to achieving these goals. This symposium comprises research addressing topical themes in climate change communication. Ogunbode, Doran and Böhm present empirical findings on how the IPCC special report on global warming of 1.5C has affected climate change concern in Norway. Brügger examines how the spatial dimensions of spontaneous climate change perceptions interact with spatial framing in climate messages. Capstick and colleagues discuss the different climate change communication approaches of practitioners in the UK. Steentjes, Pidgeon, Demski and Corner address how personal intentions and policy support are affected by messages designed to reflect different levels of proximity of climate change impacts or emphasize different forms of climate action (i.e. mitigation and/or adaptation). Finally, Uhl-Hädicke, Klackl, Jonas and Hansen present data from Austria and Argentina showing how providing people with threatening climate information can produce undesirable reactions. All presenters discuss the relevance of their findings for improving the effectiveness of climate change communication and promoting pro-environmental action.

153 The effects of the IPCC special report on global warming of 1.5C on climate change concern in Norway
Charles Ogunbode\textsuperscript{1}, Rouven Doran\textsuperscript{1}, Gisela Böhm\textsuperscript{1} (1. University of Bergen)

154 Spatial associations with climate change and how they interact with distance frames
Adrian Bruegger\textsuperscript{1} (1. University of Bern)

155 UK climate change resilience (RESILRISK): What the public thinks and how to (not) communicate
Katharine Steentjes\textsuperscript{1}, Nick Pidgeon\textsuperscript{1}, Christina Demski\textsuperscript{1}, Adam Corner\textsuperscript{4} (1. Cardiff University, 2. Climate Outreach)

156 Undesired side-effects of climate change communication
Isabella Uhl-Hädicke\textsuperscript{1}, Johannes Klackl\textsuperscript{1}, Eva Jonas\textsuperscript{1}, Nina Hansen\textsuperscript{4} (1. University of Salzburg, 2. University of Groningen)

157 The Climate Communication Project: how are we engaging the UK public and what works?
Stuart Capstick\textsuperscript{1}, Niall McLoughlin\textsuperscript{2}, Adam Corner\textsuperscript{3}, Harriett Richardson\textsuperscript{4}, Alice Bell\textsuperscript{5}, Catherine Muller\textsuperscript{6}, Sam Illingworth\textsuperscript{7} (1. Cardiff University, 2. University of Bath, 3. Climate Outreach, 4. National Centre for Atmospheric Science, 5. 10:10 Climate Action, 6. Royal Meteorological Society, 7. Manchester Metropolitan University)
Over 200 million people live on Europe’s coastline, and aquatic environments are the top recreational destination in the region. In terms of public health, interactions with “blue space” (outdoor natural environments prominently featuring water) are often considered solely in terms of risk (e.g. drowning, pollution). However, exposure to blue space has been shown to promote psychological and physical health. There is therefore considerable potential for city planners and decision-makers to contribute to the third sustainable development goal by exploiting the co-benefits to health associated with urban infrastructure in, on, and around blue spaces. Nevertheless, in order to do so, research is still needed which explores what types of exposure to blue space are associated with which health outcomes across a range of settings. This symposium will showcase: (a) findings linking perceived general and mental health with residential exposures to coastal and/or freshwater blue space in Belgium, Catalonia, southern Sweden, and the UK, (b) relationships between residential exposures to blue space, its recreational use, and physical activity in eighteen countries; and, (c) a data linkage approach for Wales which links >1 million homes with blue and natural space exposures and examines concomitant longitudinal changes in mental health.

158 General health and residential proximity to the coast in Belgium: results from a cross-sectional health survey
Alexander Hooyberg\(^1\) (1. Flanders Marine Institute)

159 General health status, psychological well-being and exposure to blue space: a cross-sectional analysis of the Scania Public Health Survey
Åsa Persson\(^1\) (1. Institute of Environmental Medicine, Karolinska Institute)

160 General health and exposure to blue space: a cross-sectional analysis of the three large European surveys
James Grellier\(^1\) (1. European Centre for Environment and Human Health, University of Exeter)

161 Do visits to blue spaces mediate the association between residential blue space exposures and physical activity? Evidence from the BlueHealth International Survey
Lewis Elliott\(^1\) (1. European Centre for Environment and Human Health, University of Exeter)

162 Changes in access and exposure to blue spaces—associations with mental health in Wales
Amy Mizen\(^1\) (1. Swansea University)
Thursday 5th September 2019 | 13:45 – 15:15 | Room 303
Taking environmental psychology to a global context (Session 1)
Chair: Friedrich
Symposium convened by Max Friedrich

Most theories and findings in environmental psychology originate in North America and Europe. However, pressing environmental problems are not limited to these regions. Particularly in developing countries, food security is threatened by over usage of natural resources and global warming. This symposium brings together researchers with a focus on food production in South and Southeast Asia. First, Isabel Richter will present how creating future scenarios influences people’s perceived behavioural efficiency, emotions, and behavioural intentions in coastal fishing communities in Malaysia and the Philippines. Next, Jeremiah Osborne-Gowey will present on the role of social networks in knowledge transmission and farming practices in Sri Lanka. His results show that engagement in labour sharing networks is positively associated with adopting drought adaptation strategies. Anna Helfers will follow up on the role of farmers’ networks in India. Her results show that affiliation to farmer organisations influences behavioural intentions via social norms and perceived behavioural control. Max Friedrich will present research from India on how personal norms develop and shape farmers behavioural intentions. He argues that activating personal norms may be a promising strategy to promote sustainable farming practices. The panel will end with an audience discussion on practical implications and future research.

163 Shared Visions: Developing and Evaluating Future Scenarios in Coastal Communities
Isabel Richter¹, Sabine Pahl¹, Lota Creencia³, Arlene Avillanosa³, Joel Sumeldan³ (1. University of Plymouth, 2. Western Philippine University)

164 The role of social networks in knowledge transmission and farming practices in Sri Lankan agricultural systems: social cognitive theory in practice
Jeremiah Osborne-Gowey¹, Amanda Carrico¹ (1. University of Colorado Boulder)

165 Decision-making in interacting social networks: Understanding straw burning behaviour in Northern India
Anna Helfers¹, Max Friedrich², Andreas Ernst³ (1. University of Kassel, 2. Swiss Federal Institute of Aquatic Science and Technology, 3. Center for Environmental Systems Research, University of Kassel)

166 Testing the norm activation model in a rural, low-income setting: The example of sustainable crop residue management in Punjab, India.
Max Friedrich¹, Nadja Contzen², Linda Steg² (1. Swiss Federal Institute of Aquatic Science and Technology, 2. University of Groningen)

167 What do the sustainable development goals mean to people in developed and developing countries?
Paul Bain¹ (1. University of Bath)
**Thursday 5th September 2019 | 13:45 – 15:15 | Room 304**

**Future and intergenerational equity; social norms**

Chair: Bergquist

**168 How is intergenerational inequity influencing young peoples’ moral obligation and pro-environmental actions?**

_Hannah Wallis¹ (1. Otto-von-Guericke University Magdeburg)_

**169 The Interplay of Interpersonal and Intrapersonal Conflicts as Barrier to a Sustainable Future**

_Johann Majer¹, Matthias Barth¹, Hong Zhang¹, Roman Trötschel¹ (1. Leuphana University Lüneburg)_

**170 Better together: Promoting Collaborative Energy Saving Behaviour**

_Alexa Spence², Caroline Leygue³, Eamonn Ferguson¹ (1. University of Nottingham)_

**171 A meta-analysis of field-experiments using social norms to promote pro-environmental behaviors**

_Magnus Bergquist¹, Andreas Nilsson², Wesley Schultz³ (1. University of Gothenburg, Department of Psychology, 2. University of Gothenburg, 3. California State University)_

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**Thursday 5th September 2019 | 15:15 – 15:45 | Atrium**

**Tea/Coffee**

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**Thursday 5th September 2019 | 15:45 – 17:15 | Lecture Theatre 2**

**The Child Outdoors**

Chair: Bonaiuto

Symposium convened by Marino Bonaiuto

Large surveys show that children’s exposure to green space is associated with cognitive development (Dadvand et al., 2015), and children’s time spent outdoors at preschool is inversely related to inattention and hyperactivity symptoms (Ulset et al., 2017). Experimental and quasi-experimental studies also demonstrated a number of cognitive and communicative benefits to children of natural outdoor environments (e.g., Amicone et al., 2018). Chawla (2015) argued for comparing different research methods and designs in order to clearly identify environmental and behavioural factors involved in the outcomes, and to help identify underlying causal relations. This symposium features different methods for studying the child outdoors. Hartmeyer and colleagues present a new project exploring the role of natural environments in generally promoting health within the family. Gattis and colleagues examine natural outdoor environments’ influence on parent-child conversations by using audio-video recordings. Amicone and colleagues compare children’s perceptions and attitudes to natural environments in school play areas by using drawings and verbal accounts. Stevenson and colleagues explore whether contact with nature improves cognitive performance in children with ADHD and whether this is moderated by medication. These four studies span different levels of analysis, helping us to better characterise outdoor environments and how children experience them.
A pilot study of a family-to-family intervention aimed at exposing families to nature and promote social, mental and physical health.
Rikke Hartmeyer¹, Matthew Stevenson¹, Peter Bentsen¹ (1. Health Promotion Research, Steno Diabetes Center Copenhagen)

Natural environments improve parent-child communication
Merideth Gattis², Thea Cameron-Faulkner², Joshua Melville³ (1. Cardiff University, 2. University of Manchester, 3. University of Oxford)

Children’s activities in nature: Graphical and verbal descriptions of recess-time activities in primary schools’ natural and built environments
Giulia Amicone¹, Silvia Collado², Paola Perucchini³, Irene Petrucchini⁴, Marino Bonaiuto¹ (1. Sapienza University of Rome, 2. University of Zaragoza, 3. Roma Tre University, 4. Universitas Mercatorum)

The potential of nature exposure to support pharmacological treatment of Attention Deficit/Hyperactivity Disorder: A randomised crossover trial
Matthew Stevenson¹, Rikke Hartmeyer¹, Janni Niclasen¹, Peter Bentsen⁴ (1. Health Promotion Research, Steno Diabetes Center Copenhagen, 2. Health Promotion Research, Steno Diabetes Center)

Parental Involvement as a Critical Success Factor in the Implementation of Green Schoolyards
Agnes van den Berg¹, Janke van Dijk², Marit de Koning³, Dieuwke Hovinga², Jolanda Maas⁵ (1. University of Groningen, 2. University of Applied Sciences Leiden, 3. IVN Natuureducatie, 4. Vrije Universiteit Amsterdam)

Thursday 5th September 2019 | 15:45 – 17:15 | Jill Craigie
Contextual and Temporal Influences of Environmental Attitudes and Behaviour – Findings from Large-Scale Global Surveys
Chair: Bauske
Symposium convened by Emily Bauske

The ultimate objective of environmental psychology is to find strategies that can amplify pro-environmental behaviour. In the search for the most efficient interventions, understanding pertinent temporal and contextual influences of people’s appreciation of environmental protection is key. In this symposium we will thus explore possible determinants of environmental attitudes, pro-environmental behaviour, and climate change perceptions. The presented studies are based on representative large-scale worldwide samples, enabling comparisons of and insights into different societies.

We will learn that:

- The environmental attitude in Germany has overall been rising steadily in the last 22 years, independently of major ecological events.
- The level of environmental attitude varies across the 28 states of the EU, but is univocally associated with green consumption.
- Pro-environmental behaviour and well-being are linked globally, but neither individual income nor a country’s developmental status affect this association, whilst cultural differences do.
Climate change opinions and political orientation are associated, but they are more strongly linked in societies with higher levels of individualism and higher greenhouse gas emissions.

Climate change perceptions can be accounted for by various socio-political and demographic factors, but the strength of these relations differs between regions.

177 The Trajectory of Environmental Attitude in Germany from 1996 to 2018: A Secondary Analysis of Nationally Representative Samples
Emily Bauske¹, Florian Kaiser² (1. Otto, 2. Otto-von-Guericke University Magdeburg)

178 Environmental Attitude in the 28 Member States of the European Union: Cross-Cultural Comparisons Grounded in Incommensurable Measurement Instruments
Jan Urban³, Florian Kaiser² (1. Charles University, 2. Otto-von-Guericke University Magdeburg)

179 Cross-National Analysis on the Political Divide in Climate Change Opinion: A Person-Context Interaction Approach
William Hoi-Wing Chan¹, Kim-Pong Tam² (1. Department of Marketing, Chinese University of Hong Kong, 2. The Hong Kong University of Science and Technology)

180 Cross-National Variation in Climate Change Perceptions and their Individual Level Determinants
Lorraine Whitmarsh¹, Linda Steg², Wouter Poortinga¹, Gisela Böhm⁴ (1. Cardiff University, 2. University of Groningen, 3. University of Bergen)

181 Relationships between pro-environmental behaviour, personal values and wellbeing: consistency and differences in a seven-country study
Stuart Capstick¹, Nick Nash¹, Lorraine Whitmarsh¹, Wouter Poortinga¹ (1. Cardiff University)

Thursday 5th September 2019 | 15:45 – 17:15 | Levinsky Room
Decision making for sustainability
Chair: Lange

182 A multiple systems approach to sustainable decision-making
Tobias Brosch¹ (1. University of Geneva)

183 More professional = more rational? How different actors make sustainable investments
Ingo Kastner¹, Sebastian Bobeth¹, Ellen Matthies¹ (1. Otto-von-Guericke University Magdeburg)

184 Empowering sustainability initiatives at the university - an evaluation of the project "Wandercoaching" by network-n
Karen Hamann¹, Gerhard Reese¹ (1. University Koblenz-Landau)

185 Consumers’ meanings attached to sustainability and motivations to act sustainably
Catalin Stancu¹, Alice Grønhøj¹, Liisa Lähteenmäki¹ (1. Aarhus University, Denmark)
Thursday 5th September 2019 | 15:45 – 17:15 | Room 206

Dealing with the underground: Public acceptance, communication and community engagement in the context of subsurface technologies

Chair: Boomsma
Symposium convened by Christine Boomsma

In the effort to reduce CO2 emissions, new technologies will need to be implemented in society, changing the way we generate power and deal with industrial emissions. Some of these technologies involve an element of our planet which is unfamiliar to most people: the underground or subsurface. The symposium brings together research into different subsurface technologies, including geothermal energy, carbon capture and storage (CCS), and shale gas. Between them, the talks cover a range of research methods from focus groups and interviews to cross-national surveys and experimental designs. The talks deal with challenges around public acceptance, communication and community engagement which are not unique to subsurface technologies. Similar questions arise for aboveground technologies such as wind energy and solar power. However, as others have noted there seems to be a particular unease among publics when it comes to ‘tampering with the subsurface’. Within this context, Tirotto and Gibson provide different approaches to studying social acceptance and perceptions of geothermal energy. Next, Boomsma and Xenias present research into CCS, specifically focusing on how to engage publics with this technology. Finally, Ter Mors investigates factors underlying public acceptance of shale gas extraction.

187 Social acceptance of deep geothermal energy in the UK: a social identity approach
Francesca Tirotto1, Sabine Pahl1, Hazel Gibson1, Iain Stewart1 (1. University of Plymouth)

188 Communicating geothermal with diverse publics: a geocognition approach
Hazel Gibson2, Iain Stewart1 (1. University of Plymouth)

189 The importance of community engagement for underground CO2 storage: Lessons and insights from the field
Christine Boomsma1, Ruben Peuchen2, Emma ter Mors1, Kevin Broecks2, Nicole de Koning2 (1. Leiden University, 2. ECN part of TNO)

190 Ignorance is bliss? Public concerns about Carbon Capture, Storage & Utilisation and the subsurface, and the impact of message framing
Dimitrios Xenias1, Lorraine Whitmarsh1, Christopher Jones3 (1. Cardiff University School of Psychology, 2. University of Surrey)

191 Public acceptance of shale gas extraction: The effects of (pseudo)voice on perceived fairness of the decision-making process and trust in project developers
Emma ter Mors1, Christine Boomsma1 (1. Leiden University)
Consumption and waste management
Chair: Aragones

192 The Importance of a Consistent Country Image for Consumer Evaluation of an Imported Environmentally-Friendly Product
John Thøgersen¹, Jessica Aschemann-Witzel¹, Susanne Pedersen¹ (1. Aarhus University, School of Business and Social Sciences)

193 Ocean connectedness and product choice: Consumer responses to single-use packaging.
Sohvi Nuojua¹, Sabine Pahl², Richard Thompson¹ (1. University of Plymouth)

194 Why do cosmopolitan individuals tend to be more pro-environmentally committed? The mediating pathways via knowledge acquisition and emotional affinity toward Nature
Kenichi Ito³, Angela K.-Y. Leung² (1. Nanyang Technological University, 2. Singapore Management University)

195 The Influence of Contextual Conditions and Decision-Making Processes on Waste Prevention Behaviour
Ana Paula Bortoleto¹ (1. University of Campinas)

196 Risk perception of pharmaceutical residues in water in Spain and Portugal.
Juan Ignacio Aragones¹, Lucia Poggio¹, Maria Luisa Lima³, Silvia Luis³ (1. Universidad Complutense de Madrid, 2. ISCTE-IUL- Instituto Universitário de Lisboa)

Thursday 5th September 2019 | 15:45 – 17:15 | Room 303
Taking environmental psychology to a global context (Session 2)
Chair: van den Broek

197 Developing a standardized mental model elicitation tool for illiterate populations in collaboration with Lake Victoria stakeholders.
Karlijn van den Broek¹ (1. University of Heidelberg)

198 I Am versus We Are: How Biospheric Values and Environmental Identity Influence Pro-environmental Behaviour Individually and Collectively across Countries?
Xiao Wang¹, Ellen van der Werff², Thijs Bouman², Marie Harder¹, Linda Steg² (1. Fudan University, 2. University of Groningen)

199 Global problems, local perspectives: Environmental issues and behaviours across cultures
Nick Nash³, Stuart Capstick³, Paul Haggar³, Lorraine Whitmarsh³ (1. Cardiff University)
Thursday 5th September 2019 | 15:45 – 17:15 | Room 304
Place attachment & modern challenges
Chair: Olivos

200 Place attachment and resilience to natural hazards: The effect of place visualisation on preparedness behaviour
Amanda Wallis¹, Ronald Fischer¹, Wokje Abrahamse¹ (1. Victoria University of Wellington)

201 Sense of place, place identity and place attachment: Exploring construct convergent-divergent validity
Stephanie Wilkie¹, Hannah Trotter¹ (1. University of Sunderland)

202 Predictors of community participation in the context of urban sustainability transitions
Maximilian Schmies¹, Jan Eickhoff¹, Marcel Hunecke¹ (1. University of Applied Sciences Dortmund)

203 Importance of satisfaction with work environment in burnout and wellbeing
Rodolfo Mendoza¹, Pablo Olivos², Yuxa Maya², Emilio Moyano⁴ (1. University of Bio, 2. University of Castilla-La Mancha, 3. University of Talca)

Thursday 5th September 2019 | 17:15 – 17:45 | Lecture Theatre 1
IAAP Business Meeting
Chair: Hartig

Thursday 5th September 2019 | 17:45 – 18:15 | Lecture Theatre 1
DGP EP Division
Chair: Reese
Economists started to investigate the connection between wellbeing, happiness, and the environment about 20 years ago, focusing initially on climate, air pollution and noise nuisance. Meanwhile, many more subjects have been covered. Many of these studies have used subjective wellbeing data as a novel tool for non-market valuation, in addition to the established stated and revealed preference approaches. This presentation briefly reviews the literature and presents a recent study on the relationship between subjective wellbeing and climate.

Friday 6th September 2019 | 10:00 – 10:30 | Atrium

Tea/Coffee

Friday 6th September 2019 | 10:30 – 12:00 | Lecture Theatre 2

A dose of nature: Opportunities and challenges
Chair: Rahm

204 Wellbeing outcomes from recent blue space visits – results from an eighteen country survey
Jo Garrett¹, Lewis Elliott¹, Mat White¹ (1. University of Exeter)

205 Individual-level intervention assessing short-term effects of blue spaces: The Walking Office Workers (WOW) study
Cristina Vert Roca¹, Mireia Gascon¹, Glòria Carrasco-Turigas¹, Lourdes Arjona¹, Lewis Elliott², Mark Nieuwenhuijsen¹ (1. ISGlobal, 2. European Centre for Environment and Human Health, University of Exeter)

206 How to promote the use of blue spaces? – A multidisciplinary approach to develop blue well-being services for everyday activities, education, rehabilitation and social integration in Finland
Ann Ojala¹, Pia Smeds¹, Katja Kangas¹, Päivi Eskelinen¹, Pauliina Louhi¹, Jaana Kotro¹ (1. Natural Resources Institute Finland (Luke))

Francesca Di Carmine², Silvia Collado², Carlo Lai³, Teresa Gloria Scalisi³, Marino Bonaiuto¹, Paola Perucchini⁶ (1. Sapienza University of Rome, 2. University of Zaragoza, 3. Roma Tre University)

208 “In the evening, I don’t walk in the park”: Perceived design qualities, safety and neighbourhood walkability
Johan Rahm¹, Catharina Sternudd¹, Maria Johansson¹ (1. Lund University)
Energy choices of individuals (or individual households) have moved right into the center of the focus of policy makers both at the European, national, and regional level. There is a rapidly growing demand for understanding the complexity of such behaviors (which include everyday behavior related to energy use but also investments in new energy and transport technologies and decentralized energy production). This symposium presents some of the core findings of the three year cross-disciplinary H2020 project ECHOES, which studied individual, social, structural and institutional impacts on energy choices within the domains of energy in buildings, electric mobility and smart energy technologies. In this symposium, a particular focus is put on the interplay between individual level predictors and social, cultural, technological and economic impacts. Two large metaanalyses are presented substantiating the impact of common psychological determinants of energy choices. Two presentations exploit the results of a large transeuropean survey to explore country differences in energy choices and the interactions between a country culture and individual energy choices. One presentation analyses drivers of energy transition for different levels of actors, and another presentation dives into the gap between values and actions based on a comprehensive analysis of different energy lifestyles.

**209 A Meta-analysis on the psychological determinants of energy saving behaviour**
Giuseppe Carrus¹, Lorenza Tiberio¹, Angelo Panno¹, Stepan Vesely⁴, Torsten Masson⁵, Immo Fritsche⁵, Christian Klöckner⁴ (1. University Roma, 2. Norwegian University of Science and Technology, 3. University of Leipzig)

**210 Identity and pro-environmental behavior: A meta-analysis**
Stepan Vesely¹, Torsten Masson², Immo Fritsche², Parissa Chokrai², Angelo Panno³, Giuseppe Carrus³, Christian Klöckner¹, Lorenza Tiberio³ (1. Norwegian University of Science and Technology, 2. University of Leipzig, 3. University Roma)

**211 Willingness to donate for carbon offsets across 31 EU nations**
Valeria Azarova¹, Jed Cohen¹, Andrea Kollmann¹, Johannes Reichl¹ (1. Johannes Kepler University)

**212 Can nationalist movements in a country increase the effect of proenvironmental social norms? Findings from the transnational ECHOES survey**
Christian Klöckner¹, Immo Fritsche², Stepan Vesely¹, Alina Mia Udall¹, Giuseppe Carrus³, Torsten Masson² (1. Norwegian University of Science and Technology, 2. University of Leipzig, 3. University Roma)

**213 Effects of source credibility on laypersons’ attitudes towards a climate engineering technology**
Geraldine Klaus¹, Lisa Oswald¹, Andreas Ernst¹ (1. University of Kassel, Center for Environmental Systems Research)
Friday 6th September 2019 | 10:30 – 12:00 | Levinsky Room

Spillover, moral licensing, values
Chair: Nartova-Bochaver

214 Triggering pro-environmental behaviours in a group context: Influence of behavioural attribution and wider spillover effects
Colin Whittle¹, Lorraine Whitmarsh¹, Dimitrios Xenias¹, Nick Nash¹, Stuart Capstick¹, Josh Lord¹
(1. Cardiff University)

215 Moral Licensing and Rebound Effects in residential lighting - an experimental study
Elisabeth Eberling¹, Elisabeth Dütschke¹, Katharina Eckartz³ (1. Fraunhofer ISI Karlsruhe, 2. TH Bingen)

216 It’s not all about money and convenience: The importance of expected environmental impact, and affective and symbolic values for climate-protecting behavior-change intentions.
Robert Tobias¹, Melina L. Spycher¹, Adrian Bruegger³ (1. University of Zurich, 2. University of Berne)

217 Green somatic marker: Environmental value orientation predicts skin conductance responses towards environmental stimuli.
Beatrice Conte³, Ulf Hahnel¹, Tobias Brosch¹ (1. University of Geneva)

218 Environmental Identity and Moral Motives in the Russian Youth
Sofya Nartova-Bochaver¹, Irkhin Boris¹ (1. National Research University Higher School of Economics)

Friday 6th September 2019 | 10:30 – 12:00 | Room 206

Transport (1)
Chair: Bobeth

219 Choice architecture in environmental car choices: Unit familiarity increases sensitivity to attribute differences
Mario Herberz², Ulf Hahnel¹, Tobias Brosch¹ (1. University of Geneva)

220 Assessing the modal shift potential of urban and rural car drivers
Susann Ullrich¹, Sophia Becker¹, Julia Jarass³ (1. Institute for Advanced Sustainability Studies (IASS) Potsdam, 2. Deutsches Zentrum für Luft- und Raumfahrt (DLR))

221 Changing people’s everyday travel – Conflicting goals, drivers, and consequences
Annika Nordlund¹, Kerstin Westin¹, Johan Jansson³, Jonas Nilsson⁴ (1. Umea University, 2. Lund University, 3. University of Gothenburg)

222 Understanding car use across different trip purposes
Erika Martins Silva Ramos³, Cecilia Jakobsson Bergstad², Jonas Nässén³ (1. University of Gothenburg, Department of Psychology, 2. Chalmers University of Technology)
223 Buying an electric car: A matter of personal benefits or norms?
Sebastian Bobeth¹, Ingo Kastner¹, Ellen Matthies¹ (1. Otto-von-Guericke University Magdeburg)

Friday 6th September 2019 | 10:30 – 12:00 | Room 207
Regulation and policy support
Chair: Fesenfeld

224 Environmental regulation in the UK: gathering insight into how policy makers map regulatory instruments to environmental risks
Elaine Gallagher¹ (1. Cranfield University)

225 Transitions to sustainable lifestyles, governance and knowledge co-production: Contributions from environmental psychology
Ricardo Garcia Mira¹ (1. University of A Coruna)

226 Renewable Energy in a Biosphere Reserve? The connection of perceived necessity and acceptance.
Silke Rühmland¹, Petra Schweizer-Ries² (1. Saarland University, 2. University of Applied Sciences Bochum)

227 Who’s Business is it Anyway? Environmental Policy and Determinants of Environmental Behaviour in Russia
Elena Sautkina¹, Alexandra Ivanova¹ (1. National Research University Higher School of Economics)

228 How to effectively motivate costly environmental policy and action?
Lukas Fesenfeld¹, Yixian Sun², Michael Wicki¹, Thomas Bernauer¹ (1. ETH Zürich, Institute for Environmental Decisions, 2. Yale University)

Friday 6th September 2019 | 10:30 – 12:00 | Room 303
Research and application of restorative environments in buildings and cities
Chair: Browning
Symposium convened by Matthew H. E. M. Browning, Sally Augustin, Nigel Oseland

In today’s society, attention is increasingly a limited resource. Mobile devices send notifications and promote feelings of always needing to be connected to social media and work. Many of us feel starved for time to focus and complete cognitively demanding tasks or be present in our daily lives. Fortunately, ongoing applied research provides practical solutions to modify the environments where we spend most of our time: in buildings and cities. Small additions and design hacks provide the cognitive benefits we seek without undue burden or cost. This symposium gathers a diverse group of junior and senior researchers from applied cognitive psychology, environmental epidemiology, and nature-based recreation to discuss how built environments can support cognitive functioning, health, and wellbeing.

229 The when, what, where, and how of cognitive restoration in built environments
Sally Augustin¹ (1. Design With Science)
230 Enhancing creativity in the workplace
Nigel Oseland\(^1\) (1. Workplace Unlimited)

231 Cumulative effects of residential restoration: Green space and future earnings from a cohort in ten U.S. cities
Matthew Browning\(^1\), Alessandro Rigolon\(^2\) (1. Illinois College of Applied Health Sciences, 2. University of Utah)

232 Dose-response curve and multisensory effects of restorative environments: A review of recent research
Matthew Browning\(^1\), Seunguk Shin\(^2\), Fatemeh Saeidi-Rizi\(^2\), Olivia McAnirlin\(^2\), Hyunseo Yoon\(^2\), Yue Pei\(^2\), Katherine J. Mimnaugh\(^2\), Carena J. van Riper\(^2\), Heidemarie K Laurent\(^2\), Steven M. LaValle\(^2\) (1. Illinois College of Applied Health Sciences, 2. University of Illinois)

Friday 6th September 2019 | 10:30 – 12:00 | Room 304
Journal of Environmental Psychology Editorial Board Meeting
Chair: Bebbington
By invitation only

Friday 6th September 2019 | 12:00 – 12:45 | Lecture Theatre 1
Publishing Environmental Psychology Research: Where are we going?
Chair: Wesley Schultz
Panel: Susan Clayton, Charles Ogunbode, Linda Steg, Sander van der Linden, in discussion with the audience (via mentimeter)

Friday 6th September 2019 | 12:45 – 13:45 | Atrium
Lunch

Friday 6th September 2019 | 13:45 – 15:15 | Lecture Theatre 2
Nature interventions from the comfort of the indoor setting
Chair: de Vries
Symposium convened by Sjerp de Vries and Matthew H. E. M. Browning

There is mounting scientific evidence for restorative and other positive health and wellbeing effects of nature. However, nowadays people spend most of their time indoors. For some people this is because their daily activities mainly take place indoors (e.g., at work or school), for others because they have limited possibilities to go outside. Time spent indoors reduces peoples’ opportunities to come in contact with nature. Facilitating nature exposure while indoors might act as a surrogate when going outdoors is not an option. In this symposium, we share and discuss the results of applied and experimental research that investigates the effects of indoor options for contact with nature such as potted plants, window views, and virtual reality, on human health and wellbeing. Special interest is payed to the mechanisms behind these effects. In the first two presentations, Van den Bogerd and De Vries present findings of their longitudinal field-experiments with indoor plants in educational and office settings, respectively. Browning will then present the results of two experimental studies on virtual window views on nature in the third presentation. In the fourth presentation he will discuss the difference between 360 degree videos in virtual reality and physical nature exposure.
233 A field-experiment on the effects of potted plants in study rooms on students’ wellbeing, productivity, attention, perceptions, and the objective indoor climate
Nicole van den Bogerd², S. Coosje Dijkstra¹, Jacob C. Seidell¹, Sander L Koole¹, Jolanda Maas¹
(1. Vrije Universiteit Amsterdam)

234 PlantBenefits: intervention study on the effects of office plants on indoor climate, the appreciation of the environment by employees, and their functioning and wellbeing
Sjerp de Vries¹, Laurie Hermans², B. van Duijn³, B. Oppedijk⁴ (1. Wageningen University & Research, 2. ECN part of TNO, 3. Leiden University, 4. Vrije Universiteit Amsterdam)

Matthew Browning¹, Seunguk Shin² (1. Illinois College of Applied Health Sciences, 2. University of Illinois)

236 Can simulated nature support health? Comparing short, single-doses of 360-degree nature videos in virtual reality with the outdoors
Matthew Browning¹, Katherine J. Mimnaugh², Carena J. van Riper², Heidemarie K Laurent², Steven M. LaValle² (1. Illinois College of Applied Health Sciences, 2. University of Illinois)

237 Fish aquaria in the workplace: A novel intervention to promote employee well-being and cognitive performance?
Heather Clements¹, Stephanie Valentin¹, Julien S Baker¹, Nicholas Jenkins¹, Jean Rankin¹, Nancy Gee⁶, Donna Snellgrove⁶, Katherine Sloman¹ (1. University of the West of Scotland, 2. WALTHAM Centre for Pet Nutrition)

Friday 6th September 2019 | 13:45 – 15:15 | Jill Craigie
Making environment-related behavior meaningful: Behavioral, personal, and social perspectives on pro-environmental behavior and wellbeing
Chair: Johnson Zawadzki

When addressing pressing environmental problems, like climate change, it is vital to consider the impacts of environmental solutions on human wellbeing. Because personally meaningful proenvironmental behaviors are potentially more likely to be performed and have the potential to enhance individuals’ wellbeing, this may be a key avenue for investigation. Therefore, the purpose of this symposium is to develop a better understanding of the different ways people see and experience meaning in their environment-related behavior, and how this may enhance wellbeing. To that end, this symposium will examine antecedents, content, and consequences of the meaning of pro-environmental behaviors. First, Elliot Sharpe (abstract 1) will examine how reflecting on one’s personal values makes pro-environmental behavior and policy support more personally meaningful, and Thijs Bouman (abstract 2) will discuss how high-profile national events, like climate protests, can create social meaning for pro-environmental action. Next, Amy Isham (abstract 3) will discuss identification of personally challenging pro-environmental behaviors which induce flow and enhance wellbeing. Finally, Sander van der Linden (abstract 4) and Steph Johnson Zawadzki (abstract 5) will discuss when and how performing personally meaningful pro-environmental behaviors are likely to elicit a “warm glow” of positive emotional responses.
238 Doing what I find important: Reflecting on values to change behaviour and improve wellbeing
Elliot Sharpe¹, Goda Perlaviciute¹, Linda Steg¹ (1. University of Groningen)

239 Creating social meaning: How major social events can change perceived group values
Thijs Bouman¹, Steph Johnson Zawadzki¹, Linda Steg¹ (1. University of Groningen)

240 More fun with less stuff: can we improve well-being through less environmentally intensive activities?
Amy Isham¹, Birgitta Gatersleben², Tim Jackson² (1. Centre for the Understanding of Sustainable Prosperity, University of Surrey, 2. University of Surrey)

241 Warm-glow from saving the planet: The role of intrinsic motivation in environmental decision-making
Sander van der Linden¹ (1. University of Cambridge)

242 Why meaning matters: Examining the relation between pro-environmental behavior and happiness
Steph Johnson Zawadzki¹, Danny Taufik², Linda Steg¹, Thijs Bouman¹ (1. University of Groningen, 2. Wageningen University & Research)

Friday 6th September 2019 | 13:45 – 15:15 | Levinsky Room
Environmental issues & health
Chair: Wang

243 London Mayor’s schools air quality audit: assessing the feasibility of recommendations and collection of baseline data
Hebba Haddad¹, Ben Barratt¹ (1. King’s College London)

244 Impacts of a changed atmosphere: Do increased CO2 levels decrease human cognitive performance?
Gesche Huebner¹, Robert Lowe¹, Tadj Oreszczyn¹ (1. University College London)

245 Acceptability of the use of enhanced weathering to help reduce climate change
Elspeth Spence¹, Nick Pidgeon¹, Emily Cox¹ (1. Cardiff University)

246 What we see when we see climate change: A comparison of EEG, ranked-preference and self-report data
Susie Wang¹, Berry van den Berg¹, Ana Lazovic¹, Daniel Chapman⁴, Adam Corner⁵, René San Martin⁶ (1. University of Groningen, 2. Yale, 3. Climate Outreach, 4. Universidad Diego Portales)

Friday 6th September 2019 | 13:45 – 15:15 | Room 206
Transport (2)
Chair: Robbins

247 Nudging for active transport – two natural experiments
Aslak Fyhri¹ (1. Institute of Transport Economics)
248 By bike to the stadium – does a bicycle parking lot lead to more pro-environmental behaviour of football fans?
Katharina Friedrichs¹, Annette Kluge¹ (1. Ruhr-University Bochum)

249 Comparing Drivers’ Visual Attention at Junctions in Real and Simulated Environments
Chloe Robbins¹, Harriet Allen², Peter Chapman² (1. University of Sheffield, 2. University of Nottingham)

Friday 6th September 2019 | 13:45 – 15:15 | Room 207
Public views on policy & participation
Chair: Williams

250 The public acceptance of fusion energy research in Europe: results from a cross-national survey study
Christian Oltra¹, Christopher Jones², Ana Prades¹ (1. CIEMAT, 2. University of Surrey)

251 SME decision making for decarbonization innovations: how people make decisions in the context of organizational culture, routines, and institutional logics.
Kevin Broecks¹, Suzanne Brunsting¹, Laurie Hermans¹, Renee Kooger¹ (1. ECN part of TNO)

252 Acceptance for cooperation - perspectives from European stakeholders on joint projects in the energy sector
Elisabeth Dütschke¹, Christian Oltra², Uta Burghard¹, Roser Sala Escarabill² (1. Fraunhofer ISI Karlsruhe, 2. CIEMAT)

253 “Quit playing games with my hub” - Towards a citizen-friendly implementation of microhubs in cities
Florian Müller¹, Sebastian Bobeth¹, Tom Assmann¹, Ellen Matthies¹ (1. Otto-von-Guericke University Magdeburg)

254 Talking to children about environmental issues: flooding
Sara Williams¹ (1. The University of the West of England)

Friday 6th September 2019 | 13:45 – 15:15 | Room 303
New Methods in Environmental Psychology
Chair: Mumenthaler
Symposium convened by Christian Mumenthaler

New methodological developments are changing the ways in which researchers investigate public attention and concerns toward environmental issues. These novels approaches open up opportunities to examine rich and complex data characterising the big data revolution that we are living today. Exploiting such methods will bring us closer to understanding how environmental concerns and behaviours are manifested in real life. In this symposium, four young researchers will spotlight new tools available to environmental and applied psychologists and show how they can contribute to understanding the human dimension of environmental sciences. Dimitrios Xenias (Cardiff University) will show how large-scale cross-national survey can be used to identify factors influencing public perceptions of carbon capture and storage technologies. Kimberly Doell (University of Geneva) will demonstrate the
high potential of experience sampling methods to track the dynamics of environmental behaviours in day-to-day life. Matthew Sisco (Columbia University) will discuss how to collect and analyse online news data to understand drivers on environmental concerns. Christian Mumenthaler (University of Geneva) will demonstrate how Twitter can be used to examine the relationship between public concerns about climate change and the experience of local weather events. Together these talks will point to ways in which we can expand our methodological toolkits in the 21st century.

255 Lessons learned from a large-scale cross-national survey on Carbon Capture and Storage
Dimitrios Xenias¹, Lorraine Whitmarsh¹ (1. Cardiff University)

256 Investigating environmental attitudes of the PISA 2015 population: Cross-national and school differences and correlates of students’ awareness of environmental matters
Marit List¹, Dennis Föste-Eggers², Daria Mundt³, Fabian Schmidt⁴ (1. Center for Environmental Systems Research, University of Kassel, 2. German Centre for Higher Education Research and Science Studies (DZHW), 3. University of Kassel, 4. University of Hamburg)

257 Environmental Behaviors in Everyday Life
Kimberly Doell¹, Beatrice Conte¹, Tobias Brosch¹ (1. University of Geneva)

258 Collecting and Analyzing Online News Data to Understand Drivers of Environmental Concern
Matthew Sisco¹, Silvia Pianta², Valentina Bosetti², Elke Weber⁴ (1. Columbia University, 2. Bocconi University, 3. Princeton University)

259 Using Twitter to Investigate the Relation Between Local Temperatures and Climate Change Concerns
Christian Mumenthaler¹, Roy Gava², Tobias Brosch¹ (1. University of Geneva, 2. University of St. Gallen)

Friday 6th September 2019 | 13:45 – 15:15 | Room 304
Mobility Forum
Chair: Reese

Many of us are aware of the fact that flying is one of the main contributors to the global climate breakdown. Still, many of us fly. Especially we as scientists have – ostensibly – various reasons to fly: We fly to conferences to present talks or posters, we are invited to present our work as keynote speakers, or we simply meet with fellow scientists to discuss future grant proposals. All in the knowing that this behaviour is highly problematic, resulting in a climate footprint that is beyond any scale of sustainability. At the same time, some scholars argue that CO2 emissions of flying “only” contribute 2-4% to global emissions, neglecting that only a small amount of humankind uses planes to travel. In this forum, I would like to discuss how we as scientists – and environmental psychologists in particular – can contribute to a shift in mental as well as material infrastructures that make scientific meetings more compatible with strong sustainability concerns and our meta-goal of decreasing emissions. There will only be a very brief input in order to provide sufficient room for a focused discussion.
Friday 6th September 2019  |  15:15 – 15:45  |  Atrium  
**Tea/Coffee**

Friday 6th September 2019  |  15:45 – 17:15  |  Lecture Theatre 2 
**Innovation in methods of restorative environments research**  
Chair: Svoray

260  **Exploring the restorative effects of environments through conditioning: The conditioned restoration theory**  
*Lars Egner*¹ (1. NTNU)

261  **Eye movements while viewing natural images in diverse vegetation periods**  
*Marek Franek¹, Jan Petružálek¹, Denis Šefara¹* (1. University of Hradec Králové)

262  **The fractal dimension of landscape photographs as a predictor of visual responses**  
*Agnès Patuano¹* (1. The University of Edinburgh)

263  **The role of culture in the association between exposure to nature and happy facial expressions**  
*Tal Svoray¹, Michael Dorman¹, Sarah Abu-Kaf², Robert Gifford⁴* (1. Ben-Gurion University of the Negev, 2. University of Victoria)

Friday 6th September 2019  |  15:45 – 17:15  |  Jill Craigie  
**Public perceptions of climate change and climate policy**  
Chair: Capstick  
Symposium convened by Anne van Valkengoed, Hans-Rüdiger Pfister, Emily Cox, Stuart Capstick, Nadja Contzen

Understanding public perceptions of climate change and climate change policies is critical for effective climate action. This symposium brings together the latest research on this important topic. First, two presentations focus on understanding and explaining climate change perceptions. Anne van Valkengoed and colleagues will present on how to conceptualise and measure climate change perceptions. Hans-Rüdiger Pfister and colleagues will show how people’s worldviews shape their climate change perceptions and recollection of climate information. Next, three presentation focus on perceptions and acceptability of climate change policies. Emily Cox will present a qualitative study on how people’s attitudes towards Carbon Dioxide Removal form. Stuart Capstick and colleagues will zoom in on two novel topics within the literature, namely perceptions of emissions reduction required to stop global warming and support for radical climate policies across countries. Nadja Contzen and colleagues will provide a moral and emotional perspective on perceptions of climate policies, showing how moral concerns can play a role in perceptions of and emotions towards Solar Radiation Management. This symposium showcases cutting-edge research on public perceptions of climate change and climate policy and highlights the theoretical and methodological diversity in studying this topic.
264 Developing and validating a climate change perceptions scale
Anne van Valkengoed1, Linda Steg1, Goda Perlaviciute1 (1. University of Groningen)

265 Recollecting climate change narratives: The role of worldviews.

266 Public attitudes to Carbon Dioxide Removal
Emily Cox1 (1. Cardiff University)

267 Does it feel morally right or wrong? A cross-cultural study on relationships between moral concerns, emotions and acceptability of Solar Radiation Management

268 Not for the faint-hearted: major emissions reduction and radical policy action is supported in the USA, Canada and Australia
Stuart Capstick1, Lorraine Whitmarsh1, Nick Nash1, Christina Demski1, Charles Ogunbode5 (1. Cardiff University, 2. University of Bergen)

Friday 6th September 2019 | 15:45 – 17:15 | Levinsky Room
Social identity and pro-environmental action
Chair: Reese
Symposium convened by Gerhard Reese, Torsten Masson, Immo Fritsche

Large environmental crises such as climate change or plastic waste are challenging humanity. As most environmental crises are global phenomena nowadays, spurred by human activity, solutions to these crises require collective efforts to mitigate consequences. In this symposium, we bring together innovative work from a social identity (SIT) perspective that offers insights into how group processes can facilitate or interfere with individual
proenvironmental behavior. Schulte, Rollin & Bamberg present how activist identities could evolve based on sympathizing with a collective goal. A conceptual explanation of this process is then presented by Barth, Masson & Chokrai who argue that a positive (collective) emotion of elevation will stimulate pro-environmental engagement. Masson, Fritsche, & Chokrai present a simple yet intriguing set of studies suggesting that group identity prompts may motivate to act pro-environmentally. Finally, two submissions present work on a specific social identity, the identification with the group of all humans. Loy and colleagues suggest that mind-body practices such as meditation may increase pro-environmental engagement through fostering global identification. Finally, Reese & Dieckmann present how identity on a global level predicts actual sustainable behavior in a resource management simulation.

269 The long and stony way from sympathizer to activist – The development of a collective activist identity
Maxie Schulte¹, Philipp Rollin¹, Sebastian Bamberg¹ (1. University of Applied Sciences Bielefeld)

270 Using positive emotions to facilitate proenvironmental change - the case for elevation
Markus Barth¹, Torsten Masson¹, Parissa Chokrai¹ (1. University of Leipzig)

271 Thinking “We” means “action”! The effects of salient social identity for pro-environmental action under conditions of perceived climate change threat
Torsten Masson¹, Immo Fritsche¹, Parissa Chokrai¹ (1. University of Leipzig)

272 Hype and hope? Mind-body practice predicts pro-environmental engagement through global identity
Laura Loy¹, Annika Leyendecker², Amina Sefovic², Kristina Speckert², Gerhard Reese¹ (1. University Koblenz-Landau, 2. University of Koblenz-Landau)

273 Think globally, harvest locally: Global identity predicts sustainable resource management in an experimental harvesting game.
Gerhard Reese³, Ulf Dieckmann² (1. University Koblenz-Landau, 2. International Institute of Applied Systems Analysis)

Friday 6th September 2019 | 15:45 – 17:15 | Room 206
Promoting sustainable food consumption by targeting relevant determinants
Chair: Bouwman
Symposium convened by Emily Bouwman

Our food choices have a considerable impact on the environment and therefore it is important to gain insight into how food choices can be steered into a sustainable direction. Moreover, to reach sustainable impact and long-term changes insight is needed into why interventions are (not) successful, by also considering the determinants of sustainable food choices. Emily Bouwman will start the symposium by presenting the state of the art when it comes to real-life interventions to promote sustainable food consumption: a systematic review on determinants regarding promotion of plant-based food consumption and/or reduction of animal-based food consumption. Following the line of the importance of considering determinants, Muriel Verain will present work on the development and validation of a sustainable food choice motives scale. Then, new studies that target sustainable food consumption and consider possible determinants are presented: Valentina Lozano Nasi will
discuss the effect of financial incentives on the number of sustainable products purchased while considering intrinsic motivation as a determinant. Finally, Wokje Abrahamse will focus on the effectiveness of information provision on self-reported meat consumption, while also investigating the effect on people’s attitudes and intentions and whether the information’s effectiveness depended on people’s motivations.

274 Real-life behavioural interventions to stimulate more plant-based and less animal-based diets: A systematic review
Danny Taufik¹, Emily Bouwman¹, Muriel Verain¹, Machiel Reinders⁴ (1. Wageningen University & Research, 2. Wageningen University and Research)

275 Sustainable food choice motives: the development and validation of the Sustainable Food Choice Questionnaire (SUS-FCQ)
Muriel Verain¹, Harriette Snoek², Emily Bouwman¹ (1. Wageningen University & Research, 2. Wageningen University and Research)

276 Financial incentives for a more sustainable diet
Valentina Lozano Nasi¹, Nadja Zeiske¹, Ellen van der Werff¹ (1. University of Groningen)

277 Encouraging people to eat less meat: the role of message framing, values, and identity
Wokje Abrahamse¹ (1. Victoria University of Wellington)

278 Predicting the consumption of expired food by an extended theory of planned behaviour
Karolin Schmidt¹ (1. Otto-von-Guericke University Magdeburg)

Friday 6th September 2019 | 15:45 – 17:15 | Room 207
Environmental psychology debates
Chair: Hoogendoorn

279 Comparing Affective Responses to Nature Experienced Via Different Environment Presentation Methods
Mark Newman¹, Birgitta Gatersleben¹, Kayleigh Wyles¹ (1. University of Surrey)

280 Opinion clusters in academic and public debates on growth-vs-environment
Stefan Drews³, Ivan Savin¹, Jeroen van den Bergh¹ (1. Institute of Environmental Science and Technology, Universitat Autònoma de Barcelona)

281 Critically Examining the Emergence of Enviromaterialist Consumers in Industrialised China and India
Prof Janine Dermody¹, Anita Lifen Zhao², Nicole Koenig-Lewis³, Stuart Hanmer-Lloyd⁴ (1. Oxford Brookes University, 2. Swansea University, 3. Cardiff University, 4. University of Gloucestershire)

282 Tampering, tinkering and messing with nature: a systematic review on the construct tampering with nature
Gea Hoogendoorn¹, Bernadette Suetterlin¹, Michael Siegrist¹ (1. ETH Zürich, Institute for Environmental Decisions)
Friday 6th September 2019 | 15:45 – 17:15 | Room 303
Water management and marine citizenship
Chair: Buchan

283 Psychological ownership and acceptability of policies directed towards management of water systems
Vanja Medugorac¹, Geertje Schuitema¹, Teresa Hooks¹ (1. University College Dublin)

284 A drop in the ocean? Fostering water-saving behaviour and spillover through informational feedback
Lorraine Whitmarsh¹, Paul Haggar¹, Nick Nash¹ (1. Cardiff University)

Sophie Davison¹ (1. European Centre for Environment and Human Health, University of Exeter Medical School)

286 Citizens of the Sea: defining marine citizenship
Pamela Buchan¹ (1. University of Exeter)

Friday 6th September 2019 | 15:45 – 17:15 | Room 304
Extinction Rebellion
Chair: Kenward

Recent times have seen an upswing in mass civil disobedience - a new form of activism in the context of UK environmental campaigns. Youth strikers have walked out of school en masse, and Extinction Rebellion has taken the view that conventional politics and campaigning are demonstrably incapable of preventing catastrophe, and only intense illegal disruption of ordinary life can bring the necessary changes – in London during the April Rebellion alone, over 1000 people were arrested for such acts. This session will feature presentation of data describing public responses to Extinction Rebellion activities, including longitudinal (n = 850) and experimental (n = 1500) samples, weighted to be nationally representative. Experimental results show that exposure to media about the April Rebellion increased support for it and reported intentions to join in with it, with these effects applying across the political spectrum. Longitudinal results show an increase in concern about the environment. The session will also feature extended discussion of the psychological aspects of this new activism, with all attendees encouraged to contribute. Discussion questions include: what can disobedient activists learn from environmental psychologists; and what are the implications of the arguments and methods of disobedient activists for the future of environmental psychology?

Friday 6th September 2019 | 17:15 – 17:45 | Lecture Theatre 1
ICEP 2021 & Close
Chair: Sabine Pahl
BOOK OF ABSTRACTS
ORAL AND SYMPOSIA ABSTRACTS

001
Nature, stress recovery, and (mal)adaptive thoughts
Daphne Meuwese¹, Karin Tanja-Dijkstra¹, Jolanda Maas¹, Sander L Koole¹ (1. Vrije Universiteit Amsterdam, 2. Saxion University of Applied Sciences)

Epidemiological and experimental studies have shown that exposure to nature has benefits for (mental) health and well-being. In recent years several nature-based therapeutic interventions have been developed following this notion, however the scientific evidence base for these interventions continues to lag behind. At the same time, mental health problems like burn-out and depression keep intensifying, especially amongst university students. The present controlled experiment aimed to assess the impact of nature on core components of these mental health problems, namely stress regulation and (mal)adaptive thinking patterns. A total of 130 students participated in this study. The design was based on the influential study by Ulrich and colleagues (1991). Similar to the original paper, participants viewed a stressful movie, and then watched a 10-minute video of one of six natural or urban environments. Outcome measures included both self-reported measures (ZIPERS, (Mal)Adaptive Thoughts, and Absorption) and psychophysiological measures (HRV, RSA, PEP, and Skin Conductance). It was hypothesized that, during stress recovery and more specifically during increased parasympathetic activation, participants would have more adaptive thoughts and less maladaptive thoughts while watching natural surroundings, compared to watching urban surroundings. Preliminary results and their implications will be presented.

002
Tales from the Global South: people-related factors influencing restoration in urban parks of a megacity.
Jessica Felappi², Jan Sommer³, Wiltrud Terlau³, Theo Kötter³ (1. University of Bonn, 2. Bonn-Rhein-Sieg University of Applied Sciences)

Empirical evidence on the effect of urban green spaces on human health and well-being still suffers from a geographical bias towards the Northern Hemisphere. Studies in the Global South could help to fill the knowledge gap on the potential role of geographic conditions, local demands, and culturally-specific perceptions and behaviors shaping human-nature relationships. This study selected the megacity of Sao Paulo to investigate the role of people-related factors on restorative experience in urban parks. Sao Paulo is the most populous city of Brazil and of the whole Southern Hemisphere, and differently from more developed cities, social inequality is evident. Its green spaces system also suffers from unequal distribution and quality. To understand the restorative experience in urban parks of this megacity and the potential effect of social inequalities and other person factors, the sample comprehend 18 urban parks located in areas with different levels of social vulnerability, and 500 parks visitors in total. The effect of personal factors (e.g. gender, income, connectedness to nature, and stress level) and behavioral factors (e.g. motivation, activity and exposure) on perceived restorativeness and restoration outcomes will be explored and preliminary results of the fieldwork conducted in the first semester of 2019 will be presented.
Choosing a walk in nature or downtown? A mixed-methods study of cognitive and sensory preferences of outdoor places for walking in older age

Marica Cassarino¹, Eleanor Bantry-White², Annalisa Setti² (1. University of Limerick, 2. University College Cork)

Introduction – The restorative and health benefits of nature are well-established; the presence of nature also promotes active lifestyles, such as walking. However, the influence of individuals’ stimulation preferences and perceived restorative potential of nature on the choice of outdoor spaces for physical activity remains under-investigated, particularly in older people, for whom walking outdoors is one of the main ways to exercise. This study explored the cognitive and sensory dimensions of preferences of outdoor spaces for walking in community-dwelling older adults.

Methods – In this convergent parallel mixed-methods investigation involving 140 healthy people aged 60+, we completed: 1) a qualitative study (walking interviews, focus groups) exploring the cognitive/sensory reasons of outdoor preferences for walking; 2) a quantitative study (survey) testing associations between walking preferences and cognitive/sensory vulnerability. Results – While most participants liked walking in outdoor spaces that offer variety and greenery, the choice of walking in nature or urban spaces varied both between and within-person based on the individual’s cognitive/sensory needs (stimulation seeking vs. avoidance), affective attitudes towards nature, and need for social engagement. Conclusions – Our findings suggest that older people’s use of outdoor spaces depends on a complex association between individual cognitive/sensory needs and socio-physical characteristics of the environment.

Growing up: Naturally Happy? The benefits of nature for children.

Femke Beute¹, Agnes van den Berg¹ (1. University of Groningen)

Happy children become happy adults. A growing body of evidence points at the importance of exposure to-and experience with-nature for the healthy development of children. Nature encounters have proven quintessential for emotional wellbeing, for an optimal cognitive and motoric development, and for several dimensions of both mental and physical health. And not only that, besides individual gains it also contributes to global wellbeing as positive experiences with nature also boost environmentally-friendly behaviours. While study results consistently show a merit of benefits of nature for children, the question remains how these effects occur. Scholars often refer to well-known restoration theories such as Stress Reduction Theory and Attention Restoration Theory; theories developed for adult restorative outcomes of nature. But do these benefits apply in the same manner for children? By presenting an overview of the benefits of nature for children, and by contrasting these with the adult restoration literature, we propose that different mechanisms may apply for children than for adults and that these pathways may differentiate between the different developmental stages during childhood.
Restorative effects in differently managed forests - A field experiment

Jenni Simkin, Ann Ojala, Liisa Tyrväinen (1. Natural Resources Institute Finland)

Introduction: Despite the research recognizing the importance of nature for human health, it remains unclear if the restorative effects are influenced by factors such as forest management decisions.

Methods: We investigated whether peoples’ restorative experiences vary in forests with different management decision and/or age: 1) an urban recreation forest, 2) a mature commercial forest, 3) a young commercial forest, and 4) an old-growth forest in its natural state. The participants (39 women and 27 men), visited each forest once under the direction of the researcher. The experiment included 15-min of observation, followed by 30-min of walk inside the forest. We measured perceived restorative outcomes (ROS), vitality (SVS) and positive and negative emotions (PANAS) during the experiment and perceived restoration (PRS) after the experiment.

Results: The restorative effects increased significantly in all forests but the highest effects were in the old-growth and mature commercial forests and the smallest in the young forest. The PRS-results were in line with the other measures of restorative effects.

Discussion: The forest management decisions and stand age has an effect to the recreational values and should be taken into account in land use planning and management of recreation forest.

Expert Views on Agents and Approaches to Plastic as a Systemic Risk – Results of an Expert Survey in Germany

Julia Steinhorst, Katharina Beyerl (1. Institute for Advanced Sustainability Studies (IASS) Potsdam)

Due to its material characteristics and ubiquitous use, plastic has reached every place on Earth and poses a systemic risk to the environment and the health of living beings. In order to develop feasible, fair and acceptable approaches that help alter and reduce plastic consumption, our research project aims at identifying patterns of perception and behavior within the German public. In a first step, we conducted a qualitative expert survey in autumn and winter 2018/19 to identify possible starting points for reducing the amount of plastic packaging for food and beverages. 28 experts from politics and administration, economy, civil society and science answered nine open questions about potential problems regarding plastics, agents, approaches and their own contribution as well as the role of consumers. Replies were analyzed using qualitative content analysis. Results show, that experts see a number of relevant agents and approaches to the problem, differing largely depending on the surveyed sector. In particular, we found a great variety in how plastic is perceived as a problem by the surveyed experts. Furthermore, the experts’ assessments of consumer agency and their own contributions to solving the “plastic problem” will be described and discussed.
Perceptions of Arctic marine ecosystems and the impact of marine plastic pollution

Elizabeth Gabe-Thomas¹, Kayleigh Wyles², Nicola Beaumont¹ (1. Plymouth Marine Laboratory, 2. University of Surrey)

Although remote ecosystems such as the coast and seas around Svalbard are traditionally perceived as unspoilt environments, recent research has shown that marine plastic pollution is adversely affecting these ecosystems and the benefits they provide to humans (ecosystem services). Gaining an understanding of how the public perceive the services provided by an ecosystem is important, as perceptions can affect support for ecosystem management and behavioural intentions towards marine conservation. Integrating environmental psychology with ecosystem service approaches, the present study examines the extent to which the marine ecosystems in Svalbard are perceived to offer specific benefits and the extent to which these benefits are perceived to be at risk from plastic pollution. A short survey was administered to visitors and residents of Svalbard (N=179). Personal factors, such as value orientations were measured alongside intentions to engage in behaviours that contribute to a reduction of plastic pollution in the ocean. The results show that while plastic risk perceptions, can predict behavioural intentions, it’s likely that this is a product of their relationship to biospheric value orientations.

From Fascination to Conservation: Can marine wildlife tourism trigger responsible handling of plastic?

Isabel Richter¹ (1. University of Plymouth)

The demand for wildlife tourism increases rapidly each year. Especially encountering charismatic species like cetaceans ranges high on the list of people’s favourites. Ideally, this kind of tourism should provide positive outcomes for tourists and wildlife alike. In practice, this is questionable and seldom measured. This project aims to explore the potential of marine wildlife experiences to catalyse responsible handling of plastic. Before creating any intervention, the project establishes a theory of learning in tourism contexts and investigates the target audience. The literature review concludes that an effective educational experience in tourism contexts is characterized by social interaction, emotional involvement and action implementation planning. To get a picture of the target audience, structured behavioural observations and two surveys have been conducted in collaboration with whale watching companies in Northern Norway (N=109) and the Azores (N=84) to measure emotions, behavioural intentions and conservation priorities. Data analysis shows that whale watching provides ideal conditions for learning as for the high level of social and emotional involvement. Of all conservation behaviours, plastic related actions are mentioned most in free recall. Action intentions are predicted by action knowledge and ascription of responsibility. Opportunities for intervention design shall be discussed.
Polluting our region or our world? Perceived local versus global consequences of microplastics pollution, local versus global identification and intention to reduce microplastics

Nadja Contzen¹, Lise Jans¹, Russell Spears¹ (1. University of Groningen)

Many environmental problems, including microplastics pollution, have both, local and global consequences. Often, it is assumed that local but not global consequences motivate people to fight pollution. However, we suggest that motivation is also contingent on people’s identification with the respective communities. The more locally identified, the more people might be motivated to fight local environmental problems; the more globally identified, the more people might be motivated to fight global environmental problems. To test these assumptions we conducted a longitudinal experimental study among Dutch citizens (N=400). At T1 we provided information on either the regional or global consequences of microplastics pollution. We measured regional and global identification, intention to reduce microplastics pollution, and factors potentially mediating the effect of identification on intention at T1, T2 (2 months after) and T3 (another 2 months later). We investigate by means of moderated mediation analyses (i) whether stronger regional or global identification, respectively, is related to higher intention to reduce microplastics pollution, depending on whether microplastics pollution is perceived as a regional or global problem, and (ii) which factors mediate the identification-intention relation, depending on the problem level. We discuss the implications of our study for the development of environmental campaigns.
Plastic or non-plastic food packaging? An investigation of explicit and implicit attitudes to consumer adoption

Nicole Koenig-Lewis¹, Adrian Palmer², Laura Grazzini³ (1. Cardiff University, 2. Henley Business School, Reading University, 3. University of Florence)

UK households currently use 525,000 tonnes of plastic food packaging annually, of which only one third is recycled. Government agencies frequently encourage adoption of ecologically-friendly packaging, however, although consumers may express preference for ecologically-responsible alternatives, subsequent behaviour may differ.

Drawing from implicit attitude theory (IAT), value-belief-norm theory (VBN), value-identity-personal norm model (VIP), this study investigated the role played by implicit/explicit attitudes, values and environmental self-identity on consumers’ purchase intention. Six IAT studies (2 lab- & 4 online-studies) with ~100 respondents each were undertaken. Respondents also completed a self-report survey.

Findings for Studies 1 and 2 confirmed positive implicit attitudes towards compostable packaging across two food categories, but dissociation between implicit/explicit measures. Studies 3-6 suggested that compared to plastic packaging, plastic-free packaging is seen implicitly as better, healthier, tastier and more linked to the self, but showed dissociation between implicit/explicit attitudes and purchase intention. VBN and VIP predicted consumer’s purchase intention, informing policies to nudge consumers towards choosing sustainable food packaging. More insights from moderated mediation analyses using SPSS Process will be provided at the conference.

This study, with replication, contributes knowledge through greater understanding of self-reported measures and their relationship to implicit evaluations that may encourage/inhibit consumers’ sustainable packaging choices.

The role of trust for climate change mitigation and adaptation behaviour: A meta-analysis

Viktoria Cologna¹, Michael Siegrist¹ (1. ETH Zürich, Institute for Environmental Decisions)

Successful climate change mitigation and adaptation require a high level of trust in experts. In an era of rising science-denialism and expert-distrust, understanding the role of trust in expert groups for climate change mitigation and adaptation behaviours is key. By reviewing the literature, we found that several trust measures influence mitigation and adaptation behaviour, namely trust in political institutions, scientists, the industry and environmental organisations, as well as general trust in people. By drawing on data from 53 studies collected in 35 different countries, we conducted a meta-analysis to explore the strength of these relationships. We find relatively strong associations of trust in scientists with the uptake of and support for several mitigation and adaptation behaviours. We present the implications that this finding has for climate scientists and discuss how scientists and other experts could engage to potentially increase trust levels.
How do people spend money they save by behaving pro-environmentally? An experimental test of the indirect rebound effect.

Lieke Dreijerink, Michel Handgraaf, Gerrit Antonides (1. Wageningen University & Research)

Saving energy usually also implies saving money. The extra savings may subsequently lead to additional consumption of goods or services that require energy, thus diminishing the energy savings. This is called the indirect rebound effect. Our study focused on establishing the existence of an indirect rebound effect in a consumer experiment. In a preregistered study we investigated whether participants (242 MTurk members): 1. Are subject to the indirect rebound effect; 2. Are unaware of the indirect rebound effect; 3. Can be made aware of their inconsistent behaviour; 4. Will show less indirect rebound when made aware. Participants completed a task on assessing the safety of cycling situations in cities (task focus: environmental vs. financial). Next they were asked to choose between rewards that varied in environmental impact. They either did or did not receive information on this impact (impact information: yes/no). Results showed that participants indeed made environmentally unfriendly choices after behaving pro-environmentally, and that they were unaware of this. Furthermore, financial-focus participants who received information made a less impactful choice than when they did not receive information, while environmental focus participants made a higher impact choice after receiving information. Possible explanations are discussed.

Why do people participate in grassroots-based sustainability initiatives? Diverging predictor patterns for users and volunteers

Stephanie Moser, Stephan Schmidt, Christoph Bader (1. University of Bern)

Introduction: Grassroots-based sustainability initiatives experiment with alternative ways of consumption and are thus promising agents for fostering pro-environmental behavior change. At the same time, sustainability initiatives depend on high levels of volunteering and collective action. The present contribution aims for a better understanding of why people participate in sustainability initiatives, and whether such engagement is an expression of a broader sustainable lifestyle.

Methods: We tested the predictive importance of different motivational factors derived from grassroots innovation research, the theory of planned behavior, and theories on collective action, using data from a cross-sectional factorial survey among members of different sustainability initiatives in Switzerland (N=180).

Results: Our results revealed diverging predictor patterns for different degrees of involvement. The intention to use initiatives’ services and offers was best predicted by favorable attitudes and perceived behavior control, whereas the intention to volunteer was primarily based on strong social identity and high participative efficacy beliefs. Furthermore, our results revealed that participation in sustainability initiatives concurs with several private-sphere pro-environmental behaviors.

Discussion: We conclude from our results that the discrepancy in motivational factors between users and volunteers might pose a challenge to the success of sustainability initiatives and thus deserves greater attention in future research.
Can high levels of attitude explain political activism? Examining the influence of environmental attitude and proactivity on environmental activism.
Anne K. Overbeck\textsuperscript{1}, Alexandra Kibbe\textsuperscript{1} (Otto-von-Guericke University Magdeburg)

Introduction
In the light of the recent proliferation achieved by the worldwide ‘Fridays for Future’-movement, interest in the understanding and predictability of such environmental activism has resurrected. This study investigates the influence of environmental attitude and proactivity on this behaviour.

Methods
With a convenience sample of $N = 326$ we examined which factors account for environmental activism. In accordance with the Campbell paradigm, environmental activism was measured indirectly via self-reported participatory and social engagement behaviour geared towards environmental protection. The 32 items form a new, reliable, one-dimensional scale.

Environmental attitude was measured with the well-established General Ecological Behaviour scale by Kaiser and Wilson and proactivity was assessed using an eight-item-scale developed by De Vries and colleagues.

Results
As was expected, environmental attitude was found to be a strong predictor of environmental activism. Concurrently, proactivity predicted environmental activism, while no significant relationship was found between the two independent variables.

Discussion
We already know, that environmental attitude consistently explains various forms of pro-environmental behaviour. It appears however, that to coherently predict whether someone with a high environmental attitude will engage in activist behaviour to pursue their goal, the additional consideration of personality traits such as proactivity is decisive.
Appealing attributes of low carbon innovations
Hazel Pettifor1 (1. University of East Anglia)

Introduction

Consumer adoption of low carbon innovations could significantly reduce CO2 emissions, in key sectors such as mobility and food. Many studies show that low carbon innovations perform poorly against the core attributes of mainstream technologies. In this paper we explore the range of public benefits that could create novel appeal for low carbon.

Methods

We used repertory grid technique, interviewing over 65 people. Participants discussed and rated the mass market appeal of 12 low carbon innovations from mobility, food, homes and energy. Analysis consisted of qualitative and quantitative.

Results

We identified 11 distinctive attributes within private and public domains. Low carbon innovations appealed more against public domain attributes where unique added value related to creating social networks, improving community, autonomy from incumbents, lowering CO2 and reducing pollution.

Discussion

Marketing is a powerful form of differentiation. It is important that low carbon innovations are positioned to emphasize unique sources of added value above incumbents. Our study shows they appeal against a range of public attributes. Market growth is more likely within niche markets, segments of consumers who value local provision, the sharing economy, improved environment, lower pollution, better use of local resources, and wider benefits to society.
EnerGAware: Factors Affecting Energy Use in Social Housing Residents and Recommendations for Energy Behaviour Change Intervention Development
Rebecca Hafner¹, Sabine Pahl¹, Rory Jones¹, Alba Fuertes¹ (1. University of Plymouth)

Introduction: Despite research efforts and current EU decarbonisation objectives, emissions from buildings have increased in recent years. Indeed, in 2016, emissions from buildings were found to account for 19% of all UK greenhouse gas emissions, within which 76% was attributable to domestic households. Consequently, determining means of reigniting progress in the decarbonisation of the domestic built environment is a key challenge faced by environmental scientists. The current research presents a qualitative exploration of factors affecting domestic energy consumption practices within the social housing sector. Method: We present the results of a series of one-on-one interview sessions, conducted with 20 participants who had previously taken part in a behaviour change intervention programme designed to reduce domestic energy demand. Results and discussion: Perceptions of varying behavioural intervention techniques were explored using an open-ended discussion framework. In addition, we aimed to develop understanding of participants’ decision making processes in this context, as well as providing insight on key psychological barriers to behaviour change which prevented participants from using less energy. These included the perception of comfort, already low usage, and habit. Ideas for ongoing intervention development are discussed, including preference for tailored non-technical visualisation tools, and implications for future policy development are considered.

Household Energy Use and Conservation: A Preliminary Study from Turkey
Ece Akca¹, Çağlar Solak², Büşra Yılmaz³, Melek Göregenli³ (1. Ege University, 2. Manisa Celal Bayar University, 3. Independent Researcher)

Introduction: According to Theory of Planned Behavior [TPB] the strongest determinant of behavior is intention which is shaped by attitudes, subjective norms and perceived behavioral control. The aim of the current study is to examine the psychological and demographic factors underlying household energy usage from the perspective of TPB. Furthermore, cultural norms and personal values for environmental concern were added into the study.

Methods: The data was collected via online survey from 209 participants. The relationship between demographic variables and psychological variables, and predictors of attitudes toward energy saving behaviors and behavioral intentions were investigated.

Results: Results revealed that willingness to sacrifice for environment is related to education level but not level of income. Being leftwinger is related to personal values, however being rightwinger is related to cultural norms. Similarly, New Ecological Paradigm Scale scores were negatively correlated with religiousness and political orientation. Attitudes were predicted by personal values and perceived control over the behaviors. Behavioral intentions were predicted by attitudes, personal values and perceived control. Additionally, attitudes were mediated the relationship between personal values and behavioral intentions.

Discussion: Results of the study supported the predictions of TPB, as well as showed the importance of personal values for pro-environmental behaviors.
Can energy social innovations deliver Energy equality? Preliminary findings from the SMARTeES H2020 project

Giuseppe Pellegrini-Masini (1. NTNU)

Introduction

Energy equality is a novel concept, grounded in the energy justice policy paradigm, which has been proposed and discussed recently. It is also a guiding principle of the empirical analysis of the SMARTeES WP6 project, a H2020 multinational research investigating the potential of energy social innovations (SIs) to achieve sustainable communities.

Methods

Five to six qualitative interviews were conducted for each leading case of the five project clusters regarding: holistic mobility plans, islands and renewable energy, district regeneration, mobility in superblocks and energy efficiency against fuel poverty. The interviews’ results will be analysed along with each projects’ literature using an energy equality framework.

Results

The results will be presented highlighting whether the SIs delivers or contributes to an energy equality improvement in the communities hosting the projects. Further drivers and barriers influencing citizens’ engagement with the SIs will be highlighted and interpreted within a theoretical framework of environmentally significant behaviour centred on psychological, contextual and resources variables.

Discussion

The results will be discussed in the context of current research on SIs and EU policy promoting sustainable SIs. Policy recommendations will be outlined pointing to possible policy interventions suitable to facilitate participation energy SIs.
Does more knowledge about climate change result in lower carbon footprints?

Ferdinand Kosak¹, Sven Hilbert¹, Elisabeth Franz¹, Barbara Alsu¹ (1. University of Regensburg)

Introduction. Results concerning the impact of knowledge on sustainable behavior are contradictory: while research describing a knowledge-behavior-gap emphasizes that knowledge alone has hardly any impact on sustainable behavior other studies report small to medium correlations of knowledge and sustainable behavior.

However, latest research shows that effects on intention-oriented measures regarding climate change might not actually result in the corresponding output in emissions. Thus we studied the role of knowledge measuring sustainable lifestyles by using a carbon footprint to investigate its relation with both established and new knowledge scales regarding climate change.

Method. 371 participants took part in an online-survey starting with a carbon-footprint-questionnaire followed by four scales covering different aspects of knowledge about climate change.

Results. Our results show that none of the established knowledge-scales is associated with the carbon footprint while only knowledge concerning total emissions corresponds with a slightly lower carbon footprint.

Discussion. Our findings suggest that prior findings regarding the impact of knowledge on sustainable behavior might overestimate the actual outcome in emissions. However, knowledge concerning the quantity of these emissions seems to be relevant for sustainable living. Implications for future research and climate communications are discussed.

Whose ‘flexibility’? – Analysis of Austrian end-users’ perspectives on demand-side flexibility and potential conflicts of use with their own interests

Andrea Werner¹, Kurt Leonhartsberger¹, Susanne Schidler¹, Daniel Bell¹ (1. University of Applied Sciences FH Technikum Vienna)

The decentralization of the renewable energy system increases the challenge of balancing the intermittent supply and demand. Expanding automated demand-side-management measures to private household technologies (e.g. heat pumps, e-vehicles, battery storage or e-boiler) is one solution to raise the “flexibility potential”, thereby increasing the grids’ balancing capacities. However, it requires households to allow external control over said devices limiting their own “flexibility”. Users initial buying motivations and expected benefit of the devices may conflict with grid-relevant strategies. Additionally, other aspects that determine technology acceptance following the TAM[1] may be relevant, e.g. need for technology control, perceived risks, data security, trust in the provider, environmental consciousness or technical affinity. So far, empirical insights on households’ perspectives on grid-relevant usage of their components are limited. Within FLEX+[2], end-users’ perspectives, motivators, expectations, compensation and non-monetary incentives for grid-relevant services are assessed with focus groups and validated by an online survey among Austrian households. This contribution shows empirical insights on end-users’ perspectives and discusses implications on user-oriented business models for demand-side-flexibility.
Predicting meat consumption: The role of VBN, social norms and health concern.

Ferdinando Fornara¹, Amanda Elizabeth Lai², Francesca Tirotto³, Annapia Sessa⁴, Stefano Pagliaro⁴


This contribution regards a research line exploring the role of socio-psychological antecedents on the reduction of meat consumption, starting from the evidence that meat production is one of the most significant contributors to the existing greenhouse gas.

The first study (N=198) tested the predictive power of an extended version of the Value-Belief-Norm (VBN) model on a simulated food choice, in fact participants were asked in an online survey to buy food products in a virtual shop and then to respond to a questionnaire. The outcome variable was the percentage of money spent for meat and meat derivates. Results substantially confirm the VBN sequential path, show the indirect role of social norms, and provide a proof of convergent validity of the new behavioural measure.

The second study (N=237) aimed at verifying whether meat consumption reduction could also be motivated by perceived health outcomes, given the health implications of this pro-environmental behaviour. An online questionnaire similar to the first study, including the virtual shopping, was administered to participants, with the addition of a measure of health concern. Results show the significant role of perceived health outcomes as well as the distinct weight of the “pro-environmental” path in predicting the vegetarian food choice.

Environmentally friendly meal composition and the influence of organic labels

Angela Funk¹, Bernadette Suetterlin¹, Michael Siegrist¹ (1. ETH Zürich, Institute for Environmental Decisions)

About one third of the total environmental impact caused by humans is related to food production. The environmental impact related to nutrition varies considerably depending on the foods selected. Therefore, consumers’ food choice is important. The aims of this study were to investigate consumers’ ability to compose environmentally friendly meals using a fake food buffet in a laboratory setting as well as investigating the influence of organic labels and possible arising moral licensing tendencies on meal composition.

Results show that consumers’ meal composition did not differ in terms of environmental impact when they were instructed to compose themselves an environmentally friendly meal compared to when they received no such instruction. Also, there were no differences in meal choice when the buffet consisted of organic versus conventional food products.

These findings reveal that people are obviously not able to compose adequate single food items for creating environmentally friendly meals. Therefore, there is a need to better inform consumers about the environmental impact of food and how to compose environmentally friendly meals to increase knowledge and ability to act environmentally friendly in their food consumption.
The influence of salient environmental identities on organic food consumption
Sandor Czellar\textsuperscript{1}, Leïla Rahmani\textsuperscript{1}, Valentina Clergue\textsuperscript{1}, Christian Martin\textsuperscript{4} (1. University of Lausanne, 2. Maynooth University)

Introduction: We investigate the effect of environmental identity and its salience on a real consumption behavior.

Methods: We manipulated environmental identity salience (high vs. low) and product description (“organic orange juice” vs. “orange juice”) in a laboratory test of an organic drink (N = 203). We measured baseline environmental identity levels. We took several dependent measures (e.g., product sensory ratings, quantity consumed, word-of-mouth, overall liking).

Results: We found a significant interaction between environmental identity salience and product description on drink freshness perceptions, $F(1,199)=4.45$, $p=.04$. Participants perceived the drink as more refreshing when their environmental identity was salient and the drink was labelled as “organic orange juice” (vs. “orange juice”), $M=5.11$, $M=4.33$, $F=5.90$, $p=.02$. We found similar effects on perceived healthiness, $M=4.77$ vs. 3.98, $F=6.80$, $p=.01$; sugar level, $M=4.15$ vs. 4.82, $F=4.73$, $p=.03$; quantity drunk, $M=216$ vs. 172 grams, $F=3.24$, $p=.07$; word-of-mouth, $M=4.01$ vs. 3.41, $F=3.51$, $p=.06$; and overall liking, $M=5.45$, $M=4.88$, $F=4.09$, $p=.04$. No effects were found regarding baseline environmental identity.

Discussion: Findings suggest that environmental identity salience is a more important construct than baseline environmental identity when studying real food consumption and reactions to organic-labelled products. Next steps involve experiments with alternative manipulations, process measures and other products.
MyFoodways®: An evidence-based mobile application to promote environmental-friendly and healthy meal preparation

Vivianne Visschers1, Vanessa Feck1 (1. University of Applied Sciences and Arts Northwestern Switzerland)

Introduction: Ideally, consumers should prepare meals with 1) a good nutritional balance and 2) a low environmental impact. Many consumers find this challenging and would benefit from a support tool. In several studies, we evaluated the effectiveness of a mobile application (an “app” called MyFoodways®) that stimulates, among others, the preparation of healthy meals with less meat, seasonal ingredients and leftovers.

Methods: In a longitudinal survey among potential users (N = 136), we investigated how the app and users’ intention, practical knowledge and self-efficacy influenced their healthy and environmental-friendly meal preparation both before (T0), one week (T1) and three weeks (T2) after starting to use it.

Results: At T1 and T2, participants reported to have prepared healthier and environmental-friendlier meals than at T0 and T1, respectively. The preparation of healthy and environmental-friendly meals at T1 was influenced by longer app usage but not by intention, practical knowledge or self-efficacy at T0. At T2, participants’ self-efficacy and practical knowledge at T1 determined their healthy and environmental-friendly meal preparation.

Discussion: Users should be encouraged to use the app for a longer time as this leads to healthier and environmental-friendlier meal preparation. Moreover, the app should evoke practical knowledge and self-efficacy in users.

Two Birds One Stone: The Effectiveness of Health and Environmental Messages to Reduce Meat Consumption

Emily Wolstenholme1, Wouter Poortinga1, Lorraine Whitmarsh1 (1. Cardiff University School of Psychology)

Introduction: Excessive consumption of red and processed meat not only has negative health outcomes, but also contributes to several environmental problems, including climate change. The current presentation reports on a study that aimed to test the effectiveness of different messages on encouraging people to eat less red and processed meat. Methods: The study involved a two-week intervention in which 320 university students received different messages via Facebook Messenger. There were four messaging conditions: control, health, environmental, combined health and environmental. Meat consumption was recorded at three time points: just before the intervention started, shortly after it had finished, and at a one month follow-up. Results: The results show that all participants decreased their red and processed meat consumption over time. Participants who received health, environmental and combined messages ate significantly less red and processed meat as compared to control participants shortly after the intervention had finished, while those in the combined condition also ate significantly less processed meat one month later. Discussion: These findings highlight the potential for framing meat reduction both in terms of health and the environment, in order to encourage behaviour change.
How senses of place shape perceptions of social, environmental and overdevelopment risk
Tara Quinn¹, Francois Bousquet², Chloe Guerbois³ (1. University of Exeter, 2. CIRAD, Green Research Unit, 3. Nelson Mandela University)

Introduction: An increasing focus on place based planning and adaptation processes brings to the fore the importance of understanding the situated experience of social and environmental change. Populations do not respond uniformly to environmental and social change, and given that consensus is needed to successfully achieve inclusive adaptation it is important to understand how and why people are more sensitive to certain changes and risks over others. Using a sense of place lens, we investigate how an individual’s relationship with their property and their town shapes their sensitivity to a range of risks. Methods: To investigate this, we conducted a survey in coastal towns in South Africa, UK and France to examine the relationship between multiple dimensions of sense of place with place-based risks (n=700). Results: We found that relationship with place matters differently for perception of social, environmental and overdevelopment risk. In particular, we find that feeling safe in place correlates with reduced perceptions of social risks but increases the likelihood of perceiving environmental risk. The role of place in risk perception is stronger at the property scale than the town scale. Discussion: Our findings have implications for risk communication around social and environmental change.

The effects of place attachment style on flood risk adaptive behaviours
Alexandra Stancu¹, Silvia Ariccio², Marino Bonaiuto² (1. West University of Timisoara, 2. Sapienza University of Rome)

Psychological aspects of people exposed to floods can be crucial to improve their adaptation to environmental changes (van Valkengoed & Steg, 2019), such as those caused by floods. The present study aims to test patterns of cognitive, emotional and behavioural coping associated to three different place attachment styles (secure, preoccupied and fearful-avoidant), regarding people living in Romanian high flood risk areas (N=237). Results show that Secure Place Attachment has a positive direct and indirect effect on Positive Coping and a negative indirect effect on Negative Coping. Results also provide a significant path, with good fit indexes, for the relationship between Secure Place Attachment and Positive and Negative Coping, through Solastalgia and Distress-Hyper-arousal. Preoccupied Place Attachment has a positive direct and indirect effect on Positive Coping: Two path models are tested and one proves good fit indexes. Fearful-Avoidant Place Attachment has a negative indirect effect on Positive Coping: The path model for Fearful-Avoidant Place Attachment does not show good fit indexes, but its theoretical implications are worth discussing. Results for each place attachment style stress how such previously ignored variable can be important for understanding specific cognitive, affective and behavioral responses from different people threatened by the same flood risk.
Place attachment needs as basic psychological needs: Their manipulation and effects on behaviours coping with natural environmental hazard
Isabel Lema Blanco¹, Silvia Ariccio², Marino Bonaiuto² (1. University of A Coruna, 2. Sapienza University of Rome)

Some studies suggest that, when evacuating from a natural hazard, people tend to go to places they are attached to rather than to places without affective relevance (e.g., Ariccio, 2017).

Merging place attachment literature (Scannell & Gifford, 2016) with basic psychological needs literature (Self-Determination Theory, SDT; Ryan & Deci, 2000), two experimental studies test if evacuation is affected by evacuation site place attachment when this is manipulated through Place Attachment Needs (PAN) based scenarios and through SDT-based scenarios.

A first study showed how both PAN-based and SDT-based scenarios lead to similar place attachment and need satisfaction, suggesting a link between SDT and the place attachment. A second study showed that place attachment manipulations based on PAN and on SDT similarly affect the evacuation site choice (F(1.74,238.07)=69.02, p<.001). Qualitative analysis on the participants’ written scenarios elaborations (used in the survey to strengthen the independent variable manipulation) show that people feel attached to places that satisfy their need of connectedness, competence, safety, comfort and autonomy.

A place satisfying psychological needs (both measured as SDT and as PAN) is associated to high place attachment and to an affect-related place choice. Results are discussed by bridging place attachment and interpersonal attachment literature.

Local science-society relations: the legitimacy of coastal flood risk information
Raquel Bertoldo¹, Séverin Guignard¹, P Dias¹, Alexandra Shleyer-Lindenmann¹ (1. Aix-Marseille Université)

Introduction: Communities dwelling in Mediterranean regions have for a long time adapted to environmental hazards. They have developed over time culturally meaningful knowledge about their environment and about what behaviours are more adapted and under which conditions. Meanwhile modern territorial management involve technical and scientific solutions that can be locally contested as not pertinent or adapted. This project is interested in how people living in the Mediterranean French coast (Fréjus and Port-Saint-Louis-du-Rhône) adapt to or resist scientific arguments presented by local risk managers in relation to the risk of coastal floods. Methods: Interviews with local policymakers and community members explore their memory of past coastal flooding events, how they remember the risk was managed; how they evaluate present risk management; and what type of information they use to estimate coastal flood risks. Results: This analysis focuses the discursive strategies used by local dwellers and local risk managers to justify their behaviours in response to scientific models for the region: knowledge legitimacy, identity and trust. Discussion: This type of analysis can support local actors about how to improve local engagement for climate change adaptation.
Worth the risk? Message framing, place identity, and the evaluation of the economic consequences of environmental policies
Patriza Catellani1, Mauro Bertolotti1 (1. Catholic University of Milan)

Introduction: Although citizens are increasingly aware of environmental risks, support for public policies aimed at dealing with these risks is hindered by considerations regarding the economic costs of the policies’ implementation. In the present research, we investigated how message framing regarding environmental policies and their economic consequences influence citizens’ attitude towards these policies. Methods: We conducted two survey experiments, one with a representative sample of Italian voters and another one with a sample of residents in a lakeside area in Italy. Participants were presented with a policy proposal describing the environmental benefits deriving from the institution of a natural reserve, followed by a text highlighting the economic costs versus benefits related to the implementation of the policy proposal. Agreement with the message, support for the proposal, and evaluation of its expected consequences were measured. Results showed that the perception of risks deriving from excessive land use was positively associated with support for the proposal. However, only participants with higher place attachment and identification with the local community were still in favour of the proposal after reading a message highlighting its economic costs. Discussion: Discussion will focus on how communication can affect decisions on whether to support (and pay for) environmental policies.

Participation - a stepping stone for societies, a stumbling block for methodologies
Anke Bloebaum1, Karen Krause2, Stefanie Baasch3 (1. Otto-von-Guericke University Magdeburg, 2. University of Bremen)

The use of participatory procedures continues to rise in an upward trend: major projects, support for energy turnaround – participation has become an essential aspect of all kinds of projects and politics. A closer look at these processes reveals dramatic discrepancies within the general demands associated with the intensity level of participation on the one hand, and vague conceptions, as well as methodological weaknesses on the other. This paper focuses on participatory processes as a field of research and application from a social science perspective, respectively from a psychological point of view. We introduce critical views on participatory processes and discuss methods and theoretical approaches from the field of psychology that could improve the quality of participatory processes. To illustrate the methodological challenges associated with participatory processes, we take two participatory backcasting workshops with transition town movement members in Halle, Saxony-Anhalt, as an example. In backcasting, actors are supported in envisioning a desirable future and formulating steps for reaching it from today. Taking the main results and the process itself into perspective, we critically reflect on the gap between theoretical and methodical demands and practicability. Finally, methodological challenges and limits for the systematic evaluation of participatory processes are discussed.
A theoretical framework for the evaluation of massive digital participation systems in urban planning

Mathias Hofmann¹ (Technische Universität Dresden)

Urban development striving to meet democratic ideals and the needs of all stakeholders must incorporate public participation. Contemporary participation processes may employ digital tools which open up new possibilities regarding the range of participants and the intensity of participation. In particular, they can uniquely allow for large and diverse groups of participants to be involved. Evaluating such processes is important because it allows one to justify the necessary costs and efforts, as well as their continuous improvement. Using the phases specified in the minimal viable process of the U_CODE project as an example, this paper aims at describing criteria for evaluating participation processes and proposes several possible operationalisations for their assessment. While the majority of these criteria resemble traditional criteria, this paper proposes an additional criterion, and ways of applying all the criteria to digital participation methods. In addition, the criteria and operationalisations described in this paper may not only be used for evaluative purposes during or after a digital participation process, but also during the planning stages. Hence, considering these criteria to assess the value of the process during its inception stage may help to avoid mistakes and to enhance the democratic value of the participation process.

Procedural fairness as an evaluative yardstick of public acceptance: A case study of multiple stepwise participatory programs for developing a master plan for environment Sapporo Japan

Susumu Ohnuma¹, Miki Yokoyama¹, Shogo Mizutori¹ (Hokkaido University)

Studies in citizen participation showed the significance of procedural fairness in the evaluation of citizen participation leading to public acceptance in policy planning. As the number of participants is limited, evaluation by non-participants is imperative. In addition, one-shot participation is insufficient because the roles of participants vary depending on the stages of the planning. Therefore, we need process design for participatory programs. Sapporo city conducted three stages of participatory programs for revising the environmental master plan, involving stakeholders and a panel of randomly selected citizens. At the first and second stage, citizens discussed ideal goals to be achieved by back-cast scenario workshops. At the third stage, citizens evaluated the proposed plan. The questions were whether a) even non-participants accept the plan if they perceive the process to have been fair, and b) the ratings of the repeated programs increase. We conducted a two-wave mailout survey for participants and non-participants by random sampling. The results revealed that participants rated procedural fairness and acceptance more positively than non-participants, and the ratings did not change among the two waves. Nevertheless, procedural fairness had the strongest effects on acceptance consistently, partially supporting the hypothesis. We discuss how the stepwise participation programs can be evaluated.
Nudgeathon for Encouraging Pro-Environmental Behaviour

Alina Mia Udall¹, Daniel Read², Umar Taj² (¹ NTNU, ² University of Warwick)

How can we effectively encourage pro-environmental behaviour (PEB) - behaviours that preserve-, prevent damage to- and/or promote improvement-to the planet? Three approaches have recently become prominent for developing effective interventions for encouraging PEB. First, participatory design: Getting participant’s involvement in the intervention design. Second, design-thinking: A five stage process for effective intervention design. Third, choice-architecture: A social science theory of how environmental cues can shape behaviour. While guidelines for these tools are present, no clear method exists which integrates all three. We present a method – Nudgeathon – which integrates participatory design, design-thinking, and choice-architecture for designing effective interventions for shaping a wide range of behaviour (such as PEB). Here, we provide an empirical test of the Nudgeathon process, in which students received an intervention aimed at reducing their energy consumption. We systematically characterized and evaluated each participation step to ensure and improve the quality of each step. We evaluate the methods’ overall effectiveness for encouraging PEB (summative evaluation). We provide theoretical and empirical contributions by highlighting the different relevant evaluation criteria needed per step/overall. We provide the best participatory practice needed when undertaking different steps. Finally, we standardize the method for publication, results evaluation, and future replication.


Matthew Stevenson¹ (¹ Health Promotion Research, Steno Diabetes Center Copenhagen)

There remain few studies investigating cognitive restoration in children and no studies that compare children and adults directly. The existing pattern of results from child participants suggests temporal aspects of performance, such as variability of reaction time, may be more sensitive to nature-based restoration than measures of specific processes, such as directed attention. Within-subject temporal variance is believed to reflect the ability to regulate inner states of arousal in response to situational demands. There is some evidence that state regulation in adults can also be improved after contact with nature; however, the particular sensitivity of this process in children hints at the possibility that how a restorative experience impacts the brain depends on an individual’s stage of cognitive development. Further, the typical paradigm for investigating cognitive restoration using a randomised-controlled design may be problematic when applied to studies involving child participants. Children must 1) be sufficiently engaged during the fatigue induction phase; 2) receive an age-appropriate restoration activity during the “treatment” phase; and 3) be tested using the most relevant outcome measures during data generation phases. Ideas towards tailoring restoration protocols for use in children will be discussed.
Behind the ART: the problem with the "effortless" soft fascination
Simone Grassini

According with the popular formulation of Kaplan & Kaplan, soft fascination is described as a form of effort-free attention characterizing the human cognition in natural environments. Specifically, the theory claims that interesting and aesthetically pleasant environments involuntarily attract attention (compared to hard fascination in which attention is voluntarily directed by cognitive-control processes). Even though the theory of natural environment being less attentionally demanding compared to urban ones finds empirical evidence, the phenomenon may have little to do with those stimuli that effortlessly and involuntarily attract the human attention. Recent physiological evidence showed that early automatic visual attention is better captured by urban scenery, in line with the large scientific literature on attention capture by dangerous/relevant visual stimuli. In the present talk recent studies will be presented, and possible explanation for these results discussed. Finally, a wider theoretical look on the restorative effect of natural settings and the possible causes of it will be shortly introduced.

Stress and boredom in nature and cities
Birgitta Gatersleben, Isabelle Griffin, Andrew Steele

Environmental restoration tends to be defined in terms of recovery from stress and mental fatigue – a low valence/high arousal state. There is plenty of evidence that natural scenes evoke more positive emotional reactions than scenes of built environments. However, evidence for arousal is much less consistent. This may be partly due to the environments that have been compared in previous studies as well as the measures that have been adopted. We conducted several studies to examine changes in mood when viewing scenes of natural or built environments. As expected, natural scenes were more likely to increase positive valence. However, natural scenes were not necessarily more relaxing, nor were built scenes necessarily more stressful. In fact some built environments may be more suitable classified as boring.
Building the case for urban restoration: a step forward along an overlooked line of inquiry
Anna Bornioli¹, Mikel Subiza-Pérez² (1. University of the West of England, 2. BIODONOSTIA Health Research Institute)

There seems to be a growing consensus among psychological restoration researchers on the theoretical and practical limitations that Attention Restoration and Stress Recovery theories exert when addressing the study of restoration in built settings. This affects the way we select study settings, the variables we expect to be restored, the way we depict natural and urban settings in terms of their value for human health and the way we understand environmental psychology. However, in this day and age, environmental psychology needs to generate useful knowledge to inspire guidelines and interventions in settings other than the recurrent urban parks, forests and green spaces. This paper will review the current state of the art for built settings and seek to address the following questions: what is to be recommended to urban planners and designers apart from planting trees in the streets and adding ponds or fountains in squares? How would we advise the remodelling of a café, a bar or a library that seeks customers to recharge their batteries when being there? We propose a theoretical framework/model that might result helpful to design future studies and will help to stimulate future research on urban restoration.

Assessing the impact of small-scale interventions on the use of waterside areas: A case study in Plymouth, UK
Himansu Sekhar Mishra¹, Simon Bell¹, Peeter Vassilijev¹ (1. Estonian University of Life Sciences)

In this paper, we aim to understand the affordances of urban bluespaces for physical and mental health and well-being through experimental testing the effect of small so-called “urban acupuncture” interventions (Marco Casagrande -http://helsinkiacupuncture.blogspot.com/) aimed at making a place more attractive and accessible. Here we present some preliminary results of pre-and-post-intervention study conducted during the warm period in 2017 and 2018 at an urban waterfront location, Teats Hill park in Plymouth, UK. We used QGIS interface on computer tablets to apply behaviour observation and mapping method for objectively measuring the relationship between blue space settings and activities. The data was structured and interpreted statistically and graphically using heat maps to understand the affordances of different behaviour settings within the bluespace. Results from the pre-and-post-intervention observation studies shows substantial increase in the use of Teat’s Hill waterfront and water-based activities. The average distance of users to water has decreased from 37.3m (2017) to 33.3m (2018). Multinomial-Logistic-Regression analysis suggests distance to water predicts resting, relaxing and observing water and weather and water variability predict ambulatory and sedentary activity types. The physical intervention has attracted more users and a change in pattern of sedentary and ambulatory and water-based activities has been observed.
Fasting plastic – Two intervention studies to break habits of plastic consumption
Lea Marie Heidbreder¹, Manfred Schmitt¹ (1. University Koblenz-Landau)

Plastic pollution is a major challenge that modern society is facing. Starting at the beginning of the waste chain, reduction behaviour becomes urgent. However, one of the most challenging parts of behaviour change is breaking old habits. To get people started with new behaviour patterns, so-called “windows of opportunity” – periods where people become open for new experiences – are expected to matter. As a fasting period might be such a “window of opportunity”, two intervention studies were implemented. A first study (N = 140) revealed a decrease in plastic consumption during fasting period (d = 0.63), this effect was maintained two weeks after fasting period and even in the long run one year later (N = 55). 39% of the participants indicated having tried a new plastic free behaviour for the first time. However, information to strengthen either problem awareness or action knowledge had no further influence on behaviour change. The second ongoing study (N = 161) aims to assess habit change and its process in more detail, measuring habits of plastic consumption weekly over the fasting period. Finally, the impact of implementation intention is further examined.

Marketing for the future: claims and design can trigger consumption and pro-environmental behaviours
Silvia Ariccio¹, Marino Bonaiuto¹ (1. Sapienza University of Rome)

According to Value-Belief-Norm theory, values have a relevant role in affecting people’s pro-environmental behaviors (Stern et al., 1995). Literature is however unclear about the possibility of affecting a value salience through marketing choices and whether this affects pro-environmental and consumption behaviours. A first study tests the effect of different claims for the same product (a beer) on willingness to pay and intention to perform pro-environmental behaviors. Claim condition referring to biospheric values (vs. egoistic values or altruistic values) have the same effect as the other claim conditions on willingness to pay (F(2, 434) = 1.07, p=.34), however it is associated to a stronger intention to perform pro-environmental behaviors (F(2, 434) = 3.98, p<.05). A second study aims at increasing recycling intention behavior of disposable items through the use of packaging and item design choices, that should communicate biospheric values. Preliminary results on disposable cups indicate that disposable items with biospheric design (vs. similar ones with neutral designs) are expected to increase recycling intention. Overall, these studies show that incorporating biospheric values into products’ marketing and design - while it does not harm economic results - facilitates more sustainable consumption choices by improving the probability of pro-environmental behaviours occurrence.
The paradox between the environmental appeal of bio-based plastic packages for consumers and their disposal behaviour
Danny Taufik¹, Machiel Reinders², Karin Molenveld², Marleen Onwezen² (1. Wageningen University & Research, 2. University of Groningen)

To realize the potential environmental benefits that recycling or composting plastic packaging made from bio-based materials can deliver, it is not only important that consumers view bio-based packaging as environmentally-friendly, but also dispose of the packaging in the correct manner. The current study explores whether consumers’ perceived environmental benefits of recyclable and compostable forms of bio-based plastic packaging match with how consumers dispose of these packages. The results of an experimental field study (n = 281) conducted in Germany show that consumers perceive only compostable bio-based plastic packages to have more environmental benefits than fossil-based plastic packages. However, consumers dispose of compostable bio-based plastic packages in an incorrect manner relatively often, compared to recyclable bio-based packages and fossil-based packages. Consumers with a higher level of bio-based product familiarity more often dispose of compostable bio-based packages correctly. Thus, although mainly compostable bio-based packages have strong environmental appeal to consumers, paradoxically this does not translate in the proper disposal actions to fully capitalize on the environmental benefits that bio-based plastic packages can actually deliver.

Good for the environment, but what about the volunteers? A multi-year examination of the impacts citizen science beach cleans have for the volunteers
Kayleigh Wyles¹, Sabine Pahl², Lauren Eyles³ (1. University of Surrey, 2. University of Plymouth, 3. Marine Conservation Trust)

Citizen science (where members of the public follow scientific protocols to collect data) offers opportunities to have hands-on experience and help with environmental issues. Previous findings on a student population found that citizen science beach cleans can be fun and engaging, raises the profile of marine litter, and encourages pro-environmental behaviours (Wyles et al., 2017). However, the generalisability of these findings on the general public have yet to be tested (i.e., are these benefits similarly found on volunteers?), nor has the underlying mechanisms behind these benefits (e.g., are these benefits mediated by a strength in nature connectedness? Is there an optimum condition for these benefits to occur?). In the UK, the Marine Conservation Society hosts a national beach cleaning event every September. Volunteers’ experiences were examined over three years (n=72 in 2016, n=401 in 2017, n=328 in 2018). Using a survey before and after the events, we will report on changes in wellbeing, nature connectedness, risk perception, and pro-environmental behaviour intentions. In addition, we were able to take into account litter levels, to see if this empowers or disheartens the volunteers. By examining the psychological dimension of beach cleans, this study further examines the impacts behind this environmental citizenship act.
The influence of biospheric values and perceived costliness on recycling

Josefine Geiger\(^1\), Ellen van der Werff\(^2\), Berfu Ünal\(^1\), Linda Steg\(^1\) (1. University of Groningen)

We aimed to study to what extent and how individual and contextual factors affect pro-environmental actions. Specifically, we studied the influence of biospheric values, perceived costliness of recycling, and their interaction on recycling. We conducted two questionnaire studies in three different municipalities with similar collection systems but different overall recycling rates. It seemed likely that the collection systems were associated with different perceived costs of recycling. As expected, we found main effects for biospheric values and perceived costliness. The stronger one’s biospheric values and the easier people perceive recycling to be, the more likely they are to recycle. Furthermore, we found an interaction effect of these two variables. Specifically, the effect of perceived costliness on recycling was more pronounced among participants with relatively weak biospheric values, suggesting that making recycling easier is particularly beneficial for people who find protecting the environment not that important. People with strong biospheric values recycle independent of the perceived costliness, probably because protecting the environment is relatively important to them. These results show that reducing the perceived costs of recycling may be a way to stimulate recycling among people who do not care much about the environment and are therefore not that likely to recycle.

A change would do you good! The impact of non-normative labelling of climate change on pro-environmental behaviour intentions

Christopher Jones\(^1\), Lorraine Whitmarsh\(^2\) (1. University of Surrey, 2. Cardiff University)

Introduction. There is growing need for public action to help mitigate the threats of climate change. This study investigates the impact that the terminology used to discuss climate change has upon people’s willingness to act. We test whether ambiguity in the terms ‘climate change’ (change can be good) and ‘global warming’ (warmth is preferable to cold) might contribute to inaction.

Methods. In an online questionnaire conducted on a diverse sample of the UK population (N=900), we asked participants to evaluate an essay about ‘climate change’ before completing scales relating to their pro-environmental intentions. Responses were compared to conditions where the term climate change was replaced with ‘global warming’, ‘climate deterioration’ or ‘climate chaos’. The group-membership of the author was also varied. We reasoned that the non-normative terms ‘deterioration’ and ‘chaos’ might be dismissed unless the author was first identified as an in-group member.

Results. A main effect of group identity was identified in the ‘climate chaos’ condition. Counter to the hypothesis, participants in the in-group condition saw the message as more manipulative and the author as more exaggerating and biased than in the out-group condition. Follow-up analyses will also be presented.

Discussion. Implications for climate change communication efforts are discussed.
Nature in Your Face: Disruptive Communication to Trigger Societal Transitions

Erica Lofstrom, Christian Klöckner (1. Norwegian University of Science and Technology)

Experts are explicitly talking about the need to limit consumption, and climate activism is growing. It is time for a shift away from the current path of nudging us into new consumption patterns without it requiring major changes in our way of life. Eco visualization may help individuals to act in accordance with their values. Nature In Your Face (NIYF) develops a methodology for participation designed to mobilize communities and resources in solving pressing issues. At the core of the methodology lies the idea of challenging our current way of doing things by confronting us with nature, or representations thereof, accentuating our dependence on it. By using eco-visualizations that put us out of our comfort zone, we stimulate creativity and engagement. This is part of a three-step process designed to harvest engagement; 1) Framing, 2) Twisting, and 3) Using. Framing involves a confrontation addressing the problem while thematically framing it to specific practices or contexts. Twisting opens up for co-creative visioning in which alternative pathways are developed. Finally, using involves testing these ideas and concepts in practice. Using Kristiansund as test case, we demonstrate how NIYF may help mobilize resources, unlock innovation potential and support cooperation between stakeholders.

Sustainability in a neighbourhood community: A qualitative research study on different stakeholder perceptions of participation possibilities within a selected neighbourhood in a German City

Ann-Katrin Knemeyer, Petra Schweizer-Ries (1. Saarland University, 2. University of Applied Sciences Bochum)

For sustainability transitions in urban environments to be achieved, local acceptance for sustainability needs to be increased. Cities are systemic entities and citizens are integral stakeholders for implementing sustainable pathways. Local bottom-up-initiatives are at the forefront in terms of sustainable social innovations.

A study was conducted to analyse stakeholder perspectives of the local public and policy-makers regarding sustainability options in a German neighbourhood community. The ways in which sustainability norms influence behaviour and which factors positively affect urban communities in their sustainable development is looked into.

Methodologically, a multistage qualitative research design has been applied. Semi-structured interviews with residents of the neighbourhood community (N = 26) and municipal staff (N = 9) were conducted. Furthermore, group discussions (N = 3) examined beliefs, motivations and the role of social learning in the community. Due to the explorative nature of the study, the data was analysed using grounded theory.

Preliminary findings indicate that personal resources are highly important. Further results will identify differences and similarities in perceptions and expectations concerning sustainability. Contributions to an improved understanding between residents and municipalities, offering alternatives for designing sustainable cities together are discussed.
Adolescents’ Perceptions of the Psychological Distance to Climate Change, Its Relevance for Building Concern about It, and the Potential for Education

Moritz Gubler¹, Adrian Bruegger², Marc Eyer³ (1. University of Teacher Education Berne & University of Berne, 2. University of Berne, 3. University of Teacher Education Berne)

Introduction

One of the greatest social and environmental challenges of this century is climate change. Unfortunately, it is still unclear how to motivate people to engage in environmentally friendly behaviour. To be effective, education and communication strategies must take into account people’s perceptions and beliefs. A root difficulty is that the general public tends to perceive climate change as a psychologically distant phenomenon - something that, if at all, happens not here, not now, and not to oneself.

Methods

In a survey conducted during October and November 2018, we quantitatively explored perceptions of psychological distance to climate change with a highly relevant but so far overlooked population - adolescents.

Results

Swiss adolescents (N = 587) perceived climate change to be a certain and present risk. However, they perceived climate change to affect other places and other people more than themselves. Regression analysis revealed a significant inverse relationship between distance and concern: respondents who felt psychologically closer to the phenomenon expressed greater concern.

Discussion

The findings contribute to the understanding of how young people perceive climate change, which should assist in designing education strategies to make it more salient for individual behaviour.

Green and protective backyards: predicting adaptive behaviors

Gabriel Muinos¹, Linda Steg¹ (1. University of Groningen)

Climate is globally changing and will continue doing so in the next years, which involves new challenges for local communities that need to engage in actions to protect themselves from the most pressing negative consequences of climate change. For example, sudden rains are expected to increase in frequency and intensity, which may increase risks of sewage overload. Residents can prevent or limit such risks by greening their backyards, increasing the amount of absorbent material such as soil and decreasing chances of sewage overload.

We examine to what extent the Protection Motivation Theory (PMT) is effective in explaining adaptive behavior such as greening one’s backyard. For this purpose, we conducted a questionnaire study among 179 residents with backyards of the city of Groningen (the Netherlands). Results showed that the PMT variables significantly predict adaptive behavior. Specifically, we found that variables related to risk appraisal (i.e., perceptions of severity of the risks and vulnerability to the risks) and coping appraisal (i.e., response efficacy and self-efficacy) increase the likelihood that people will green their gardens. We will discuss the theoretical and practical implications of our study.
The impact of initial attitudes, values, and political ideology on information processing and public acceptance of geothermal energy
Ulf Hahnel¹, Goda Perlaviciute², Kathleen Slatford², Philippe Voruz¹ (1. University of Geneva, 2. University of Groningen)

Public acceptability is of upmost importance for the development of renewable energy projects, yet little is known about the processes resulting in public acceptance or resistance. Here, we present two studies in which we investigate opinion formation towards geothermal energy projects. To shed light on the impact of information acquisition on opinion formation and polarization, we provided information about the technology and traced participants’ information search strategies. Findings from Study1 (N= 175, Netherlands) show how participants’ initial attitudes and values influence information acquisition and opinion formation. That is, more positive initial attitudes led to more positive attitudes after information acquisition and participants with strong biospheric values (i.e. caring about nature and the environment) sought more information about the environmental consequences of geothermal energy, which in turn led to more positive attitudes towards the technology. In Study2 (N= 174, Switzerland), we illustrate how political ideology shape initial attitudes towards the technology in the absence of information. In line with Study 1, ideology-based attitudes influenced project acceptance via confirming information search. Findings provide insights into the mechanisms underlying opinion formation and polarization regarding large-scale renewable energy projects and point to means to improve project communication.

Acceptability of wind energy: the role of trust and emotions
Leonie Vrieling¹, Goda Perlaviciute², Linda Steg¹ (1. University of Groningen)

In order to tackle climate change, a transition to more sustainable production of energy is needed. Public acceptability is key for successful implementation of renewable energy projects. Extending the Protection Motivation Theory, we propose that perceived consequences of renewable energy projects and trust in parties responsible for renewable energy projects (rather than perceived personal control over the risks caused by energy projects) influence people’s emotions towards renewable energy projects, which in turn influence acceptability of these projects. Specifically, we argue that people have little control over the consequences of renewable energy projects, and need to rely on responsible parties, such as governments, that can reduce risks of renewable energy projects. We conducted a questionnaire study to test our reasoning. We found that the more people perceive negative consequences of a local wind energy project, and the less they trust governmental actors responsible for the local energy transition, the more they experience negative emotions, and the less they experience positive emotions towards the wind energy project. Moreover, we found that people perceive the local wind energy project as less acceptable the more they experience negative emotions and the less they experience positive emotions towards the wind energy project.
The effect of perceived naturalness of a cause on the evaluation of environmental hazards: The case of fracking

Bernadette Suetterlin¹, Michael Siegrist¹ (1. ETH Zürich, Institute for Environmental Decisions)

People base their risk assessments related to environmental hazards on the perceived naturalness of the cause of hazards. As a result, identical outcomes are perceived as more severe when the incident is human-compared to nature-caused. However, it is unclear whether naturalness of the direct cause (e.g., toxic chemicals) or naturalness of the cause of the incident (e.g., cause of release of chemicals) leads to these biased risk assessments. We provided participants with a text describing how several animals died due to toxic chemicals that 1) originated from the burst pipe of a fracking installation; 2) were naturally occurring but were released due to vibrations caused by fracking; 3) were naturally occurring and were released because of an earthquake; 4) originated from the pipe of a fracking installation that burst because of an earthquake. Analyses revealed that the death of animals was generally perceived as more severe when the hazard was human-caused. However, when the incident was nature-caused, in case of a natural direct cause (naturally occurring chemicals), the outcome was perceived as less severe. The same results emerged for evoked affect and perceived animal suffering. These findings suggest that people strongly react to the human component when judging hazards.

The role of space and place in shaping views on shale gas ‘fracking’

Darrick Evensen¹, Patrick Devine-Wright², Lorraine Whitmarsh³ (1. University of Edinburgh, 2. University of Exeter, 3. Cardiff University)

Public perceptions of the controversial oil and gas extraction technology of hydraulic fracturing (‘fracking’) have been studied for ten years. The massive proliferation of studies, first in the US but now also in Australia, Canada, and several European countries, has revealed a number of factors reliably affecting support and opposition across national, regulatory, and cultural contexts. Two factors that emerged more recently in affecting public acceptability of ‘fracking’ are sense of place (one’s attachment to, dependence on, and identity in association with the local landscape) and proximity to development. Construal-level theory and theories of place attachment have been invoked. In our representative national UK survey (N=2500, March 2019), we operationalise both sense of place and psychological proximity to ‘fracking’. This is the first research to include both sense of place and proximity, and the first to measure psychological proximity in addition to using standard measures of objective spatial proximity (e.g., distance to a well site). We discuss the relative influence on acceptability of ‘fracking’ of both theoretical constructs in comparison to each other and to the typical demographic covariates associated with attitudes on this issue. We offer recommendations for UK energy policy.
A review of reports from Dutch organisations on how to reduce residents’ energy use and choices for sustainable technologies at home

Marjolein Overtoom1 (1. Delft University of Technology)

Introduction. An important part of the transition to a more sustainable world, is to help people be more sustainable. Various methods to change people’s behaviour at home have been implemented the last few years by the Dutch government, municipalities, commercial parties, and local resident’s initiatives. There is a body of knowledge available from behavioural science on how to reduce energy use, but it is not known if this knowledge is used in practice. This leads to the following: What are the questions organisations have, and what are their solutions to reduce residents’ energy use?

Method. An inventory of documents from different non-governmental and governmental organisations in the Netherlands on reducing residents’ energy use was received, of which 40 documents were selected for further analysis. They were reviewed on research method, sample, conclusions, recommendations, and were categorised on how to reduce energy use.

Results & Discussion. Almost every document stressed the importance of behaviour in reducing energy use, but there were different approaches for realising the changes. Additionally, the majority does advise to engage with the residents on a personal level. This is hopeful for the future, but it remains unclear how to apply this in practice on a national scale.

Averting a “tragedy of the commons” in Maasai land: Exploring predictors of willingness to protect communal land among Northern Tanzanian pastoralists

Anna Rabinovich1, Stacey Heath1, Vladimir Zhischenko1, Francis Mkilema4, Aloyce Patrick4, Mona Nasseri5, Will Blake2, Patrick Ndakidemi2 (1. University of Exeter, 2. NM-AIST, 3. Schumacher College, 4. University of Plymouth)

Extensive land degradation presents a critical threat to society welfare in many East African countries. One factor that severely exacerbates the extent of the problem is the so called “tragedy of the commons” – a lack of concern for communally shared land and consequent use of suboptimal land management practices. The present paper makes initial steps towards resolving the problem by exploring socio-psychological predictors of willingness to care for shared land among the pastoralist population. We surveyed 297 Maasai pastoralists (47% women) in the Monduli District of Northern Tanzania and conducted a multivariate path analysis. The results demonstrated that community-based identification was strongly related to willingness to adopt more sustainable land management practice. This effect was mediated by collective efficacy (a sense that one’s community can cope with the land degradation), as well as by perceived amount of support from other community members and trust in them. In addition, community-based identification interacted with relevant social norms to predict willingness to take action. The results are consistent with the existing work on social dilemmas around environmental resources and extend them into an international developmental context.
Basic human values of farmers – motivation for change towards climate resilient agriculture

Jaana Sorvali¹ (1. Natural Resources Institute Finland (Luke))

Climate change challenges agriculture with extreme weather events and new risks. Agriculture has a dual role in mitigation; as a source of greenhouse gases and a sink for carbon. Farmers have a crucial role in determining the future sustainability of our food systems and thus their values and their motivations are crucial. We studied farmers’ values by using the refined theory of 19 basic human values by Schwartz. The theory enables us to differentiate between values supporting change and compare our results to previous value studies using Schwartz’s theory. Standardized survey was answered by a representative sample of 4401 farmers in Finland in 2018.

Our research answers the following questions: 1) Can the motivational structure of 19 values be found from data concerning Finnish farmers? 2) What are the value priorities of Finnish farmers? 3) Do value priorities differ according to demographics? 4) How do our results relate to other value studies? And finally; 5) what our results mean as regards to agriculture and food systems of the future? We used statistical methods to explore the values of Finnish farmers in detail. Our results offer interesting insights into an area of utmost importance to the future of sustainable food systems.

Land managers: payments for ecosystem services, networks and social learning

Liz O’Brien¹, Bianca Ambrose-Oji² (1. Forest Research)

Introduction. There is increasing interest in valuing the variety of ecosystem services that woodlands can provide in the United Kingdom. Land managers play a key role in the delivery of forest ecosystem services through active woodland creation and management. This research explored evidence for land manager perceptions of the concept of payments for ecosystem services (PES), the existing use of networks to support land managers’ decision making, and the ways in which land managers learn from others.

Methods. The research involved semi-structured interviews with land managers (n=44), further analysis of the British Woodlands Survey 2015, and narrative analysis from 4 workshops with stakeholders (n=48).

Many land managers were not familiar with the concept of PES. However, they did often recognise that their woodlands could provide a range of benefits to society. The research identified key networks of importance: 1) related to place; 2) related to woodland management and associated institutions; and 3) related to social and personal identity. It is important to understand and engage with land managers and involve them in the design of the mix of approaches that might enable more active woodland creation and management, and the delivery of a range of forest ecosystem services.
Climate change and livestock farmers’ concern of tick-born disease

Maria Johansson1, Anders Flykt2, Atle Mysterud3 (1. Lund University, 2. Mid Sweden University, 3. University of Oslo)

Introduction: Climate change have led to an increase in distribution of Ixodes ticks and tick borne diseases among humans and animals towards higher elevation and latitude in Europe. Departing from emotional appraisal theory this study aimed to understand livestock farmers’ concerns about current densities of ticks and how farmers cope with the situation.

Method: Data was collected by means of a survey among 776 Norwegian cattle and/or sheep farmers.

Results: Statistical analyses show that 45% of the farmers had experienced tick borne diseases among their livestock with negative implications for their own perceived quality of life. Most farmers handled the new situation by problem-solving centered coping primarily medication, information-seeking and change of land-use practices. Emotion-centered coping strategies were present to some extent. In hierarchical regression analysis, information-seeking and emotion-centred coping were associated with higher self-reported fear of ticks and tick-borne disease among livestock.

Discussion: Emotional appraisal theory can be used to understand the psychological process behind livestock farmers’ concerns of tick-borne diseases. The emotional appraisal process suggests that experts’ assessments should be complemented with an understanding of farmers’ interpretation of the situation and their strategies to cope with the negative implications of the increasing presence of ticks.

Why do people (not) pay for nature conservation? Insights from representative surveys in Germany

Carolin Biedermann1, Gerhard Reese2 (1. Leibniz-Zentrum für Agrarlandschaftsforschung (ZALF) e.V., 2. University Koblenz-Landau)

Nature conservation not only needs the financial support from governments but also from private individuals. However, even though numerous studies have been conducted on charitable giving on the one hand and environmental behaviour on the other, there is little published research on the determinants of people’s financial support of nature conservation. It has not yet been sufficiently investigated whether or not different determinants drive financial support (e.g. donating to an organisation, buying voluntary offsets or consistently purchasing organic products) as compared to other modes of action (e.g. volunteering or participation in demonstrations or petitions). We address this knowledge gap by exploring the data sets of several representative surveys of German citizens using factor analysis and logistic regression. Against the backdrop of the ecosystem services concept and goal-framing theory, we examine in particular whether certain arguments for nature conservation promote different types of financial engagement or address various target groups. First findings suggest that certain frames, especially those that focus on the benefits of nature to humans, appeal only to specific groups of people. Our results can provide important insights into how conservation engagement can be successfully framed for specific target groups and types of engagement.
Greenkeeper: an online toolkit for valuing the multiple benefits of urban green spaces  
*Sian de Bell* (1. University of Exeter, presented on behalf of the Greenkeeper project team)

Introduction: Healthy, happy urban populations depend on well-designed green infrastructure, yet the values of the environmental and health benefits that green infrastructure provides are poorly understood. This can lead to underinvestment or inadequate provision of suitable greenspaces. In collaboration with Vivid Economics and Barton Willmore, we are developing Greenkeeper, an online green infrastructure valuation toolkit. Methods: Developed with input from potential users, including planners, developers and local authorities, the toolkit combines analysis of the physical and mental health benefits of greenspace from Monitor of Engagement with the Natural Environment (MENE) survey data, information on visits to greenspace from mobile phone data, and greenspace features derived from remote sensing. Results: These multiple sources of data are used to quantify and value the benefits of individual greenspaces, including physical activity, mental health, air quality and noise reduction. The tool calculates values for existing spaces and estimates them for new green infrastructure. Discussion: Greenkeeper values the health benefits of greenspace, which are of increasing interest in policy and planning, as well as providing values for a range of benefits through one tool. By allowing the mapping and comparison of green infrastructure, the tool can be used to inform development and planning policy.

Last chance for conservation: how travel can promote connection to nature and pro-environmental behaviour  
*Christy Hehir*, *Caroline Scarles*, *Kayleigh Wyles*, *Joseph Kantenbacher* (1. University of Surrey, 2. Indiana University Bloomington)

‘Last-chance tourism’ is a rapidly growing type of travel for tourists seeking non-consumptive experiences with animals and land/seascapes that are vanishing. However, travel to threatened areas raises the spectre of tourists loving an already dying destination to an early death. Though recent studies hint that the increased connection to nature fostered by tourism can prompt visitors to provide philanthropic support for conservation, no study has measured the role of travel on these behaviours.

Partnering with two leading UK adventure travel tour-operators, this mixed-methods research examines the role of perceptions of last chance tourism and greater connection to nature in explaining how travel can increase pro-environmental behaviour (focusing on philanthropy). Quantitative and qualitative analysis of 924 respondents’ travel patterns, donation histories and levels of connection to nature were analysed to assess the value of travelling to conservation.

Travel to last chance destinations was associated with the greatest philanthropy to conservation, when compared to other international and domestic trips in nature. Further analysis reveals several factors including close wildlife encounters and first time visits that underpin emotional connections to nature within the short-term tourist experience. This study facilitates collaboration between the tour-operator and non-profit sector to greater meet their financial conservation goals.
Taking it home with you? - Pro-environmental Behaviour Change in a National Park Context and Spillover to a Domestic Context

Conor John¹, Lorraine Whitmarsh¹, Dimitrios Xenias¹, James Lawrence⁴ (¹. Cardiff University School of Psychology, ². Brecon Beacons National Park Authority)

Introduction. Previous research has found that when leaving a home context, many individuals reduce their pro-environmental behaviours. The impact of this cross-contextual behavioural disparity is evident in the Brecon Beacons National Park, in South Wales. With 5.5 million visitors per year, in some areas, paths have become strewn with litter, breeding birds are disturbed, rural roads are clogged with traffic and tensions are rising between locals and visitors. This research aims to increase understanding of this cross-contextual behavioural shift and develop interventions that can encourage more pro-environmental behaviours in the National Park.

Methods. Surveys with National Park visitors (N=107) examined cross-contextual behavioural spillover, investigating which behaviours are shared across a home and a nature-based context. GPS logging of litter was also used as a more objective measure of behavioural impact on natural sites.

Results. Results indicate that certain pro-environmental behaviours are shared across contexts but that studying nature-based context-specific behaviours (i.e. disturbance to wildlife) is difficult, as these behaviours do not align with any home context behaviours.

Discussion. Spillover between the National Park and a home context is discussed. Intervention effectiveness is also discussed, as are the implications for practitioners within the field of tourism and site management.

The how and why of shorter showers: effects of construal level and real-time feedback on water and energy use

Michel Handgraaf¹, Anouk Griffioen¹, Gerrit Antonides¹ (¹. Wageningen University & Research)

One challenge within the domain of pro-environmental behavior is designing interventions with lasting impact. We investigated whether receiving real-time feedback about (warm) water use in the shower for one month has lasting effects. When forming new habits, people may focus on concrete features of the behavior and think of how to perform it. Alternatively, they can think of underlying reasons by thinking of why they should perform it. This distinction is captured in construal level theory. We hypothesized that low construal thinking would be effective for short-term change and high construal thinking for long-term change. In an experimental field study in all-inclusive student housing, we measured individual daily energy and water use for three months. 92 participants were randomly assigned to the high or low construal level condition and completed pre and post intervention surveys. Overall participants significantly reduced their water use while receiving feedback. After one month, we uninstalled the feedback device and measured participants’ water use for another month. Participants still used significantly less water as compared to the baseline period. We found limited support for our hypotheses: after the feedback device was removed our high construal manipulation only worked better for participants who highly valued the environment.
Evaluation of an open participatory process for socio-ecological transformation in a suburban district: challenges and perspectives

Jan Eickhoff, Maximilian Schmies, Marcel Hunecke (1. University of Applied Sciences Dortmund)

In the transdisciplinary research project ‘DoNaPart’ a real world laboratory has been established in a suburban district of a German city. Within this setting an open participatory process was implemented to foster social-innovations and collective actions in the fields of energy, mobility and consumption e.g. a self-help bicycle repair shop or community gardening activities. Several questions arise on how to systematically evaluate such a participatory process which adapts to the needs of the citizens and is characterized by openness, flexibility and collective action. This is particularly challenging because in the beginning of the process, when evaluation criteria are set, it is not clear what will happen during the implementation and who will be the actors. In the case of DoNaPart we chose both a quantitative and a qualitative approach to investigate processes of psychological empowerment in urban transformations. Before and after the participatory interventions a representative standardized survey of residents was conducted in the project quarter (N > 500) and in a comparison district (N > 300). Furthermore qualitative interviews with key persons and field observations were conducted throughout the process. In our talk we will discuss this specific evaluation approach and address questions on theoretical foundation, methodology and applicability.

Participation as a behaviour change instrument? Evaluation of citizen participation in climate change adaptation of four cities in Germany

Torsten Grothmann (1. University of Oldenburg)

One prevalent aim of citizen participation in climate change adaptation in Germany is to encourage participating citizens to protect themselves from flood damage. Hence, in an evaluation study of participatory climate change adaptation processes of four cities in Germany using standardized participants questionnaires we focus on behaviour change effects. Furthermore, we measure effects on determinants of self-protective behaviour such as risk perceptions, self- and collective efficacy beliefs and perceived responsibilities (Valkengoed & Steg 2019). Results indicate that mostly people already motivated for self-protective behaviour attend the analysed participatory events and workshops so that participation was rather ineffective in triggering new self-protective behaviour. This questions behaviour change as a useful evaluation criterion for citizen participation. Nevertheless, participation was effective in increasing existing motivations and determinants of self-protective behaviour, particularly collective efficacy beliefs regarding collective action of citizens and municipal actors. This specific strength of participation has not only relevance for empowerment of collective action but also of individual behaviour (Jugert et al. 2016). Furthermore, beliefs regarding citizens’ and governmental responsibilities for flood protection were changed, which links to the function of participatory processes as a room for negotiating responsibilities and to formative evaluation criteria such as fairness and legitimacy (Goldschmidt 2014).
Evaluating Participant Engagement in an Environmental Citizen Science Project
*Keren Kaplan Mintz* (1. Shamir Research Institute, University of Haifa)

Introduction: This case study sought to evaluate participant engagement in an environmental citizen science project in which participants were asked to record and upload observations of animals and plants on the Golan Heights in Israel. The research questions were: What are the motivational sources of and barriers to participating? How does management of the participation process affect and possibly enhance participation? The theoretical framework for data collection and analysis entailed integrating perspectives on informal science education, intrinsic motivation, citizen science, and environmental psychology. Methodology: The research questions were addressed using qualitative methods: interviews with management team members and with participants and analysis of written documents based on thematic analysis and coding. Results: While about 700 citizens downloaded the project application, only 300 uploaded observations, and of these only about 60 uploaded their observations on a regular basis. Whereas environmental concerns and place attachment emerged as important reasons for joining the project, they did not always help sustain participation. Technological obstacles in using the application were a main barrier for participation. Discussion: More opportunities for intrinsic motivation among participants are needed to achieve greater participation in the project.

Evaluation of children’s and adolescents’ participation in Education for Sustainable Development – insights into challenges and successful practices in Germany
*Malte Nachreiner* (1. Hochschule Darmstadt)

Planning and implementation of comprehensive environmental projects, including instances of Education for Sustainable Development (ESD), benefit greatly from a thorough analysis of target groups’ views, motivations and specific needs. Hence, involvement and participation of target groups’ members is an efficient tool to incorporate essential information in these processes. However, as ESD’s target groups regularly consist of children and adolescents, whose living environment and means of communication are rather specific, participation and its evaluation in ESD faces certain challenges. This contribution presents insights concerning how practitioners of ESD in Germany respond to these challenges, i.e. which criteria and methods they apply in order to evaluate how successful practices of integrating children’s and adolescent’s views have been, while taking into account the specific needs and demands children and adolescents have regarding ESD. To gain these insights, several workshops were conducted with practitioners of ESD, as well as members of the target groups, i.e. children and adolescents of different age. In addition, implications how these practices of evaluating children’s and adolescents’ participation influence planning and evaluation of ESD in general are discussed.
Does participation in an urban living lab empower people to collectively develop sustainability solutions – and if yes, why?

Philiipp Rollin¹, Sebastian Bamberg¹ (1. Bielefeld University of Applied Sciences)

Urban Living Labs (ULL) represent sites that allow different urban actors to design, test and learn from experimentation about sustainability solutions. Thus a key element in the operation and success of ULLs is user involvement. Users are often viewed as co-creators who shape ULL outcomes by contributing with their knowledge and experience. The transformative potential of ULLs for sustainability is often interconnected with this user participation. Whereas there is already some research on the characteristic of and processes within an ULL that contributes to the development of innovative sustainability solutions, little is known about the psychological consequences of ULL for participants themselves. Our research focus is on theoretically conceptualizing the psychological processes through which participation in ULL may stimulate positive individual consequences (intrinsic motivation) as well as group outcomes like empowerment, social learning and social capital which are decisive for long-term political engagement necessary for successful societal transformations. Besides presenting a theoretical frame work integrating motivational and collective action research lines, measurement instrument as well as correlational date from two survey studies are presented and discussed.

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30 Days Wild: A Four-Year Review

Miles Richardson¹ (1. The University of Derby)

The Wildlife Trust’s 30 Days Wild Campaign is a UK wide nature engagement intervention that promotes Nature Connectedness (NC) by asking people to engage with nature every day for a month. Since 2015, the annual campaign and has led to increases in NC, health, happiness, and conservation behaviours. The findings from the past four years are compiled. Data from 958 participants was analysed across four years with 129 male, 828 female, and 1 undisclosed gender participants. Previously, the samples have Sensitivity: Internal been predominantly female thus combining the data allowed sex differences to be compared. All measures increased from pre to post and pre to follow-up with significant differences in scores across different time points. Participants with lower baseline NC showed the greatest increase in NC, happiness, and conservation. Participants with higher baseline NC scores reported greater health increases. Males had a significant improvement in all measures from pre to post, sustained at follow-up. The sustained improvements demonstrate the effectiveness of the intervention especially for those with lower baseline NC who experienced the greatest improvement (except health). While the campaign is effective regardless of sex, how to engage men in nature for NC given the low uptake needs addressing.
Nature Contact, Nature Connectedness and Associations with Health, Wellbeing and Pro-Environmental Behaviours

Introduction: Contact with, and psychological connectedness to the natural world are both associated with various health and sustainability-related outcomes. To date, though, the evidence base is fragmented, with studies rarely exploring contact and connectedness simultaneously. Methods: Using a representative sample of the adult population of England (N = 4,960), we investigated the relationships between three types of nature contact, psychological connectedness, health, subjective wellbeing and pro-environmental behaviours within a single study. Results: Living in a greener neighbourhood was, by itself, unrelated to any health/wellbeing or sustainability outcomes. By contrast, people who visited nature ≥ once a week were more likely to report ‘good/very good’ health and high levels of pro-environmental household behaviours. Moreover, people who watched/listened to nature documentaries reported higher levels of both pro-environmental behaviours, but also lower life satisfaction. Independent of visit frequency, Nature Connectedness was positively related to eudaimonic wellbeing and both types of pro-environmental behaviour. Moreover, Nature Connectedness moderated the relationships between incidental contact and pro-environmental household behaviours, and between intentional contact and eudaimonic wellbeing. Discussion: Results support the contention that contact with, and psychological connectedness to the natural world influence human well-being and pro-environmental outcomes through different mechanisms. Implications for policy and practice are discussed.

The Pathways to Nature Connectedness: Applying Research in a UK Context
Ryan Lumber1, Miles Richardson1, David Sheffield1 (1. The University of Derby)

Introduction: Feeling connected to nature has been shown to be beneficial for wellbeing and pro-nature outcomes. General nature contact and knowledge based activities are often used in an attempt to engage people with nature. However, the specific routes to Nature Connectedness have not been examined systematically previously. Methods: Two online surveys (total n = 321) of engagement with, and value of, nature activities structured around the nine values of the Biophilia Hypothesis were conducted. In a third study (n = 72), a walking intervention with activities operationalising the identified predictors, was performed. Results: Contact, emotion, meaning, and compassion, with the latter mediated by natural beauty, were predictors of nature connectedness, yet knowledge based activities were not. In the walking intervention, a significant increase in Nature Connectedness was found when walking in and engaging with the pathways Sensitivity: Internal compared to walking in nature alone or walking in and engaging with the built environment. Discussion: The pathways provide alternative values and frames to the traditional knowledge and identification routes often used by organisations when engaging the public with nature. Organisations including the National trust and the Wildlife Trusts have utilised the pathways in their public engagement with this approach discussed.
A Smartphone App for Improving Wellbeing through Urban Nature

Kirsten McEwan¹, Miles Richardson¹, David Sheffield¹, Fiona J. Ferguson⁴, Paul Brindley⁴ (1. University of Derby, 2. University of Sheffield)

Introduction: Mental illness is the largest cause of disability in the UK. It is increasingly accepted that exposure to the natural environment is linked to human health and wellbeing. With increased urbanisation, there are fewer opportunities for people to engage with nature. Urban natural environments provide daily access to residents who would not normally have the time or inclination to travel to natural environments. Therefore, interventions to connect people with urban nature are needed. Methods: This randomised controlled trial evaluated a Smartphone based wellbeing intervention. The app prompted 582 adults, including those with common mental health problems, to notice the good things about urban nature or built spaces. Results: There were statistically significant and sustained improvements in wellbeing at one-month follow-up. Importantly, in the noticing urban nature condition, compared to a built space control, improvements in quality of life reached statistical significance for all adults, and also clinical significance for those with a mental health difficulty. The improvement in wellbeing was partly explained by significant increases in Nature Connectedness and positive affect. Discussion: The study provides the first controlled experimental evidence that noticing the good things about urban nature has strong clinical potential as a wellbeing intervention and social prescription.

Perceived restorativeness of the landscapes, nature connectedness, and people's living environments: How are they related?

Seiji Shibata¹ (1. Sagami Women's University)

Introduction: Relationships among people's childhood environments, nature connectedness, and perceived restorativeness of natural landscapes have not been well studied yet. Methods: Total 1,260 participants participated in this study (M=630, F=630, age 30-59). The participants were collected from three groups: those who grew up in a mountainside area, those who grew up in a seaside area, and those in an urban area. The participants' nature connectedness was assessed with the feelings toward nature scale. Then, the participants were given photographs of natural landscapes to evaluate their perceived restorativeness. Results: A multi-group structural equation modelling using the landscapes as a group factor was employed to examine the relationships among participants' childhood environment, feelings toward nature, perceived restorativeness of the landscapes. The resulting model showed that growing up in a mountainside or a seaside area led to a higher score on feelings toward nature scale. The result also showed that the score on feelings toward nature scale and the perceived restorativeness of the landscape were correlated positively. Discussion: The results suggested that growing up in a rural area could foster people's nature connectedness, and those who have stronger nature connectedness tend to perceive natural landscapes more restorative.
Compete with an electric fleet —Context relevant factors and measures fostering e-car purchases in commercial fleets

Annalena Becker¹, Sebastian Bobeth¹, Ingo Kastner¹, Ellen Matthies¹ (1. Otto-von-Guericke University Magdeburg)

Introduction. The integration of electric cars in commercial fleets is a promising field to accelerate the shift from combustion engine cars to electric cars. Fleets such as those of care services describe an area of application with feasible ranges and economic benefits. This study aimed to identify the most relevant factors influencing the decision for integrating electric cars in organisations.

Method. 101 decision-makers from private care services participated in an online survey. A discrete choice experiment measured the importance of three varied external factors: range, financial support by public funds, and the availability and financial support for an infrastructure package that would supply the organisation with a parking lot and a charging station. Results. All three external factors were found to be significant for the decision to purchase an electric car. The decision was influenced mostly by financial aspects. The infrastructure package was also very appealing for decision-makers. Significant interactions were found between external and organisational factors like long daily distances and the availability of sufficient parking space. Discussion. Results indicate that policy measures supporting the integration of electric cars in commercial fleets play an important role for decision-makers and should be developed further.

On-demand ridesharing shuttles: a mobility service of the future?

Birgit Mack¹, Karolin Tampe-Mai² (1. Zirius, University of Stuttgart)

Introduction. On-demand ridesharing shuttles combine individual rides into optimized routes with flexible pick-up and drop-off points. They can help to reduce congestion and CO2-emissions. We asked how a shuttle system and its context should be designed to encourage commuters to use shuttles rather than their own car, while discouraging defection from public transport. Method. Through an online survey including a choice-based conjoint experiment we investigated determinants of travel mode choice in commuters of the Stuttgart region (n=1000). Study participants chose between using their own car, public transport, and a shuttle service based on electric vans. Travel costs, travel time, walking distance, occupancy rate of shuttles and public transport, social norms, and car parking fees were varied as attributes. Results. These attributes had significant effects on travel mode choice. If they were set to levels corresponding to a realistic starting situation for a shuttle system —higher costs and longer walking distances when using shuttles rather than one’s own car, equal travel time for all travel modes, introduction of inner-city parking fees for private cars —11% opted for the shuttle. Discussion. If conditions are optimized, the introduction of shuttle services seems to be a viable path towards a more sustainable transport system.
Is car sharing for environmentalists? The downside of car sharing-supportive conditions
Laura Henn¹, Florian Kaiser¹ (1. Otto-von-Guericke University Magdeburg)

Introduction. In our research, we compared car sharing-users and nonusers with regard to their environmental attitudes. We expected to find lower levels of environmental attitude with car sharing-users in supportive conditions (e.g., high availability and, thus, convenient access to car sharing) compared to car sharing-users in unsupportive conditions. Because of the convenience gains car sharing should not only attract environmentalists but also less environmentally engaged people.

Method. In a quasi-experiment in six German cities that either represent car sharing-supportive or unsupportive conditions, we studied 791 car sharing-users and 436 nonusers.

Results. As expected, we found car sharing users to be more environmentally engaged than nonusers. In other words, car sharing is for environmentalists. Unexpectedly, this was generally the case, in the supportive and not only in the unsupportive conditions. At the same time, among environmentally engaged individuals self-reported car use was higher for car sharing-users relative to nonusers.

Discussion. We thus conclude that car sharing can also become too attractive from an environmental protection point of view. As such, it leads to more car use in environmentalists. The picture reflects the fact that—at least in Germany—car mobility is still rather attractive and hard to resist even for environmentalists.

Contextual drivers for spillover effects from a workplace dietary choice intervention to pro-environmental behaviours in the home setting
Caroline Verfürth¹, Christopher Jones², Diana Gregory-Smith³, Caroline Oates¹, Panayiota Alevizou¹ (1. University of Sheffield, 2. University of Surrey, 3. Newcastle University)

Introduction. Spillover effects describes when one pro-environmental behaviour leads to another, often initiated by a behaviour change intervention. While spillover effects between behaviours and its underlying factors have been widely studied, little is known about spillover between settings (e.g. work, home). This study investigated the influence of contextual factors on spillover effects between settings by evaluating the effects of a meat reduction intervention in a workplace on employees’ pro-environmental behaviours at home.

Method. The meat reduction intervention was implemented in the canteen of a medium size private sector company. Overall, 26 semi-structured pre-and post-intervention interviews were conducted with employees to better understand contextual factors that facilitated or reduced spillover between work and home. Thematic analysis using NVivo12 was used to analyse the interview.

Results. Differences in perceived behavioural control and social dynamics between the settings were identified as contextual factors that influenced contextual spillover. Furthermore, it was found that contextual barriers can lead to indirect spillover effects (i.e. from meat reduction at work to local food consumption at home).

Discussion. Theoretical and practical implications are discussed, including considerations for future research. This study provides insights into contextual factors that influence the performance of pro-environmental behaviours in different contexts.
Reducing household waste

Ellen van der Werff (1. University of Groningen)

Introduction. To move to a circular economy, households need to reduce their residual waste. Policy makers aiming to reduce household waste, can provide a context in which households receive feedback on their waste. Feedback has been shown to be an effective strategy to change behavior, particularly when behaviour is compared to a standard. However, which standard is most effective in changing behaviour? Methods. We conducted a field study in collaboration with a waste company to test the effect of different types of feedback on residual waste behaviour. We tested four conditions. We expected feedback on households’ waste compared to their own waste goals to be most effective in reducing waste followed by feedback on household waste compared to waste produced by other households. We expected feedback comparing households’ waste to their own past waste to be less effective. Finally, we expect the control group that only received tips on how to reduce waste to reduce their waste the least. Results. We tested the feedback in a context with and without a financial incentive to reduce waste. Effects on self-reported and actual household waste were tested as well as the underlying processes. Discussion. The theoretical and practical implications will be discussed.

Promoting high-flow, sustainable lifestyles: Why are materialistic values problematic?

Amy Isham (1. Centre for the Understanding of Sustainable Prosperity, University of Surrey)

Engagement in flow experiences is linked to greater well-being and lower environmental impact. However, materialistic values appear to undermine an individual’s ability to experience flow. I hypothesised that both the level of self-regulatory resources and the way in which these are used will mediate the negative relationship between materialistic values and flow proneness. Study 1 distributed surveys to a nationally representative sample of 2000 British adults. Results demonstrated that individuals displaying stronger materialistic values tended to report lower levels of self-regulatory strength, which may be due to their greater tendency to grant self-regulatory resources to the avoidance of undesirable states. Lower levels of self-regulatory strength were linked to a reduced propensity to experience flow. Study 2 utilised a between-participants laboratory experiment with 104 members of the university to test the potential causal nature of these relationships. Priming materialistic values led individuals to report poorer quality flow experiences in a subsequent activity period, however, depleting levels of self-regulatory resources via an emotion suppression task was not able to significantly influence subsequent flow. Accordingly, if self-regulatory resources explain the negative relationship between materialism and flow, they do so via their influence on processes preceding the flow experience itself.
Public acceptance of low-consumption policy measures and behaviours: Comparing the efficacy of social norm, commitment, and hypocrisy interventions.
Daniel Thorman¹, Lorraine Whitmarsh¹, Christina Demski¹ (1. Cardiff University)

In accepting the necessity of globally reducing consumption levels, a better psychological understanding of this transition becomes pertinent. Social norms and hypocrisy have been explored in research on environmental behaviour. This study focuses on the unexplored domains of low consumption behaviours (e.g. reducing plastic use, repairing not replacing) and policy support (e.g. environmental taxation, reduced working hours). Research was designed using emergent themes from a focus group stage as part of a mixed methods thesis (n = 259). Results indicate hypocrisy inducement reduced support for government intervention and increased support for market de-regulation; in contrast, eliciting commitment increased support for government control, and decreased support for market regulation. Participants in the commitment condition (but not the hypocrisy condition) also reduced their intentions to engage in high consumption behaviours. This replicates the ‘rebound’ effect of hypocrisy manipulations found previously. Whilst there were no main effects of social norms on policy acceptance or behavioural intentions, there were interaction effects with the hypocrisy paradigm, namely social norms framing increased the effectiveness of making a commitment to reduce consumption behaviour. In line with previous studies showing that commitment is an effective strategy to promote proenvironmental behaviour, we find it also works for low-consumption behaviours.

ABSTRACT WITHDRAWN

Goals for Good: An Intervention to Decrease Materialistic Values, with Consequent Changes in Wellbeing, Pro-environmental Attitudes, and Pro-environmental Behaviours. Introduction
Tim Kasser¹, Natasha Parker², Birgitta Gatersleben², Anat Bardi⁴ (1. Knox College, 2. University of Surrey, 3. Royal Holloway, University of London)

Decades of research demonstrate that materialistic values are associated with lower wellbeing and with lower levels of pro-environmental attitudes and behaviours. Materialism has been on the rise in young people, and materialism has peaked at an historical high for Millennials.

This study experimentally tested an intervention asking young working adults (aged 18-30) in three countries (UK, Italy, Hungary) to set intrinsically focussed goals. The impact on their materialistic value orientation was measured, along with their wellbeing, pro-environmental attitudes and behaviours. Data were collected from an active control group who undertook a goal setting intervention that made no attempts to influence the content of their goals and from a non-active control group who undertook no intervention.

Participants in the experimental group demonstrated a significant decrease in their materialistic value orientation at the end of the intervention; this decrease was maintained 2 months after the intervention ended. In contrast, there were no changes in materialism among the active and non-active control groups. Reductions in materialism were associated with increased happiness, environmental concern, perceived personal agency to reduce environmental damage, and environmentally friendly lifestyles. Reductions in materialism were also associated with decreased negative affect and search for meaning in life.
Consumer identities and sustainable lifestyles.

Birgitta Gatersleben¹, Patrick Elf¹, Ian Christie¹ (¹. University of Surrey)

People’s identities and values are related to their environmental behaviour. Moral values and identities, in particular, are strong predictors of intentional pro-environmental behaviour. However, promoting sustainable lifestyles involves more than the promotion of intentional proenvironmental behaviours such as recycling or buying green alternatives. Recently we demonstrated that four consumer identities are important: morality, frugality, thriftiness and wastefulness. Morality and frugality are linked to biospheric values, but only morality is also linked to altruistic values. Wastefulness is linked to egoistic and materialistic values. Whereas morality is associated with pro-environmental behaviours such as recycling or buying green products, frugality may be a better predictor of behaviours associated with “saving”. The reverse is true for wastefulness. Here we examine to what extent these consumer identities predict changes in different environmental behaviours among participants of a one-year longitudinal UK project that aimed to promote sustainable lifestyles (and a matched control group; N = 2 x 100). Preliminary analyses show that morality, frugality, thriftiness and wastefulness are related to different attitudes and behaviours, as expected. The findings suggest that promoting sustainable lifestyles involves more than promoting moral values and identities. It also requires tackling wasteful behaviour, which may not be achieved through moral appeals.

#Flygskam vs #airtravel? Evaluating the impact of social media postings on travel transportation choices.

Jan von der Brelie¹ (¹. University of Gothenburg, Department of Psychology)

The decision to fly is one of the behaviors with the greatest carbon-impact an individual can take. In previous studies, the link between pro-environmental attitudes and air travel behavior is rather weak. However, the theory of planned behavior (TPB) has been successfully applied to predict the intention to fly less. Therefore, this experimental study seeks to test interventions that promote alternatives to air travels by using the components of this model. We compare the effects of Instagram postings of users who choose to fly, with those who use alternative ways of transportation. Hence, we test two main hypotheses. First, we expect that Instagram posts promoting higher fuel-efficient ways of transportation lead to higher scores of the intention to fly less. Second, we hypothesize that participants of the alternative travel treatment group have higher scores on all variables of the extended TPB (attitudes, perceived behavioral control, social norms and behavior-specific self-identity) compared to participants of the air travel treatment group. For this online study we use a between-subject design and attempt to recruit up to 160 participants in Sweden and Germany. Although data collection is still ongoing, results will be available at the conference.
Social identity formation and sustainable behavior and cooperation in the energy domain

Lise Jans (1. University of Groningen)

Introduction: In the transition towards a more sustainable energy system, there is an increasing demand that individuals change their energy behaviors and align their energy behaviours to others. Social identity aspects (e.g. group identification/group norms) play an important role in understanding whether someone is willing to change their behaviors and with whom someone is willing to cooperate. Here, I will show the added effect of social identity aspects to understand sustainable behavior and cooperation in the energy domain. Furthermore, I will discuss how social identities that are formed from the bottom-up from individual expressions may be able to facilitate the transition towards a more sustainable energy system.

Methods: I will illustrate this with findings from two recent studies on bottom-up sustainable initiatives in communities (N=303) and an organization (N=274).

Results: The results show that the more a sustainable initiative is perceived as formed from the bottom-up (rather than top-down), the higher group identification and sustainable group norms are, and the higher self-reported sustainable behaviours are, in turn.

Discussion: Hence, I propose that bottom-up initiatives ability to strengthen these two aspects of shared social identity, can move people towards more sustainable energy behaviours. Thereby bottom-up initiatives can foster the energy transition.

Revealing decision-making processes in peer-to-peer energy communities

Ulf Hahnel, Mario Herberz, Tobias Brosch (1. University of Geneva)

Introduction. An increasing amount of decentralized renewable energy generation renders balancing of energy supply and demand more challenging. Peer-to-peer (P2P) energy trading based on the idea that community members directly exchange electricity among each other is a promising means to optimize energy flows. However, it is still unclear to what extent community members are actually willing to participate in P2P networks, making predictions about the value of the approach challenging.

Method and Results. We address this gap by analyzing homeowners’ trading decisions in simulated P2P trading scenarios (N=301). Findings show that individual independence (B= 2.12, Z=23.17, p<.001) and energy prices set within the community (B= 0.89, Z=18.03, p<.001) are key determinants of trading behavior. We moreover identified four groups that systematically differed in their trading decisions ranging from price sensitive prosumers to classic non-trading consumers. In order to gain additional insights into the underpinnings of trading patterns, we characterized the identified trading groups based on demographics and psychological determinants.

Discussion. Our findings shed light on homeowners’ decision-making patterns in P2P energy networks and allow policy makers to more accurately predict risks and benefits associated with the concept.
Consumer demand for blockchain-enabled peer-to-peer energy trading in the United Kingdom: An online survey experiment

Michael Fell\textsuperscript{1}, Alexandra Schneiders\textsuperscript{1} (1. University College London (UCL))

Introduction: Peer-to-peer (P2P) energy trading could support growth in low-carbon generation, among other benefits. Blockchain technology is being used in a number of trials of this approach to provide a secure and credible record of transactions and energy flows. Method: We used a nationally representative online survey experiment (n=2064) to explore people’s intention to participate in such schemes depending on various characteristics. Results: Overall intention to participate was high (at least 52% across groups). We found evidence that P2P schemes which offer to meet a higher proportion of household consumption are more popular. There is provisional evidence that schemes which operate at the city/region level are more popular than national ones, and limited evidence that they are more popular than at the neighbourhood level. A scheme offered by the local authority was most popular, with those operated by an energy supplier, community energy group or social media company less so. While highlighting characteristics of blockchain technology such as immutability, decentralization and transparency put more people off than they attracted, anonymity was more popular. Lastly, mentioning the word Bitcoin reduced people’s likelihood of participating. Discussion: We use these findings to highlight important questions regarding the future composition and operation of P2P schemes.

The ways people talk about peer-to-peer electricity trading: A view to understanding the social psychological dimensions of P2P

Denise Wilkins\textsuperscript{1}, Mark Levine\textsuperscript{2} (1. Microsoft Research, 2. University of Exeter)

Introduction. Existing research characterises peer-to-peer electricity trading (P2P) as a means to address energy challenges. However, limited research has examined the public’s perceptions of P2P and the digital platforms that underpin P2P. Method. Using thematic analysis, we analyse talk about P2P from 40 interviews with members of the public who have a self-defined interest in renewable energy. Results. Although participants characterise P2P as offering opportunities to advance sustainability goals, they also express uncertainty about the ability of digital platforms to solve core energy issues. Whereas participatory forms of energy generation and management are understood to be key for advancing sustainability goals, participants describe traditional energy companies, the political system and individuals’ priorities as obstacles to widespread participation. Considering these challenges, the ability to trade electricity with peers is characterised as a resource that could be enabled by a digital platform, and has the potential to change the culture and relationships that are central to sustainability. However, negative elements are also described. Given P2P’s novelty, participants illustrate its utility and weaknesses by drawing on notions of personal and social identity, and characterisations of intra- and intergroup relations. Discussion. Our work highlights the social psychological dimensions of P2P, we draw out implications for technology design.
Capturing values within peer-to-peer energy sharing systems
Lurian Pires Klein¹, Giovanni Allegretti¹, Luisa Matos³, Manuel Gameiro¹ (1. University of Coimbra, 2. Virtual Power Solutions)

Introduction: The literature states that a primary driver of human behaviour is a predisposition for altruistic behaviours. This assertion encourages the development of peer-to-peer (P2P) energy sharing systems, since they are grounded in the social interconnectedness among end users. Considering this, this study aims to answer whether values arise as a core outcome of these systems. At present, research fails to analyse the wider qualitative dimension of P2P energy sharing systems. That is, empirical evidence about their potential values-based dimension is still missing.

Methods and Results: This study developed a values-based assessment framework that allows to identify subtle values arising from P2P energy sharing systems. This framework derived from the We Value Toolkit, which was repurposed, tested, and validated in three pilot projects in Portugal. The sample (N=123 end users) was selected by convenience sampling. Preliminary results indicate that P2P concepts are promising in generating new values as well as reinforcing pre-existing ones.

Discussion: By making values tangible and measurable, this study aimed to shift the bottom-line focus of P2P energy sharing systems from profit-making to the social value being delivered. Based on that, this study asserts that values should be seen as a core outcome of the energy transition movement, rather than just a marginal aspect.

Welcome to wilderness? Assessing the sense of wilderness in the Black Forest National Park

The Black Forest National Park wants people to engage with nature and to perceive wilderness, thus to promote health and environmental education. However, it is an open question what ‘wilderness’ is from the visitor’s perspective, how perceived wilderness is associated with health, and if this initiates learning. To address these questions, we constructed a scale to measure perceived wilderness.

Second, we designed a field study where N = 13 participants evaluated trails regarding health, wilderness and learning. Using an intensive-longitudinal design, each participant filled in self-reports at 24 pre-defined waypoints per trail. Additionally, we elicited physiological and objective data using GPS-devices, heartrate monitors and temperature sensors. Results showed that the wilderness scale allows for a detailed assessment of perceived wilderness. A stronger sense of wilderness was associated with restorative processes. Mixed results emerged regarding environmental learning. The results complement wilderness definitions by providing the perspective of perception. They inform the park management to optimize trails to provide the best possible wilderness experiences regarding health promotion and environmental education. Finally, a future Citizen Science project will build on the results, where visitors will be encouraged to map perceived wilderness and to report features that enhance or impair their sense of wilderness.
Socio-cultural forest monitoring: landscape and forest preferences of Swiss residents
Nicole Bauer¹, Eike von Lindern², Jacqueline Frick³, Marcel Hunziker¹ (1. Swiss Federal Research Institute WSL, 2. Dialog N – Research and Communication for People, Environment and Nature, 3. University of Zurich)

The use of the forests and the attitudes of the population towards forests and forest development is important for the adaptation of management and policies. In Switzerland these are assessed on a regular basis in the Socio-cultural Forest monitoring. The results of the last survey with 3022 respondents, indicate that forests are highly valued by Swiss residents as part of their daily environment and for recreational purposes and used very intensively: 45% of the respondents visit the forest one to two times a week during spring, summer and autumn. We assessed the preferred landscape qualities, specific natural elements (e.g. tree composition, deadwood, etc.) and infrastructural elements in the forests (e.g. bike trails, benches). We found that the specific natural forest elements could be grouped into three factors according to principal component analysis: the multisensory forest (factor 1 contributing to 26% of variance), the wild forest (factor 2: 14% of variance) and the monoculture (factor 3: 13% of variance). The elements of the multisensory forest (e.g. natural sounds, mixed forests) were rated positively while the qualities of the wild forest (e.g. dark forest, dense undergrowth) were rated more negatively. These results will help to establish priorities concerning the management of forests.

The role of knowledge, values and forest owner identity for private forest management in Sweden
Louise Eriksson¹, Clas Fries² (1. Umea University, 2. Swedish Forest Agency)

There are diverse demands on forests and environmental psychology can provide insights on how different management aims can be achieved in private forests by uncovering the drivers of forest management. Even though knowledge is considered important for forest management, an elaborate conceptualization and improved measurement of knowledge is needed. This study examined the role of knowledge (subjective and objective), values (general and forest), and forest owner identity (FOI) for different forest management strategies (i.e., production, biodiversity, recreation, climate adaptation, and climate substitution). The study was conducted by means of a postal questionnaire to a random sample of private forest owners in Sweden (n = 3000, response rate: 43%). Regression analyses revealed that general values were predictors (direct or indirect) of production, climate substitution, and biodiversity management. Forest values were furthermore significant direct or indirect determinants of all types of management. Objective knowledge was a direct predictor of biodiversity and climate adaptation management, and indirect predictor of production. Subjective knowledge and FOI had direct impacts on all types of management. Results verify that knowledge, values, and FOI were important for private forest management (Adj R2 = .13-.36) and highlights the need to conceptually distinguish between subjective and objective knowledge.
'I am a farmer not a forester'. Understanding landowner beliefs to encourage greater integration of trees in the rural landscape.

Nerida Anderson¹, Rodney Keenan¹, Lyndall Bull³ (1. University of Melbourne, 2. Lynea Advisory)

Deforestation and intensive agricultural practices contribute to climate change and environmental degradation. At the same time, global demand for timber and wood products is increasing. Integrating trees into productive farming systems can help address the environmental consequences of deforestation and provide wider social and economic benefits, while also helping meet demand for timber and wood. However, approaches encouraging greater integration of trees on farms have been largely ineffective in many developed countries. Beliefs are a key determinant of landowner intentions. This study examines the beliefs underlying landowner willingness to plant and explores how an understanding of beliefs can be applied to encourage greater integration of trees on farms. In this mixed method study 34 semi-structured interviews and a postal survey (n=183) were conducted with landowners in Victoria, Australia to identify the perceived benefits and barriers to integrating trees. Key barriers included negative beliefs about economic and commercial outcomes, and beliefs about skills and ability to achieve desired outcomes. Self-identity – ‘I am a farmer not a forester’ - was a key factor underlying landowner beliefs. This highlights the need to consider the social and cultural context in which beliefs are shaped when developing behavioural interventions to encourage land use change.

What can we learn from observing how psychological concepts are applied in environmental management?

Kathryn Williams¹, Andrea Rawluk¹, Rebecca Ford¹ (1. University of Melbourne)

Environmental psychologists want their research to contribute to positive societal outcomes, a goal reinforced by external expectations of research impact. Much has been said about the context that support research translation; less is known about how insights from psychological research change and are changed by environmental management. Based on case studies incorporating participatory observation, interviews and document analysis, we explored how psychological research on values of the public was incorporated into bushfire planning by government agencies in Victoria, Australia. We found that knowledge of values was selected and modified to meet strategic goals and fit with knowledge culture of the organisation. For example, concepts of value proposed for use in bushfire planning were reframed to fit the landscape scale of regional planning and less tangible values affected by bushfire (e.g. experience of nature) were excluded. Reasons for this included absence of scientific guidance on how some values are impacted by bushfire and lack of confidence among practitioners in working with social and qualitative data. Environmental psychologists should appreciate that their knowledge will be changed by practitioners, that systematic change is likely necessary to its utilisation, and that capacity building in social analysis is an integral component of research impact.
A Longitudinal Study to Assess Whether Changes in Work Environment Predict Changes in Privacy Appraisal and Associated Outcomes
Clara Weber¹, Birgitta Gatersleben², David Uzzell² (1. ZHAW, 2. University of Surrey)

Privacy fit is a frequently reported issue in open office environments, yet its contextual predictors and its consequences remain understudied. This research was designed to examine contextual predictors of change in privacy fit and coping appraisal, as well as changes in consequences of privacy fit during an office move. Data was collected over two points of measurement from 61 office workers who moved from a standard open-plan office to an office that is activity-based. The first questionnaire was distributed six weeks prior to the office move and the follow-up questionnaire seven months after. With its longitudinal design, this study extends past research by demonstrating the changing nature of privacy fit and revealing predictors of change in privacy fit and coping appraisal. Cross-lagged autoregression analysis of change confirmed suggested predictors such as increase in variety of settings and in adherence of others to protocols that positively influenced post-move privacy fit. Further, change in coping appraisal post-move was predicted by an increase in perceived environmental and behavioural flexibility. Changes in privacy fit and appraisal were associated with increases in work and workplace satisfaction and decreases in emotional and mental work fatigue post-move.

Is It Really That Uncomfortable? Reflecting on the Measurement of Discomfort from Glare
Steve Fotios¹, Michael Kent² (1. University of Sheffield, 2. Berkeley Education Alliance for Research)

Discomfort from glare is possibly the most widely researched topic within the human factors of lighting. Despite this effort, and despite the number of models which have been proposed, there is still no consensus as to the physiological basis of the discomfort response nor the magnitude of discomfort experienced in a given situation. The two procedures most commonly used in discomfort glare studies are category rating and luminance adjustment. Through five experiments we have demonstrated the influence of changes to design parameters: stimulus range, pre-trial demonstration of stimulus range, anchors, evaluation sequence and visual task during discomfort evaluation. Of these, stimulus range bias appears to have the largest effect size. Amongst others there are two key findings from this work. First, that measuring discomfort may be creating a problem that does not actually exist, e.g. in studies using a rating scale that does not permit the option of reporting no discomfort. Second, the disagreement between studies may be attributed to stimulus range bias in the underlying data rather than the correctness of the exponents used in a particular model. Advancement of knowledge requires wider recognition of experimental bias and the development of new methods.
Range Bias in Environmental Safety Appraisals: Stimulus Range Affects Absolute Agreement Not Consistency
Antal Haans¹, Steve Fotios² (¹ Eindhoven University of Technology, ² University of Sheffield)

Environmental appraisals are commonly measured with self-report scales which are vulnerable to all kinds of response biases. One such bias is the range bias in which a rater’s evaluation of an environment depends on the range of the evaluated attribute in the stimulus set. Fotios and Castleton [2016; Leukos, 12(4), 235-243] demonstrated such range bias in evaluations of the safety of nocturnal urban streets. The present study aimed to replicate and extent their findings. We found stimulus range to affect safety evaluations to a statistically significant extent; thus confirming that stimulus range biases raters’ responses to self-report items. However, correlational analyses revealed that inter-scene differences were consistent regardless of stimulus range. Moreover, linear equating—which does not affect relative differences between scenes—resolved the disagreement between ratings obtained with differently ranged stimulus sets, as indicated by Bland-Altman plots. In other words, the presence study demonstrates that range bias affects absolute agreement, but that inter-scene differences (i.e., consistency) remain unaffected. Although absolute estimates, such as this street is “moderately safe”, should be used with caution, we found no indication that range bias affects negatively the validity of correlational analyses, as when regressing safety perception on illuminance levels.

What Makes a Tranquil City? Qualitative Analyses of Crowdsourced Data Regarding Perceptions of Urban Tranquillity
Eleanor Ratcliffe¹, Grant Waters², Julie Godefroy³ (¹ University of Surrey, ² Tranquil City; Anderson Acoustics, ³ Julie Godefroy Sustainability)

Experiences of environmental tranquillity are often associated the sights, sounds, and other sensory experiences of nature. However, tranquillity can also be found in urban settings; i.e., in urban parks, quiet streets, and garden squares. Perception-based and crowdsourced initiatives such as Tranquil City and Hush City aim to facilitate the identification and use of such spaces. However, the specific environmental properties that contribute to perceptions of urban tranquillity are understudied. We present results of analyses of photographic and text data (N = 721 cases) by members of the public, who used the hashtag #tranquilcitylondon on Instagram and Twitter to identify tranquil locations in London. Content analysis of image data revealed that 73% of such spaces were primarily green (e.g., parks and gardens); 12% were primarily blue (e.g., marina, river/canalside); 6% were ‘pocket’ nature integrated into the urban fabric; 7% were primarily built (e.g., cultural or heritage buildings); and 2% were street trees. Ongoing analyses include links between crowdsourced images and environmental datasets, and thematic analysis of text supplied alongside the images, and results of these will be presented at the conference. Our findings enhance understanding of the environmental properties, both built and natural, that can inform positive experiences of urban environments.
Anthropogenic Noise Source and Intensity Effects on Mood and Relaxation in Simulated Park Environments

Jacob Benfield\textsuperscript{1} (1. Penn State Abington)

Research on human-caused sound has shown a range of effects in outdoor and simulated outdoor environments. Aircraft noise, ground traffic, and human voices have all been shown to lower scenic evaluation ratings and influence individual reports of affective state. However, those effects are often shown cross-sectionally or with simple pre-post measures of mood. Additionally, the research is not always in agreement concerning the size, cause, or direction of effect (e.g., Mace et al., 1999 compared to Benfield et al., 2010) or fails to test the effect of sound intensity alongside sound type. As such, the current project utilized a time series of 15 measurements of overall mood and relaxation collected during a 30-minute period in which participants (N = 229) were exposed to randomized volume levels of natural sounds, natural sounds with aircraft noise, natural sounds with ground traffic, or natural sounds with human voices added. Results supported previous findings with significant sound type X volume interactions showing differing rates of decline for both mood and relaxation; these effects were shown in momentary assessments after controlling for noise sensitivity, task effort, and task fatigue, all of which had been used by previous researchers to explain differences among previous findings.

Unveiling the Public Participation Chain

Goda Perlaviciute\textsuperscript{1}, Lorenzo Squintani\textsuperscript{2} (1. University of Groningen)

Policy action to mitigate climate change is indispensable, but it often faces public resistance. The “Yellow vests” movement and anti-wind protests in many countries are prominent examples. One possibility to increase public acceptability is to replace the top-down decide-announce-defend approach with more public participation in decision-making. Social sciences uniformly prescribe early public involvement and public voice in decision-making. Yet, current approaches do not take into account the full decision-making chain, which can qualify how early public participation actually is and how much voice people actually have. Our recent public survey among residents in the province of Groningen, the Netherlands (n=1129) showed initial evidence that people particularly want to participate in decision-making on a micro level, such as energy projects in their vicinity, and less in decision-making on more general regional and national energy plans and policies. However, when it comes to concrete local energy projects, major decisions have already been made at a macro level, making it too late for citizens to have real voice in decision-making. We argue that taking public participation chain into account gives important new insights into why public participation practices are sometimes ineffective in increasing public acceptability of policy actions to mitigate climate change.
Social Identity Insights on Why a Community Vote on a Wind Energy Development Went Wrong in King Island, Australia

Rebecca Colvin (1. Australian National University)

Greater participation of communities in environmental decisions is encouraged for processes of energy development for both moral and strategic reasons. But, techniques for participation that may appear democratic and empowering can in practice cause adverse outcomes depending on how they are designed, implemented, and –critically—how they interact with the local social context. In this presentation, I share insights from a study theoretically grounded in the Social Identity Approach that interrogated the dynamics of a community vote for a large-scale wind energy proposal in King Island, Australia. The vote was one element of a two-year consultation process concerning a 200-turbine wind energy facility, and was cited by project proponents as a means to secure the social licence to operate. While the use of a vote perhaps appeared to be a mechanism for transferring decision-making power from the corporate proponent to the local community, the vote itself was socially destructive as it precipitated polarization and ossification of opinion, and exacerbated social distance between supporters and opponents of the proposal, eventually leading to legal actions against the proponent. The Social Identity Approach highlights the complexities of an ostensibly democratic participatory processes, and points to broader challenges for sustainable energy transitions.

Effects of Influence over Decisions and Effort Investment on People’s Willingness to Participate in Decision-making on Sustainable Energy Projects

Lu Liu (1. University of Groningen)

Research suggests that involving people in decision-making can lead to more socially acceptable sustainable energy projects, compared to top-down decision-making that often fuels public resistance. However, participation in decision-making takes time and effort, which might make people reluctant to participate. Therefore, the question remains how people make the trade-off between having influence over decisions and having to invest time and effort. Two experimental studies were conducted to examine the main and interaction effects of influence over decisions and time and effort investment on people’s willingness to participate. Study 1 showed a positive effect of influence over decisions on willingness to participate, but –surprisingly—no effect of time and effort investment on willingness to participate. Study 2, in which we increased the amount of time and effort needed for participation and made participants feel they need to take real action to participate, showed a negative effect of time and effort investment on willingness to participate; interestingly, the main effect of influence over decisions on willingness to participate was no longer significant. The results suggest that people in general may want more influence over decision, yet needing to invest time and effort in decision-making may reduce their willingness to participate.
Public Acceptability of Innovative Heating System in the Netherlands: the Perceived Role of Fairness
Crystel Hajjar¹, Nadja Contzen¹, Frank Hindriks¹, Linda Steg¹ (1. University of Groningen)

A major challenge to the energy transition may be the lack of acceptability of innovative sustainable technologies. Previous research suggests that perceptions of fairness could lead to increased acceptability. In this study, we build on this research by exploring which aspects of fairness are perceived to be the most relevant. Data were collected by conducting semi-structured interviews with representatives from various heating production and distribution companies, as well as municipal representatives. Preliminary results suggest that stakeholders perceive considerations of fairness, in particular procedural fairness, to be an important factor for increasing acceptability. Respondents also value public participation in decision-making as an ideal despite expressing concerns over when and how it is best applied. However, the role of procedural fairness in the face of perceived negative outcomes, such as the lack of choice or high installation costs remains unclear. Increasing perceptions of fairness in order to increase acceptance raises challenges, especially on reconciling the different perspectives the public might have on fairness. Such practical and theoretical implications will be discussed.

Laypeople associations with energy transition pathways in Norway and Germany
Rouven Doran¹, Gisela Böhm², Hans-Rüdiger Pfister³, Daniel Hanss⁴ (1. University of Bergen, 2. University of Bergen; Inland Norway University of Applied Sciences, 3. Leuphana University Lüneburg, 4. University of Applied Sciences Darmstadt)

Introduction: A selection of twenty-five components was presented as stimulus material to elicit cognitive structures underlying laypeople associations with different pathways to facilitate sustainable energy transition. Methods: Participants were recruited in two countries demonstrated to differ in their historic and present energy profiles, Norway and Germany. Each participant was tasked to (i) select motives and values that they considered as being most strongly associated with each component and (ii) rate the perceived impact of each component on climate change. Results: Results for the first task suggested that different clusters were associated with specific motives and values; for example, individual actions like avoiding long flights were closely associated with ‘self-constraint’ and ‘comfort’, whereas technological solutions like solar panels were more closely associated with ‘ample energy supply’. Results for the second task differed insofar that there was no clear division based on whether a component seemingly belongs to the individual, political, and/or technological sphere. For example, solar panels, wind farms, and hydropower were on average regarded as having a reducing impact on climate change, whereas nuclear power was on average deemed to have no such reducing impact. Discussion: A discussion of the findings in the context of cross-country differences concludes the presentation.
Stress-reducing effects of nature: A multi-lab replication of the Ulrich et al. (1991) study

Karin Tanja-Dijkstra¹ (1. Saxion University of Applied Sciences)

The reproducibility of scientific research has been much debated in recent years and this debate is also finding its way into the domain of environmental psychology. In view of these debates, it seems highly desirable to obtain more insight into the reproducibility of nature’s restorative effects. One of the first and most influential experiments to test this notion was conducted by Ulrich, Simons, Losito, Fiorito, Miles, and Zelson (1991). In this experiment, 120 subjects first viewed a stressful movie, and then watched a 10-minute videotape of either natural or urban environments. Both in physiological and self-reported measures, stress recovery was faster and more complete when subjects viewed a nature video rather than an urban video. This well controlled study has had a large and enduring impact on both a scientific and societal level. This talk will present the findings of a large-scale pre-registered multilab replication project involving 10 labs from the Netherlands, Sweden, UK and the USA. In total, 978 participants were exposed to a stressor video and subsequently watched one of six environmental videos, thereby closely replicating the set-up of the original work. Physiological measures included indicators of both sympathetic and parasympathetic activity. Implications of the findings are discussed.

Appraising the psychological benefits of green roofs for city residents and workers

Kathryn Williams¹, Kate Lee¹, Leisa Sargent¹, Katherine Johnson¹, John Rayner¹, Claire Farrell¹, Rebecca Miller¹, Nicholas Williams¹ (1. University of Melbourne)

A number of studies examine the restorative potential of green roofs, a form of building integrated ‘nature’. These studies typically use designs in which plants are added to roofs and preference or restoration outcomes compared with those of standard roofs. While indicating restorative potential, these studies are often weakly related to everyday human interactions with green roofs. For example, studies based on images of green roofs may use unrealistically ideal viewpoints while field-based studies rely on access to roofs that may be denied in everyday life. In this presentation we consolidate restoration theory and research by considering green roofs in the light of foundational models of human-environment interaction and social-ecological thinking. While green roofs can provide restorative benefits, whether those benefits occur and for whom is shaped by interactions between multi-scalar characteristics of the physical environment (e.g. surrounding buildings, climate), social climate (e.g. access, cultural views on nature in cities), activities that can be undertaken on a green roof (e.g. opportunities to socialise), and individual resources and adaptation (e.g. opportunities to change environments). We consider the implications for understanding the restorative value of green roofs and (re)consider how more holistic frameworks might further our understanding of restorative environments more generally.
Implications for restorative environments theory of integration with an individual-level skill-based approach to the management of vulnerable adaptation resources

Freddie Lymeus¹, Per Lindberg¹, Terry Hartig¹ (1. Uppsala University)

Insights from meditation science can guide the articulation of restorative environments theory with regard to personal skills and practices. From this perspective, individuals can be instructed and trained to experience restoration in a wider range of settings, with higher efficiency, and with greater depth or intensity. This presentation draws on knowledge gained through a series of experimental studies on an individual-level approach called restoration skills training (ReST) that integrates meditation practices and concepts with restorative processes supported by a natural setting. Summarizing key results from this project, the presentation will center on the theoretical implications of introducing individual training into the restorative environments framework. Specifically, the presentation covers implications related to: 1) how investment of personal resources in a restorative experience could either add or detract from the resource gain achieved; 2) the relationship between a top-down regulated mode of processing of environmental input and the bottom-up regulated process of restoration; 3) the temporal and spatial scale of the expected processes and outcomes; and 4) the allocation of responsibility for making the needed conditions available.

How have we tested attention restoration theory?

Terry Hartig¹ (1. Uppsala University)

Since its early days within environmental psychology, research on restorative environments has largely consolidated around a narrative that encompasses two contrasting theories: attention restoration theory, with its emphasis on a cognitive process of restoration, and stress reduction theory, with its emphasis on a psychophysiological process. These theories, separately or together, have provided a basis for many comparisons of the restorative effects of different environments. But how have the core claims of these theories been addressed in experimental operations? In this presentation I will address this question with a view to studies guided by attention restoration theory (ART). Focusing on those experiments covered in recent meta analyses, I will examine how the restorative process described in ART has been represented in terms of the antecedent condition and in underlying components of the restorative experience (being away, fascination, extent, and compatibility). The examination has implications for the interpretation of extant findings, preparations for further research, and restorative environments theory more generally.
Effects on restoration when varying the meaning of an encounter with another person in nature

Henk Staats¹, Philipp Schneider² (1. Leiden University, 2. Utrecht University)

Since its early days within environmental psychology, research on restorative environments has largely consolidated around a narrative that encompasses two contrasting theories: attention restoration theory, with its emphasis on a cognitive process of restoration, and stress reduction theory, with its emphasis on a psychophysiological process. These theories, separately or together, have provided a basis for many comparisons of the restorative effects of different environments. But how have the core claims of these theories been addressed in experimental operations? In this presentation I will address this question with a view to studies guided by attention restoration theory (ART). Focusing on those experiments covered in recent meta analyses, I will examine how the restorative process described in ART has been represented in terms of the antecedent condition and in underlying components of the restorative experience (being away, fascination, extent, and compatibility). The examination has implications for the interpretation of extant findings, preparations for further research, and restorative environments theory more generally.

What are you looking at? The visual cues used to evaluate other pedestrians

Khalid Hamoodh¹, Steve Fotios¹ (1. University of Sheffield)

Imagine that you are walking alone and see another pedestrian ahead: what are the visual cues that tell you whether to approach or avoid? After dark, road lighting should enhance ability to make this evaluation. Past road lighting research has tended to focus on Facial Identity Recognition (FIR), assuming that identity recognition is the critical element. More-recent research has focussed instead on Facial Emotion Recognition (FER) because it is associated with approach-avoid decisions of unfamiliar people. Both approaches assume the face to be the critical feature of another person but that has yet to be established. An experiment was conducted to explore the hierarchy of potential cues to safety judgements - gender, number of people, walking direction, light direction, and face visibility. Test images were photographs of actors embedded into a nighttime urban scene. The images were displayed on a PC screen and evaluated using two procedures, category rating and paired comparison. The results suggest that visibility of the face is important: if this visibility is reduced by clothing (wearing a hood) or lighting (back-lit rather than front-lit) then the degree of safety is reduced.
Exploring the Influence of Distraction on Visual Detection of Pedestrians

Steve Fotios¹, Scott Fox¹, Chloe Robbins¹, Richard Rowe¹ (1. University of Sheffield)

Research has shown how changes in road lighting affect drivers’ ability to detect peripheral hazards such as a pedestrian at the edge of the road. Cognitive distractors also impair drivers’ ability to detect pedestrians in peripheral vision. However, there has been little research into the interaction between lighting and distraction in the context of pedestrian safety. A pilot study explored how different distractor tasks moderate visual detection of peripheral targets. Whilst fixating on a central cross, drivers (18-25 and ≥65 years) were required to detect peripheral targets appearing in one of four locations. Simultaneously, participants performed different cognitive tasks: (1) reporting a single digit displayed in place of the fixation cross; (2) the n-back task (n = 0, 1, 2); (3) a word generation task; and (4) a control. Results confirm that all distractor tasks caused a significant reduction in peripheral target detection. The single digit task, n=1 and the word generation task produced similar detection performance; the n=2 task caused significantly greater reduction in peripheral detection compared to any other distraction. These findings identify suitable levels of distraction to be used in further work examining the interaction between lighting and distraction during pedestrian detection tasks.

Does the presence of lighting encourage cycling after-dark? A big data approach

Jim Uttley¹, Steve Fotios¹, Robin Lovelace³ (1. University of Sheffield, 2. University of Leeds)

Cycling has a range of health, environmental and economic benefits, prompting governments across the world to promote this mode of transport. Cycling should be a viable option at all times of the day, including after-dark. Previous research has demonstrated that darkness significantly reduces the number of people cycling. Outdoor lighting may encourage more people to cycle after-dark. Two sets of big data were used to assess the impact of lighting on cycling rates after-dark. Cycling frequencies were estimated using crowdsourced cycling trip data at a street level. These were compared against the presence of outdoor lighting on the streets and paths used by cyclists. An odds ratio method were used to quantify the relationship between lighting and cycling rates, accounting for other seasonal and time-of-day factors. Cycling trip data and lighting data were analysed for three cities in the UK (Glasgow, Newcastle and Sheffield). Odds ratios suggested the presence of lighting on a path or road increased cycling rates after-dark. Lighting is an important aspect of the built environment that can encourage more cycling. Further work should identify optimal lighting characteristics to maximise cycling rates after-dark, and also investigate the effect of lighting on cyclist safety.
Cyclists and Car Drivers at junctions: how are intentions communicated?

Peter Walley1, Yee Mun Lee2, Oliver Carsten2, Jim Uttley4 (1. Transport for Greater Manchester, 2. Institute for Transport Studies, University of Leeds, 3. University of Sheffield)

Three quarters of all cyclist casualties in the UK occurred at, or within 20 metres of junctions. A mutual understanding of intentions between road users is required for safe interactions to occur at junctions, due to the multiplicity of potential movements. The factors that influence the safe passage of cyclists during left turns are not currently well researched. This study aimed to fill that gap. Naturalistic driving data can provide useful insights into interactions when cyclists turn left in front of car drivers. The ability to analyse interactions from a driver’s viewpoint provides a unique understanding, allowing for both device-based and informal communication methods to be examined. A framework for categorising driver-cyclist interactions was developed and used to code interactions at junctions using the UDRIVE naturalistic driving database. Analysis demonstrated the frequency of use for communication methods in real-world scenarios and, using statistical testing, their effect on facilitating a safe interaction between cyclists and drivers in different environments. Social cues and norms within these environments were also identified. The research has potential implications for the interpretation of interpersonal communication by automated vehicles, future road and shared space design, and cycle safety training.

Healthy travel: What lies under the radar?

Ian Walker1, Gustav Bösehans1, Bruno Osorio1, Nick McCullen1 (1. University of Bath)

Healthy active travel carries many individual and societal benefits, but levels of healthy travel remain relatively low. This presentation draws together recent studies to explore hidden needs and suppressed demands for healthy travel. We begin with analysis of the energy implications of travel, and how this interacts with other energy demands, particularly within the home. This adds a new dimension to the urban/rural division in healthy travel discussions by demonstrating a greater energy drive in rural settings than usually recognised. We then look at suppressed and potential demand for healthy travel. We suggest shifting our focus away from travel behaviours and towards travel goals might usefully enhance our understanding of this topic. We also suggest that frequently expressed motives for travel, especially by car, might be reinterpreted, especially as a reflection of social and cultural norms. We provide empirical data from a public transport segmentation analysis that further demonstrates that a focus on people’s travel goals might be important for encouraging more active travel. We finish by suggesting the outstanding issue now is how to use these insights to encourage modal shift from car use to healthy travel, and indicate potential avenues through greater focus on travel goals.
Pro-environmental behavior - An expression of a general moral motivation depending on connectedness to nature
Siegmar Otto¹, Sarah Zabel², Pablo Díaz-Siefer³, Alexander Neaman³ (1. University of Hohenheim, 2. University of Heidelberg, 3. Pontificia Universidad Catolica de Valparaiso)

Introduction: Prosocial and pro-environmental behavior can be seen as behaviors with a general moral foundation. Nevertheless, some people act more prosocial and some more pro-environmental. We propose that each person has a certain level of a general moral motivation, which is directed in different domains such as prosocial and pro-environmental behavior. We propose that some motive or reason is necessary for a person to direct his or her general moral motivation into one domain or the other. Some motives for prosocial behavior are gain in social status or reciprocity. For pro-environmental behavior, connectedness to nature seems to be a strong motive.

Methods: In order to test if and to what degree connectedness to nature directs moral motivation towards pro-environmental behavior, we analyzed to what degree connectedness to nature mediates the effect of moral motivation on pro-environmental behavior in a heterogeneous Chilean sample (N = 443).

Results and Discussion: We found that connectedness to nature mediates the effect of moral motivation on pro-environmental behavior. Based on further comparisons of members of environmental vs. social organizations, we will show that a general moral motivation is directed to specific domains of moral behavior depending on the strength of individual motives.
(Almost) all quiet over one and a half years: A longitudinal study on causality between key determinants of private flood mitigation

Sebastian Seebauer¹, Philipp Babicky² (1. Joanneum Research Forschungsgesellschaft mbh, 2. University of Graz)

Introduction. Previous studies disagree on the strengths and directions of the effects between risk appraisal, non-protective and protective responses in private flood mitigation. This may be due to the widespread use of cross-sectional survey designs, which infer causality from theoretical considerations alone. The present longitudinal study, in contrast, uses the antecedence of cause to effect to confirm causal relations.

Methods. Drawing on two-wave survey data from 554 flood-prone households in Austria, a series of cross-lagged autoregressive models analyses pairwise combinations between risk perception, fear, non-protective and protective responses.

Results. Over the course of 1.5 years, in the absence of any policy intervention or flood disaster, these factors show remarkably high temporal stability. Stability is highest for non-protective responses and fear. Only in very few instances can causal effects over time be confirmed statistically. Non-protective responses emerge as the major causal drivers; foremost, denial and reliance on public protection limit private flood mitigation.

Discussion. This overall null finding on causality puts into question the theoretically-assumed causal relationships and the effects found in cross-sectional studies. Finding non-protective responses to be key determinants in an overall picture of stability suggests that this factor should be given a stronger role in future risk research.

More nature, greener behaviour? Evidence from nationally representative surveys in England


Human actions are threatening the ability of global ecosystems to maintain planetary life-support systems. Progress on changing human behaviour to meet the challenges of regional and global sustainability has been slow. The current research investigated whether urban living, and detachment from the natural world, might be part of the problem. Using data from two nationally representative samples of England (combined N ≈ 42,000), we explored the associations between exposure to nature (operationalised as neighbourhood greenspace, coastal proximity, and recreational nature visits), and several self-reported pro-environmental behaviours. Controlling for potential confounders, we found positive relationships between recreational nature visits and both private and public sphere behaviours. The more individuals visited nature for recreation, and thus maintained physical contact with the natural world, the more likely they were to report ‘private’ behaviours such as saving energy and ‘public’ behaviours such as conservation volunteering. Relationships with neighbourhood exposures were more complex, potentially reflecting situational constraints and opportunities. Results complement experimental work suggesting nature exposure can promote pro-social behaviour, though more work is needed to investigate issues of causality with respect to pro-environmental behaviours. Improving access to, and contact with, nature, e.g., through better urban planning, may be one mechanism for meeting sustainability targets.
Environmental attitude and connection with nature: A two-country comparison between France and Germany

Inga Wittenberg¹, Ghozlane Fleury-Bahi², Manuel Hefti² (1. Otto, 2. Université de Nantes)

Introduction. Environmental protection is a widely discussed topic. Moreover, many people living in urban settings, connection with nature and its role in environmental protection are an important issue. Difference can be observed among countries concerning the context making environmental protection and connection with nature more or less difficult. France and Germany differ in several ways regarding such contextual factors. In the present study we investigated environmental attitudes and connection with nature comparing these countries based on the Campbell Paradigm (Kaiser, Byrka, & Hartig, 2010).

Method. We conducted an online-questionnaire distributed in France and Germany. Over 600 persons participated to the survey (about 300 in each country).

The questionnaire included the General Ecological Behavior Scale (Kaiser & Wilson, 2004) and the Disposition to connect with nature Scale (Brügger, Kaiser, & Roczen, 2011). The German versions were translated in order to validate French versions of these scales.

Results. Fit statistics for the scales are good in both languages. A comparison between the samples based on Rasch Analysis revealed differences concerning the difficulty of several items. Furthermore, the results showed positive correlations between the scales.

Discussion. We will discuss the similarities and differences observed between the countries, in particular regarding the behavioural difficulties.
Basic psychological needs in the context of climate change: Does social exclusion trigger climate change denial and serve as a societal barrier for sufficiency orientation?

Marlis Wullenkord¹, Josephine Tröger¹, Gerhard Reese¹ (1. University of Koblenz-Landau)

Sufficiency-oriented, low-consumption lifestyles are one possible strategy to overcome the climate crisis. However, those who produce the highest emissions often do not act in accordance with their pro-environmental attitudes. Rather, defensive self-protective strategies such as denial are widespread. Here, we investigate if the frustration of basic psychological needs could serve as an explanation for this ostensibly paradoxical finding. We conducted two studies investigating how – in the face of climate change threat – the satisfaction of psychological needs (especially relatedness) may result in a) less self-protective strategies and b) higher sufficiency orientation. Study 1 (N = 302) examined associations between needs, sufficiency orientation, and self-protection. As hypothesized, need satisfaction predicted sufficiency orientation and self-protection, such that those who reported high need satisfaction (especially competence and relatedness) endorsed higher sufficiency orientation and reported less use of self-protective strategies. In Study 2 we manipulated climate change threat and relatedness (Cyberball-paradigm). Self-protection, sufficiency orientation, and materialism were dependent variables. In line with study 1, we expect to find a positive influence of relatedness on sufficiency orientation and a negative influence on self-protection. Basic need satisfaction may be a pre-requisite for sufficiency orientation. Future directions and implications for the socio-ecological transformation will be discussed.
Everything is just a click away. Digital environments and sufficiency-oriented consumption behaviour

Vivian Frick¹, Tilman Santarius¹, Ellen Matthies² (1. Technische Universität Berlin, 2. Otto-von-Guericke University Magdeburg)

Consumption is increasingly immersed in digital environments. It has been suggested that exposure to digital environments is associated with higher consumption levels due to the convenience of online shopping, exposure to online advertisement and consumption-related peer information in social media (SMPI). This was examined including behavioural costs of online shopping as a moderating factor, and subjectively ideal or sufficient levels of consumption, personal and social norms as mediating factors.

In three cross-sectional representative online surveys on the consumption of clothing, digital devices and air travel consumption (N = 2724), the amount of products or services purchased (outcome), exposure to online advertisement and SMPI (predictors), mediators, moderators and control variables were assessed.

Behavioural costs of online shopping are mostly perceived to be lower than those of offline shopping. Exposure to online advertisement and SMPI correlated with higher self-reported consumption levels of new and sufficiency-oriented products. Subjectively ideal or sufficient levels of consumption and some social norms partially mediated this relationship.

Associations between digital environments and consumption levels may be due to an influence of digital environments on consumption levels or because already consumption-oriented individuals find more consumption-related cues there due to personalization. Experimental and longitudinal studies should test causal relationships.

You are what you (m)eat: Exploring meat related identities of Danish consumers

Louise Randers¹ (1. Aarhus University)

It has been suggested that unsustainably overconsumption of meat is difficult to change in part because it is linked to a person’s identity. However, an identity is not static, but related to the dynamic aspects of consumption. Identity processes in the realm of meat consumption are only studied little and the research usually focuses on a single identity and on meat in general or a single meat category. Other important identities and dynamic identity processes are therefore overlooked. Hence, this study will explore the role of identity-behavior processes, inspired by dual-process models of cognitive functioning. In the on-going data collection, 24 semi-structured in-depth interviews are conducted with Danish meat eaters, flexitarians, vegetarians and vegans in all ages. Photo diaries, vignettes and a self-brand connection approach are applied. Data are analyzed by means of a “grounded theory” approach using NVivo 12. Known and novel identities and linked processes are expected to emerge. Results are discussed in the light of identity theory about ‘markedness’ and dualprocess models of cognitive functioning. The discussion will focus on how the data inform identity theory and identity-based behavioral campaigns promoting less meat consumption.
Money buys an SUV, while time fosters sufficiency? - The influence of working hours, income and available time on high-impact unsustainable behaviour and pro-environmental behaviour

Sebastian Neubert¹, Hugo Hanbury¹, Christoph Bader¹, Stephanie Moser¹ (¹ University of Bern)

Recent studies have shown that psychological motivational constructs (like environmental awareness) only predict consumptious unsustainable behaviour with particular high environmental impact (like mobility behaviour) to a small extent, whereas income is the most relevant predictor. It has been considered that working time reduction might be a promising strategy to counter this harmful income effect. The less people work, the less money they have to spend on unsustainable behaviour. Additionally, reduced working time might increase discretionary time, and might thus allow individuals to better align their actions on their (pro-environmental) values, leading to an increase in sufficiency-oriented behaviour. However, intra-individual empirical evidence of these assumed effects is sparse. To better understand these effects, we run an ongoing study with working Swiss residents (N > 800) on working time, income, unsustainable overconsumption behaviour and sufficiency-oriented behaviour. Individuals reducing their working time are assessed three times over a 10-month period (1-month-pre-, 3-months-post- and 9-months-follow-up assessment) and compared to control groups of full-time and part-time workers. At ICEP, we will present and discuss cross-sectional analyses of the first questionnaire with a particular focus on the interplay of income, discretionary time, values and both high-impact overconsumption and sufficiency oriented behaviour.

Is individual sufficiency-orientation reflected in less “stuff”? The example of electronic household devices

Laura Henn¹ (¹ Otto-von-Guericke University Magdeburg)

Individual consumption behaviour encompasses a plethora of decisions and situations in which individuals are tempted to consume (e.g. to buy things) and is thus to a large extent dependent on intrapersonal factors such as an individual’s motivation for a low-consumption lifestyle. Especially electronic household devices often promise a surplus in convenience and comfort. From a sustainability point of view, consumption of electronic devices is especially problematic due to the high resource demand during production and operation and the difficulty of recycling. Because many electronic devices are dispensable, sufficiency orientation should be reflected in the possession of less electronic devices. In this talk I first present a measurement scale for individual sufficiency-orientation. I then present data (N = 105) measuring participants’ sufficiency-orientation and assessing the amount of electronic devices they possess. The results show the Rasch-homogeneity of the sufficiency scale and a negative correlation of $r = -.31$ ($p = .001$) with the number of possessed electronic devices as well as a negative correlation with the size of some selected devices (e.g. washing machine, TV). This research contributes to the measurement of sufficiency-orientation and offers a validation criterion central to the sufficiency concept: less “stuff”—a sign for a decluttered lifestyle.
Neighbourhood Greenspace and Health-Risk Behaviours: Results from a Nationally Representative Survey.

Leanne Martin¹, Sabine Pahl¹, Mat White³, Jon May¹ (1. University of Plymouth, 2. University of Exeter)

A preliminary investigation of a conceptual model, proposing that increased nature exposure may reduce health-risk behaviours, through reductions in negative affect. Using a representative sample of the adult population of England (Health Survey for England, 2012) we investigated the relationships between neighbourhood greenspace, three health-risk consumption behaviours (current smoker, heavy smoker, exceeding recommended weekly alcohol limits), two abstinence behaviours (successful smoking cessation, alcohol abstinence) and negative affect, whilst controlling for a range of covariates. Specifically, the study addressed three research questions: 1) Is the availability of neighbourhood greenspace associated with the prevalence of health-risk behaviours?; 2) Is neighbourhood greenspace related to the prevalence of abstinence behaviours?; 3) Are any such relationships mediated by negative affect? Findings will be discussed with consideration of their implications for environmental policies and public health initiatives.

A pilot study of campus greenspace use by students at the University of California, Irvine

Miryha Runnerstrom¹, Nik Warren¹ (1. University of California, Irvine)

Introduction: Recent studies show that a majority of college students face stress at levels severe enough to disrupt their studies; consequently, attention to campus restorative environments is warranted. The primary objective of this study is to explore how campus greenspaces are utilized by students at the University of California, Irvine (UCI).

Methods: An anonymous online survey of 31 UCI students (M age=21.2 years) was conducted to explore campus greenspace use and opportunities for psychological restoration. The survey included questions on frequency of time outdoors and preference for outdoor activities.

Results: Analyses showed that 20 participants spent time outdoors on campus at least 1-3 times per week and 22 wanted more opportunities to be outdoors. A majority of participants preferred outdoor spaces when socializing with friends (n=20) and exercising (n=18). Analysis of short-answer responses revealed that participants desired additional study spaces, seating in existing outdoor spaces, and more nature spaces across campus.

Discussion: Because the bulk of students regularly spend time outdoors and prefer outdoor campus environments for certain activities, an opportunity exists to enhance and expand on-campus greenspaces. For example, green walls and water features could be added to areas with extant outdoor seating to promote opportunities for restorative experiences.
The Soothing Effect of Nature: A Cross-cultural Experiment on the Effect of Environmental Art on Relaxation
Bing-Tao Lee¹ (¹ University of Cambridge (The Behaviour and Building Performance Research Team))

Introduction: This research attempts to provide empirical evidence of how human relaxation is influenced by different kinds of paintings, and whether culture and/or different levels of self-construal moderate this influence.

Methods: An experiment was conducted with an online questionnaire, containing neutral questions with paintings as decoration. 401 participants were randomly assigned to one of five conditions, and their degree of relaxation was measured before and after answering the questionnaire. One control group without a painting was implemented alongside the four combinations of natural or urban paintings with a positive or negative theme.

Results: Multiple linear regression analyses showed that after exposure to art representing nature with a positive theme, participants’ degree of relaxation changed depending on their level of interdependence.

Discussion: This study suggests that people with a high level of interdependence are more sensitive to positive reinforcement in the physical environment. Paintings with negative themes can soothe people if their prior mood is relatively gloomy, which implies that person-environment consistency provides a psychological bond. In application, this study suggests that art representing nature should be put in public places or in certain types of organisations, such as hospitals, whose organisational culture encourages interdependence.
Healing in the Harvest: Indigenous Mental Wellness and Traditional Land-Based Food Practices in Subarctic, Canada

Nicole Spiegelaar¹ (1. University of Toronto)

Introduction: This study builds on my work with the Indigenous Cree of subarctic James Bay, Canada, where the government has declared a mental health state of emergency. Cree well-being is enhanced by traditional hunting (harvesting). The objective of this study was to explore the Cree value of land-based experiences for mental wellness.

Methods: I did semi-directed interviews during the spring and fall harvest seasons with the Cree (n=24, 50:50 male:female). Participants described their land-based experiences in relation to mental wellness. I identified dominant themes, coded them using used NVivo software, and reviewed with the community.

Results: I identified 39 recurring themes that I will discuss in the context of three recurring paradoxes: social, cognitive and work. Qualitative analysis revealed why the inherent quality of work, thinking and social relations are different in the natural environment. Harvesting counters the effects of colonial abuse by healing relations with oneself, each other and the land.

Conclusions: The Cree primarily value nature-based subsistence because it shifts the way people interact, from competitive and individualistic to reciprocal and supportive. Participants identified elements of nature immersion that facilitate healing through reciprocity, such as survival interdependence, phenomenological experiences and cultural teachings encoded in the natural environment.
(How) Do visitors of open air events adapt to heat stress? Exploring vulnerability, risk awareness and adaptive behaviour via interviews and behavioural observations
Anna Heidenreich, Martin Buchner, Annegret Thieken, Ariane Walz (1. University of Potsdam)

Introduction: We are facing an increase in heat stress during summer. Open air events are especially exposed and require individual and organisational adaptation. This case study explores visitors’ behaviour and perception during six weekends in 2018 at a six-monthly horticultural show with 700,000 visitors in total.

Methods: 306 visitors were interviewed about their weather perception, risk awareness, risk knowledge and heat adaptation behaviour. In addition, 2,750 behavioural observations were made. Correlation analyses, ANOVA and multiple regression analyses were conducted.

Results: During the examination period temperatures recorded at the exhibition ground varied between 19°C and 35°C. Differences in adaptation behaviour were observed between cold and rainy days (<25°C), warm summer days (25-30°C) and hot days (>30°C). Age and physical fitness had an impact on the perception of heat and the reported thermal stress. Self-reported adaptation behaviour could mostly be confirmed by the behavioural observations. Most interviewees (90%) were unaware of official heat warnings. Concerning adaptation measures against heat stress, most people saw a high individual responsibility and held the organizers not strongly responsible.

Discussion: Recommendations are given to organizers of future open air events planning for visitors’ safety and comfort. Tailored risk communication may foster public awareness for heat stress.

Convince yourself to do the right thing: using self-persuasion to stimulate moral behaviour and care for monkey well-being among zoo visitors
Nieke Lemmen, Kees Keizer, Linda Steg, Thijs Bouman (1. University of Groningen)

Introduction: Persuasive information, such as the provision of arguments that emphasise the importance of behaviour, is often used to encourage moral behaviour. However, on the basis of the self-persuasion principle, we hypothesise it may be more effective to make people convince themselves by letting them provide their own arguments. We investigated the effects of providing arguments versus self-generated arguments on rule compliance and the perceived importance of the relevant rule. Method: Two field experiments were performed in Apenheul zoo in which visitors were either provided with arguments emphasising the importance of one of their rules (one should not lure the monkeys) or with the question “why should you not lure the monkeys?”. We observed rule complying behaviour of visitors (N = 2,438) and asked visitors how much they valued the rule via questionnaire (N = 358). Results: We found that both providing visitors with arguments and providing visitors with a question about the importance of the rule increased compliance, compared to control. However the perceived importance of the rule only increased when visitors were asked to come up with reasons themselves. Discussion: We will discuss challenges in the design of the study, particularly how to control for possible confounding factors.
Promoting Conservation Using Personalized Normative Feedback: Lessons from the Field
Samantha Mertens¹, Wesley Schultz¹ (¹. California State University)

Field experiments offer a rigorous methodology to test hypotheses in a natural context. We define field experiments as those which include a high degree of naturalism in terms of units, treatments, settings, and observations. In field experiments, treatments mimic natural phenomena in that they are implemented in a manner consistent with the setting. Oftentimes, treatments in a field experiment are embedded in the flow of everyday life and are not viewed by the participants as unusual. This talk presents results from a large-scale field experiment with more than 2,000 households, testing the impact of personalized normative feedback on the volume of trash and recycling collected in a California city. Preliminary results are presented comparing normative feedback about the five closest neighbours, residents across the city, best recycling households across the city, and a state-wide diversion target. The talk highlights lessons learned with regard to maintaining rigorous experimental methods while responding the changing contexts of a natural setting. Examples include interactions with residents, run-ins with law enforcement, inclement weather, complying with IRB regulations, coordinating with city government, and managing a large field team.

The motivational impact of smart incentives to promote sustainable behaviour
Nadja Zeiske², Ellen van der Werff³, Linda Steg¹ (¹. University of Groningen)

Introduction: Financial incentives are often used to promote sustainable behaviours. However, research shows that these incentives do not always result in long-term behaviour changes. Possible explanations for this are that financial incentives only provide a temporary reason for people to engage in the desired behaviour, and that they crowd out intrinsic motivation. We examined to what extent these explanations play a role in both the short and long-term effectiveness of a three-week free public transport card in encouraging individuals to commute to work using public transport.

Method: We conducted a longitudinal field study in collaboration with the municipality of Groningen (N=379). Participants completed a questionnaire before and twice after the intervention period.

Results: We found that the incentive effective was in promoting the use of public transport. However, participants reported low intentions to use public transport after the intervention period ended. We found that the financial aspect of the behaviour was only perceived to be an important reason during the intervention period, but no longer after the intervention period. Interestingly, we did not find a crowding out effect of intrinsic motivation to commute to work over time. Discussion: The challenges and lessons learned from conducting field research in collaboration with external organisations are discussed.
The effect of automation on pro-environmental behaviour: seven field studies
Niamh Murtagh1 (1. University College London (UCL))

Introduction: In discourses around responding to climate change, technology is often claimed as a primary solution. When it comes to saving energy in buildings, for example, automated systems are often proposed as the answer. However reliance on technology carries psychological implications. It has been argued that faith in technology may lead to abdication of personal responsibility for behaviour and change. In this set of studies, we examined the effect of perception of automation on three everyday behaviours. Method: We conducted a total of seven field studies. These examined three everyday behaviours with environmental impact (calling a lift, opening a door, switching off a light). In each case, manipulations were introduced to imply that action would be automated. Baseline behaviour was measured and compared with the behaviour in the manipulation condition. Results: Across all three behaviour types, the findings supported our hypothesis that perception of automation undermined baseline behaviour. Discussion: The conclusion from the findings is that automated technology may weaken pro-environmental behaviour. The methodological approach offered novel contribution as well as challenges. The benefits and drawbacks of field studies merit greater attention in investigating everyday pro-environmental behaviours.

The effect of nudging in promoting the consumption of organic fruits and vegetables
Kerstin Weimer1, Richard Ahlström1, Francisco Esteves1 (1. Mid Sweden University)

Introduction: A field study collecting behavioral data was conducted to investigate effects of behavioral interventions, commonly known as nudges, in promoting the consumption of organic fruits and vegetables.

Methods: Consumption, both organically and conventionally produced fruits and vegetables, was measured in a grocery store during four days (one day every other week) where consumers were exposed to informational messages in combination with either emotional images or social norm messages. Measurements of daily consumption without exposure to nudges were carried out during four other days (one day every other week, alternated with the nudging days).

Results: The results showed that the proportion of sold organic products in total sale of the selected fruits and vegetables was slightly higher during nudging days when price differences between conventional and organic products were low. This limited effect of nudging disappeared when the price of organic products was essential higher than the price of conventionally produced products.

Discussion: The price as a well-known barrier to purchase of organic food is discussed together with some measures that can be taken to compensate for the prevailing differences in price between organic and conventional products.
Exploring the impact of school-based environmental education on home practices

Victoria Circus (1. University of Sheffield)

Introduction. Education is a vital tool to equip children with the necessary awareness, skills, attitudes and knowledge they need to secure a more sustainable future. As school children strike from school and sign petitions to raise awareness of climate change, environmental education seems as important as ever.

Methods. This project explores whether a multi-media environmental education programme (using songs and animations) impacts primary school children and their families using the lens of ‘home practices’, where social practice theory is applied to household sustainability issues. Potential impact on different practice domains within the home (e.g. energy, water, food) are explored, along with different strategies family members might use to influence one another and the different factors that help or hinder any process of change. Observations at school and in the home as well as interviews are used.

Results. Fieldwork is still ongoing, but preliminary results indicate that the environmental education is having some impact on pupils, with certain barriers preventing the children from discussing or actioning the education at home.

Discussion. Future environmental education programmes might benefit from including content on communication skills, for example, to maximise the impact their programme has on pupils and their families.

Testing the effect of environmental considerations in explaining adolescents’ environmental behaviour

Audra Balunde (1. Mykolas Romeris University, 2. University of Groningen)

Research has shown that people’s biospheric values, environmental self-identity, and personal norms influence their pro-environmental behaviour. While this has been found for adults, the question is whether such general environmental considerations influence pro-environmental behaviour among adolescents too. Considering that adolescents undergo intense development of moral and identity structures, can the influence of biospheric values, environmental self-identity and personal norms on environmental behaviour already be detected in this stage of development? We studied the effects of these environmental considerations: on general pro-environmental behaviour such as recycling, consumption of sustainable products and the use of sustainable transportation (Study 1, n = 256); and on specific pro-environmental behaviours, namely recycling non-refundable plastic, purchasing locally-produced products and cycling to school (Study 2, n = 349). We tested this effect in the sample of adolescents in Lithuania, a country where knowledge is much needed about key factors motivating people’s pro-environmental behaviour. The results of both studies indicate that adolescents’ pro-environmental intentions and behaviour can be explained by biospheric values, environmental self-identity and personal norms. Theoretical and practical implications of the study will be discussed.
Different personality trait patterns of adolescents also mean different patterns of their pro-environmental behavior

Mykolas Simas Poškus¹, Audra Balundė¹, Lina Jovarauskaitė¹ (1. Mykolas Romeris University)

Introduction. Different individuals find motivation from different sources and thus even the same group of pro-environmental behaviors can be performed for different reasons. Different pro-environmental behaviors are rarely alike; thus, it becomes relevant to understand whether different individuals engage in different types of pro-environmental behaviors as well and to describe these patterns.

Method. The present study addresses this by examining a dataset representative of Lithuanian adolescents (N = 508, age M = 15 (SD = 1.4)). Participants’ personality traits were assessed using the Big Five inventory; a variety of environmentally relevant behaviors were assessed with items adapted from the General Ecological Behavior questionnaire and newly constructed items.

Results. Adolescents could be grouped into four groups (Positive, Negative, Open, Outgoing). Participants pro-environmental behaviors were compared among clusters. Differing patterns of engaging in sets of pro-environmental behaviors (self-serving, altruistic, food choice) which are typical for certain personality clusters were found.

Discussion. Individuals from the Positive cluster engage in both self-serving and altruistic behaviors, while individuals from other clusters tend to pick and choose in what positive behaviors to engage. The Negative cluster actively opposes pro-environmental behaviors, indicating that this group needs special attention when targeting interventions.

Student Flatshares – Determinants and Well-Being

Juliane Bücker¹ (1. Otto-von-Guericke University Magdeburg)

Striving for a more sustainable society, understanding pro-environmental lifestyles and their impact on the individual is crucial. Sharing a flat entails a considerably lower consumption of resources and energy than living alone, and is thus investigated as a sustainable form of dwelling worth promoting. To explore the determinants of flatsharing, and flatsharers’ well-being, students living in Magdeburg (Germany) were asked to participate in an online-survey (N = 168), and the answers of flatsharers (61.3%) were compared to those of students living alone. Flatsharers reported less income, a higher financial motive, and higher perceived behavioural control of their possibilities to flatshare. They also perceived descriptive norms to flatshare as stronger than students living alone. Flatsharers had a more positive attitude towards flatsharing and reported higher levels of trait sociability and trust in others, but a lower preference for solitude. Levels of well-being did not differ, but a high sense of belonging to one’s flatmates was positively connected to affective well-being. Comparing flatsharers to non-flatsharers, pragmatic, normative and internal determinants predicted flatsharing significantly and simultaneously. Flatsharing is pro-environmental in its impact, and, conversely, the results suggest that the quality of the living environment in a particular flatshare is related to individual well-being.
Predictors of Public Transport Use among University Students during the Winter: A Multiple-Group Structural Equation Modelling Approach

Alim Nayum¹, Trond Nordfjærn¹ (1. Norwegian University of Science and Technology)

Considering its large potential of reducing negative effects of road transport, stimulating wider use of public transport is identified important for sustainable urban development. The current study aimed to examine attitudinal factors underlying the use of public transport in winter among female and male university students. A self-administered questionnaire survey was conducted among 441 students (229 females and 206 males) at the two largest university campuses in Trondheim, Norway. A multiple-group structural equation modeling approach was used to test relationships among constructs using an extended version of the theory of planned behavior hypothesized to predict public transport use during the winter. Analyses revealed no meaningful gender differences in the magnitude and direction of the specified relationships while also controlling for age. This suggests that proximal attitudinal factors exert a similar influence on the use of public transport in winter among university students regardless of gender. Moreover, a strong social-normative effect and significant influence of subjective assessment of accident probability in winter with public transport suggest that campaigns promoting sustainable and environmentally friendly travel modes can benefit from the same intervention highlighting these aspects for university students in both genders.

Extending ART to explain creativity: Using thought probes to understand mind wandering in nature

Kate Lee¹, Kathryn Williams¹, Terry Hartig³, Katherine Johnson¹ (1. University of Melbourne, 2. Uppsala University)

An emerging body of research suggests that nature experience may boost creativity, but there is little understanding of the process through which these effects might occur. Recent conceptual work extends existing theory, positing dual pathways: (1) through attention restoration and (2) through mind wandering. Mind wandering is implicated in creativity more broadly, but this pathway is untested in regard to nature experience. To understand better the potential role for mind wandering in nature and possible benefits for creativity, we drew on experience sampling to elucidate thoughts while in different environments. We asked participants to provide brief qualitative accounts of their momentary thoughts that we classified as focused or unfocused, and as internally oriented or externally oriented toward the environment. Through this process we identified thoughts resembling mind wandering. We examined whether this mind wandering was linked to creativity measured before, and after, experiences in different environments. Our work extends existing theory, testing recent theoretical advances proposing a role for mind wandering during nature experience, as well as strengthening the emerging body of research exploring nature and creativity.
Finding restorativeness in greenscapes, using GoogleMaps and GoogleStreetview

Robert van Dongen\(^1\) (1. Eindhoven University of Technology)

Natural elements in residential streets, like trees, grass strips, flowers and wall climbing plants - together the urban greenscape - are not well researched, yet may have a large potential for the restorativeness of urban environments. The present research consisted of an online survey among respondents (n = 415) in the Dutch city of Eindhoven. They were asked to indicate in GoogleMaps three locations throughout the city. First their home location, and second two locations (one in their neighborhood and one on city level) that the respondents considered attractive in the sense of pleasant and relaxing, due to the urban greenscape. The respondents were to approach the task thinking of going home after a busy day. GoogleStreetview was used to analyze the locations on greenscape elements and designs plus other aspects such as building style and openness. The findings support previous research which showed the importance of (large) trees and the configuration with urban green on both sides of the street. Furthermore, the presence of a park affected the choice positively, while paved gardens and a post-war (1950-1980) building style did so negatively. At the conference, further details about green elements, configurations and urban context will be discussed.

Future cities: Using virtual technology to design restorative residential neighborhoods

Pall Jakob Lindal\(^1\), Terry Hartig\(^2\), Kamilla Run Johannsdottir\(^1\), Hannes Vilhjalmsson\(^1\) (1. Reykjavik University, 2. Uppsala University)

The presentation will cover a series of studies on design for restorative quality in built urban environments. In the first study, previous results of restoration likelihood ratings of static images of residential streetscapes were used to generate two virtual urban environments (VEs). As reflected in self reports and cognitive performance, the differences in architectural properties and street vegetation between the two VEs did not differentially promote actual restoration. A replication study used improved VEs, with different modes of presentation and virtual transport as well as continuous cardiovascular measurement. The environmental manipulations promoted restoration to different degrees as reflected in cardiovascular activity and preference ratings, but not in self report and cognitive performance nor in ratings of restorative quality. In a study now in preparation, complexity manipulations will be made both on the streetscape and neighborhood levels to provide more realistic variations in restorative quality experienced during the virtual navigation. These and related studies raise important questions about 1) using static images vs. VEs as the mode of presentation; 2) measuring restoration likelihood vs. actual restoration; and 3) how to increase urban diversity to promote actual restoration.
Preference and restoration effects of nature and urban images: The roles of image properties and spatial information

Claudia Menzel¹, Gerhard Reese¹, Michael Schreiner¹ (1. University of Koblenz-Landau)

Viewing nature compared to urban environments is generally preferred and can have beneficial effects on well-being. To study the underlying mechanisms and to test theories proposed in this research field, we investigated low- (e.g., colours) and high-level (i.e., object recognition) processing of nature and urban images with relation to well-being, preference, and perceived restorativeness. We used both image analyses and experimental manipulation of visual input in several paradigms applied in three studies. Results indicate that image properties (when controlled for image content) have no impact on well-being and both liking and restorativeness ratings, but some impact on associations with valence. However, image content (when controlled for image properties) influences well-being and both liking and restorativeness ratings. Further preliminary data indicate that spatial frequency content (i.e., presence of coarse vs. fine structure) of an image does not influence preference and perceived restorativeness differently as was suggested by earlier research which suggested differing mechanisms for these outcome variables. In sum, results show that both for preference and perceived restorativeness, spatial information is crucial although low-level visual processing seems to play a minor role as well. These findings are relevant when discussing differences and similarities between different theoretical approaches.

The impact of a micro-nature experience on sustained attention performance and arousal

Katherine Johnson¹, Timothy Doman¹, Keitaro Machida¹, Jonathan Januar¹, Kate Lee¹, Kathryn Williams¹ (1. University of Melbourne)

In previous research a micro-break spent viewing a flowering meadow green roof image was associated with performance maintenance on the Sustained Attention to Response Task (SART), whereas after viewing a concrete rooftop image performance declined (Lee et al., 2015). Changes in sub-cortical arousal were argued to underpin this decrement, however no direct evidence was provided. Arousal underpins sustained attention and can be measured using pupil diameter. Sixty-six participants completed a slowed Fixed SART designed for eye-tracking. They then viewed either a green or concrete roof image for 40 seconds before completing a second SART. The groups performed similarly during the first SART and in the first half of the second SART; in the second half the concrete group made more omission errors than the green group. The green group reported higher scores on the Perceived Restorativeness Scale than the concrete group. Tonic pupil size significantly decreased during both SARTs for both groups. This study extends our understanding of the neuropsychology of restoration by providing evidence that exposure to nature within an urban environment has positive restorative benefits, limited attention benefits as measured on this slowed Fixed SART, and that these psychological benefits are not associated with changes in underlying arousal.
Implementation intentions and visual imagery in environmental behaviour: A novel theoretical approach on implementation intentions
Mariana Gaytan Camarillo¹, Alexa Spence¹ (1. University of Nottingham)

Over the last years, responding to environmental issues, has been one of the key intentions for individuals and policy makers. However, consumerism pushes us to overuse resources leading us to the opposite direction from sustainable intentions. Behavioural scientists have found that 30% of the variance of people’s behaviours is explained by intentions, leaving intention-behaviour gap. One strategy to bridge this intention-behaviour gap is implementation intentions (II). By forming if-then action plans, II connect environmental cues and actions facilitating goal achievement. Evidence within environmental studies show how visual messages have more cognitive advantages over written or verbal messages. The present study is focused on testing visual representations of II that may link affective, cognitive and behavioural responses all together to a specific cue. 80 participants were asked to commit to two different environmental goals, with or without if-then action plans (control vs treatment), and II framed differently (visual or text). Our hypotheses: participants with II will remember the environmental behaviours and fit them on their daily routines; visual II participants will recall goals accurately leading to an enhanced performance of goals. The findings of this study contribute to the II literature and provides the use of self-regulation strategies for environmental behaviours.

Clearing Behavioral Costs with Attitude: The Attitude-Behavior Gap Revisited
Florian Kaiser¹, Alexandra Kibbe¹, Liane Hentschke¹ (1. Otto-von-Guericke University Magdeburg)

Introduction: People are no hypocrites. With our research, we demonstrate that the notorious attitude-behavior gap—that people verbally profess an environmental attitude without actually protecting the environment—is a chimera that derives (a) from incommensurable measurement of attitude and behavior and (b) from ignoring the fact that behavior is a function of both, attitude and the costs of behavior. Methods: In our two quasi-experiments, we researched 396 and 235 individuals in their manifest ways of commuting and eating. Results: We found incommensurability to massively depress correlations between continuous measures of attitude and binary occurrences of behavior. In three independent tests, we also uncovered that behavioral costs have to be cleared with corresponding levels of environmental attitude first before a behavior will become manifest. Discussion: Obviously, professing an opinion—e.g., environmental protection is important—is undemanding and does not need much dedication. Thus, we should stop confusing expressing rather undemanding opinions with pronounced attitudes, which also show in much more taxing behavior that require more personal resources, such as time, care, and effort.
Reverberation Effect of a Behaviorally Informed Institution

Dmitri Bershadskyy1 (1. Leibniz Institute for Economic Research)

Introduction: Interventions, while costly, are needed to sustain societally desirable behaviour. This paper analyses the extent to which a newly established behavioral intervention influences behaviour even after its removal. Methods: In the laboratory experiment we employ a public goods game (N = 384) using a communication platform which enables non-binding and unverifiable cheap talk prior to the contribution to a public good. Results: This paper provides evidence that such an efficiency providing behavioral intervention has a lasting positive effect on contributions to a public good even after it was removed – albeit after the removal the contributions are lower and abate over time to the previous magnitude. This can be referred to as the reverberation effect. Furthermore, this research shows that enabling individuals to fund such an intervention themselves does not affect contribution behavior. Instead, the sole driver of the size of the contributions in any given round is the existence or the reverberation of the intervention. Discussion: The paper therefore points out implications for the question whether behaviorally informed interventions can be removed without consequences after they have affected the behavior. Using this knowledge might help in designing cost-effective interventions.

Coffee-to-Go Cup Consumption and Self-Regulated Behavioural Change

Charis Eisen1, Jana Katharina Köhler1, Anna Keller1, Daniel Hanss1, Silke Kleihauer1, Nathalie Wendorff1 (1. University of Applied Sciences Darmstadt)

Introduction: Although disposable Coffee-To-Go-Cups (TGC) cause severe environmental issues like resource depletion and pollution, they are a popular convenience for many people. We investigated the transition to environmentally-friendly alternatives using the stage model of self-regulated behavioural change (SSBC). The model describes change in four stages, each characterized by specific intentions and influenced by psychological variables.

Methods: We obtained 573 responses to a questionnaire consisting of items on participants’ current stage of change, behaviour, and influencing factors. Participants responded to items for three alternative behaviours: using a refundable cup system, using one’s own cup, and reducing consumption of hot beverages on the go.

Results: Model variables largely predicted stage intentions with irregularities on some stages. Psychological constructs varied in their predictive power within behavioural alternatives. Members of different stages differed in key variables according to model predictions – e.g. TGC consumption decreased in the last stage, where the model predicts the adoption of alternative behaviours.

Discussion: The results indicate that the stage model largely describes TGC consumption. Based on insights into drivers of the behavioural change process, we derived implications for interventions promoting pro-environmental behaviour. Additionally, we discuss starting points for further development of the SSBC based on its present application.
Reducing Household Energy Consumption Through Self-Regulation and Habit
Dove Webb1, Geoffrey Soutar1, Marylene Gagne1, Tim Mazzarol2, Jillian Sweeney1, Alexandra Boeing3
(1. University of Western Australia, 2. Curtin University)

Introduction: Significant interest exists in exploring ways to reduce household energy consumption. Given the necessary changes often implied, understanding what underlies behavior continues to receive significant attention. This includes the investigation of the relationship between motivations and behavior, which among others has been studied through the lens of organismic integration theory (OIT), a mini-theory of self-determination theory. OIT emphasizes the internalization of different behavioral regulation types in the explanation of behavior. The study reported on here extends knowledge by investigating the direct and moderating effects of integrated and external regulation on the relationship between intention and behavior.

Method: Two online surveys were completed (n = 433) by householders in Perth, Western Australia over a two-month period. Results: Findings reveal a strong indirect relationship between integrated regulation and behavior via intention, and a significant direct negative relationship between external regulation and behavior. While external regulation moderated the positive relationship between intention and behavior, the moderating effect of integrated regulation and habit was non-significant. Furthermore, a direct effect for habit on behavior was found. Discussion: These findings highlight that different regulation types affect both intention and behavior in different ways. The findings further support habit as an important predictor of energy consumption.

When guilt brings on positive change: Applying a network approach to attitudes in changing consumer behaviour towards plastic.
Maria Zwicker1, Hannah Nohlen1, Frenk van Harreveld1 (1. University of Amsterdam)

In a time of rapid climate change, understanding what may encourage sustainable behaviour is a vital, but difficult task. Using an attitude network approach, we investigated which beliefs people hold toward regular and bio-based plastic in order to develop an empirically-based approach to attitude- and behaviour change.

With a qualitative study (N= 95), we distilled 25 aspects (i.e. cognitions, emotions) that contribute to people’s attitude toward using (bio-based) plastic. Subsequently, these aspects were tested among 508 online participants. This data was used to build a network displaying relationships between participants’ attitude, feelings, and behaviour regarding plastic use. Above all, guilt was most strongly connected to people’s willingness to pay more for bio-based products. Based on this, we conducted another study (N= 285) in which we manipulated guilt (general guilt, personal guilt, and control condition) to determine its effects on people’s willingness to pay for a sustainable cause. Results show that manipulating guilt indeed led participants to donate more to a sustainable cause. This effect was fully mediated by self-reported guilt.

Determining which factors influence consumers to change their buying behaviour towards sustainability is the first step in creating a demand for more sustainable products amongst the public and investors.
Collective action for forest protection is predicted by two emotional paths: Group-based anger and being moved

Helen Landmann\textsuperscript{1}, Anette Rohmann\textsuperscript{1} (\textit{1. FernUniversität in Hagen})

\textit{Introduction:} The dual pathway model of collective action (van Zomeren et al., 2004; 2010) covers an emotional path to collective action through group-based anger and a rational path to collective action through group efficacy beliefs. We propose an additional path through feelings of being moved (Landmann, Cova, & Hess, 2019). Specifically, already existing collective action may be appraised as meaningful, therefore elicit feelings of being moved and subsequently enhance intentions for future collective action.

\textit{Method:} Participants who support a forest protection campaign (Hambacher Forst) responded to an online survey (\(N = 205\)). They indicated their appraisals (injustice, group efficacy, meaningfulness) and emotions (anger, being moved) related to the campaign as well as their intentions for future collective action.

\textit{Results:} Future collective action was predicted by appraisals of injustice and meaningfulness but not by efficacy beliefs. These paths to collective action were partially mediated by anger and by being moved.

\textit{Discussion:} The findings suggest an expansion of the dual pathway model of collective action. In addition to the paths through anger and efficacy, a path through feelings of being moved should be considered. Negative emotions (anger) as well as positive emotions (being moved) can motivate collective action for environmental protection.
Understanding the psychology of denial towards reducing high-carbon behaviours

Susanne Stoll-Kleemann¹ (1. University of Greifwald)

This paper assesses the scope for changing high-carbon behaviors in the light of basic human rights being violated through the impacts of climate change. Inadequate political action has accelerated the urgency to investigate possibilities to establish individuals as the first movers of the essential transformational process.

This study is based on a representative online survey of 1032 German citizens that assessed climate change, its causes, responsibilities, and probabilities of mitigation measures. The results show that the majority of respondents know and care about climate change, its harmful effects and agree on the necessity to act against climate change. They regard multiple actors as responsible for action, including themselves. In particular, mechanisms of moral disengagement are at the center of maladapted behavior such as the diffusion and displacement of responsibility.

Highlighting the harm that highly self-interested behavior causes decreased the likelihood that individuals would morally disengage. When aware of the suffering they cause, self-censure start to function and serves as self-restraining influence.

The synthesis of the findings reinforces the contention that more attention needs to be given to individuals’ multiple motivations and the pursuant strategies, such as motivating and diffusing new social norms that could shape the necessary behavioral transformations.

Predictors of worry about climate change across Europe

Thea Gregersen¹, Rouven Doran¹, Gisela Böhm³, Endre Tvinnereim¹ (1. University of Bergen, 2. University of Bergen; Inland Norway University of Applied Sciences)

Introduction: This presentation reports on research that explores the relative importance of different predictors of worry about climate change, based on data from the European Social Survey (ESS).

Methods: Specifically, it examines associations between climate change beliefs, political ideology, and worry about climate change whilst controlling for cross-country variation. Results: Preliminary statistical analyses suggested that some of the variance in individual citizens’ worry about climate change was due to variation across countries; for instance, worry ratings were the highest in Portugal and the lowest in Israel. Worry about climate change was furthermore predicted from beliefs that climate change is caused by humans, beliefs that climate change will have negative impacts, and from locating oneself closer to the ‘left’ rather than the ‘right’ of the political spectrum. Political ideology moderated statistical associations between climate change beliefs and worry about climate change. Cross-country variation in worry was partly explained by country-average political ideology.

Discussion: Implications of the research findings with regard to climate communications are noted; with a particular focus on the interplay between various predictors of worry about climate change across Europe.
Optimistic orientation facilitates pro-environmental behavior: A longitudinal study on quality of life and everyday behavior

Naoko Kaida¹, Kosuke Kaida² (1. University of Tsukuba, 2. National Institute for Advanced Industrial Science and Technology)

Introduction: The aim of the present study was to investigate associations of the balance of optimism and pessimism orientations as personal traits with pro-environmental behavior and subjective well-being.

Methods: A longitudinal questionnaire survey consisting of two waves were conducted with Japanese respondents within an interval of three months (N = 770, Mean age 49.6 ± 15.23 years). Correlation analyses and structural equation modelling were conducted to identify relationships between pro-environmental behavior and positive and negative psychological states and orientations.

Results: Results of both the two surveys indicated positive correlations of optimism-pessimism orientation (O/P ratio) and subjective well-being with pro-environmental behavior. Negative associations were also confirmed between depression, stress, and sleepiness and pro-environmental behavior. Structural equation modelling using the two-wave data revealed that O/P ratio is positively associated with pro-environmental behavior as longitudinal associations.

Discussion: These results suggest that optimism-pessimism orientation can be related to current and future engagement in pro-environmental behavior and improvement in subjective well-being which could lead to an environmentally sustainable society with enhanced quality of life.

The effects of the IPCC special report on global warming of 1.5C on climate change concern in Norway

Charles Ogunbode¹, Rouven Doran¹, Gisela Böhm¹ (1. University of Bergen)

In October 2018, the Intergovernmental Panel on Climate Change (IPCC) published a special report on the impacts of global warming of 1.5°C above pre-industrial levels. The report indicated that global temperatures have risen by about 1°C since pre-industrial times and are set to reach 1.5°C between 2030 and 2052 at the current emission rates. There has yet been no empirical investigation of how the report affected public opinion regarding climate change. Consequently, we conducted a longitudinal study using a nationally representative sample of the Norwegian public to compare levels of climate change concern before and after the publication of the IPCC special report. Our results show that, although climate change concern is generally higher three months after the report was published compared with five months before, people exposed to the report show a greater increase in climate change concern compared with those who had not heard of the report. Political orientation moderated the effect of exposure to the IPCC report on climate change concern; with exposure to the report positively predicting an increase in climate change concern among left-leaning, but not right-leaning, individuals. Implications of the results for climate change communication are discussed.
Spatial associations with climate change and how they interact with distance frames
Adrian Bruegger1 (1. University of Bern)

Existing perceptions of and associations with climate change can influence whether people perceive this issue as a risk and how strongly they are motivated to act. This study aimed to explore the general public’s associations with climate change and particularly where these associations are located geographically. Moreover, this study was interested in whether and how existing spatial associations would interact with different spatial frames of climate change messages. To examine these questions, we first assessed participants’ spontaneous associations with climate change and then asked them to locate these associations geographically. We then randomly assigned participants to one of three conditions in which we manipulated the geographical focus of climate change (close, distant, or mixed). We expected that when the spatial focus of a message fits participants’ spatial representation of climate change, the message should be more convincing and increase their willingness to take actions to mitigate it. Using a quota sample of the Swiss adult population (N = 592), we found that most participants represented climate change as something that was both close and distant at the same time. However, there was only very little evidence for the anticipated interaction between different types of spatial frames and existing geographical associations.

UK climate change resilience (RESILRISK): What the public thinks and how to (not) communicate
Katharine Steentjes1, Nick Pidgeon1, Christina Demski1, Adam Corner4 (1. Cardiff University, 2. Climate Outreach)

Building resilience towards the impacts of a changing climate is gaining prominence on the political agenda for many nations. However, to date there is scarce evidence on how citizens view climate risk adaptation and we have a limited understanding of how these views are related to climate risk perceptions and communication strategies. Our research project (RESIL-RISK) will address this knowledge gap by testing theoretically driven communication strategies within a nationally representative UK sample. We conducted an online study with a sample of around 3 000 respondents with six demographically matched over-samples. The oversamples (n= 250 each) experimentally tested the effects of climate messages on personal intentions and policy support, by manipulating proximity of climate change impacts (national vs. local vs. both) and priority of climate actions (adaptation vs. adaption alongside mitigation). In this talk we will shed light on the question whether stressing the relevance of preparing for climate change within public discourse bears the danger of reducing motivations to mitigate climate change (mitigation deterrence). Furthermore, we will discuss our findings in the context of the mixed evidence around psychological distance in relation to national and local climate adaptation efforts.
Undesired side-effects of climate change communication
Isabella Uhl-Hädicke1, Johannes Klackl1, Eva Jonas2, Nina Hansen4 (1. University of Salzburg, 2. University of Groningen)

Environmental campaigns and policymakers often try to promote pro-environmental behavior by providing people with information about the harmful consequences of climate change. However, people tend to cope with existential threats in symbolic ways that do not target the problem at hand, such as defending their ingroup. Consequently, climate change information may mobilize people to act pro-environmentally (i.e. direct approach), but it can also trigger group-defensive reactions including derogating outgroups (i.e. symbolic approach). We present research focusing on people’s response to climate change information. In two experiments conducted in Austria and Argentina, we tested the effect of climate change threat versus neutral information on direct and symbolic threat reactions. The results indicate that reading the climate change information mainly resulted in undesired side-effects. On average, people tended to respond to climate change threat information in a symbolic rather than direct way by, for example, expressing a higher level of ethnocentrism (Study 2), or reduced intentions to act pro-environmentally (Study 1), compared with the control group. We discuss potential strategies for promoting direct responses to threatening climate change information and practical implications for climate change communication.

The Climate Communication Project: how are we engaging the UK public and what works?
Stuart Capstick1, Niall Mcloughlin2, Adam Corner3, Harriett Richardson4, Alice Bell5, Catherine Muller6, Sam Illingworth7 (1. Cardiff University, 2. University of Bath, 3. Climate Outreach, 4. National Centre for Atmospheric Science, 5. 10:10 Climate Action, 6. Royal Meteorological Society, 7. Manchester Metropolitan University)

The transformational changes necessary to ensure effective climate change mitigation require strong public support and involvement. There is a growing knowledge base for effective climate change communication. However, rather less is known about the approaches being used by those carrying out public engagement, and the rationales on which they are basing their public work. We surveyed 178 climate communication researchers and practitioners, to ask about the types of engagement activities they carried out, their views on communicating and engaging with the public (e.g. the purpose of doing this, and what is appropriate and effective) and their experiences of using different approaches. Climate communication practitioners outlined a series of motivations and principles they saw as important. These included the need to resonate with audiences; use of innovative and appealing materials; grounding approaches in climate science; and the use of techniques that promote agency and empowerment. Many of the approaches being used by communication practitioners were informed by the evidence base. While there was widespread recognition of the importance of participatory approaches for developing public engagement, this was however undertaken less often in practice than one-way communication.
General health and residential proximity to the coast in Belgium: results from a cross-sectional health survey
Alexander Hooyberg1 (1. Flanders Marine Institute)

The health risks of coastal areas have long been researched, but the potential benefits for health are only recently being explored. The present study compared the general health of Belgian citizens in relation to residential proximity to the coast. Data was drawn from the Belgian Health Interview Survey (n = 60,939) and investigated using linear regression models and indirect effect analyses on several hypothesized mechanisms with bootstrapped confidence intervals. Results indicated that populations living < 5 km of the coast reported better general health than populations living at >50-100 km. Four commonly hypothesized mechanisms were considered but did not mediate this relationship: scores for mental health, physical activity levels and social appreciation were not higher at 0-5 km from the coast, and the air pollution (PM10 concentrations) was lower at 0-5 km from the coast but not statistically associated with better health. Results are standardized for the age, gender, having a chronic disease, BMI, employment status, income, smoking status, urbanization level, season, and year, as well as neighbourhood levels of green and freshwater blue space. This study established strong positive relations between oceans and human health, similar to previous studies from the UK.

General health status, psychological well-being and exposure to blue space: a cross-sectional analysis of the Scania Public Health Survey
Åsa Persson1 (1. Institute of Environmental Medicine, Karolinska Institute)

Blue spaces provide environments for restoration, recreation and social interaction, and may contribute to mental and physical health and wellbeing. This study investigates the association between residential blue space, general health, and psychological well-being, and is based on a cohort of 28,000 individuals aged 18-80 years from the Scania Public Health Survey from 2012. Outcomes and covariate information were collected through questionnaires and from registries. Blue space exposures were estimated using (i) areas of blue space in 300 and 1000m buffers around residential addresses; and (ii) distances from homes to lakes and rivers, using data from international land cover databases. Analyses included multivariate logistic regression analyses, controlling for potential confounders. Preliminary analyses did not suggest a clear pattern in the association between blue space and health after confounding adjustment. However, there were indications of an association between having more blue space within a 1000m radius buffer and lower odds of poor general health, whereas living closer to the sea was associated with higher odds of poor mental health. Further investigations will focus on any potential effect modification by demographic, socio-economic and other environmental factors.
General health and exposure to blue space: a cross-sectional analysis of the three large European surveys

James Grellier1 (1. European Centre for Environment and Human Health, University of Exeter)

The health effects of exposures to the natural environment—particularly green space—in urban settings have been documented previously in several European countries. The impact of exposures to blue spaces has been much less explored. Also, the operationalisation of key environmental variables, choices of modelling approaches, and selection of covariates vary considerably among existing studies. This analysis used a coordinated approach to explore associations between several health indicators and residential measures of exposure to natural environments (green and blue space) in survey data collected in three geographically different European locations: Catalonia (Spain), Scania (Sweden) and the UK. Outcomes investigated include several self-reported measures of health, comprising general health (based on a single item from the Short Form Health Survey), any chronic disease, and three physical conditions (high blood pressure, diabetes, and respiratory disease). Several metrics of residential exposure were developed using the Urban Atlas 2012. Heterogeneities in effects were explored among the three datasets and summary estimates prepared using meta-analysis.

Do visits to blue spaces mediate the association between residential blue space exposures and physical activity? Evidence from the BlueHealth International Survey

Lewis Elliott1 (1. European Centre for Environment and Human Health, University of Exeter)

Relationships between physical activity and residential/recreational exposures to natural space are often limited to certain definitions of “nature” or “physical activity”. This study aimed to assess relationships between residential access to blue space, its corresponding recreational use, and physical activity attainment in a consistent way in a pan-European context. Data were taken from the BlueHealth International Survey – a harmonised 18-country survey primarily focused on the relationship between recreational contact with blue spaces and human health and wellbeing that was developed in the Horizon 2020 ‘BlueHealth’ project (www.bluehealth2020.eu). This presentation will specifically report on findings from hierarchical models which examine associations between different metrics of blue space accessibility (coastal proximity, freshwater coverage in buffers) and the amount of physical activity or walking undertaken in the last week as well any mediation effects concerning energy expenditure accrued in those blue spaces on recreational visits. The analyses will control for a range of demographic, spatial, and temporal confounds and we hypothesise large between-country variation in the significance and strength of these relationships.
Changes in access and exposure to blue spaces—associations with mental health in Wales

Amy Mizen (1. Swansea University)

Spending time in green and blue spaces (GBS) has beneficial impacts on mental health. However, the evidence base is limited with respect to longitudinal studies. The main aim of this longitudinal, population-wide, natural experiment, is to quantify the impact of exposure to GBS on wellbeing and common mental health disorders, for a national population. A GBS typology was developed in partnership with planners and policy makers. Local government Audits and satellite data were brought together to build a national, longitudinal GBS dataset for 1.4 million homes in Wales, UK. We will create quarterly household access to GBS for eleven years (2008-2018). We will link GBS access scores to individual level mental health for 1.7 million people with primary care data and survey data (n = ~12,000) on wellbeing. This presentation will report the curation of the national, longitudinal dataset of GBS and a cross-sectional access to GBS for 2018. Access to GBS varied by socio-economic status, urban/rural classification and type of GBS. We will expand this analysis to create quarterly household level GBS access for 2008-2018. We will explore how house moves, and visits to GBS change the association between GBS density and outcomes.

Shared Visions: Developing and Evaluating Future Scenarios in Coastal Communities

Isabel Richter1, Sabine Pahl2, Lota Creencia3, Arlene Avillanosa3, Joel Sumeldan3 (1. University of Plymouth, 2. Western Philippine University)

The GCRF Blue Communities project aims to improve the sustainable use of marine resources in Southeast Asian coastal communities (http://www.blue-communities.org/Home). In this talk, findings will be presented from ongoing fieldwork in the Philippines with an outlook to following fieldwork in Malaysia, Vietnam and Indonesia.

Thinking about the future is assumed to increase understanding and engagement of future challenges such as climate change and to have the potential to trigger behaviour and policy change (Sheppard, 2014). However, thorough evaluation is still lacking, which we begin to address in this project.

Three future scenarios, based on local perceptions, were co-created with communities. These three scenarios were creatively represented by the community in the form of paintings. The effect of the creative engagement on various psychological variables, including the consideration of future consequences scale (CFS) was measured with survey questionnaires on a small sample of local high school students (N=21 so far). Our preliminary finding is that thinking about the future was associated with a significant increase of CFS, especially when the scenario represented was a positive one. Other findings will be presented and future steps will be discussed.
The role of social networks in knowledge transmission and farming practices in Sri Lankan agricultural systems: social cognitive theory in practice
Jeremiah Osborne-Gowey\textsuperscript{1}, Amanda Carrico\textsuperscript{1} (1. University of Colorado Boulder)

Climate change is pressuring dynamics in coupled natural and human systems, necessitating human adaptation. Adaptation in complex, multi-scalar systems requires collaborative approaches. Understanding how actors collaborate and exchange knowledge is of considerable importance for predicting adaptive responses and identifying opportunities for interventions. Data for this analysis come from the Sri Lankan Environmental and Agricultural Decision-making Survey (SEADS) – a survey of 1,148 smallholder paddy-farming households in Sri Lanka’s heavily agricultural “dry zone”. We examine the relationship between a farmer’s social networks (e.g., social connections outside the household, participation in shared labor and water governance organizations or assistance programs) and knowledge and adoption of drought adaptation strategies (e.g., seed selection, irrigation management, harvest timing). In addition to social networks, we also consider the role of natural and economic resources and risk tolerance. Preliminary analyses suggest that engagement in labor sharing networks are positively associated with knowledge and adoption of adaptive practices. Here we discuss the implications of these findings 1) within the broader constructs of social cognitive theory, 2) on the projected agricultural impacts of climate change, and 3) for policies and programs designed to support desirable and adaptive behaviors among smallholder farmers.

Decision-making in interacting social networks: Understanding straw burning behaviour in Northern India
Anna Helfers\textsuperscript{1}, Max Friedrich\textsuperscript{2}, Andreas Ernst\textsuperscript{3} (1. University of Kassel, 2. Swiss Federal Institute of Aquatic Science and Technology, 3. Center for Environmental Systems Research, University of Kassel)

Annual paddy straw burning is a major problem in Punjab, India, causing harmful air pollution and health problems. We applied the theory of planned behaviour (TPB) to identify psycho-social factors steering farmers’ intentions regarding non-burning. We subsequently examined the impact of farmers’ affiliation to crucial agents in the agricultural sector and their interplay with TPB. Multivariate regression confirmed theory of planned behaviour (TPB) factors to significantly predict non-burning intention, $R^2_{adj} = .354$. Perceived time cost ($b = -0.30$) was the strongest predictor followed by perceived behaviour control (PBC) ($b = 0.28$), descriptive ($b = 0.25$) and injunctive norms ($b = 0.22$), and financial cost ($b = -0.22$). Affiliation with the farmers’ association Kisan Union significantly decreased non-burning intention ($b = -0.31$). Mediation analyses, conceptualizing TPB factors as mediators, revealed that this effect was fully explained through TPB variables, mainly by the effect via PBC (IE = -0.18). Considering psychological determinants as mediators between social agents and intention seems a promising approach to develop theory-based interventions considering farmers’ social-reality in decision-making. As such, the negative influence of Kisan Union should be approached by enhancing PBC in associated farmers, e.g. by familiarising with nonburning-methods, providing model-learning and self-help groups.
Testing the norm activation model in a rural, low-income setting: The example of sustainable crop residue management in Punjab, India.
Max Friedrich¹, Nadja Contzen², Linda Steg² (1. Swiss Federal Institute of Aquatic Science and Technology, 2. University of Groningen)

Each year, crop residue burning in northern India causes drastic air pollution and severely degrades soil fertility and ecosystems. The dominant narrative among policy makers is that farmers exclusively burn out of economic compulsions, which suggests that moral considerations do not play a role. However, there are many farmers who do not burn but instead use alternatives, although these are less economical. We investigated whether moral motivations affect intentions to not burn by applying the norm activation model (NAM) to crop residue burning. We conducted 177 standardized face-to-face interviews across four districts in rural Punjab, surveying awareness of the negative consequences of burning (AC), outcome efficacy to alleviate these consequences (OE), personal norm to not burn (PN) and intention to not burn. We found support for the NAM, in that AC predicted OE; AC and OE predicted PN and PN predicted intention to not burn. NAM variables explained 45% variance in PN and 15% of variance in intention to not burn. These findings call for a critical evaluation of the dominant narrative in science and practice that agricultural behaviours are exclusively driven by economic motives. Activating personal norms may be a promising intervention to promote non-burning in Punjab.

What do the sustainable development goals mean to people in developed and developing countries?
Paul Bain¹ (1. University of Bath)

Introduction. The United Nation’s 17 Sustainable Development Goals (SDGs) offer a framework for engaging the public with sustainability. Public understanding of the SDGs and sustainability influence this engagement, as people’s prior beliefs influence their personal and public behaviours. We aimed to identify these public understandings through the “mental maps” people use to relate the SDGs to environmental, social, and economic sustainability.

Method. Community participants in 12 countries (Argentina, Australia Brazil, China, France, India, Russia, Sweden, South Africa, South Korea, UK, USA; N=2134) were provided with short descriptions of environmental, economic and social sustainability, and rated how each of the 17 SDGs were targeted at achieving that aspect of sustainability.

Results. Four mental maps were identified, which varied on two dimensions. First, people either contrasted environmental v social sustainability or economic v. social/environmental sustainability. Second, they saw SDGs targeting different elements of sustainability or the same element(s).

Discussion. Some mental maps of sustainability diverged from common intuitions and expert models, identifying opportunities and challenges for engaging the public with sustainability, such as “Green New Deal” initiatives. Cultural differences were identified, but there was also a dominant mental map across countries that could serve as a “default” model for communicating sustainability internationally.
How is intergenerational inequity influencing young peoples’ moral obligation and pro-environmental actions?
Hannah Wallis² (Otto-von-Guericke University Magdeburg)

Anthropogenic climate change as a consequence of the older generation’s resource allocation decisions, influence in particular young people. Research on how intergenerational inequity influences young people’s moral obligation to act pro-environmental is lacking. Drawing from research on resource allocation (e.g., Bang, Koval & Wade-Benzoni, 2017) and collective action (e.g., van Zomeren, 2013) suggests a two-sided perspective. Perceiving decisions of previous generations as not generous towards the own generation could reduce the moral obligation of younger generations. Identification with one’s generation, high collective efficacy and rage (e.g., towards previous generations) might be related to a higher moral obligation motivating pro-environmental actions such as activism (e.g., protest, Fridays for Future). Approximately N=400 adolescents and young adults (16-25 years old) will participate in an online study starting in April 2019. Data will be analyzed using structural equation modeling. We expect the results to give further insights into what is driving young people to engage in pro-environmental actions.

The Interplay of Interpersonal and Intrapersonal Conflicts as Barrier to a Sustainable Future
Johann Majer¹, Matthias Barth¹, Hong Zhang¹, Roman Trötschel¹ (Leuphana University Lüneburg)

Many complex environmental and sustainability issues involve conflicts of interests that require joint decision making between conflicting parties via negotiations. However, overlooked is the fact that parties may not only perceive a conflict of interests between their own and their counterparts’ interests (i.e., interpersonal conflict), but, at the same time, also between their own interests in the present and their own interests in the future (i.e., intrapersonal conflict). Such intrapersonal conflicts have been intensely studied in decision-making research, yet, hardly ever considered in social conflict research. The superordinate goal of the present research project is to integrate both lines of research and to investigate the interplay of interdependent psychological conflicts as major barrier to a sustainable future. Based on prior research, we develop a novel, theoretical framework that begins with the premise that parties resolve their conflicts of interests on the social and temporal level in a prioritized rather than a comprehensive way. This prediction is supported by a first experimental study. By investigating the interplay of psychological conflicts on the social and temporal level, the present research seeks to understand novel, unexplored barriers to sustainable conflict resolution and seeks to improve pivotal joint decision processes.
Better together: Promoting Collaborative Energy Saving Behaviour
Alexa Spence¹, Caroline Leygue², Eamonn Ferguson¹ (1. University of Nottingham, 2. Mexico)

Introduction. Promoting energy saving behaviour is a key aim for many organisations and policymakers however individual behaviours are often the focus. We examined how motivations, and perceived rewards and barriers, differ between individual and collaborative energy behaviour.

Methods. A nationally representative UK survey (N=1729) examined perceptions relating to energy use both at home and in the workplace. A further small scale survey study (N = 133) examined perceived rewards and barriers to behaviour using both open and closed-ended questions.

Results. Individual energy saving actions were perceived to be more common than collaborative actions, though both rewards and barriers were perceived as higher for collaborative behaviour. Key barriers to cooperative behaviour were perceptions of conflicting views with others and a lack of support for behaviour whilst key associated rewards were a greater environmental impact and an increase in environmental awareness. Participants indicated individual energy saving actions were more motivated by costs whereas collaborative actions were more motivated by reputation building and reluctant altruism.

Discussion. Campaigns should specifically target collaborative energy saving actions given antecedents differ to individual behaviour, and because collaborative actions may have bigger environmental and social impacts. Supporting communication between people may be one way of supporting collaborative actions.

A meta-analysis of field-experiments using social norms to promote pro-environmental behaviors
Magnus Bergquist¹, Andreas Nilsson², Wesley Schultz³ (1. University of Gothenburg, Department of Psychology, 2. University of Gothenburg, 3. California State University)

The effect of induced social norms to promote pro-environmental behaviors was tested in a meta-analysis. To identify relevant research we performed a literature search 1) using electronic databases, 2) hand searching reviews, dissertations, meta-analyses, and all studies included in the meta-analysis, and 3) by contacting leading researchers in the field. The search resulted in 10’885 hits. Using 6 eligibility criteria we included 90 field-experiments for the analysis. Three hypotheses and explorative analyses were tested in Comprehensive meta-analysis using a random effects model. Results revealed a positive main effect of social norms compared to control conditions (d = 0.33). A first moderation analysis found that social norms induced by the environment (e.g., littered versus clean environments) were more influential than social norms induced by messages (e.g., “75% of guests in this hotel usually use their towels more than once”). Second, the influence of social norms was found to be stronger in individual than collectivistic countries. Finally, an exploratory moderation found stronger effects of social norms in student samples than in non-students samples. We discuss advice for practitioners and suggestions for future research.
A pilot study of a family-to-family intervention aimed at exposing families to nature and promote social, mental and physical health.

Rikke Hartmeyer, Matthew Stevenson, Peter Bentsen (1. Health Promotion Research, Steno Diabetes Center Copenhagen)

Introduction: Exposure to nature for families with children seems to have a positive effect on individuals’ health as well on the families’ health. To investigate the health effects on families, a family-to-family intervention aimed at exposing families to nature was developed in collaboration with the Danish society for Nature Conservation. Families volunteered to plan and deliver activities for other families and these families were supported with information and inspiration about activities. Method: In the pilot study, the intervention is monitored though surveys, observations and interviews. Measures of nature connectedness and parental stress are applied before, during, and after the intervention period using self-report questionnaires. Data is collected from families planning and delivering the interventions, as well as those participating in the activities. Results: We predict that parents that participate in the intervention will experience reduced stress and that both children and parents will show enhanced nature connectedness after the intervention period. Discussion: The discussion will focus on how reduced stress among parents might positively affects parenting behaviour and the quality of the parent and child interaction which is important for children’s mental and social health. Further, we focus on how enhanced nature connectedness might affect future exposure for nature among children.

Natural environments improve parent-child communication


Introduction: We investigated how natural environments impact parent-child communication in a within-subjects experimental design. Methods: Parents and children spent 15 minutes exploring natural environment (a city park) and 15 minutes exploring a built environment (the park’s education centre). We examined four indicators of communication quality from video recordings: verbal responsiveness, verbal connectedness, attention to faces, and attention to pointing. Results and Discussion: Natural environments impacted verbal communication positively. Parents and children were more responsive in the natural environment in comparison to the built environment (Parent responses in the park M=57.72%, SD=8.96, parent responses in the centre M=46.15%, SD=9.42, t(17)=4.02, p=.02; child responses in the park M=66.90%, SD=10.35, child responses in the centre M=51.93%, SD=9.95, t(17)=5.48, p<.001). Conversations were more connected in the natural environment compared to the built environment (turn length in the park: M=2.27, SD=.49; turn length in the centre: M=1.75, SD=.22, t(17)=4.59, p<.001). Natural environments impacted attention to faces and pointing in contrasting ways. Dyads were more responsive to looks to the face in the natural environment, and more responsive to pointing in the built environment.
**Children’s activities in nature: Graphical and verbal descriptions of recess-time activities in primary schools’ natural and built environments**

Giulia Amicone¹, Silvia Collado², Paola Perucchini³, Irene Petruccelli⁴, Marino Bonaiuto¹ (1. Sapienza University of Rome, 2. University of Zaragoza, 3. Roma Tre University, 4. Universitas Mercatorum)

**Introduction:** Most studies about effects of children’s experiences in nature do not focus on such experiences. The aim is thus to analyse children’s activities during school recess-time in natural (vs. built) environment, using two different instruments: children’s graphical and verbal descriptions of free play time. **Method:** In a between-subjects field experiment, 298 primary school children spent recess-time playing freely in natural (vs. built) environment. Afterwards they drew themselves in the environment they played; they wrote a description of their play activities; and they filled in a standardized measure of positive and negative affect and a self-report for attitude towards the playground. Indicators for drawings characteristics regard: drawing in general, the persons, the environment. Indicators for playtime writings regards: social play, cognitive play, non-play behaviours. Their presence/absence and frequencies are computed. **Results:** Preliminary results show significantly higher frequency (in the natural vs. built environment) for graphical and verbal indicators related to the presence of natural and atmospheric elements, exploration, physical activities. In addition, older children reported a more positive affect and attitude towards the natural environment (vs. built). Natural environments within school are associated with more active play and are more appreciated by children. **Discussion:** Further analyses are developed for discussion.

**The potential of nature exposure to support pharmacological treatment of Attention Deficit/Hyperactivity Disorder: A randomised crossover trial**

Matthew Stevenson¹, Rikke Hartmeyer¹, Janni Niclasen¹, Peter Bentsen⁴ (1. Health Promotion Research, Steno Diabetes Center Copenhagen, 2. Health Promotion Research, Steno Diabetes Center)

**Introduction:** Evidence suggesting that exposure to nature has a therapeutic effect on children with ADHD is limited. Studies in typically-developing children suggest exposure to nature leads to improved regulation of behaviour towards task-related goals. We test this hypothesis in children with ADHD using two versions of the Continuous Performance Test (CPT). **Method:** Performance during a fast (i.e. short inter-stimulus interval) version of the CPT will be compared with performance during a slow (i.e. long inter-stimulus interval) version. Such comparison allows measurement of the participants’ ability to allocate extra effort to maintain performance when the task becomes harder and less-enjoyable. **Results:** We predict children with ADHD will be slower and less accurate during the slow CPT due to the extra effort required to performance the task, but the performance decrement will be improved after walking together in a natural environment, suggesting that exposure to nature can help children with ADHD by restoring cognitive resources underlying self-regulatory processes. Through linear mixed modelling, we explore whether medication type, dosage, sub-diagnosis, subjective restoration, connectedness to nature, and demographics moderate cognitive restoration in children with ADHD. **Discussion:** Preliminary findings will be presented and discussed.
Parental Involvement as a Critical Success Factor in the Implementation of Green Schoolyards
Agnes van den Berg1, Janke van Dijk2, Marit de Koning3, Dieuwke Hovinga4, Jolanda Maas5 (1. University of Groningen, 2. University of Applied Sciences Leiden, 3. IVN Natuureducatie, 4. Vrije Universiteit Amsterdam)

Green schoolyards may support children’s healthy development and urban sustainability. Parental involvement is one of the critical success factors for the establishment and maintenance of green schoolyards. However, little is known about parental views on green schoolyards. The present study reports data from two studies in which a total of 440 parents of children in schools with green and paved schoolyards were surveyed on various issues related to the schoolyard, including their appreciation of the schoolyard, children’s behavior on the schoolyard, (dis)advantages of a green schoolyard, and willingness to become involved. The results show that green schoolyards are generally more appreciated and that parents from schools with green schoolyards more often report the schoolyard to support varied play and other behaviors they deem important. All parents recognize the advantages of a green schoolyard, but parents who have experience with green schoolyards report more advantages. Parents generally want to be involved in designing a green schoolyard and with activities on the green schoolyard, but to a lesser extent with maintenance. However, parents also see the downsides, and their time and willingness to help is limited. Based on these findings, some recommendations for communication and organizing parental involvement are provided.

The Trajectory of Environmental Attitude in Germany from 1996 to 2018: A Secondary Analysis of Nationally Representative Samples
Emily Bauske1, Florian Kaiser2 (1. Otto, 2. Otto-von-Guericke University Magdeburg)

Introduction: Reliable knowledge on long-term trajectories of environmental attitude for any specific society is lacking. The predominant reasons are: (a) studies typically cover only a limited scope of time, and (b) the level of respondent’s environmental attitude is determined with proxies instead of theoretically grounded measurement instruments. Methods: In our research and for the first time, we explore people’s environmental attitude in Germany over the past 22 years by using a multi-item instrument that is rooted in a variant of the venerable tripartite model of attitudes. As such, our scale involves a pool of 78 affective, cognitive, and behavioural items with an acceptable reliability of .70. For this secondary analysis, we employ data of 28,701 German residents in total, collected biennially, commissioned by the German Federal Environmental Agency. Results: We found a slow and steady rise in people’s environmental attitude in Germany from 1996 to 2018 but also some substantive fluctuations, which seem to be independent of any potentially relevant events, such as the Fukushima Daiichi Nuclear Disaster or the general economic development in Germany. Discussion: Obviously, people’s environmental attitudes can be reliably and retrospectively assessed and compared, despite significant changes in the employed item sets between surveys.
Introduction: Cross-cultural research in environmental psychology faces a nearly unsurmountable challenge: psychological attributes, such as environmental attitudes, must be assessed with commensurable (i.e., formally equivalent) measurement instruments. Otherwise, meaningful comparison of attitude levels across societies is not possible. As the establishment of commensurable environmental attitude measures has proven to be an almost unattainable goal in cross-cultural environmental psychology, we propose an item response theory-based model that also allows for valid cross-cultural comparisons of attitude levels even with incommensurable measurement instruments.

Method: For our secondary analysis, we used data from the Eurobarometer 81.3 survey conducted in the 28 member states of the European Union (EU) in 2014 (N = 27,998). Environmental attitude was measured within the Campbell Paradigm as a Rasch scale, and a Guttman scale was used to measure engagement in green consumption.

Results: We found not only systematic differences in environmental attitude but also that environmental attitude scores were associated with practically the same levels of engagement in green consumption across the 28 states of the EU. Discussion: Our results show that multi-level models can be used to assess environmental attitude cross-culturally even with incommensurable measurement instruments; this opens a new venue for cross-cultural attitude research.

Introduction: Public opinions on climate change are always diverse. One prominent factor that explains this diversity is political orientation. Studies found that liberal-oriented individuals are less sceptical about climate change than conservative-oriented individuals are; yet, this political divide in climate change opinions also appears to vary across societies.

Method: In this research, we adopt a person-context interaction approach to elucidate under what sociocultural contexts the political divide would be particularly pronounced. We propose that the role political orientation in shaping climate change opinions depends on the extent to which the cultural context affords free self-expression and the socioeconomic structure relies on carbon-intensive industry.

Results: We found supportive evidence to this proposition with data from two international surveys (Year 2010 ISSP and Year 2007 Voice of the People): the association between political orientation and climate change opinions was stronger in societies with higher levels of individualism and higher levels of greenhouse gas emissions.

Discussion: These findings highlight the importance of considering sociocultural contexts in the study of climate change opinions. They suggest that future studies should be mindful of the possibility that pathways from personal factors to climate change opinions may vary across societies.
Cross-National Variation in Climate Change Perceptions and their Individual Level Determinants

Lorraine Whitmarsh¹, Linda Steg², Wouter Poortinga¹, Gisela Böhm⁴ (1. Cardiff University, 2. University of Groningen, 3. University of Bergen)

Introduction: There is extensive literature showing that socio-political variables, including values and political orientation, as well as socio-demographics, e.g. gender and education, are key factors in climate change perceptions. Yet little is known whether these effects are consistent across countries, mostly due to a lack of high-quality cross-national studies and different conceptualisations of key dimensions. Method: In this study we use data from Round 8 of the European Social Survey (ESS8; n=44,387), which included a module on public attitudes to climate change and energy. We examine how different individual-level factors are associated with climate change perception across 22 European countries and Israel. Results: Results show that sociopolitical and demographic factors are significant predictors of climate change beliefs and concern. We show that some associations are remarkably consistent across these 23 countries. Particularly, political orientation, education and human values were linked to the four dimensions of climate change perceptions. We demonstrate that the strength of relationships is generally weaker in Eastern Europe, in particular for human values, political orientation and age; and that some relationships are stronger in Northern Europe as compared to Western Europe. Discussion: This suggests that findings from one country do not always generalize to other national contexts.

Relationships between pro-environmental behaviour, personal values and wellbeing: consistency and differences in a seven-country study

Stuart Capstick¹, Nick Nash², Lorraine Whitmarsh¹, Wouter Poortinga¹ (1. Cardiff University)

Introduction: A positive and reciprocal relationship between proenvironmental behaviour (PEB) and personal wellbeing has been demonstrated across nations. There is good reason however to think that the nature of the PEB-wellbeing link might vary cross-culturally and between individuals. Methods: We use large-scale survey data from Brazil, China, Denmark, India, Poland, South Africa, and the UK to test a series of hypotheses using pre-registered and pre-planned regression models. We examine whether the PEB-wellbeing link is influenced by individual-level income and country-level development status; consider the role of individual values and goals; and assess the role of cultural differences for both public and private sphere behaviours. Results: We observe a clear link between PEB and wellbeing across nations. Some evidence suggests that values and goals are more aligned to PEB in developed countries, and that cultural differences affect the connection between PEBs and wellbeing. We find little evidence that individual income or a country’s development status affects the PEB-wellbeing link. Discussion: Our findings suggest that particular types of PEB might be more ‘rewarding’ in some cultural contexts than others, but challenge the notion that the benefits of PEB are more likely to accrue to those with higher incomes or particular value types.
A multiple systems approach to sustainable decision-making

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Introduction: Sustainable decisions are often conceptualized as the result of consciously accessible factors such as value systems, beliefs, and knowledge structures. This is at odds with contemporary multiple systems approaches to decision-making, which acknowledge that decisions are also to a large extent driven by relatively automatic mechanisms such as implicit associations and affective responses (somatic markers). The research presented here aims to develop a more comprehensive model of sustainable decision-making integrating multiple classes of determinants.

Methods: Participants (N=80) performed an extensive series of experimental tasks assessing potential determinants (core values, implicit associations, somatic markers towards environmental and social stimuli) and several types of sustainable decisions (repeating consumption decisions, one-shot purchase decisions).

Results: Path analyses revealed that repeating consumption decisions were jointly determined by participants' biospheric values and somatic marker strength, while one-shot purchase decisions were determined by biospheric values and implicit associations towards the environment.

Discussion: Results illustrate that sustainable decisions are indeed concurrently influenced by consciously accessible factors and by more automatic factors such as implicit associations and somatic markers. Moreover, different decision domains are influenced by different classes of determinants, pointing toward potential intervention strategies to promote sustainable decisions in different domains.
More professional = more rational? How different actors make sustainable investments

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Introduction. Energy-relevant investment decisions (e.g., efficiency behaviors) are highly complex behaviors involving substantial energy saving potentials. They are affected by multiple factors and may be based on, for instance, ecological or financial considerations. Despite their saving potentials, research in the field of energy-relevant investments is still fairly limited and narrowed down to household decisions. In contrast, there is virtually no research investigating energy-relevant investments in organizations. Most researchers (implicitly) assume that organizations ground there investment decisions on financial considerations only. These assumption is somewhat disputable, especially as several organizations are run by one person or small groups which may also have other (e.g., ecological) motives.

Methods. We conducted two online decision experiments comparing energy-relevant investment decisions in households (n=139) and (small-sized) organizations (n=101). We investigated e-car purchases as an example.

Results. We rather found similarities than differences between the groups: In both cases, decision makers were more likely to make investments if they were technically interested and felt social pressure; additionally, they were sensitive towards direct and indirect financial benefits (e.g., free travel tickets). Furthermore, organizations were found less likely making e-car purchases if decision makers showed high ecological concerns.

Empowering sustainability initiatives at the university - an evaluation of the project "Wandercoaching" by network-n

Karen Hamann¹, Gerhard Reese¹ (1. University Koblenz-Landau)

Self-efficacy, collective, and participatory efficacy are substantial predictors of pro-environmental action. Nevertheless, few experimental studies and even fewer field studies have investigated causal dynamics and variability of efficacy beliefs. In an evaluation study, we tested the effects of the coaching program "Wandercoaching" from network-n, a network promoting sustainable university education, operations and governance. 40 German university initiatives with a focus on sustainability were trained for one weekend by two qualified coaches. A Wandercoaching workshop usually contained measures of teambuilding, visioning, input on environmental protection (at universities), project planning, best practices of other universities or conceptual work on higher education policies. N=174 coaching participants completed both pre- and post-questionnaires that were developed in a transdisciplinary process. As hypothesized, an increase in knowledge, group identity, self-efficacy and collective efficacy could be examined. Moreover, this is to our knowledge the first study to find an increase in participatory efficacy. Pro-environmental behavior was not affected by the coaching weekend. Method recordings by the coaches give further insights into the processes at work. We will discuss implications for practice and elaborate on laboratory intervention studies that could be derived from the Wandercoaching program.
Consumers’ meanings attached to sustainability and motivations to act sustainably
Catalin Stancu, Alice Grønhøj, Liisa Lähteenmäki (1. Aarhus University, Denmark)

Introduction. The negative consequences of consumerism receive increasing attention. While sustainable choices are seen as solutions, insights into consumer perceptions and drivers of such choices across domains are limited. The objective was to study the motivational drivers to act sustainably in two behavioural domains (food vs. apparel) which both represent necessary consumption, but differ in manner of consumption as food is ingested whereas apparel is carried outside the body.

Methods. Twenty-three semi-structured interviews with Danish millennials were carried out to elicit meanings of sustainability and relevant motivations in the two domains. Thematic and cross-case comparative analysis was employed.

Results. Sustainability in general was related to environmental rather than social or economic aspects, nevertheless social aspects were widespread in consumers’ discourse about clothing. Consumers’ motivations to engage in sustainable behaviours were largely egoistic (e.g. health from food; saving money in apparel), while altruistic or ethical motivations were linked to product disposal activities (recycle in food, donate clothes in apparel). Only few interviewees had a sustainable consumer identity which they expressed in their behaviour.

Discussion. Sustainability as identity makes people more aware of what could be done and reflect their own actions against, which results in higher probability for motivational/identity clashes.

Measuring pro-environmental behavior in the laboratory
Florian Lange, Alexander Steinke, Siegfried Dewitte (1. KU Leuven, 2. Hannover Medical School)

Introduction: To address the limitations of self-report measures, we developed the Pro-Environmental Behavior Task (PEBT) as a computerized tool for the assessment of actual pro-environmental behavior under controlled laboratory conditions. We present data on the psychometric properties of the PEBT and illustrate its potential use in an experimental analysis of pro-environmental behavior.

Methods: The PEBT involves a series of choices between two modes of transportation. On each PEBT trial, participants can either choose the faster car option, which causes a series of lights to be illuminated, or they can save the associated energy by choosing the bicycle option at the expense of spending more time in the laboratory. We used this task in two pre-registered studies (both N = 120) examining the reliability and validity of choice behavior on the PEBT.

Results: PEBT choices were consistent across trials, correlated to conceptually relevant variables, and sensitive to conceptually relevant manipulations. These effects were replicable and independent of the labelling of PEBT options.

Discussion: These findings highlight the psychometric quality and utility of the PEBT as a task that can open new avenues for research on pro-environmental behavior. Opportunities and limitations of laboratory research on pro-environmental behavior will be critically discussed.
Social acceptance of deep geothermal energy in the UK: a social identity approach
Francesca Tirotto, Sabine Pahl, Hazel Gibson, Iain Stewart (1. University of Plymouth)

Introduction: Geothermal energy used as power generation has a high potential for sustainable future energy demands (Li et al., 2015). The implementation of a deep geothermal technology must deal with communities’ social acceptance as lack of acceptance of the technology can hinder the implementation of renewable energy options (e.g., Kunze & Hertel, 2017). Therefore, the aim of this study concerns the social acceptance of the first, deep geothermal technology in the UK across populations living nearby. A Social Identity approach is proposed applying the SIMPEA model (Fritsche et al., 2017), the novel construct of Collective Self-determination (Thomas et al., 2017), and the concept of Procedural Justice Climate (Naumann & Bennett, 2000). Methods: A mixed approach was adopted. Focus groups and a correlational study were implemented to analyse the aforementioned social processes. Results: The first qualitative study showed the salience of the communities’ identities (Cornish) when evaluating the geothermal technology. The second study established the important role of collective processes in giving direction to the acceptance of the geothermal technology. Discussion: People’s energy technology evaluations are intrinsically grounded in their social identity complexity. Considering social processes dimensions leads to a better understanding of drivers underlying social acceptance of sustainable energy technologies.

Communicating geothermal with diverse publics: a geocognition approach
Hazel Gibson, Iain Stewart (1. University of Plymouth)

As geothermal power generation is developed in countries not commonly associated with geothermal activity, Enhanced Geothermal Systems (EGS) are increasingly being promoted. EGS, however, can be difficult for the public to engage with because most of the activity happens deep underground and thus is frequently associated with more controversial forms of geological technology, such as fracking for oil and gas. In order to effectively engage with local populations about geothermal as a renewable energy resource it is important to discover how far people’s conceptualisations go when it comes to these innovative new forms of technology, and where gaps exist in communication between expert and non-expert groups. The nascent field of geocognition can help to uncover these conceptualisations. One example of such a study is currently being conducted at the United Downs Deep Geothermal Project in Cornwall, where expert and non-expert visualisations of a deep geothermal project are being collected using a GeoCube, a method involving the use of a 3D Participatory Mapping technique within a semi-structured ‘mental models’ approach (Morgan et al, 2002). By comparing the expert and non-expert perceptions around this EGS project in Cornwall, it is possible to discover the gaps in both groups’ communication.
The importance of community engagement for underground CO2 storage: Lessons and insights from the field

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Carbon capture and storage (CCS) has returned to the policy agenda as a climate change mitigation technology, particularly to reduce industry emissions. In the Netherlands, plans are being developed for offshore underground CO2 storage. However, publics tend to be unfamiliar with CCS which is often associated with negative perceptions and safety concerns. This study examined success factors and pitfalls with regards to community engagement in current and former CCS projects; along with lesson-learned from other infrastructure projects (e.g. gas extraction, renewables). Semi-structured interviews (N=20) with community engagement officers were conducted; a card sorting task examined experiences with community compensation in particular. The findings indicate that how community engagement is defined and when it is seen to be successful differs between projects. The impact of community engagement legislation, including institutionalised compensation practices, was an important theme. With regards to community compensation a variety of aims and uses were discussed, from raising acceptance to building a positive relationship with local communities. In the card sorting task, these aims were linked to different forms of compensation, revealing insightful groupings. This research highlights the complicated nature of implementing CCS and the importance of careful consideration of local contexts and needs.

Ignorance is bliss? Public concerns about Carbon Capture, Storage & Utilisation and the subsurface, and the impact of message framing

Dimitrios Xenias1, Lorraine Whitmarsh1, Christopher Jones3 (1. Cardiff University School of Psychology, 2. University of Surrey)

Introduction: Carbon Capture and Storage (CCS) has been in use in industrial processes for decades, but remains unfamiliar and controversial for many publics. Despite growing evidence on factors shaping CCS perceptions, there remain few cross-national studies. Here, we present a mixed-method study on public perceptions on CCS and carbon dioxide utilisation (CDU). Methods: Expert interviews (N=13) and survey (N=99); cross-national (UK, US, Canada, Netherlands, Norway) quantitative survey (N=5,406) on public perceptions of CCS, and experimental evaluation of differential CCS message frames. Results: Experts were concerned about a lack of public knowledge about CCS and difficulty communicating why CCS is necessary. Our public survey found that CCS framing (e.g. techno-fix vs broader societal change) affected responses differentially, and that pairing CCS with CDU achieved higher support for CCS, but also that information frames interacted with national and individual-level factors. Discussion: Tailoring CCS information to audience values will likely be more effective than generic communications. Different groups will support CCS implementation to different degrees, depending on the CCS framing presented to them.
Public acceptance of shale gas extraction: The effects of (pseudo)voice on perceived fairness of the decision-making process and trust in project developers

Emma ter Mors¹, Christine Boomsma¹ (1. Leiden University)

Public acceptance is a major challenge for the siting of underground (energy) facilities like shale gas extraction and carbon capture, within this context trust in project developers plays an important role. Engaging local residents by giving them a voice opportunity has been shown to increase trust in project developers. This study examined whether offering a genuine voice opportunity in particular (i.e., taking residents' voiced input and ideas really into consideration) instigates trust in project developers, and whether perceived procedural fairness plays a mediating role in this. In a scenario study (3x2 between-subjects design), undergraduate students (N=179) were asked to imagine that a fictitious gas company plans to implement a shale gas extraction project near the place where they live. The type of voice opportunity (genuine voice vs. pseudo voice vs. no voice) and the reputation of the project developer (high vs. low trust reputation) were varied. Subsequently, trust in the company and fairness of the decision-making process for the project were measured. As predicted, providing a genuine voice opportunity resulted in more trust in the project developer, compared to a pseudo voice opportunity or no voice opportunity, and this effect was mediated by perceived fairness of the decision-making process.

The Importance of a Consistent Country Image for Consumer Evaluation of an Imported Environmentally-Friendly Product

John Thøgersen¹, Jessica Aschemann-Witzel¹, Susanne Pedersen¹ (1. Aarhus University, School of Business and Social Sciences)

Consumers use the country of origin (COO) as a cue to the quality of products, when the quality is difficult to assess before the purchase. Research has identified differentiated country images, but has not yet studied the impact of the increasing focus on sustainability on country image. Hence, we ask: Do consumers differentiate between a country’s environmental and other images? If so, does it influence consumers’ evaluation of a sustainability-differentiated product from the country? In addition to or mediated through the country’s general or sector-specific image?

Methods. Two studies using online surveys of representative samples from Denmark, Germany and France, investigating the relationship between consumers’ country images and evaluation of an organic food product. In Study 1, we develop the instruments with a Danish sample (N=500). In Study 2, we validate with samples from Germany and France (N=500 from each), evaluating an organic food product from Denmark.

Results. Participants indeed differentiate between a country’s environmental image and its general and production-related images. The country’s environmental image influences its general and sector-specific images and, indirectly, the consumer’s evaluation of a sustainability-differentiated (i.e., organic food) product from the country.

Discussion. Implications for countries and companies exporting “green” or “sustainable” products are discussed.
Ocean connectedness and product choice: Consumer responses to single-use packaging.
Sohvi Nuojua¹, Sabine Pahl², Richard Thompson² (1. University of Plymouth)

Introduction. Single-use packaging items constitute a large share of marine plastic pollution. Packaging accumulates in the ocean as a result of inappropriate disposal and spillage. One source of the problem are unsustainable consumer decisions, as food items packed in plastic that is often unrecyclable are purchased daily. It is important to understand what perceptions and attitudes underlie these decisions.

Method. 512 participants completed an online study where their responses to drinks in different types of packaging were recorded. 24 pictures of drinks with unique combinations of packaging recyclability (recyclable, non-recyclable), material (plastic, glass, aluminium, carton) and content (water, orange juice, cola) were rated by all participants. A survey measuring ocean connectedness, marine litter concern and trust in the waste management system was also administered.

Results. Recyclable packaging was rated higher than non-recyclable, and glass was the preferred material. Interaction effects showed that those higher in ocean connectedness or marine litter concern rated recyclable packaging more positively and rated plastic lower than other materials. With increased trust in the waste management system all packaging was rated more positively.

Discussion. This study demonstrates an association between ocean connectedness and preference for sustainable packaging. This passion could be harnessed to target consumer behaviours.

Why do cosmopolitan individuals tend to be more pro-environmentally committed? The mediating pathways via knowledge acquisition and emotional affinity toward Nature
Kenichi Ito¹, Angela K.-y. Leung² (1. Nanyang Technological University, 2. Singapore Management University)

Past research offered evidence that cosmopolitan individuals behave more pro-environmentally. The current study systematically examined two mechanisms explaining why. One the one hand, cosmopolitan individuals acquire knowledge about global challenges with respect to environmental crises and become aware of mitigating strategies. On the other hand, cosmopolitan individuals extend their prosociality beyond humankind and develop an emotional affinity toward the natural environment. We set out to provide the first empirical support for these cognitive and emotive pathways accounting for why cosmopolitan individuals become more environmentally friendly individuals. We recruited a large community sample (N = 959) to systematically investigate the simultaneous mediation of cognitive and emotive characteristics of cosmopolitan individuals on their commitment to and frequency of pro-environmental behaviors (PEBs). The results revealed that cosmopolitan orientation fostered both acquisition of knowledge and emotional affinity toward the natural environment, while emotional affinity was a stronger predictor for commitment to and frequency of PEBs. Theoretical implications for a nuanced understanding of the motivational value of the cognitive and emotive pathways on PEBs are discussed.
The Influence of Contextual Conditions and Decision-Making Processes on Waste Prevention Behaviour
Ana Paula Bortoleto¹ (1. University of Campinas)

Waste prevention policy has many shapes. While end-of-pipe approaches have been dominating waste management in the past, information-based campaigns have gained ground on waste prevention behaviour (WPB). The idea is that increasing environmental awareness will result in changing people’s behaviour towards a less waste generation. Most policies to foster WPB rely upon large-scale information campaigns focusing on consumption options. These campaigns, however, rely mainly on community-level information and incentive-based campaigns with somewhat disappointing effects on WP—which might be due to contextual barriers and decision-making processes. People often must make decisions in the face of limited time, information, and computational resources facing a situation with inherent uncertainty. This study aimed to infer how contextual barriers and heuristics are reflected in individuals’ decision-making processes related to pro-environmental consumption.

We assessed four different heuristics within a representative sample of Campinas, Brazil. Our findings suggest that pro-environmental consumption is rather susceptible to contextual conditions local climate, culture-specific beliefs, affluence, regulations and infrastructure. The participants’ choice of heuristics is to a significant degree a subjective translation of these contextual conditions. We will additionally show how our results can be an important instrument for policymakers to implement waste prevention policies based on consumption choices.

Risk perception of pharmaceutical residues in water in Spain and Portugal.
Juan Ignacio Aragones¹, Lucía Poggio¹, María Luisa Lima³, Silvia Luis³ (1. Universidad Complutense de Madrid, 2. ISCTE-IUL- Instituto Universitário de Lisboa)

The aim is to study, in two different countries - Spain and Portugal -, how professionals and users of senior residences perceive the risk of the wastewater pollution due to the excretion of pharmaceuticals in these centers.

Method: 104 staff members and 90 relatives and residents, from both countries, participated in the study. All of them filled in a questionnaire designed ad hoc that contemplated: the level of information available on the subject studied, the magnitude of the perceived risk for the environment and for the health.

Results: The results showed the scarce degree of information that the groups have on this issue. The analyses of univariate variance allowed us to observe differences between the groups with respect to the magnitude of risk for the environment, and for the health. In addition, the perception of specific damages that this type of pollution may cause is analysed. And, to what extent the presentation of the drugs and some of the most used in these centres are perceived as pollutants.
Developing a standardized mental model elicitation tool for illiterate populations in collaboration with Lake Victoria stakeholders.

Karlijn van den Broek (1. University of Heidelberg)

Mental models, or internal constructs that structure an external environment, facilitate the interpretation of complex system and guide individual decision-making. Understanding mental models of complex conservation challenges, and the heterogeneity in mental models across decision-makers, will help identify barriers to effective environmental resource management. Yet, current mental model elicitation methods do not allow for comparison of mental models, nor are they appropriate to be used with illiterate populations, excluding communities with lower educational backgrounds. Hence, we developed and tested a novel standardized mental model elicitation tool in collaboration with Lake Victoria stakeholders, which is suitable for illiterate populations. Using this tool, we investigated mental models on the Nile perch stock, a vital economic resource that has been declining in the past decades due to a complex interplay of ecological, social and institutions factors. We compare the tool’s mental model data with mental models obtained through interviews (N=30) to evaluate the tool in light of conventional methods. Tanzanian Fishers’ (N=220) mental models of the Nile perch stock are presented. We discuss the findings’ policy implications and invite researchers to apply the tool to other conservation challenges.

I Am versus We Are: How Biospheric Values and Environmental Identity Influence Pro-environmental Behaviour Individually and Collectively across Countries?

Xiao Wang, Ellen van der Werff, Thijs Bouman, Marie Harder, Linda Steg (1. Fudan University, 2. University of Groningen)

Most research in environmental psychology is conducted in individualistic countries and focuses on factors pertaining to individuals. It is often unknown whether these findings also apply to more collectivistic countries, in which groups might play a bigger role. In the current paper, we test the strongly individual-focused Value - Identity - Personal Behaviour - pathway, in which personal biospheric values relate to pro-environmental actions via environmental self-identity, in an individualistic and collectivistic country. Furthermore, we test whether a new group-focused pathway, in which group values influence pro-environmental actions via environmental group identity, could further improve the prediction of pro-environmental actions, particularly in collectivistic countries. Questionnaire studies were conducted among Dutch (N = 161) and Chinese students (N = 168). Our results indicate that individual biospheric values and environmental self-identity predict pro-environmental actions in both individualistic and collectivistic cultures. The group-level pathway also exists in both countries but is weakly related to environmental behaviour and appears strongly linked to the individual-level variables. We discuss the theoretical and practical implications of our studies, and the relevance of doing research across cultures.
Global problems, local perspectives: Environmental issues and behaviours across cultures

Nick Nash¹, Stuart Capstick¹, Paul Haggar¹, Lorraine Whitmarsh¹ (1. Cardiff University)

Introduction. Climate change is often portrayed as a homogeneous physical phenomenon that is notable by causative effects that are global and yielded only to science. However, at a more local, grounded level, such understandings have little currency and are removed from citizens’ everyday experiences. This study investigates cross-cultural perspectives on the most significant environmental issues affecting citizens and the most important behavioural responses to address those issues.

Methods. Participants comprised citizens from a culturally diverse range of countries (Australia, Brazil, Canada, China, Denmark, India, Nepal, Nigeria, Poland, South Africa, UK, USA). A mixed-methods approach comprising surveys in 11 of these countries (N=11,160) and interviews in 7 countries (N=219) gauged a range of environmental and behavioural perceptions.

Results. Surveys and interviews indicated that while citizens were aware of and concerned about global climate change, these became blended with more local environmental problems. Across cultures, environmental and behavioural perceptions were significantly informed by salient local environmental issues.

Discussion. Scientific renderings of global climate change may lack resonance with locally-grounded perspectives, which can explain limited citizen engagement. More needs to be done to incorporate alternative understandings of climate-relevant issues within policy and practice.

Place attachment and resilience to natural hazards: The effect of place visualisation on preparedness behaviour

Amanda Wallis¹, Ronald Fischer¹, Wokje Abrahamse¹ (1. Victoria University of Wellington)

Introduction: New Zealand is exposed to many natural hazards and yet, in spite of heightened risk, rates of personal preparedness remain low. Innovative approaches that recognise people-environmental relationships are needed to increase preparation behaviours in at-risk populations.

Method: We employed a longitudinal survey in a community sample in Wellington, New Zealand to examine whether the use of visualisation would strengthen people’s intentions to prepare (at time 1) and encourage the implementation of preparedness behaviours (at time 2). Specifically, a guided place-based visualisation task was used which asked participants to visualise a place they feel attached to.

Results: Based on the literature, we expect that visualising an attached place will result in stronger intentions to prepare, and greater implementation of preparedness behaviours at a follow-up, when compared to visualising a neutral place. Comprehensive findings will ready for presentation in September 2019.

Discussion: This research reinforces the relevance of place attachment for understanding and predicting all-hazard preparedness through using it as a basis for an intervention to change behaviour. We anticipate that findings from this study will enhance our understanding of the ways in which simple place-based interventions can increase preparedness and, therefore, reduce future disaster losses in New Zealand.
Sense of place, place identity and place attachment: Exploring construct convergent-divergent validity
Stephanie Wilkie¹, Hannah Trotter¹ (1. University of Sunderland)

Introduction: It is unclear how sense of place, place identity, and place attachment overlap. This study explored their convergent-divergent validity using 1) correlations between popular measures, 2) comparisons within-participant and by place preference and 3) their prediction of pro-environmental behaviours and attitudes.

Methods: Online participants (N = 212) from research participation schemes and social media self-categorized as having an urban or nature place preference and completed the Sense of Place measure referring to places consistent with this categorisation. They completed nature relatedness/place identity/place attachment measures (counter-balanced); the latter two were in the context of place preference.

Results: Moderate, positive overall correlations and subscale correlations across measures indicated divergence and that measures captured different facets of underlying constructs. Overall, sense of place and place identity were equal and higher than place attachment. Those with a nature preference reported the same pattern; urban preference participants reported equal levels in all three. After controlling for nature-relatedness, only sense of place predicted pro-environmental behaviour and attitudes.

Discussion: The findings supported construct divergence. Differences by place preference reinforced strong linkages between nature preference and higher levels of sense of place and place identity. This suggests future studies should consider place preference when measuring person-place relationships.

Predictors of community participation in the context of urban sustainability transitions
Maximilian Schmies¹, Jan Eickhoff², Marcel Hunecke¹ (1. University of Applied Sciences Dortmund)

Introduction. The socio-ecological transition of cities can be framed as a process of collective action of citizens for a common goal. A major question in this field is how people get active and take part in bottom-up participatory processes. Research on empowerment, collective action and community participation offers a fruitful body of theory, which has not been systematically adapted to the context of urban transition.

Method. Processes of community participation were implemented in an urban quarter and psychologically evaluated in a pre-post design in the intervention district (N = 500) and in a comparison district (N = 300). To investigate predictors of community participation a working model was operationalized and analyzed using structural equation modelling.

Results. Results underline the importance of control beliefs and efficacy and community identification. Cognitive aspects of empowerment e.g. critical awareness seem to play a minor role.

Discussion. Our explorative study provides support for the application of established theories of community participation on the context of bottom-up urban transitions. However, some distinctions should be taken into account, which might be due to the spatial characteristics of the urban context and the non-competitive goals of transition movements.
Importance of satisfaction with work environment in burnout and wellbeing

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The study of physical conditions of the work environment and their relationship with psychosocial aspects, such as the well-being and mental health, is important for the applied link between workplace and quality of life. Firstly, the psychometric properties of an instrument that measures satisfaction with the work environment are studied, which includes the presence of physical elements and others related to the decoration; secondly, the relationship of its factors with general well-being (GW) and burnout (BO) are studied, in a sample of 610 workers from Spain and Chile. A Multi-Group Confirmatory Factor Analysis, comparing both national groups, show a model which fit in two dimensions (GFI=.97; CFI=.96; TLI=.95): Ergonomic Satisfaction (ES) and Aesthetic Satisfaction (AS), with factorial loads greater than .5 for all its items in each factor. Both factors correlate positively with GW and negatively with BO. Step-by-step multiple regression analysis shows that ES, AS and the exposure to music explain 21% of the variance of GW and BO. We discuss why satisfaction with the workplace environment, aesthetic as well as ergonomic, have an important status in relation to well-being and mental health; and the higher impact of perception comparatively with exposition to some real physics conditions.

Wellbeing outcomes from recent blue space visits – results from an eighteen country survey

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Aquatic environments, or blue spaces, are receiving increasing attention as potential public health resources and have been associated with restoration (White et al., 2010), physical activity (Elliott et al., 2015) and social interactions (de Bell et al., 2017). In this research, we explored a range of wellbeing outcomes from recent blue space visits.

The BlueHealth International Survey was administered online to a representative (by age and region) sample of at least 1,000 people in each of 18 countries. These comprised 15 European countries with the addition of Hong Kong, California (USA) and Queensland (Australia). A component of this survey focused on the respondents’ most recent visit to a blue space.

We explored the association between both visit and environmental characteristics and a range of recalled wellbeing outcomes: autonomy, a sense of achievement, relatedness with others, connectedness to nature, restorativeness, happiness, anxiety, worthwhileness and satisfaction. We also included various socio-demographic covariates, such as country of residence, age and sex in our analyses.

A total of 14,991 respondents reported a visit to a blue space of at least 10 minutes in duration.

The latest findings will be presented and discussed with their potential relevance to policy considered.
Individual-level intervention assessing short-term effects of blue spaces: The Walking Office Workers (WOW) study

Cristina Vert Roca¹, Mireia Gascon¹, Glòria Carrasco-Turigas¹, Lourdes Arjona¹, Lewis Elliott², Mark Nieuwenhuijsen¹ (1. ISGlobal, 2. European Centre for Environment and Human Health, University of Exeter Medical School)

In contrast with green spaces, there is still a lack of evidence regarding health and well-being benefits of exposure to blue spaces. The objective of this randomized crossover study was to evaluate short-term well-being effects that office workers experience after walks on different environments (blue space vs. urban space). We also assessed the persistence of these potential effects over time. A sample of 60 office workers were randomly assigned to a different exposure (blue, urban, or control) each week. They walked for 20 minutes per day along a predefined route for each of the exposures, except the week they were exposed to control that they rested for 20 minutes in the study room. Participants’ well-being was measured with questionnaires answered before and after the exposure. Preliminary results of this study found that subjects reported better quality of life and well-being scores after being exposed to blue space compared with urban space. Better sleep quality was also suggested although it was not statistically significant. From 4 hours after the exposure, well-being benefits persisted, and scores were higher when participants were exposed to blue space compared with urban space. These findings improve our understanding on the effects of blue spaces on well-being.

How to promote the use of blue spaces? – A multidisciplinary approach to develop blue well-being services for everyday activities, education, rehabilitation and social integration in Finland

Ann Ojala¹, Pia Smeds¹, Katja Kangas¹, Päivi Eskelinen¹, Pauliina Louhi¹, Jaana Kotro¹ (1. Natural Resources Institute Finland (Luke))

Blue spaces are recognized as a resource for human health and well-being, but they are often underutilized. We present preliminary results from ongoing research to support discussion and decision making between key stakeholders (scientists, entrepreneurs, and policy makers). The everyday activities example is based on the questionnaire data collected in Finland in the frame of the EU Horizon 2020 project BlueHealth compiled with the local spatial data. Education activities are presented by an experiential intervention with activities on the theme of fish as food in different sequential learning environments (class, water environment and school kitchen). Three different age groups participated. Rehabilitation and social integration intervention pilot was tailored between fishermen and participating municipality. The pilot aimed at supporting the well-being of unemployed young men and consisted of five sequential parts, lasting 3 hours each. Quantitative and qualitative methods are used for analyzing the data. We expect that the results will reveal the most potential places for blue well-being services, and that the activities in blue environment support understanding and formation of positive values and attitudes towards blue spaces. We will discuss the possibilities to support co-operation between stakeholders and promote the formation of new service structures for blue well-being services.
Francesca Di Carmine1, Silvia Collado2, Carlo Lai2, Teresa Gloria Scalisi1, Marino Bonaiuto1, Paola Perucchini3 (1. Sapienza University of Rome, 2. University of Zaragoza, 3. Roma Tre University)

INTRODUCTION. Attention is essential to development and healthy life. Unfortunately, a growing number of school children suffer of chronic attention deficit such as the Attention Deficit Hyperactivity Disorder (ADHD). Most literature is focused on the role that social environment plays in child development whereas scarce attention is paid on the physical environment, both built and natural.

METHOD. We present two studies with the aim of evaluating how a walk in three different outdoor environments (natural, built-historical, built-modern) may affect children with ADHD (Study 1) and the possible correlation between symptoms’ severity and their general frequency of contact with Nature (Study 2).

RESULTS. In Study 1, some preliminary results show better environmental perception in the Nature condition, than in the Standard-urban condition and the Historical-urban condition and better attention only in the natural context. In Study 2, we expect a positive correlation between Frequency of Contact with Nature, perceived restorativeness and symptoms severity.

DISCUSSION. In accordance to previous research, our findings show a great impact of Nature contact on cognitive functioning, among other benefits. The absence of costs, virtually, and side effects should motivate into applying research outcomes with the aim of improving the quality of life of atypical children.

“In the evening, I don’t walk in the park”: Perceived design qualities, safety and neighbourhood walkability
Johan Rahm1, Catharina Sternudd1, Maria Johansson1 (1. Lund University)

Introduction. Walking as a means of transportation is central in sustainable urban design. Little focus has, however, been placed on the influence of micro-level environmental features, such as vegetation and street lighting, on perceived safety and walking.

Method. This study applied a non-explicit approach to explore the impact of greenery and outdoor lighting on neighborhood walkability. Participants (n = 106) from three neighborhoods in Malmö, Sweden, took part in focus group discussions concerning neighborhood qualities related to walking.

Results. A thematic analysis revealed four inter-related themes relevant for perceived safety after dark: avoidance, entrapment, presence of others and prospect. The quality of greenery and street lighting impacted people’s route choices and forced some participants to make detours. In line with the prospect-refuge theory, entrapment, prospect and the presence of others influenced perceived safety, which in turn impacted whether the participants walked or not.

Discussion. The results indicate that urban greenery and street lighting need to be considered jointly, since their interaction influences perceived safety and impacts the walkability of the neighbourhood. Providing good overview over the nearby surroundings, by sufficient lighting and/or well-kept greenery, may reduce perceived entrapment, but also directly improve perceived safety and encourage pedestrian use.
A Meta-analysis on the psychological determinants of energy saving behaviour

Giuseppe Carrus1, Lorenza Tiberio1, Angelo Panno1, Stepan Vesely2, Torsten Masson3, Immo Fritsche3, Christian Kloeckner2 (1. University Roma, 2. Norwegian University of Science and Technology, 3. University of Leipzig)

Individual level factors such as ecological attitudes, pro-environmental values, awareness of consequences of ones behaviour, beliefs in climate change, emotions intended as motivational drivers of human behaviour, and intentions to adopt energy saving solutions have been frequently considered as potential antecedences of energy saving behaviour (ESB). We conduct a series of five single meta-analyses, based on 102 independent samples taken from 67 published studies, with 59,948 participants, to evaluate the strength of the associations between individual psychological determinants and energy-saving intention or behaviour. The meta-analyses’ results show a positive large association of emotions with energy-saving intention/behaviour (ESIB); a positive moderate/large association of attitude with ESIB; a positive moderate association of awareness of consequences/beliefs in climate change with ESIB; a positive moderate association of intention to adopt energy saving solutions with energy-saving behaviour; a positive small/moderate association of pro-environmental values with ESIB. Moderation analyses show that the associations between emotions and pro-environmental values with ESIB are weaker among older people; the relationship between emotions and ESIB is weaker among women; the association between intention and behaviour

Identity and pro-environmental behavior: A meta-analysis

Stepan Vesely1, Torsten Masson2, Immo Fritsche2, Parissa Chokrai2, Angelo Panno1, Giuseppe Carrus3, Christian Klöckner1, Lorenza Tiberio3 (1. Norwegian University of Science and Technology, 2. University of Leipzig, 3. University Roma, 188

Identity processes are increasingly recognized as potential drivers of pro-environmental action. The task of the present work is to systematically evaluate existing research on the links between proenvironmental behaviours and behavioural intentions and different types of personal and social identity. We focus on social identity, environmental identity, connectedness to nature, place identity and on their links to pro-environmental behaviours and intentions. We conduct a series of eight met analyses, drawing on data from 353 independent samples with 176,956 participants. The evidence points to a robust positive role of environmental identity and connectedness to nature in promoting pro-environmental behaviours and intentions. The evidence also suggests that forming a proenvironmental social identity might potentially be the most powerful driver of a general propensity for pro-environmental action. The results with respect to the effects of place identity or place attachment are mixed. However, the mixed results may – partly – stem from differences in the measurement of place identity
Willingness to donate for carbon offsets across 31 EU nations

Valeria Azarova¹, Jed Cohen¹, Andrea Kollmann¹, Johannes Reichl¹ (1. Johannes Kepler University)

Recent surveys consistently show that a majority of people have some degree of worry about the potential negative effects from climate change. Faced with this concern, and the slow or non-existent effort of governments to mobilize against climate change, citizens can take an active role in reducing greenhouse gas (GHG) emissions. One option for individuals to reduce GHGs is donations to voluntary carbon offset programs, which incur a monetary cost, but little to no cost in terms of time or effort. This research investigates the willingness to donate to voluntary carbon offset programs across 31 European nations, analysing both the country-level and individual-level drivers. Our analysis is based on revealed-preference survey data of 18,000 respondents where they had the option to directly donate their compensation for participating in the survey to a carbon-offset fund. The preliminary findings show significant differences in willingness to donate across the investigated countries, although the results for country level drivers are mixed. Looking at the individual drivers, factors like age, gender, employment status and income contribute to higher willingness to donate for carbon offsets. Furthermore, respondents who self-reported as pro-environmental also demonstrated a higher willingness to donate, giving no evidence for a value-action gap.

Can nationalist movements in a country increase the effect of proenvironmental social norms?

Findings from the transnational ECHOES survey

Christian Klöckner¹, Immo Fritsche², Stepan Vesely¹, Alina Mia Udall³, Giuseppe Carrus³, Torsten Masson² (1. Norwegian University of Science and Technology, 2. University of Leipzig, 3. University Roma)

Nationalist movements characterized by strong focus on a country’s identity have blossomed in European countries in recent years. Such movements go hand in hand with negative beliefs about climate change, energy saving and nature conservation. However, the emergence of a nationalist movement often leads to a stronger polarization of a society where the silent choses sides. Based on the results of a large multinational survey in the ECHOES project with more than 18,000 representative respondents from all EU countries plus Norway, Turkey, and Switzerland, this study explored if a stronger polarization of a society along the lines of national identity (expressed as a higher standard deviation of identification of residents with a country) has an impact on the relations between social norms and personal norms, thus the degree by which social norms are internalized. This potential effect is contrasted against polarization in identification with your city or region and identification with the EU. Whereas a strong polarization in national identity (which can for example be found in Poland, Turkey and the UK) and regional identity lead to stronger links between injunctive energy saving norms and personal energy saving norms, this effect cannot be found for identification with the EU.
Effects of source credibility on laypersons’ attitudes towards a climate engineering technology

Geraldine Klaus¹, Lisa Oswald¹, Andreas Ernst¹ (1. University of Kassel, Center for Environmental Systems Research)

Climate engineering technologies are discussed controversially in the expert domain, while a public debate about their acceptability is still missing.

We assessed the influence of perceived source credibility on laypersons’ attitudes concerning climate engineering (CE) related statements, to get an insight into possible future real-life evaluations. Subjects were randomly assigned to one of three source conditions: (1) politicians, (2) researchers or (3) citizens, which argued either (1) for the deployment, (2) against the deployment or (3) for research but against the immediate deployment of stratospheric aerosol injection (SAI).

We found statistically significant differences in the assessed credibility, covering the facets trust and competence between the three sources. Findings suggest a strong effect of source credibility on the acceptance of SAI, compared to the actual statement content. It seems not to matter much if the source’s evaluation of SAI is positive or negative; the recipients’ opinion mainly depends on their assessment of the source’s credibility.

These findings are highly relevant for communication strategies in the CE debate, such as the construction of an objective and neutral information campaign, which could start a public discussion about CE to find a well-balanced consensus with all parties concerned.
Triggering pro-environmental behaviours in a group context: Influence of behavioural attribution and wider spillover effects

Colin Whittle¹, Lorraine Whitmarsh¹, Dimitrios Xenias¹, Nick Nash¹, Stuart Capstick², Josh Lord¹ (¹. Cardiff University)

Introduction. Acting on climate change requires significant lifestyle shifts rather than piecemeal behaviour change. Behavioural spillover offers one pathway to achieving wider shifts. Previous work proposes that when behaviours are externally attributed, they lack the intrinsic motivation required to catalyse other behaviours.

Method. Participants were assigned to one of two experimental conditions involving participation in a discussion group and subsequent engagement in a pro-environmental behaviour for two weeks following (either reduction of plastic waste or food waste). In condition 1, behaviours were self-assigned (N=67), while in condition 2 behaviours were researcher-assigned (N=80). A third (control) condition involved participation in the discussion group only (N=85).

Results. Initial analysis demonstrated a main effect of time on intentions; however, this effect did not interact with condition. In contrast, time did interact with the target behaviour, with targeted behaviours increasing significantly more than non-targeted behaviours. Further analyses report on the relationship between the changes in targeted and non-targeted behaviours, with mediation (environmental identity) and moderation (locus of control).

Discussion. The behaviour change intervention succeeded in increasing wider pro-environmental behaviour intentions; however, differences in the attribution of the target behaviour did not increase the effectiveness of the intervention.

Moral Licensing and Rebound Effects in residential lighting - an experimental study

Elisabeth Eberling¹, Elisabeth Dütschke¹, Katharina Eckartz² (¹. Fraunhofer ISI Karlsruhe, ². TH Bingen)

Rebound effects reduce the energy demand reduction from energy efficiency increases. Understanding the underlying mechanisms is therefore crucial. Potential drivers under discussion include moral licensing, i.e. a cognitive process by which individuals justify immoral behaviour (e.g., using more and brighter lights) by having previously engaged in moral behaviour (e.g., switching to a more efficient lighting). Since empirical research on this topic is rare, we conducted an experimental study: Participants (n=491) chose between three LEDs which were all more energy-efficient than their current one. For investigating Moral Licensing, the perceived environmental behaviour of the participants was manipulated by a previous assessment of environmental behaviour: Treatment easy provided the impression of highly environmental behaviours, treatment difficult as behaving less environmentally friendly. A control group focused on leisure time behaviours. Overall, we are able to demonstrate rebound effects in LED choice and find effects of the manipulation on the moral self-perception. However, we do not find significant patterns regarding treatment condition and LED choice. On the contrary, in both treatments, easy and difficult, individuals tended to show more environmentally friendly choices. These results suggest that bringing environmental behaviours to people’s mind could contribute to weakening rebound effects in general.
It’s not all about money and convenience: The importance of expected environmental impact, and affective and symbolic values for climate-protecting behavior-change intentions.

Robert Tobias1, Melina L. Spycher1, Adrian Bruegger2 (1. University of Zurich, 2. University of Berne)

Introduction: A common assumption is that people show climate-damaging behaviors, because these are more attractive, for example, cheaper or easier to perform than less damaging behaviors. This study investigates what actually hinders changing behaviors to protect the climate (i.e., mitigation behaviors).

Methods: A survey in the Canton of Berne (Switzerland), in 2018, assessed the intentions, expected environmental impacts, cost-benefit, normative and behavioral-control evaluations, and affective and symbolic values of six mitigation behaviors.

Results: Linear regression analyses showed that the most important determinants are the expected environmental impact, and affective and symbolic values (absolute Betas between 0.2 and 0.5, p<0.5, adj. R² between 33% and 65%). Variables related to cost-benefit, normative, and behavior control evaluations were relevant only for few behaviors. For example, reducing car driving is the only behavior that is strongly influenced by cost-benefit evaluations, the injunctive norm, and the value for identity (absolute Betas around 0.20).

Discussion: For successfully changing climate-relevant behaviors, the key is to convince people of the impact of such behavior change (requiring that there is actually such an impact). Further, the affective and symbolic values of the targeted behaviors have to be considered and dealt with. Costs and norms are mostly of little relevance.
Green somatic marker: Environmental value orientation predicts skin conductance responses towards environmental stimuli.
Beatrice Conte¹, Ulf Hahnel¹, Tobias Brosch¹ (1. University of Geneva)

Introduction. Previous research has shown that self-reported value orientations and emotions predict people’s environmental attitudes and behaviors. However, the link between these two components of subjective experience remains unclear. Appraisal approaches define emotions as transient representations of values, as they only arise in response to objects that are relevant to one’s major concerns. Interestingly, emotions can be captured through physiological responses called somatic markers: somatosensory signals that drive the organism towards appropriate affective and behavioral responses within a situation. Within this theoretical framework, we aimed at addressing the issue by using self-reported environmental (i.e., biospheric) values to identify a somatic marker of environmental concern, and explain individual differences in emotional reactions towards environmental stimuli.

Methods. 105 participants were presented with a series of images with environmental versus non-environmental affective content while we recorded their SCRs.

Results. Results showed that self-reported biospheric values positively correlated with mean SCRs magnitude toward environmental stimuli (p = .021), but not toward non-environmental stimuli (p = .473).

Discussion. We identified a somatic marker of environmental concern. Our results shed new light on the relationship between environmental values and emotions, by showing that self-report measures of environmental value orientation predicted individual differences in emotional reactivity towards environmental stimuli.

Environmental Identity and Moral Motives in the Russian Youth
Sofya Nartova-Bochaver¹, Irkhin Boris¹ (1. National Research University Higher School of Economics)

Introduction. Environmental Identity (EID) is a self-concept demonstrating the extent to which people perceive themselves as part of nature, incorporated in it and defined by it (Clayton, 2003). It is one of the multiple people’s identities. Previous research has shown that EID contributes to individuals’ environmental attitudes and behavior and mental well-being widely. We hypothesised that EID may be positively connected with moral motives as well. The current study is aimed at investigating whether EID and moral motives are interrelated or not.

Methods. Our sample consisted of 274 undergraduate students (17-21, 218 females). We used the EID scale and Moral Motives Model scale including six subscales, according to the motives identified (Helping, Not-harming, Self-restraint, Social order, Social Justice, and Self-reliance).

Results. It was found that EID score, as well as Not-harming and Self-reliance scores were higher in a female group. Furthermore, it was revealed that EID positively correlated with almost all motives but in a male group except Social justice and Self-restraint, and in a female group – except Social order.

Discussion. We can conclude that EID is a personal feature really expanding a person’s recognition of one’s own interdependence with a larger collective. Supported by RFBR, Project 19-013-00216.
Choice architecture in environmental car choices: Unit familiarity increases sensitivity to attribute differences

Mario Herberz\textsuperscript{1}, Ulf Hahnel\textsuperscript{1}, Tobias Brosch\textsuperscript{1} (1. University of Geneva)

We argue that consumers’ reluctance to adopt efficient technologies such as EVs could partially stem from unfamiliarity with kWh as a metric. When considering to buy an EV, consumers have to effortfully translate the unfamiliar metric of kWh / 100 km into the familiar metric of liters / 100 km in order to evaluate their efficiency.

We hypothesized that displaying consumption in kWh / 100 km reduces consumers’ sensitivity to differences in consumption. In order to test our assumption, we conducted two studies where participants compared pairs of cars on their perceived level of consumption. We experimentally manipulated the unit in which consumption was displayed (liter vs. kWh) between subjects.

In Study 1 (N = 161 car drivers), we found that the use of the less familiar unit of kWh / 100 km reduces consumers’ sensitivity to differences in consumption. In Study 2 (N = 122 students), we replicated our findings from Study 1 and identified handling difficulty as the origin of this familiarity effect.

Our findings support the use of liters fuel equivalence / 100 km to display the energy consumption of EVs. This allows consumers to process their efficiency advantages more easily and might therefore increase preference.

Assessing the modal shift potential of urban and rural car drivers

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What moves people? In urban and in particular in rural areas it is still mainly the own car. But looking at the demographic change and CO2 emissions, behavioral changes in the private car sector are more than necessary. With the ipsative theory of behaviour in mind, we investigated which subjective and objective constraints keep car drivers from switching to the bike, public transport, or multimodal options, by conducting a representative survey among N= 1,800 regular car drivers in the city-state of Berlin and the federal state of Brandenburg. We further asked for their modal switch preferences when it comes to mobility policy scenarios such as driving bans, city tolls, reduced speed areas as well as reduced or more expensive parking space. We will present regional, personal, and demographic differences in constraints regarding mobility behavior as well as the behavioral change potential of the respective scenarios. These insights into human mobility behavior are valuable information for politicians as well as city and country planners, who want to take action for sustainable transportation.
Changing people’s everyday travel – Conflicting goals, drivers, and consequences
Annika Nordlund1, Kerstin Westin1, Johan Jansson2, Jonas Nilsson3 (1. Umea University, 2. Lund University, 3. University of Gothenburg)

Introduction: The car is the dominating travel mode in today’s society, with known negative environmental consequences. Any effort to achieve a sustainable transport system must be balanced against people’s different needs and opportunities, but also at what stage of behavioral change (Captive, Pre-contemplation, Contemplation, Preparation, Action, Maintenance; Bamberg, 2013) people are and how different attitudinal factors (environmental values, individual responsibility, personal and social norms) interact with these stages.

Method: This study was conducted as an online experiment in a panel (n = 1607), based on the goal framing theory (Lindenberg & Steg, 2007) and thus presenting measures to decrease car use from different frames (Gain, Hedonic, Normative goal frames).

Results: The results indicate that how a message is framed is important for acceptance, and also that there are differences in attitudinal factors given the behavioral change stage the person is found in.

Discussion: Framing a measures might been seen to provide a sense of the benefit with complying with the measure (gain time, feel better, doing the right thing), and using different goal frames is beneficial since people differ in what is important to them in general and in different behavioral change stages.

Understanding car use across different trip purposes
Erika Martins Silva Ramos1, Cecilia Jakobsson Bergstad2, Jonas Nässén2 (1. University of Gothenburg, Department of Psychology, 2. Chalmers University of Technology)

Introduction. The study aimed (1) to identify classes of motives for choosing a mode of transport and (2) to measure the effects of these motives along with driving habit, descriptive norms and attitudes on the frequency of trips by car for different purposes (for commuting, shopping, child-related activities and leisure purposes).

Method. A survey was sent by post to 3000 (34.6 % of response rate) Swedish residents in metropolitan, semi-rural and rural areas.

Results. By means of a factor analysis, three classes of motives for choosing a mode of transport were identified: Perceived Outcomes, Symbolic-Affective and Instrumental motives. OLS models assessed the predictive levels of the motives, descriptive norms, attitudes, driving habit and socio-demographic variables on the frequency of trips by car for the different trip purposes.

Discussion. This study has some clear take-home messages that could be relevant for urban planners and other researchers in the area of transportation. First, it was identified that child-related trips are less sensitive to social and situational cues. Second, it was identified that leisure trips have a non-predictive relationship with driving habits. Third, contrarily to leisure trips, commuting and shopping trips were strongly influenced by driving habits.
Buying an electric car: A matter of personal benefits or norms?

Sebastian Bobeth¹, Ingo Kastner¹, Ellen Matthies¹ (1. Otto-von-Guericke University Magdeburg)

Introduction. A long string of research in environmental psychology has demonstrated the importance of social and personal norms for pro-environmental behavior. However, in the context of investment decisions in energy-efficient technologies, they are assumed to be less important than expected personal costs and benefits. As empirical evidence is still scarce, we aimed to investigate the relevance of both kinds of motives in the context of electric car adoption.

Methods. We conducted an online questionnaire with 220 German household members interested in buying a new car. The questionnaire included several possible predictors of electric car adoption. We tested three research models to explain adoption intention: An adjusted modified norm activation model, an extended technology acceptance model, and an integrated model with predictors of both models. We analyzed the hypothesized models with path analyses.

Results. All three models explained a significant share of adoption intention. The integrated model explained the highest share of variance. It suggests a central role of social norms and personal norm, which have the strongest effect on adoption intention and affect perceptions of the technology.

Discussion. Our study challenges prior assumptions of a minor role of normative influences in the context of households’ investment decisions.

Environmental regulation in the UK: gathering insight into how policy makers map regulatory instruments to environmental risks

Elaine Gallagher¹ (1. Cranfield University)

Environmental regulation and policy making play a pivotal role in ensuring that society and business function in a sustainable manner in line with the environmental and economic objectives of our governing bodies. Despite the importance of this role, rarely do we consider policy makers as individuals, and how their personal experiences, background and perspective influences how they evaluate risk and how this links to instrument choice. The current study analysed 14 semi-structured interviews with policy officials from the UK Department for Environment, Food and Rural Affairs (DEFRA) to explore the use of a variety of regulatory instruments and different levels of risk across 14 policy domains and 18 separately identified risks. Interviews took place within a policy environment of a better regulation agenda and of broader regulatory reform. Statements relating to the use of regulatory instruments were categorised into positive, negative and neutrally framed comments. The findings of the study help shed light on policy makers’ behaviour and thinking when choosing policy instruments, and how they relate to the relevant environmental risk. The study also highlights the somewhat flawed thought process which was evident when discussing instrument effectiveness and degree of risk.
Transitions to sustainable lifestyles, governance and knowledge co-production: Contributions from environmental psychology
Ricardo Garcia Mira1 (1. University of A Coruna)

Introduction. This work adopts a systemic approach to lifestyles, considering them to be patterns of time use in daily life domains and contexts, that take place in given locations and have associated consumption patterns. It goes beyond disciplinary understandings of determinants of sustainable lifestyles or conditions for transitions to a green economy and integrate knowledge across a multi-disciplinary approach. Climate change adaptation is nowadays a priority, and a discussion about the most appropriate strategies and governance patterns is analyzed.

Method. We adopt an integrative approach, which combines qualitative and quantitative techniques, including a back-casting method (García-Mira et al, 2016; García Mira and Dumitru, 2014). Seven European regions co-developed a series of participatory visions of the future in which sustainable lifestyles and economics became the norm in each region, and described potential pathways to reach them.

Results. Our results analyze the ways in which everyday life is organized and how it might actually create obstacles, and also create possibilities for change. People organize their activities in different ways, experience acceleration or time affluence (Kasser and Sheldon, 2009).

Discussion. The paper analyze how these experiences generate feelings of stress and unhappiness/lack of wellbeing, and induce specific behavioral adjustments with implications for sustainability.

Renewable Energy in a Biosphere Reserve? The connection of perceived necessity and acceptance.
Silke Rühmland1, Petra Schweizer-Ries2 (1. Saarland University, 2. University of Applied Sciences Bochum)

The expansion of renewable energy is an opportunity for generating electricity with little CO2 emissions. The planning of renewable energy plants, however, can cause public opposition, which can lead to unsatisfied citizens, even in model regions such as biosphere reserves.

A case study of four renewable energy plants in a biosphere reserve in Germany was conducted for photovoltaic systems on open space and wind turbines, both planned and built. Study subjects were residents living closer than 5 kilometers to the power plants (N = 361).

Place meanings of the biosphere reserve and symbolic interpretations of the technologies (surveyed in a pre-study) are analyzed, including place attachment and context variables such as the perceived necessity for further expansions of renewable energy in the biosphere. Results show differences in terms of technologies and regarding built and planned energy plants. Surprisingly, the perceived necessity was a constant predictor of acceptance amongst all included variables. This result indicates that perceived necessity should be included as a contextual factor in acceptance studies. Besides the presentation of empirical results, the ways in which perceived necessity could be operationalized, possible interconnections with other variables (e.g. attitude towards policy decisions) and arising difficulties are discussed.
Who’s Business is it Anyway? Environmental Policy and Determinants of Environmental Behaviour in Russia
Elena Sautkina, Alexandra Ivanova (1. National Research University Higher School of Economics)

The environmental issues in today’s Russia, especially those related to pollution and climate change, are considerably pressing problems. Meanwhile, the authorities’ attempts to address these issues have been insufficient. Officiously, the burden of addressing environmental education, communication and behavior change have mainly been left to the third and private sector, and the population. The lack of adequate environmental policies, along with the prominence of social and economic issues, may have accounted for an ‘environmental apathy’: low levels of environmental awareness, values and behavior, as has been suggested by a growing body of literature. However, different regions of Russia have different degrees of exposure to environmental issues and varying levels of environmental concern. The recent wave of protests against the existing waste management policy shows, for example, how apathy can turn into activism. There is also evidence suggesting that the growing internationalization positively affects people’s readiness to introduce environmental policies and practices, which is at odds with the current levels of environmental policy development. We are proposing to investigate the determinants of environmental behavior, as well as attitudes and expectations towards environmental policy in Russia. Results of an exploratory survey and interview study will be presented and discussed.

How to effectively motivate costly environmental policy and action?
Lukas Fesenfeld, Yixian Sun, Michael Wicki, Thomas Bernauer (1. ETH Zürich, Institute for Environmental Decisions, 2. Yale University)

The significant potential for reducing humanity’s environmental impact lies particularly in areas where the costs of behavioral change are highest. Shifting public support in favor of accepting costly demand-side environmental policies is a key challenge for policymakers. A common practice of researchers in recent years has been to run emphasis-framing experiments to test how different policy arguments change citizens’ environmental attitudes. Motivated reasoning and Bayesian theory stress the importance of people’s prior beliefs for updating their attitudes. While empirical evidence so far tends to report significant (heterogeneous) framing effects, we review existing framing experiments and run comparative survey experiments with 9750 respondents in China, Germany and the United States to test how robustly typical frames shift attitudes towards costly environmental policies and actions across cultures, consumption contexts and population subgroups. Comparing standard linear regression results to more conservative Bayesian sparse regression outputs, we find that survey-embedded framing studies tend to pick up noisy (heterogeneous) treatment effects and consequently over report significant results. Our results have broader implications for survey-embedded experimental and public opinion research. Future research should strive for realistic, field experimental settings to test how people update their attitudes and can be motivated for costly environmental policies and actions.
The when, what, where, and how of cognitive restoration in built environments

Sally Augustin (1. Design With Science)

Designing opportunities for cognitive restoration into built environments is crucial for the mental performance and wellbeing people today. We are cognitively exhausted by the need to mentally focus/concentrate on the tasks at hand and this exhaustion has far ranging implications. Once our stocks of mental processing power are depleted, our cognitive performance becomes degraded, and we get grumpy and ineffective participants in group endeavours. The single most important way that built environments contribute to restoration is via providing effortlessly fascinating experiences. Built environments can encourage mental refreshment via the support of natural experiences, such as visual access to green roofs, as well as carefully curated human-created ones, such as views of art. Research is rapidly expanding the range of experiences that are known to be effortlessly fascinating. Attendees will leave this session with a better understanding of how built environments can support cognitive restoration, generally as well as with real world examples of how client populations’ stocks of cognitive processing power can be influenced by modifications to the built spaces that they utilize and the consequences of cognitive restoration-related design decisions.

Enhancing creativity in the workplace

Nigel Oseland (1. Workplace Unlimited)

As industry advances further into the quaternary economic age, that of innovation, enhancing the creativity of the workforce is more important than ever. Are the fashionable workplaces of Google and Red Bull, with slides and bean bags, the answer, or are they simply a fad? Can knowledge sharing, creativity and innovation be better improved through psychological-based workplace features, such biophilic design, that offer attention and cognitive restoration? We share relevant research from around the world, in the fields of evolutionary psychology and neuroscience, including two of surveys of UK office workers that resulted in practical workplace solutions for enhancing creativity. This research highlights the differences in types of interaction that require different spaces for success. Likewise, we show that the innovation cycle, in which creativity us dependent upon team and solo activities, is better supported by different work-settings. The research shows that getting up from the desk, spending time in nature, and exploring new routes and places to work, enhance creativity rather than funky and trendy office spaces.
Cumulative effects of residential restoration: Green space and future earnings from a cohort in ten U.S. cities
Matthew Browning¹, Alessandro Rigolon² (1. Illinois College of Applied Health Sciences, 2. University of Utah)

One of the greatest benefits of ongoing restorative environments might be socioeconomic status advancement. These effects would be particularly beneficial for children starting from families suffering from poverty. Residential access to green space might provide restoration and, consequently, support academic achievement, creativity, and emotional regulation – traits, which might help low-income children rise out of poverty. We present a study that examined the relationship between recent incomes of children born between 1978 and 1982 in the 10 largest U.S. cities and density of green space they were exposed to during childhood. Conditional autoregressive models of tracts in the ten largest U.S. cities (n = 5,849) showed statistically significant positive weak associations between income rank and above-average levels of greenness but not between income rank and public park measures, adjusting for individual and neighborhood confounders and spatial autocorrelation. Tracts with lower average levels of precipitation (city-level), lower disadvantage, higher levels of population density, or higher annual temperatures do not show beneficial effects of green space. We conclude with implications for the planning and design of cities, given that greenness was weakly associated with children rising out of poverty in wetter, cooler, less-dense, more advantaged census tracts of 10 U.S. cities.

Dose-response curve and multisensory effects of restorative environments: A review of recent research
Matthew Browning¹, Seunguk Shin², Fatemeh Saeidi-Rizi², Olivia McAnirlin², Hyunseo Yoon², Yue Pei², Katherine J. Mimnaugh², Carena J. van Riper², Heidemarie K Laurent², Steven M. LaValle² (1. Illinois College of Applied Health Sciences, 2. University of Illinois)

Psychology and design professionals could better provide restoration and health promotion services to their clients if these professionals had empirically derived guidelines on the use of multisensory environments. Few studies compare the impact of natural elements through different sensory pathways. Similarly, few studies examine the dose-response curve for individual sensory inputs or multisensory experiences. We describe three studies that begin to address these research gaps. First, a review of natural landscape simulation experiments found no differences in beneficial outcomes between exposure number, immersive potential, duration, size, or multisensory quality. Next, an experiment with six-minute exposures showed no additional mood or restorative benefits from an outdoor forested setting with visual, acoustic, haptic, and olfactory feedback over an indoor virtual reality setting with only visual and acoustic feedback. Last, another experiment showed no differences in perceived restoration between six-minute exposures to indoor environments with no sensory inputs of nature versus environments with visual inputs or acoustic, visual, and olfactory inputs. These studies collectively highlight the potential for short exposures to restorative environments with fewer numbers of multisensory sensory inputs. We discuss implications and applications of these findings for psychology and design professionals.
A field-experiment on the effects of potted plants in study rooms on students’ wellbeing, productivity, attention, perceptions, and the objective indoor climate

Nicole van den Bogerd¹, S. Coosje Dijkstra¹, Jacob C. Seidell², Sander L Koole³, Jolanda Maas⁴ (1. Vrije Universiteit Amsterdam)

Potted plants in study rooms might contribute to students’ wellbeing and academic performance. We conducted a field experiment with a controlled pretest-posttest design to explore the effects of potted plants in study rooms in a university library on students’ perceived wellbeing, attention, productivity, room attractiveness, comfort, and the evaluation of the intervention using questionnaires. Additionally, we included indoor climate measures to explore the effects of plants on the indoor climate. Preliminary results (N=472) suggest that potted plants did not have a direct effect on students’ perceived wellbeing, attention, and productivity. However, plants did seem to improve perceived room attractiveness and comfort. Additionally, at the posttest 61% of the students who used the study room with potted plants reported that the plants were a reason they would choose to study in that room again because the room, for example, “feels nicer” “gives a homely feel” and “has more oxygen”. Plants also positively improved the room temperature, humidity, and the level of particular matter. These results provide some support for using potted plants in study rooms to contribute to students learning experiences, although no effects were found on academic related outcomes.

PlantBenefits: intervention study on the effects of office plants on indoor climate, the appreciation of the environment by employees, and their functioning and wellbeing

Sjerp de Vries¹, Laurie Hermans², B. van Duijn³, B. Oppedijk⁴ (1. Wageningen University & Research, 2. ECN part of TNO, 3. Leiden University, 4. Vrije Universiteit Amsterdam)

A field experiment with a controlled pretest-posttest design was conducted in three organizations. In each organization, two offices were selected. One month after the pretest, plants were introduced in one of the offices. The plants are aimed at increasing the air humidity in wintertime by 15%-points. After three months, a posttest was conducted. Temperature and air humidity were monitored for one year. In total, 75 employees participated during both pre- and posttest. Analyses of variance were conducted, with Time as within-subjects factor and Condition and Organization as between-subjects factors. Positive effects of the plants were observed for the visual appearance of the office, having positive feelings and self-rated functioning. A negative effect was observed for the need for recovery after a working day. No effect was observed for other measures, o.a. thermal comfort, ability to concentrate, stress level, social climate. The most striking result was a logistic regression for having reported sick during the previous three months (control = reference), adjusting for organization and sickness reporting on the pretest, showing a rather substantial effect of Condition: OR = 0.22 (0.05-0.93). At the moment, the study is being replicated at more locations, with a larger number of participants.
Matthew Browning¹, Seunguk Shin² (1. Illinois College of Applied Health Sciences, 2. University of Illinois)

This study examines the effects of virtual windows with nature scenes on affect, attention, and perceived restoration. Ninety undergraduate students were exposed to a virtual environment of a busy café created by three-sided video projection and an essential oil diffuser with the aroma of coffee. While two sides of the room had the recorded scenes of the café, the other side presented a 6-minute video of an open window of nature with the additional aromas of grass and dirt, a closed window of nature, or a brick wall. Changes in pre- to post-treatment scores on the PANAS and the Digit-Span Test suggested that the closed and open virtual windows had no restorative effects over the brick wall. To see if such results were due to the busyness of the café overwhelming the restorativeness of nature, an online survey with 10-second videos was conducted with 577 students. No differences were observed between the three treatments projected in a café versus an empty classroom setting, although windows were more restorative than brick walls in both settings. These two experiments suggest that virtual nature’s restorative effects attenuate as dosages (i.e., level of immersion, duration of exposure) increase, but more research is needed.

Can simulated nature support health? Comparing short, single-doses of 360degree nature videos in virtual reality with the outdoors
Matthew Browning¹, Katherine J. Mimnaugh², Carena J. van Riper², Heidemarie K Laurent², Steven M. LaValle² (1. Illinois College of Applied Health Sciences, 2. University of Illinois)

Nature exposure in mobile virtual reality (VR) could provide emotional wellbeing benefits for people who cannot access the outdoors. Little is known about how these simulated experiences compare with “real” experiences. We conducted an experiment with healthy undergraduate students (n = 84) that tested the effects of 6minutes of outdoor nature exposure with 360-degree VR nature videos, which were recorded at the same outdoor location. Skin conductivity, restorativeness, and mood before and after the exposure were measured. Outdoor and VR nature increased physiological arousal similarly, benefited positive affect and were rated as equally restorative compared to an indoor control setting; however, only outdoor exposure increased positive affect. Benefits of nature held even after adjusting for preferences toward nature, experiences in nature and VR, and demographic characteristics. We discuss research needs and relevancy to environmental psychological theory related to understanding the emotional benefits derived from VR nature experiences.
Fish aquaria in the workplace: A novel intervention to promote employee well-being and cognitive performance?

Heather Clements¹, Stephanie Valentin¹, Julien S Baker¹, Nicholas Jenkins¹, Jean Rankin¹, Nancy Gee², Donna Snellgrove², Katherine Sloman¹ (1. University of the West of Scotland, 2. WALTHAM Centre for Pet Nutrition)

Introduction: Research suggests that exposure to animals and nature in the workplace can improve cognitive performance and increase employee well-being. As fish aquaria provide both exposure to nature and opportunities for human-animal interaction, the presence of aquaria in working environments may have similar benefits. Therefore, the current research sought to investigate the effects of viewing an aquarium during the working day on employees’ psychological and physiological well-being, and cognitive performance.

Methods: Employees and PhD students from the University of the West of Scotland were randomly assigned to take part in one of two studies. Study 1 assessed the short-term effects of viewing an aquarium on mood, physiological stress, and cognitive performance, while Study 2 assessed the longer-term effects of repeated viewings on psychological and physiological well-being. Both studies used within-subjects designs such that all participants were assessed under each of three conditions: viewing a live fish aquarium, viewing a fish video, and sitting quietly.

Results: Data were analysed using separate repeated measures ANOVAs, and results from the psychological, physiological and cognitive tests will be presented.

Discussion: The findings of this research may be used to inform the future design of working environments which better support employee health and well-being.
Doing what I find important: Reflecting on values to change behaviour and improve wellbeing
Elliot Sharpe, Goda Perlaviciute, Linda Steg (1. University of Groningen)

Reflecting on what we find important may help us to act more in line with our values. This has been shown in the context of altruistic and health behaviour (Maio, Olsen, Allen, & Bernard, 2001; Tapper, Jiga-Boy, Haddock, Maio, & Valle, 2012). However, research has not yet tested if reflecting on biospheric values can influence pro-environmental behaviour and support for environmental policy. In a first study, we find that reflecting on the importance of protecting the environment increases support for an energy policy with personal behavioural costs. In a second study, we attempt to replicate the findings of the first study, while also testing the effects of reflecting on biospheric values on energy saving intentions. Extending previous research, we additionally test if reflecting on the importance of protecting the environment and then acting in line with these values has implications for wellbeing. It has been argued that acting in line with what we find personally important is associated with greater hedonic and eudemonic wellbeing (Christie, Atkins, & Donald, 2017; Ferssizidis et al., 2010), which implies that reflecting on biospheric values and then acting in line with those values might be associated with wellbeing outcomes. Practical implications for policymakers will be discussed.

Creating social meaning: How major social events can change perceived group values
Thijs Bouman, Steph Johnson Zawadzki, Linda Steg (1. University of Groningen)

Personal values are key drivers of, and can provide personal meaning to, people’s environmental actions. We argue that perceived group values—the values individuals believe ingroup members endorse—can play a similar critical role as personal values and, importantly, can have unique potential for promoting environmental actions. We hypothesize that one important difference between personal values and perceived group values is that perceived group values are more likely to be changed by major social events (e.g., elections, climate protests) than personal values, offering unique opportunities for strengthening the value-base behind environmental actions. Data from cross-sectional (during national elections) and longitudinal (before and after the Amsterdam climate march) studies support our hypothesis that perceived group values shape the social lens through which people view environmental actions and can influence individuals’ personal environmental engagement. Further, our longitudinal study demonstrates that a major social event (i.e., climate march) can change perceived group values, while personal values remain relatively stable. Our findings provide critical insights into how perceived group values impact the social meaning of environmental actions and can motivate individual pre-environmental engagement. We will discuss new theoretical perspectives on the value-base that underlies environmental actions, and provide new avenues for environmental interventions.
More fun with less stuff: can we improve well-being through less environmentally intensive activities?

Amy Isham\textsuperscript{1}, Birgitta Gatersleben\textsuperscript{2}, Tim Jackson\textsuperscript{2} (1. Centre for the Understanding of Sustainable Prosperity, University of Surrey, 2. University of Surrey)

Excessively desiring material goods is unsustainable and detrimental to human well-being. Therefore, alternative ways of living well within ecological limits must be uncovered. Flow, an experience of total immersion in a challenging activity, has been associated with enhanced well-being. However, we are not aware of any examination of the environmental costs of more or less flow-conducive activities. Through an analysis of experience sampling forms and well-being surveys taken from the members of 500 US families, we test the hypothesis that activities which allow for the experience of flow also tend to have a low environmental impact. We found that individuals who experience stronger characteristics of flow in their leisure activities tend to have greater momentary well-being, whereas those experiencing flow more frequently report greater retrospective well-being. Moreover, a small negative relationship was found between an activity’s flow score and its environmental impact. The analysis allows us to identify a specific group of high-flow, low–environmental impact activities, which can provide a starting point from which we can begin to understand the structures that need to be promoted in order to achieve a ‘more fun with less stuff’ ideal.

Warm-glow from saving the planet: The role of intrinsic motivation in environmental decision-making

Sander van der Linden\textsuperscript{1} (1. University of Cambridge)

Decades of research in the behavioral sciences has shown that people are willing to help others in need. What remains unclear, however, is whether people derive a similar sense of “warm-glow” from cooperating in more psychologically distant social dilemmas such as climate change and helping to save the environment. Moreover, although network contagion effects now increasingly allow social causes to reach a large number of interconnected individuals fast, efficiently, and at low cost, little is known about the duration of such viral online empathy and prosociality. I’ll review evidence from four studies to help carve out a research agenda for understanding the role of norms, affect, and motivation in environmental decision-making.
Why meaning matters: Examining the relation between pro-environmental behavior and happiness

Steph Johnson Zawadzki1, Danny Taufik2, Linda Steg1, Thijs Bouman1 (1. University of Groningen, 2. Wageningen University & Research)

Understanding how and when pro-environmental behavior might enhance wellbeing is critical for addressing environmental challenges while securing people’s wellbeing. While performing pro-environmental behaviors is linked with both hedonic and eudaimonic happiness, relatively little is known about why these relations exist, whether the relation are uni-or bi-directional, and the conditions under which the relations may be stronger or weaker. Using data from the European Social Survey and three experiments, we sought to better understand the relation between pro-environmental behavior and wellbeing. The survey and the first experimental study showed that the pro-environmental behavior–wellbeing relation is likely bi-directional and may be stronger when people can reflect on their pro-environmental behavior and reflect on what this behavior means for their wellbeing. Two other experimental studies showed how ascribing clear pro-or anti-environmental meaning to people’s behavior impacted their perceptions of the behaviors’ personal meaningfulness (i.e., by sending positive self-signals) to elicit positive or negative feelings. The resulting positive (but not negative) feelings were associated with motivation and intentions to perform future pro-environmental behaviors. Taken together, these studies suggest that the pro-environmental behavior–wellbeing relation is likely bi-directional and may be particularly strong when participants see their behavior as personally meaningful.

London Mayor’s schools air quality audit: assessing the feasibility of recommendations and collection of baseline data

Hebba Haddad1, Ben Barratt1 (1. King’s College London)

Exposure to air pollution contributes to numerous health problems and tens of thousands of premature deaths per year in the UK. Children are particularly vulnerable to the harmful effects of air pollution, due to their developing bodies. In 2017, the Mayor of London commissioned air quality audits of the 50 most polluted primary schools in London, all exceeding legal limits of nitrogen dioxide (NO2).

Our current work uses qualitative and quantitative methods to evaluate the audit process and implementation of the recommendations. Interviews with key actors (13 government officers and 10 school representatives) were conducted to assess the perceptions of the audit, if the audit recommendations are feasible to be implemented in practice, what barriers may be encountered and how these would be overcome. The survey work provides baseline data of awareness, attitudes and current behaviour of parents and children before audit recommendations have been implemented (parents n = 85, children n = 103). We also discuss the process of evaluating a large scale environmental and public health policy, and its implementation across an urban area.
Impacts of a changed atmosphere: Do increased CO2 levels decrease human cognitive performance?

Gesche Huebner¹, Robert Lowe¹, Tadj Oreszczyn¹ (1. University College London (UCL))

Introduction. Climate change has severe consequences for humans, such as health impacts resulting from the burning of fossil fuels, i.e. pollution, and impacts from a changing climate, such as extreme heat and flooding. There is a third, neglected, category that covers impacts from the *changed atmosphere* per se, i.e. a higher concentration of CO₂. Do increased atmospheric CO₂ levels influence human cognition negatively?

Method. We carried out a rapid evidence assessment. Identified keywords were searched for in title, abstract, and keywords in Scopus and Web of Science. Results were imported into the systematic review software EPPI-Reviewer, and screened according to prespecified criteria.

Results. Five journal articles were retained after screening. The level of reported details did not allow a meta-analysis; instead, results were descriptively interpreted. All studies took place in environmental chambers in which pure CO₂ was inserted to reach levels between 500 ppm and 5000 ppm. Two studies did not find any effect of CO₂ on performance, but three studies found that cognitive performance decreased under higher CO₂ concentrations.

Conclusions. The outcome that human performance might decrease under higher CO₂ is already in itself alarming but would have wide-reaching implications on energy use, e.g. of heating and ventilation systems.

Acceptability of the use of enhanced weathering to help reduce climate change

Elspeth Spence¹, Nick Pidgeon¹, Emily Cox¹ (1. Cardiff University)

Carbon dioxide removal may be necessary to meet the target set out in the Paris Agreement. Research has grown rapidly in the exploration of new technologies and strategies to help reduce carbon dioxide and remove it from the atmosphere to limit the impacts of climate change. One way of doing this is through enhanced weathering in which silicate minerals (e.g. basalt) could be mined, crushed and spread on land.

It is vital to understand how acceptable society would find enhanced weathering if it was adopted as a way to help reduce climate change. We conducted a cross-national survey in the UK, US and Australia and will present initial findings on what influences acceptability of enhanced weathering. Support for research and deployment was measured with conditions attached by people on their choice of whether enhanced weathering should be carried out as well as concern around climate change. By identifying how people assess the possible risks and benefits of enhanced weathering and how it relates to their attitudes towards climate change, we can establish how this strategy is understood and how acceptable carbon dioxide removal may be as part of the solution to minimize climate change.
What we see when we see climate change: A comparison of EEG, ranked-preference and self-report data

Susie Wang1, Berry van den Berg1, Ana Lazovic1, Daniel Chapman2, Adam Corner3, René San Martin4
(1. University of Groningen, 2. Yale, 3. Climate Outreach, 4. Universidad Diego Portales)

Images are a key part of climate change communication; they are representations of the issue in people’s minds. Few studies have directly looked at how people process climate imagery. One way is to use high-temporal resolution electroencephalography (EEG) to examine neural processes evoked by different images. We test a key hypothesis from the literature: impacts of climate change (floods, storms) capture attention more than solutions (wind turbines, solar power).

We compared ranked-choice and self-reported ratings of climate imagery with event-related potentials (ERPs), to explore how they correspond. Participants viewed images of impacts and solutions and rated each image while EEG activity was recorded. Then, under the guise of selecting images for an environmental campaign, they completed a task in which they selected one of two images randomly presented (always an impact paired with a solution).

Results showed that deployment of attention (indicated by a P300 ERP component) was greater for impacts than solutions. Further, we compared self-reported image ratings with P300, and isolated clusters of imagery that may prompt deployment of attention for different reasons. Image choice was predicted by both self-report ratings and the P300.

We discuss the implications and potential for using neural measures in climate imagery research.

Nudging for active transport – two natural experiments

Aslak Fyhri1 (1. Institute of Transport Economics)

Introduction. Nudges are increasingly used to change people’s behaviour for the better of society. In transport, there are few good examples of effective nudges for improved safety or sustainability. Controlled intervention studies are needed to disentangle how different measures work. Road markings for cyclists are conveyors of information, as much as legal and physical regulations of movement. In the current study we use this as an example of nudging for increased bicycle use. Further, we look at the use of “handlebars” in front of stop lights as a nudge for reducing red light running, thus increasing road safety.

Methods. We use a multi-method approach, using survey data, video and mobile app data before and after interventions carried out in Oslo. We compare with control sites that saw no changes.

Results. We find that the nudges lead to behavioural changes. We found no psychological correlates to these changes.

Discussion. The theoretical underpinnings of the results can lead to an increased understanding of how nudging principles (such as information, default option and social proof) can be seen in light of psychological theoretical concepts such as mental maps, injunctive and descriptive norms and habit strength.
By bike to the stadium – does a bicycle parking lot lead to more pro-environmental behaviour of football fans?

Katharina Friedrichs¹, Annette Kluge¹ (1. Ruhr-University Bochum)

Introduction. Through sustainability initiatives, football clubs have started to reduce sport spectators’ travel emissions. This raises the question, whether sustainability efforts (e.g. a bike lot) actually lead to pro-environmental behaviour of football fans and if such an activity closes the behaviour-intention gap.

Methods. The pre-post-test-study’s aim was to investigate fans’ travelling behaviour to football matches and subsequent impact of a sustainability initiative (i.e. bicycle lot). The theory of planned behaviour was used to understand which variables influence the fans’ intention to bike to the home stadium before and after the construction of a bike lot. In the pre-test a total of \( N = 740 \) football fans \( (M_{age} = 34.9 \text{ years}) \) participated.

Results. Pre-test data showed that attitude towards behaviour, perceived behavioural control, and subjective norms predicted the intention to bike to the home stadium \( (p < 0.001, R^2 = .23) \). One of the reasons for not choosing the bike was the insecurity to park it safely at the stadium. Although the pre-intention was low, respondents agreed that biking could serve as an important physical exercise.

Discussion. Promoting health-related aspects could encourage fans overcoming the behaviour-intention-gap. Post-test is scheduled for April, 2019; data will be integrated and presented.

Comparing Drivers’ Visual Attention at Junctions in Real and Simulated Environments

Chloe Robbins¹, Harriet Allen², Peter Chapman² (1. University of Sheffield, 2. University of Nottingham)

Introduction. Driving simulation is widely used to answer important applied research questions, however, it is vital for specific driving tasks to undergo behavioural validation testing. Given that intersections require complex interactions with other vehicles governed by sequences of head and eye movements, it is important to understand whether these visual search strategies are accurately captured in a simulated environment.

Methods. The current study directly compared drivers’ visual attention at junctions in a high fidelity driving simulator and in a real car, in both low and medium demand driving situations. Natural junctions in Nottingham were used for the on-road phase and the same junctions were recreated in the simulator.

Results. The frequency and size of drivers’ head movements were not significantly different between manoeuvres performed in the simulator and on real roads however, drivers’ mean fixation durations were longer in the simulator compared to on-road, particularly in low demand situations. These findings were interpreted as evidence for lower levels of visual engagement with the simulated environment compared to the real world.

Discussion. These findings indicate that driving simulators can be useful tools for investigating drivers’ visual attention at junctions, particularly when the driving task is of at least moderate demand.
The public acceptance of fusion energy research in Europe: results from a cross-national survey study
Christian Oltra1, Christopher Jones2, Ana Prades3 (1. CIEMAT, 2. University of Surrey)

Introduction. There is growing appreciation, among policy makers and industry alike, that understanding and fostering ‘public acceptance’ is a central to the commercial deployment of low carbon energy technologies and associated infrastructure in Europe. While currently an experimental technology, fusion energy has the potential to be such low carbon energy option.

The ongoing research, demonstration and deployment of commercial fusion energy will involve significant public investment from the member states of fusion development programmes and will imply large-scale infrastructure, the socio-technical embedment of which will be influenced by the public and stakeholders.

Methods. Here we present the findings of an online survey, conducted on nationally representative samples (N = 900 per nation) from 21 European countries as part of the EUROFusion-SES project.

Results. We focus our analysis on cross-country and other group differences in self-reported measures of perceived benefits and costs, positive and negative affect, attitudes, acceptance and support of fusion energy research. Second, using a multivariate, socio-psychological approach, we examine the individual-level determinants of people’s acceptance of fusion energy.

Discussion. We consider the implications of the findings for the social acceptance of fusion energy in different European countries, including implications for programmes of public engagement and communication.

SME decision making for decarbonisation innovations: how people make decisions in the context of organizational culture, routines, and institutional logics.
Kevin Broecks1, Suzanne Brunsting2, Laurie Hermans3, Renee Kooger4 (1. ECN part of TNO)

To reach countries’ carbon emission reduction targets, firms in industry need to decarbonize their production processes. Decarbonisation is difficult because many barriers to the adoption of decarbonisation innovations exist. For example, many firms lack well-functioning energy management systems, organizational cultures conducive to change or the knowledge needed to appropriate these innovations. Hence, many firms fail to identify worthwhile opportunities for innovation, reject promising investment proposals and fail to implement the organizational and behavioural changes needed to implement innovations successfully. These challenges are exacerbated for small and medium enterprises (SMEs) with few resources for such search and selection processes.

In this study, we aim to foster understanding of how industrial SMEs search for opportunities for decarbonization innovations and how they choose among innovations that differ in their economic, social and environmental effects. In particular, we focus on how individuals within these organizations make decisions between innovations and how these decisions are affected by the organizational context, such as the culture of the organization, the interaction between organizational layers, organizational routines or institutional logics. The study consists of a literature review into these processes, as well as interviews with decisions makers (e.g. higher or middle management) in industrial SMEs in the Netherlands.
Acceptance for cooperation - perspectives from European stakeholders on joint projects in the energy sector
Elisabeth Dütschke¹, Christian Oltra², Uta Burghard¹, Roser Sala Escarabill² (1. Fraunhofer ISI Karlsruhe, 2. CIEMAT)

Introduction. Bilateral cooperation via joint projects is enabled by the renewable energy directive. However, this opportunity has not been used so far. This contribution explores the reasons for it using the example of building concentrated solar power (CSP) plants in Southern Europe for electricity use in Central Europe. From a theoretical perspective, psychological concepts on social acceptance are combined with a socio-technical understanding of the innovation system.

Methods. Based on a sample of 53 in-depth interviews with systematically chosen stakeholders from France, Germany, Netherlands, Spain and the European level it is explored what contributes and what hinders sociopolitical acceptance of such joint projects and how this relates to market and community acceptance. Interviews were analysed by methods of content analysis.

Results and Discussion. Market acceptance for CSP seems feasible and positive on the supply side, however the demand side is less clear and suffering from low levels of knowledge and interest. Local acceptance is not identified as specifically critical for CSP. Socio-political acceptance is heterogeneous with stronger support in Spain and among scientists and technology developers while policy makers especially in Germany and the Netherlands are more critical. Overall different narratives seem to emerge which could lead to diverging views.
“Quit playing games with my hub” - Towards a citizen-friendly implementation of micro hubs in cities
Florian Müller¹, Sebastian Bobeth¹, Tom Assmann¹, Ellen Matthies¹ (1. Otto-von-Guericke University Magdeburg)

Introduction. Integrating prior acceptance research, Huijts, Molin, and Steg proposed a comprehensive framework to explain technology acceptance. Yet, its broader applicability has rarely been tested. We applied the framework to investigate the acceptance of cargo-bike-friendly infrastructure in cities. Cargo bikes can substitute 25% of inner-city deliveries of goods by light commercial vehicles and contribute to CO2 emission reductions and higher quality of life. However, the implementation of micro hubs is necessary for the turnover of goods and could potentially be perceived as a disruptive element by city residents.

Methods. We carried out an online survey with 1,200 residents of major German cities. We adjusted the comprehensive acceptance framework to identify relevant predictors of people’s intention to act in favour or against a hypothesized hub in their neighbourhood.

Results. Our results show the significance of attitudes, emotions, personal norms, and social norms for intention to act. Attitudes and emotions are predicted by perceived trust in relevant actors, fairness of the process, and place attachment.

Discussion. The results demonstrate the applicability of the acceptance framework and deepen our understanding of predictors of people’s acceptance of environmental changes. For practitioners, they show the relevance of appropriate communication and citizen participation.

Talking to children about environmental issues: flooding
Sara Williams¹ (1. The University of the West of England; Bristol)

Children are affected by environmental events and increasingly need to be knowledgeable and prepared as the climate changes and events such as flooding become more frequent. Despite calls for their inclusion, children are often excluded from research and policy concerning flooding. Adults are uncertain of talking to children, questioning what is appropriate both cognitively and emotionally.

Fifteen group discussions using action research with children (7-9yrs) were completed. In small groups children discussed the topic of flooding with the researcher facilitated by visual semi-structured guide. Thematic analysis of the data revealed 4 strong themes; knowledge and experiential learning; affect and empathy; agency; adaptation and behaviour change; and insight into reasons for lack of action by adults.

Results indicated that children have knowledge and questions about complex environmental issues such as flooding. Children rely on their memory and experience when they are involved in group discussions. Children’s episodic memory can be fragmented and so it is crucial that any initiatives and interactions with children are age and stage appropriate. Children have social capital, and increasing their involvement in environmental issues empowers them, gives them agency and could lead to them being catalysts to change with intergenerational influence and sustained behaviour changes.
Lessons learned from a large-scale cross-national survey on Carbon Capture and Storage

Dimitrios Xenias¹, Lorraine Whitmarsh¹ (1. Cardiff University)

Carbon Capture and Storage (CCS) is a carbon dioxide abatement technology with several decades of industrial history, and an important contributor to global climate change mitigation. Public acceptance of CCS projects is necessary, so it is important to address public awareness, concerns, and misconceptions about the technology, the subsurface and ways of presenting relevant messages. Our unprecedented study combined cross-national comparisons with quasi-experimental designs, allowing comparisons of CCS perceptions and messaging frames across countries. Methods: Cross-national quantitative survey (N=5,406, on UK, Canada, USA, Norway and the Netherlands) on experimental evaluation of differential message frames on CCS, and factors influencing public perceptions of CCS. Results: Presenting CCS as part of broader societal change VS as a techno-fix had differential effects on CCS support. Messaging frames interacted with national and individual-level factors. Other factors, e.g. mentioning costs of CCS implementation, might dampen support. Discussion: Customisation of messaging to different audiences’ values is crucial to achieve effective communications on CCS. Publics with different values will support CCS implementation to different degrees, depending on the CCS perspective presented to them. We will also discuss practical aspects of designing and executing a project of this scale.

Investigating environmental attitudes of the PISA 2015 population: Cross-national and school differences and correlates of students’ awareness of environmental matters

Marit List¹, Dennis Föste-Eggers², Daria Mundt³, Fabian Schmidt⁴ (1. Center for Environmental Systems Research, University of Kassel, 2. German Centre for Higher Education Research and Science Studies (DZHW), 3. University of Kassel, 4. University of Hamburg)

The PISA studies provide unique opportunities to investigate competencies and attitudes of the 15-year-olds across the world. Several researchers investigated correlates of environmental attitudes (EAs) of the PISA 2006 population, showing that EAs are associated with science-related attitudes, science literacy, and interactive teaching methods. Overall, relationships differ between countries. Here, we investigate EAs in PISA 2015, to test the stability of the findings based on PISA 2006. Including data of 52 countries, a three-level (students – schools – countries) regression analysis on awareness of environmental matters (ENVAWARE) reveals that most of the variance is located at the student level. However, there is substantial variance on the school and country levels, indicating the impact of context-level variables in predicting EAs.

In line with previous findings, important predictors of ENVAWARE are science literacy and science-related attitudes. Optimism regarding environmental issues is negatively related to ENVAWARE. Interactive teaching methods show a significant, yet small effect on ENVAWARE. We compare the results with the PISA-2006-findings and discuss our findings with regard to country differences.
Environmental Behaviors in Everyday Life
Kimberly Doell\(^1\), Beatrice Conte\(^1\), Tobias Brosch\(^1\) (1. University of Geneva)

Introduction: Environmental psychology mainly draws conclusions about the mechanisms driving environmentally relevant behaviors (ERBs) based on well-controlled, but artificially induced laboratory settings. Experience sampling (ES) is a type of momentary ecological assessment rarely utilized, even though its high potential for understanding naturalistic observations of ERB frequencies (and content). We aimed to understand the impact of values and emotions as predictors of these behaviors.

Methods: Across two large-scale, international experiments (one observational: N=181; and one intervention based: N=300), we utilized an ES paradigm which repeatedly assessed different types of ERBs. Results: In experiment one, we showed that positive emotions towards ERBs (e.g. pride), above values, predicts the likelihood to commit positive ERBs (i.e. “warm-glow”) and analyses of the daily dynamics of ERBs revealed evidence for vicarious licensing (i.e. “see good, do bad”). In experiment two, we showed how (positive or negative) environmental information influences the likelihood to commit ERBs. Discussion: These results support the argument about the impact of emotions on individual predispositions to act to protect the environment. We help to clarify how information distribution campaigns may have widespread effects on behavior. Environmental psychology stands benefit from a closer look at the antecedents, dynamics, and consequences of everyday real-world ERBs.

Collecting and Analyzing Online News Data to Understand Drivers of Environmental Concern
Matthew Sisco\(^1\), Silvia Pianta\(^2\), Valentina Bosetti\(^2\), Elke Weber\(^3\) (1. Columbia University, 2. Bocconi University, 3. Princeton University)

Introduction: News coverage can impact public concern about environmental problems. News sometimes communicates scientific views and can communicate evidence of problems such as reporting pollution levels. It has not been empirically shown how strong and how long lasting news effects are on public opinions. Given its influential capacity, it is also interesting to examine what drives news coverage. Events such as extreme weather and scientific reports are candidates to prompt attention. Yet, it has not been demonstrated how much such events compare in producing news coverage.

Methods: There are several barriers to effectively collecting and analyzing news media data. Collecting news data normally requires programmatically downloading data through an API or by web scraping. The statistical challenges common to any time series analysis apply as well as routine challenges with analyzing observational data. Analysis of news data also often requires automated text analysis. Results: I will detail how our team solved these problems in an ongoing study and lessons learned from collecting and analyzing news data.

Discussion: Related to the questions and methods mentioned above, I will discuss preliminary findings from a current study in which we are collecting international news data paired with longitudinal survey data.
Using Twitter to Investigate the Relation Between Local Temperatures and Climate Change Concerns

Christian Mumenthaler¹, Roy Gava², Tobias Brosch¹ (1. University of Geneva, 2. University of St. Gallen)

Introduction: Generalisations about the climate from local weather perceptions are flawed, but widespread among the general public. Previous studies have shown that people are more likely to report concerns about climate change when local temperatures are perceived warmer than historical averages. On the contrary, the experience of changes in local weather patterns has been traditionally pointed as one of the reasons why it is difficult for the public opinion to create a representation of long-term global climate trends, causing disbelief or less concern on climate change.

Method: Here, we investigate the impact of factual short-term volatility of local temperatures on public concerns about climate change expressed on the full Twitter data stream from 2011 to 2017 in Spain.

Results: A key result of this study is that an increase of weekly variability of temperatures predicted public attention toward climate change on Twitter. Results also showed a U-shape relation between the weekly mean temperatures and climate change related tweets.

Discussion: By using new methods of investigation to estimate how climate change concerns are affected by both mean temperature and temperature variability, this study adds considerable strength to the evidence of a significant association between experience of physical temperatures and the manifestation of climate change concerns.

Exploring the restorative effects of environments through conditioning: The conditioned restoration theory

Lars Egner¹ (1. NTNU)

Psychological restoration occur in exposure environments containing nature, such as forests, parks, and rooms with a window view to nature. This effect is explored through a new two-step conditioning model, named conditioned restoration theory. It suggest that one first learn to associate nature with relaxing emotions, and later re-experience these emotions when presented with nature or associated stimuli. Cognitive mechanisms in this process have been demonstrated in the fields of evaluative conditioning, classical conditioning, and conscious expectancy, and it is argued that most nature-restoration effects can be explained through these mechanisms. Finally the theory of conditioned restoration is integrated into research findings on restorative environments. Finally limitations and weaknesses are discussed.
Eye movements while viewing natural images in diverse vegetation periods
Marek Franek¹, Jan Petružálek¹, Denis Šefara¹ (1. University of Hradec Králové)

The positive affect of viewing nature on cognitive functions is explained in terms of perceptual fluency in the processing of nature scenes based on their fractal structure. The present study analyzed eye movements while viewing natural and urban scenes. The objective was to analyze differences while viewing deciduous forest pictures in two vegetation periods. It was supposed that vegetation without foliage has a lower level of fractal complexity, which may result in differences in eye movements.

Fifty-five students participated in the study. They viewed photographs of forests with foliage, forests without foliage, and urban scenes. Eye movements were recorded using Tobii X2-60 eye tracker.

The results revealed significantly lower mean number of fixations in viewing natural scenes compared to urban scenes and significantly lower mean number of fixations in viewing natural scenes with foliage compared to natural scenes without foliage. Moreover, natural scenes with foliage had significantly higher fractal dimensions than natural scenes without foliage and urban scenes.

The data showed a lower cognitive effort while observing natural scenes vs. urban scenes, as well as association between eye movements and fractal complexity of presented images. A higher fractal complexity was linked with a lower eye movement activity.

The fractal dimension of landscape photographs as a predictor of visual responses
Agnès Patuano¹ (1. The University of Edinburgh)

Introduction. In the quest for understanding human reactions to different natural visual stimuli, qualities such as naturalness and complexity have been found to be critical. However, the quantification of these qualities remained elusive. In the last two decades, methods of fractal analysis have conquered many disciplines tasked with the systematic analysis of living forms. But can they be of any use for the analysis of landscape scenes?

Methods. Five methods of image segmentation were applied then analyzed with the box-counting method using two different software. Preference data were collected through an online survey disseminated in France and the UK.

Results. Two main methods of fractal analysis were found to yield values which could then be used to predict preference. Specifically, the fractal dimension of the landscapes’ silhouette outlines were found to be associated with perceived naturalness while the fractal dimension of the photos’ extracted edges were found to record a type of complexity strongly correlated with participants’ desire to explore a scene.

Discussion. The results of this study, although in contrast with previous research, highlight some of the cognitive underpinning of our visual preferences. However, the validity and replicability of the methods are still up for debate.
The role of culture in the association between exposure to nature and happy facial expressions

Tal Svoray¹, Michael Dorman¹, Sarah Abu-Kaf¹, Robert Gifford² (1. Ben-Gurion University of the Negev, 2. University of Victoria)

Introduction. According to the attention restoration theory, exposure to nature (ETN) renews directed attention resources, which increases positive outcomes. The theory has received support in a number of studies of the prevalence of happy facial expressions (HFE) in natural settings. However, the question of universality of ETN-HFE association requires more study.

Method. We explored ETN-HFE associations in Boston, representing a more individualistic culture, and Yokahama, representing a more collectivistic one. The study had three objectives: (1) To learn whether ETN-HFE association holds in these two cultures; (2) To discover whether spatio-temporal interactions affect this association; and (3) To investigate whether the presence of other people affects the association. These questions were studied using Flickr social network data (N = 132,415) and geoinformatics tools.

Results. ETN was associated with HFE in both societies. Water bodies and under developed landscapes were more appreciated by people from Yokohama. Weekends and hot months were more appreciated by people from Boston. In both societies, HFEs were more prevalent in presence of other individuals, but in Boston the effect was stronger.

Discussion. Our results support the universality of ETN-HFE association. Cultural differences between the two societies will be discussed based on minor changes in ETN effects.

Developing and validating a climate change perceptions scale

Anne van Valkengoed¹, Linda Steg¹, Goda Perlaviciute¹ (1. University of Groningen)

People’s perceptions of climate change can diverge widely. Studying these perceptions has been an important topic within environmental psychology. Yet, a standardised measure to accurately assess climate change perceptions is not currently available. This reduces the validity of research findings and complicates the comparison of findings across studies. To address this gap in the literature, we introduce a theoretical framework conceptualizing climate change perceptions as a multidimensional concept, based on which we develop a scale that assesses the five dimensions of climate change perceptions: perceived reality, causes, consequences, spatial distance, and temporal distance of climate change. The scale was constructed following a multistep procedure. First, a literature study was conducted to generate a pool of items reflecting the five dimensions. Next, the items were rated by climate change perceptions experts on their relevance and clarity for measuring the five dimensions of climate change perceptions. Based on the experts’ ratings, a first selection of items was made. A questionnaire study among 354 American participants confirmed the theoretical five-dimensional structure of the scale and showed that the reliability and convergent, predictive, and discriminant validity of the scale were good. Implications for studying climate change perceptions are discussed.
Recollecting climate change narratives: The role of worldviews.

Hans-Rüdiger Pfister¹, Gisela Böhm², Andrew Salway³, Kjersti Fløttum⁴ (1. Leuphana University Lüneburg, 2. University of Bergen; Inland Norway University of Applied Sciences, 3. University of Sussex, 4. University of Bergen)

Recent research has demonstrated that climate change perceptions are strongly related to worldviews. Drawing on theories of reconstructive memory and cultural theory, we assume that the recollection and communication of climate change information is affected by one's own worldview as well as by the worldview of one's target audience. In an experimental study (N=266), participants read a narrative about three politicians, each described as holding a specific worldview, who tried to mitigate climate change. Participants retold the narrative to a hypothetical person who was characterized as either an individualist, hierarchist, or egalitarian, or unspecified. The retellings were recorded in free text format; additionally, the participants' worldview was assessed. Results show that retellings are selectively reconstructed according to the worldview of the participant, becoming more compatible over time, as well as targeted to the audience's worldview. Participants holding a more egalitarian worldview show less distortion than do individualists and hierarchists. An audience with an explicit worldview leads to more distorted retellings than does a neutral audience. We discuss how the understanding and communication of climate change is shaped by underlying beliefs such as worldviews, which might help to explain effects such as polarization.

Public attitudes to Carbon Dioxide Removal

Emily Cox¹ (1. Cardiff University)

In order to meet ambitious climate change targets, there may be a need to remove previously-emitted CO2 from the atmosphere using Carbon Dioxide Removal (CDR). Understanding public attitudes is crucial for effective and ethical technology development, yet there is relatively little work on public attitudes towards CDR.

We have conducted deliberative focus groups with members of the public in 6 locations in the UK and the United States Midwest, focusing on three major CDR proposals: Direct Air Capture, Bioenergy with carbon capture (BECCS), and Enhanced Rock Weathering. Our participants learnt about CDR over a period of 6 hours, giving them time to carefully formulate and reformulate their ideas in conversation with others. We will present the results from our analysis of this data, to reveal areas where publics perceive the greatest risks and benefits of each technology, and their attitudes to the concept of removing CO2 from the atmosphere. We will also try to understand why people form particular attitudes, so that we can work towards generalisable theories of how people respond to novel technology proposals. Cross-national qualitative work is quite rare, therefore we also hope to understand important similarities and differences between attitudes in different national contexts.
Does it feel morally right or wrong? A cross-cultural study on relationships between moral concerns, emotions and acceptability of Solar Radiation Management


To limit global warming to below 1.5° Celsius, radical innovations that go beyond greenhouse gas emission reduction have been proposed, including Solar Radiation Management (SRM). While SRM is increasingly, though controversially, discussed among experts and policymakers as an option to fight global warming, the general public is as yet mostly unaware about its existence. However, successful implementation of SRM will largely depend on public acceptability. Because the possible positive effects of SRM (i.e. Earth cooling) and its negative effects (e.g. changed rainfall patterns) would cross borders and affect countries unequally, we propose that people’s moral concerns about the decision to use SRM and its potential consequences may influence public acceptability of SRM. Method We present results of a cross-cultural study on moral concerns related to SRM based on student samples from 27 countries on all continents (N= 200 per country). We investigated (i) whether moral concerns related to moral authority (who has the right to decide on the use of SRM) and perceived procedural and distributive justice are grounded in people’s values, and (ii) whether they are associated with emotions towards SRM as well as acceptability. We discuss similarities and differences between countries as well as theoretical and practical implications.
Not for the faint-hearted: major emissions reduction and radical policy action is supported in the USA, Canada and Australia

Stuart Capstick\(^1\), Lorraine Whitmarsh\(^1\), Nick Nash\(^1\), Christina Demski\(^1\), Charles Ogunbode\(^2\) (1. Cardiff University, 2. University of Bergen)

Introduction: Recent syntheses of climate science have established that meeting internationally-agreed targets for global temperature rise of 1.5°C to 2°C will be enormously challenging, and require substantial emissions reduction year-on-year. This is unlikely to be achieved without public involvement, support, and understanding. Method: Large-scale surveys carried out in 2019 in the USA, Canada and Australia (n=3,000) gauged perceptions of emissions reduction needed over a ten-year period. We also develop novel items to assess levels of support for more radical policy and personal action on climate change. Results: At the sample level, participants accurately estimate the percentage emissions reduction required over ten years (mean=46.0, SD=24.6) in line with IPCC conclusions. Participants express relatively high levels of support for limiting high-carbon industries, reducing material consumption, and for protest and civil disobedience; lower, though still evenly-distributed, levels of support are obtained for reduction in personal meat consumption and air travel. Even in countries typically associated with resistance to stringent climate action, there is a surprisingly high recognition of the scale of emissions reduction required, and support for radical policy. This suggests that there may be greater opportunities for such measures to be considered and introduced, than is often assumed to be the case.

The long and stony way from sympathizer to activist – The development of a collective activist identity

Maxie Schulte\(^1\), Philipp Rollin\(^1\), Sebastian Bamberg\(^1\) (1. University of Applied Sciences Bielefeld)

Introduction: The anthropogenic climate change is one of the today’s challenges to tackle. But in order to confront this threat, we need a societal transformation to a more sustainable society. Therefore, this presentation focuses on groups as effective grass root promotors of societal change. From previous research, we know that politicized identity (the identification with a transformation oriented group) is one central determinant of collective action intention. Method: For a better understanding of the development of politicized identities we conducted a series of experiments using the opinion-based group interaction method by Thomas and McGarty (2009) as stimulating intervention. Results: In the presentation we presents results from five cross-sectional and longitudinal studies from different levels of sympathizing with transformation oriented groups (n=total= 541). Based on the encapsulated model of social identity in collective action (Thomas, McGarty & Mavor2009, Thomas, Mavor & McGarty 2012) the results outline the central role of collective efficacy on the development of an politicized identity and collective action intention. However, at the same time collective efficacy eluded our attempts to manipulate it. Discussion: Implications for the understanding of how sympathizers develop a collective activist identity will be discussed
Using positive emotions to facilitate proenvironmental change - the case for elevation
Markus Barth, Torsten Masson, Parissa Chokrai (1. University of Leipzig)

Introduction: Studies on emotional sources of proenvironmental behaviour have often concentrated on negative emotions such as guilt. As negative emotions are often aversive, we argue that there should be more research regarding the effects of positive emotions on proenvironmental behaviour. We propose that feelings of elevation (i.e. warmth and appreciation experienced after witnessing exceptional moral behaviour) are positively linked to proenvironmental intentions. Method: In three studies (N = 517) we investigated the association of elevation as a reaction to an exceptional moral behaviour of the in-group to proenvironmental intentions. We controlled for other positive emotions (such as pride and empathy), and for well-established predictors of proenvironmental behaviour such as environmental self-identity. In two studies, we employed a novel manipulation of elevation. Results: Elevation was a significant and independent predictor of the dependent variable. In addition, the experimental manipulation increased reported elevation significantly. Discussion: Our results suggest that positive emotions such as elevation might be used in programs to facilitate proenvironmental behaviour. However, more research is needed to distinguish elevation as a construct more clearly from similar concepts such as awe and being moved.

Thinking “We” means “action”! The effects of salient social identity for pro-environmental action under conditions of perceived climate change threat
Torsten Masson, Immo Fritsche, Parissa Chokrai (1. University of Leipzig)

Previous research has often investigated the effects of social identity on environmental behaviour, focussing on constructs such as in-group norms or collective efficacy. Methods: The present research takes a more “direct” approach. Following the SIMPEA model (Fritsche et al., 2018) as well as the model of group-based control (Fritsche et al., 2013), we reasoned that reminders of group membership (vs. personal identity) should increase people’s proenvironmental action intentions, mediated, for example through decreased feelings of personal helplessness. After increasing the salience of climate change threat, we tested whether (simple) reminders of group membership (vs. reminders of personal self) would affect people’s intentions to engage in different types of pro-environmental behaviour, including private action intentions, willingness to pay a premium for eco-friendly products, acceptance of “green” policy measures, collective action intentions to fight climate change. Results: Results of three experimental studies (Ntotal = 562) in two countries (Germany, Italy) showed consistent support for the motivating effect of salient social (vs. personal) identity on collective action intentions. For the remaining types of behaviour, the effects of group reminders were less consistent. Discussion: Implications and possible boundary conditions of social identity processes are discussed.
Hype and hope? Mind-body practice predicts pro-environmental engagement through global identity
Laura Loy¹, Annika Leyendecker², Amina Sefovic², Kristina Speckert², Gerhard Reese¹ (1. University Koblenz-Landau, 2. University of Koblenz-Landau)

Humanity is facing global environmental challenges and a global identity has been found to predict pro-environmental engagement (Reese, 2016). As the origins of a global identity are still not broadly understood, we aimed to contribute to investigating its predictors. We reasoned that one way to cultivate a global identity might be through the mind-body practices of yoga and meditation that are pursued by an increasing number of people. Method: In our online survey study, we compared 113 practitioners and 145 non-practitioners of yoga and/or meditation in their global identity and pro-environmental engagement. Results: We found that practice positively predicted a global self-definition (β = .19), ecological behaviour (β = .25), and climate policy support (β = .23). Moreover, the relations between practice and ecological behaviour and climate policy support could be partially explained through a stronger global self-definition (indirect relations β =.05 and .08). Discussion: We suggest that mind-body practices might bear the potential for contributing to a sustainable society and that their causal effects on global identity should be examined in future research. Our results extend recent research on a relation between mindfulness as outcome of mind-body practices and pro-environmental engagement (Fischer et al., 2017).

Think globally, harvest locally: Global identity predicts sustainable resource management in an experimental harvesting game.
Gerhard Reese¹, Ulf Dieckmann² (1. University Koblenz-Landau, 2. International Institute of Applied Systems Analysis)

Introduction: The idea that all humanity could serve as a human ingroup has a long history but has only recently received considerable empirical attention, with various studies showing that stronger global identity predicts pro-social and pro-environmental action and policy support. However, very little is known about the behavioral consequences of global identity. Methods: In two studies, we employ a social dilemma game - the Forest Game - that allows the analysis of sustainable resource practices. Assuming that global identification predicts behavior that benefits the whole ingroup, we predicted that people who identify on a global scale would act more sustainably in the game. Results & discussion: In a first study (N=80), we find evidence that global identity predicts sustainable behavior, such that the stronger global identification, the less did participants deplete the forest, reducing their actual chances for a lottery win. In Study 2 (planned N = 240), we seek to replicate this finding, and test whether this effect is catalyzed by stronger beliefs in humanity's collective efficacy.
Real-life behavioural interventions to stimulate more plant-based and less animal-based diets: A systematic review

Danny Taufik¹, Emily Bouwman¹, Muriel Verain¹, Machiel Reinders² (1. Wageningen University & Research, 2. Wageningen University and Research)

This review aims to identify important determinants regarding promotion of plant-based food consumption and/or reduction of animal-based food consumption in a real-life setting. Knowledge about underlying determinants contribute to effective interventions, because it gives insight into why an intervention is (not) effective. The Determinants Of Nutrition and Eating (DONE) framework is used to categorize the determinants. Two electronic databases were searched from 2008 until January 16, 2019. First, articles were screened based on title. Next, the abstracts of the resulting set of articles were screened. In the final phase, full-text articles were screened. Three researchers independently coded the articles. In total 48 articles, with report on 51 studies, are included. Four studies promoted simultaneous increase of plant-based food consumption and decrease of animal-based food consumption, all targeting environmental determinants and four studies aimed to reduce animal-based food consumption, of which two targeted individual determinants, one study interpersonal determinants and another study environmental determinants. In total 40 studies aimed to promote plant-based products of which the majority targeted either individual or environmental determinants. The analyses of the results and writing up the discussion is still in progress and will be discussed.

Sustainable food choice motives: the development and validation of the Sustainable Food Choice Questionnaire (SUS-FCQ)

Muriel Verain¹, Harriette Snoek², Emily Bouwman¹ (1. Wageningen University & Research, 2. Wageningen University and Research)

The aim of this study is to develop and validate a scale to measure the full range of sustainable food choice motives and to test to which degree sustainability motives are multi-dimensional. Sustainability motivations are increasingly important for consumers in their consumption of food and the fragmentation of the way sustainability motives are currently operationalized show the need of developing a comprehensive, validated, easy to use scale to measure food choice motives, that can function as a standard in research on sustainable food consumption in multiple European countries. Data on sustainable food choice motives of 5116 respondents from five countries (the Netherlands, Denmark, Czech Republic, France, and Italy) is used to develop the Sustainable Food Choice Questionnaire (SUS-FCQ). Exploratory and Confirmatory Factor analyses are used to test the multi-dimensionality of sustainable food choice motives and to develop the SUS-FCQ. The scale are tested for convergent and discriminant validity. First results indicate that there are two dimensions: General sustainability (which includes animal welfare, ethical and environmental concerns), and Local and seasonal. The analyses of the results and writing up the discussion is still in progress and will be discussed.
Financial incentives for a more sustainable diet

Valentina Lozano Nasi¹, Nadja Zeiske¹, Ellen van der Werff¹ (1. University of Groningen)

Financial incentives (e.g. pricing strategies) can be a useful strategy in promoting pro-environmental behavioural change. However, empirical findings show how, once the incentive is removed, the behaviour tends to return to baseline. I will present a study where I tested the effect of a price discount on more sustainable alternatives to animal products on the purchase of such products. Besides, I investigated if justifying the discount with an environmental concern can strengthen consumers’ intrinsic motivation to adopt a more sustainable diet also in the long term. I conducted a longitudinal online experimental study based on a virtual supermarket with two time-point measures and three conditions: Discount, Environmental Discount and Control. I compared the effect of the different conditions on the number of sustainable products purchased and on intrinsic motivation to reduce consumption of animal products. The financial incentive with and without an environmental reason did not promote the purchase of sustainable food. Furthermore, intrinsic motivation did not differ between the conditions. However, additional analyses confirmed intrinsic motivation as the key predictor for the purchase of more sustainable products. Plausible explanations for the results as well as limitations in the experimental design will be discussed.

Encouraging people to eat less meat: the role of message framing, values, and identity

Wokje Abrahamse¹ (1. Victoria University of Wellington)

Our food choices have considerable impacts on the environment, including but not limited to climate change, water pollution, and deforestation. But, people seem to be largely unaware of the environmental impacts of what they eat. Much of the research on how to encourage sustainable food consumption focuses on the provision of information to raise awareness and, ultimately, change behaviour. But, changing people’s food choices is difficult. This suggests that information provision might need to be targeted at people’s motivations to improve its effectiveness. Two quasi-experimental studies (using a student and a general public sample) investigated whether information provision would be effective in changing (i) people’s attitudes towards eating meat and intentions to reduce meat consumption, and (ii) self-reported meat consumption two weeks later. The research also examined whether the information’s effectiveness depended on people’s motivations. People were randomly assigned to one of three groups and were presented with information that either appealed to self-interest motivations for eating less meat (e.g., health benefits), altruistic motivations for doing so (e.g., environmental benefits), or a control message (about food allergies). Results of the two studies will be discussed, as well as practical implications for further research in the area of sustainable food consumption.
Predicting the consumption of expired food by an extended theory of planned behavior

Karolin Schmidt¹ (1. Otto-von-Guericke University Magdeburg)

Introduction: Preventing household food waste and overconsumption of food represent important leverage points to improve global environmental sustainability. Previous research shows, that consumers’ performance of food waste preventing consumption practices referring to expired food represents an effective way to promote the prevention of household food waste and overconsumption of food. But in order to promote this performance, more information about the psychological predictors determining this performance is needed.

Methods: Therefore, an online survey was conducted with a sample of German consumers (N = 331) in order to propose a comprehensive theoretical model explaining consumers’ performance of food waste preventing consumption practices referring to expired food.

Results: Individual willingness to consume expired dairy products was well predicted by the Theory of Planned Behavior (TPB), which was supplemented with personal norms, habits and perceived health risks.

Discussion: Based on the presented findings, the present research provides relevant implications for future research and valuable implications for intervention practice in order to promote consumers’ performance of food waste preventing consumption practice referring to expired food and, thus, to promote the prevention of household food waste and overconsumption of food.

Comparing Affective Responses to Nature Experienced Via Different Environment Presentation

Methods

Mark Newman¹, Birgitta Gatersleben¹, Kayleigh Wyles¹ (1. University of Surrey)

Introduction: Understanding which aspects of nature are good for our wellbeing is important to developing experiences in personal, professional and healthcare settings that leverage these benefits. However, visiting real environments is not always an option and surrogate exposure methods (e.g., slideshows) are tricky to manipulate (e.g., weather or physical structure) and do not easily foster immersion. Conversely, virtual reality (VR) is becoming more accessible and enables a bespoke, dynamic and immersive experience.

Methods: To explore how people experience different representations of nature 16 participants (n₂female =8) viewed the same lake in the real world, in VR and as a video projected on to a wall.

Results: Results showed that the most enjoyment was derived from the real experience, then VR and then the video. When talking about the experiences, participants discussed themes relating to senses, immersion, scene content, and safety and comfort, frequently using pleasure and contentment words, with VR also eliciting excitement words.

Discussion: VR offers a suitable alternative alongside existing surrogate methods, however the influence of participants’ expectations on nature experiences needs to be considered.
Opinion clusters in academic and public debates on growth-vs-environment
Stefan Drews¹, Ivan Savin¹, Jeroen van den Bergh¹ (1. Institute of Environmental Science and Technology, Universitat Autònoma de Barcelona)

Introduction. The debate about the relationship between economic growth and environmental sustainability involves many dimensions as well as much diversity in terminology. While it is often summarized in terms of dichotomous pro- and anti-growth positions, several studies indicate that additional views exist, and that these may differ between experts and the general public. The objective of this paper is to identify and analyze segments of the scientific and general population with distinct views in this respect.

Method. We bring together two data sets: one from a nationally representative survey of the general public of Spain (N = 1,004) and another from an international survey of researchers from various disciplinary backgrounds (N = 814). Latent class analysis is used to examine the data.

Results and discussion. We identify three similar segments in the two samples, labelled as Green growth, Agrowth and Degrowth. Clusters in scientific opinion systematically differ on all main environmental and non-environmental questions, while clusters in public opinion differ only on some issues. Overall, clusters are more consistent, better distinguishable on all constituent dimensions and more polarized in the scientific than public opinion survey. We discuss implications for policy and further research.
Critically Examining the Emergence of Enviromaterialist Consumers in Industrialised China and India

Prof Janine Dermody¹, Anita Lifen Zhao², Nicole Koenig-Lewis³, Stuart Hanmer-Lloyd⁴ (1. Oxford Brookes University, 2. Swansea University, 3. Cardiff University, 4. University of Gloucestershire)

Introduction: We examine Chinese and Indian consumers’ materialism and sustainability orientations within their buying choices. Western evidence maintains materialism and sustainability are negatively correlated. Our research (among others) indicates the opposite effect in China, mediated by pro-environmental self-identity. To date, studies have not examined this effect in India. Our examination is framed within the rising tensions of China and India’s increasing industrialisation and marketisation, and ecological problems of national and global significance.

Methods: We present findings from our conceptually and behaviourally detailed long questionnaire administered to an online panel of adults in urban China (n=1,024) and India (n=1000), using SPSS PROCESS to test for direct/indirect effects.

Results: We found an emerging new enviromaterialist (green-materialist) consumer segment in China and provisionally in India (more insights at the conference). Within this segment, materialism directly and positively influences their sustainability buying behaviour, in direct contrast to Western consumers. Discussion: Whilst industrialisation aids human wellbeing in China and India, the emergence of enviromaterialists, who personify their government-sanctioned materialistic consumer-culture, is ecologically problematic nationally and globally. This study reminds us of the challenges in cultivating and expanding authentic sustainability behaviours, and in facilitating interconnected cooperative thinking across nations for ecological, economic and human good.

Tampering, tinkering and messing with nature: a systematic review on the construct tampering with nature

Gea Hoogendoorn¹, Bernadette Suetterlin¹, Michael Siegrist¹ (1. ETH Zürich, Institute for Environmental Decisions)

Tampering with nature has been shown to be a strong, and sometimes even the strongest, predictor for risk and benefit perception and acceptance of various technologies and behaviors. This is also true for technologies that are relevant for the environment, such as geoengineering or synthetic meat production. As perceived tampering with nature is crucial for the acceptance of these technologies, it is helpful to understand what the construct tampering with nature is, which factors it relates to, and when a technology or behavior is perceived as such. In a systematic review, we show that very little systematic research has been conducted on tampering with nature. Tampering with nature has not been clearly defined yet, and no systematic operationalization of tampering with nature is used in current literature. Moreover, we show that tampering with nature is often used interchangeably with other constructs such as naturalness. Based on the literature, we propose that three preconditions have to be fulfilled for a technology to perceived as tampering with nature: The technology has to be perceived as unnatural, morally questionable, and the consequences have to be perceived as uncertain or uncontrollable. Lastly, we present a new scale to assess the construct tampering with nature.
Psychological ownership and acceptability of policies directed towards management of water systems
Vanja Medugorac¹, Geertje Schuitema¹, Teresa Hooks¹ (1. University College Dublin)

Introduction. The goal of this study was to explore if three groups of water systems users in Ireland – private well-owners, group water scheme members, and users of the public mains – differ in their level of psychological ownership (PO) over these systems. We also investigated if PO influenced their water conservation awareness and behaviour, and public acceptability of policies directed towards management of water system. We hypothesised that actual and PO over water systems has a role in explaining differences in behavioural and attitudinal outcomes among these three groups.

Method. An online survey was conducted among private (N=152), group (N=144), and public (N=152) owners of water distribution systems.

Results. Private well-owners did feel higher individual and collective PO, knowledge, control, and investment over their water systems than the remaining two groups. Also, group water scheme members showed higher knowledge, control and investment over their water system than public group. However, there were no significant differences in water conservation awareness and behaviour, or policy acceptability among three groups. Data collated from all groups shows that collective PO is the only consistent positive predictor of policy acceptability suggesting the importance of group-level feelings.

Discussion. Theoretical and policy implications will be discussed.

A drop in the ocean? Fostering water-saving behaviour and spillover through informational feedback
Lorraine Whitmarsh¹, Paul Haggar¹, Nick Nash¹ (1. Cardiff University)

Introduction. Addressing sustainability issues requires significant lifestyle change, and ‘behavioural spillover’ (change in one behaviour leads to further behavioural change) may offer one way to achieve this. Research has mostly focussed on spillover mediated by identity change, but there is also reason to think it could arise through increased collective/self-efficacy. The current study explores this route to behavioural spillover through feedback on shower time to reduce water consumption.

Methods. Participants (N=167) were university students and staff, randomly assigned to either an information or feedback condition. Feedback was tailored to individuals in line with their progress to reduce their shower time relative to baseline.

Results. Overall, shower time reduced from 7.8 to 5.5 minutes, but there was no significant difference between conditions. Positive changes in other water-saving and pro-environmental behavioural intentions were also observed; however, this was not a function of the change in shower time (i.e., not due to spillover). Mediation analyses also found little evidence of spillover.

Discussion. The intervention was effective for the target behaviour, but reduced shower time did not lead to further lifestyle change. Further work should explore other possible spillover mediators or interventions.
Public Perceptions of the Risks and Benefits of Marine Activities for Human Health and Wellbeing.

Sophie Davison¹ (1. European Centre for Environment and Human Health, University of Exeter Medical School)

Over recent decades, research has started to understand the risks and benefits which marine ecosystems present to human health and wellbeing. However, evidence is still limited on how the public perceives these risks and benefits. To address this knowledge gap, the Seas, Oceans and Public Health in Europe (SOPHIE) survey was created. Completed by 14,000 participants from 14 European nations, the pan-European SOPHIE survey evaluated the European public’s perceptions of the risks and benefits of marine activities for human health and wellbeing, with particular focus given to understanding perceptions of marine activities highlighted in the EU’s Blue Growth strategy (i.e. aquaculture, marine biotechnology, ocean energy, seabed mining and coastal tourism). The talk will outline some of the key results from the survey including (1) the trade-offs members of the public make when considering the risks and benefits of marine activities to (a) the economy, (b) the environment and (c) human health and wellbeing, and (2) the moderating effects of individual differences (i.e. personality, political persuasion and marine connectedness) on these perceptions. The talk will conclude by discussing the implications of these results for policy makers across Europe, as well as how the results will benefit the development of marine communications.

Citizens of the Sea: defining marine citizenship

Pamela Buchan¹ (1. University of Exeter)

Introduction. As a specific class of environmental citizenship, marine citizenship has historically received little attention in the academic world. Whilst both marine and environmental citizenship no doubt share commonalities, what is it about the sea which specifically inspires action and how does a duty towards marine environmental health express in people’s lives?

Methods. Using interdisciplinary approaches and mixed methods, active marine citizens are identified via case study, and surveyed and interviewed. Analyses integrate psychometric measures and demographic data with meaningful qualitative data to generate a quantifiable and deep understanding.

Results. This paper focuses on defining marine citizenship as function of the values and identities of active marine citizen participants.

Discussion. By examining the value base of active marine citizens; their attachment to the sea as a place, both locally and more generically; and considering how marine citizenship is influenced by and influences policy; a meaningful understanding of marine citizenship as a concept is produced. This paper explores the concept of marine citizenship with a view to providing an understanding that will facilitate policy and community action that seeks to engage people in promoting good marine environmental health.
P01

Potential antecedents of Pro-Environmental Behaviours: A pilot study for an integrative model

Elisa Menardo¹, Margherita Brondino¹, Margherita Pasini¹ (1. University of Verona)

Introduction. Given that human behaviours are the major cause of environmental problems it is important to establish the reasons that encourage individuals to perform Pro-Environmental Behaviours (PEBs). Some studies suggest that exposure to natural environments is associated with a greater likelihood of implementing PEBs. In particular, perceived restorativeness of natural environment, environmental attitude, and connection to nature (CNS) has been proposed as predictor of PEBs. However, although environmental psychology has sought to identify coherent patterns of antecedents of PEBs, the knowledge about the relationship and reciprocal influence between antecedents is incomplete. This project aims to fill that gap proposing an integrated model of antecedents of PEBs.

Method. 126 adults (82% female, mean age 22.4 (13.4)) were assessed using a two-wave design, and different alternatives models were tested (path analysis) to verify the relationship between restorativeness, attitude and CNS as antecedents of PEBs.

Results and Conclusion. The best model ($\chi^2(1) = 1.09; CFI = .996; \text{RMSEA} = .048$) showed that environmental attitude and CNS fully mediate the relationship between restorativeness and PEBs. Further analyses with a larger sample are needed to verify other potential mediational effects.

P02

Environmental consciousness in Germany 2018 – Results of a representative survey

Angelika Gellrich¹ (1. German Environment Agency)

Every two years, the German Environment Agency conducts a study on environmental consciousness in Germany. It collects survey data about a wide range of environment related topics. One main topic in 2018 was agriculture and nutrition. In the poster, the focus will lie on this topic.

A representative random sample of the German population (N = 2,000) was drawn and surveyed by the means of computer assisted web interviewing (CAWI; mean duration: 35 minutes). It was conducted in August and September 2018 and data was analysed hence.

People stated to be highly concerned about environmental impacts of agriculture, for example with regard to effects on biodiversity. In a ranking task on expectations for agriculture, results show low impact on the environment to be of superior importance, directly followed by the aim to supply all citizens with high-quality and healthy food. In contrast, people state that current agricultural policy is mainly oriented towards the interests of industry, and not towards the needs of consumers or environmental protection.

To conclude, our survey results show that current politics are not made according to the people´s priorities and expectations. They point at the need to strengthen the enforcement of environmental policies.
P03

Learnings from applications of the stage model of self-regulated behavioral change: A systematic review
Anna Keller¹, Charis Eisen¹, Daniel Hanss¹ (1. University of Applied Sciences Darmstadt)

Introduction: Stage models are increasingly used to explain behavioral change in support of sustainable development. According to these models, behavioral change takes place in successive and qualitatively different stages, and transition from one stage to the next is determined by stage-specific variables. This study reviews empirical applications of the stage model of self-regulated behavioral change (SSBC) to summarize the findings of this line of research and to facilitate further development and application of the model.

Method: We conducted a systematic literature search, in which we identified 10 peer-reviewed SSBC-based studies published between 2013 and 2018 that met our inclusion criteria. Six of these studies employed a cross-sectional, three an interventional, and one a correlational longitudinal design.

Results: The cross-sectional and longitudinal studies generally support the model, although we identified some open questions that require further investigation. The interventional studies found stage-tailored informational measures to be more effective than non-stage-tailored measures in promoting behavioral change.

Discussion: Some of the key challenges related to applying the SSBC are (a) whether and how to analyze multiple behavioral alternatives and (b) establishing a validated and reliable tool to diagnose a person’s stage of change. From these insights, we derive recommendations for researchers and practitioners.

P04

Shifting towards a sustainable society. Combining insights from psychology with transition studies.
Lieke Dreijerink¹, Roald Suurs² (1. ECN part of TNO, 2. TNO)

It is widely recognized that changes in our current ways of production and consumption are needed in order to counter climate change. In this transition towards a sustainable society, both changes on a system and behavioral level are needed. Socio-technical transitions are large-scale transformations within society during which the structure of the societal system fundamentally changes. These transitions are studied primarily by considering the interplay of processes at the micro, meso and macro level. On all levels behaviour and psychological concepts like social norms and personal values play a role. Insights from transition studies and psychology are however hardly combined. In this study we do combine the two and analyze historical societal changes that asked for systems and individual changes. We define a number of factors that drove or held back previous transitions. Furthermore, we focus on a number of measures to reduce carbon emissions defined in the Dutch Climate Agreement. By means of interviews with experts and citizens we study the implications of these measures for the system and for individual behaviour. Finally, based on lessons from history and current measures we draw up strategies for shifting towards a sustainable society. Findings will be presented and discussed.
Model of Identities for Action-Comprehensive Action Determination Model (MIA-CADM): A Structural Equation Modelling Approach
Alina Mia Udall¹ (¹. NTNU)

Introduction. How can we optimally understand pro-environmental behaviour (PEB) - behaviours that preserve, prevent damage, or promote improvements, to the planet? Three key approaches are used to understand PEB. First, the comprehensive action determination model (CADM), which combines the most common theories in environmental psychology. Second, the social identity model of pro-environmental action which explains how social identity processes affect both appraisal of, and behavioural responses to, large-scale environmental crises. Third, the universal theory of identity which is a model for how a person’s individual, group, and place identities associate with PEB. No attempt has been made to integrate these approaches to optimally understand PEB. Therefore, to what extent do these different approaches overlap and explain PEB? Here we test a new framework, called Model of Identities for Action-CADM (MIA-CADM), which integrates these three approaches.

Methods. We provide an empirical test of MIA for understanding PEB in a UK representative sample of 4,000 people using structural equation modelling.

Results. These three approaches collectively explain PEB with a large effect, whereby identities (individual/group/place), and intentions, directly explain PEB the most.

Discussion. Interventions to increase PEB need to focus on making salient individual/group/place identities and strengthening commitment (intentions) to act.
Affective evaluation of pro-environmental PSAs and additive effects of text and imagery in promoting pro-environmental intentions

*Rasa Pilkauskaitė Valickienė¹, Arvydas Kuzinas¹, Mykolas Simas Poškus¹ (1. Mykolas Romeris University)*

**Introduction.** The aim of the present study was to investigate the effectiveness of differently worded and illustrated public service announcements (PSAs) encouraging pro environmental behavior. This research was funded by a grant (No. S-MIP-17-134) from the Research Council of Lithuania.

**Method.** Two experiments combining text-based appeals and an images were carried out. The first experiment (N=348; 75% female, age M=20 (SD=1.4)) used appeals that were: 1) highlighting an injunction; 2) highlighting an injunction with a negative descriptive norm; 3) highlighting an injunction with a positive descriptive norm. Appeals were written on a photograph that either depicted a nature scene or the same scene with litter. The second experiment (N=94, 67% female, age M=19 (SD=0.6)) compared differences in littering intentions after viewing PSAs that were either congruent or not in their contents.

**Results.** The first experiment demonstrated that a congruent combination of text appeals highlighting an injunction together with a positive descriptive norm and positive descriptive imagery elicited the most positive emotions, while in the second experiment this condition positively affected behavioral intention more than alternative conditions.

**Discussion.** An additive effect of descriptive imagery and appeals presented together could potentially increase the effectiveness of PSAs.
Drivers and barriers for sustainable consumption in Spain: the role of consumer cooperatives in promoting sustainable lifestyles

Isabel Lema Blanco, Ricardo García-Mira, Jesús Miguel Muñoz-Cantero (1. University of A Coruna)

Sustainable consumption is becoming increasingly important on the international agenda (UN, 2019), with direct impact on greenhouse gas emissions, the conservation of nature and people well-being (Dumitru & García Mira, 2017). Considering consumption is deeply conditioned by the social and organizational contexts in which citizens are embedded (Gifford and Nilsson, 2014), this qualitative study investigates the role of grassroots local consumption initiatives in the promotion of responsible consumption in food, transport and energy domains. 27 in-depth interviews were conducted to members of 8 Galician food initiatives. Data analysis followed the general principles of the grounded theory (Thronbreg and Charmaz, 2014) and was supported by ATLAS.ti software.

The results show that foodcoops are relevant actors in the promotion of sustainable consumption, facilitating access to foods and services that respect organic, local and fair production criteria, favouring the adoption of vegetarian diets and frugal/simple lifestyles. Participants reported cultural and contextual barriers to green lifestyles, in specific in workplaces. With regards to psychological factors influencing consumption patterns, the difficulty perceived in changing habits and the perception of time-pressure arise both as main obstacles, while the desire to maintain coherence in all areas of life is the main instigator of pro-environmental behaviour.

No evidence of within-domain moral licensing in environmental domain

Jan Urban, Markéta Braun Kohlová, Štěpán Bahník (1. Charles University, 2. University of Economics)

Introduction. There is some evidence that engagement in pro-environmental behavior can subsequently induce less proenvironmental behavior, allegedly through licensing effect (e.g., Catlin & Wang, 2013; Garvey & Bolton, 2017; Geng, Cheng, Tang, Zhou, & Ye, 2016). However, since mediators of licensing are rarely examined (e.g., Robitaille, 2014) and many close replications of licensing studies fail to replicate the licensing effect (e.g., Blanken et al., 2014), there remains much to be learned about such inhibitory effects.

Method. We conducted a close and highly powered pre-registered replication (N = 1,800) of a recent study of within-domain licensing in environmental domain (Noblet and McCoy, 2018). We used Bayesian methods to test the hypothesis that recollection of proenvironmental behavior makes people less likely to support proenvironmental policies and manifest proenvironmental intention and that such inhibitory effects are mediated by self-perception.

Results. We did not replicate the licensing effect of the original study in spite of the fact that licensing manipulation led to change in self-perception.

Discussion. Our findings suggest that recollection of prior proenvironmental behavior is unlikely to spur anti-intention. Alternatively, our results could also indicate that an important moderator, not listed in Noblet and McCoy’s (2018) study, can completely hinder licensing.
**P09**

**The Impact of Implementation Intentions on Pro-Environmental-Behavior: A cross-domain study**  
Yvonne Emig¹, Vivica v. Weichs¹, Scarlett Friedrich¹, Hans-Peter Erb¹ (1. Helmut Schmidt Universität)

Despite the rising motivation for Pro-Environmental-Behavior (PEB), there is still a gap between the individual’s intention to act and actual PEB. A promising tool to promote goal striving and behavior change is the self-regulation strategy of implementation intentions. Implementation intentions are if-then plans for intended behavior in goal-relevant situations. In prior studies, the effect of implementation intentions on PEB was demonstrated for only few specific domains, such as mobility. However, it is still unknown whether implementation intentions are an effective tool across pro-environmental behavioral domains.

We currently conduct a two-part online-study with n = 150 participants in Germany. We ask the participants to name a personal goal in the context of PEB, which they would desire to attain within the next week. We assign the participants to three conditions: (1) formulation of an implementation intention, (2) repetition of goal intention and (3) control condition. After one week, the participants indicate whether they attained their personal goal.

We hypothesize that, independent of the domain, participants adopting the strategy of implementation intention would be more likely to attain their personal goal. Our study makes an important contribution to existing research on the suitability of implementation intentions for effective strategies to promote PEB.

**P10**

**Facets of Mindfulness in Stages of Behavior Change toward Organic Food Consumption**  
Nadine Richter², Marcel Hunecke¹ (1. University of Applied Sciences Dortmund)

Introduction. Recent empirical studies suggest associations between mindfulness and self-reported ecological behavior. However, none of the studies have taken empirically based theories of action into account, which are applied to explain ecological behaviors. To address this gap, the present study examines the relationships between five facets of mindfulness and organic food consumption, considering stages of behavior change and stage-specific predictors adapted from the Theory of Planned Behavior and the Norm-Activation Model.

Methods. An online study with a sample of 560 participants was conducted. Structural equation modelling, analyses of variance and mediator analyses was used to test hypotheses.

Results. The multivariate analyses show a significant association of observing with goal intention ($\beta = .317$, $p<.000$) and indirect effects on goal intention mediated by personal norms and attitude. Further, the analyses show that people in the maintenance stage have higher levels of observing than those in the precontemplation stage ($p=.004$, $d=.43$).

Discussion. Especially the mindfulness dimension of observing is relevant for organic food consumption. The study highlights the potential of mindfulness to support pro-environmental behavior and gives orientation for the conceptualization of intervention studies.
Determinants of intentions to purchase and donate used goods in the context of charity shopping

Hiroe Maeda¹, Satoshi Watanabe² (¹. Nanzan University, 2. Aichi Shukutoku University)

Introduction: While reuse is useful for waste reduction, charity shop purchases/donations of used goods are not common in Japan.

Methods: We investigated the psychological determinants of purchasing/donating used goods behaviours using the two-phase model of environmentally conscious behaviour. During July-August 2018, we conducted a questionnaire survey among charity users at three charity shops in Nagoya using convenience sampling; 148 individuals responded. In September, we also administered an online survey to 500 Nagoya residents, whom we selected using quota sampling.

Results: The main results were as follows: (a) charity users showed stronger ascription of responsibility, personal norm, and intentions to buy/donate used goods, and perceived greater environmental risk, effectiveness, and benefits of purchasing used goods than non-charity users, (b) charity users rated the cost of donating used goods lower than non-charity users, (c) benefits of purchasing second-hand goods and effectiveness were the main determinants of intentions to engage in charity shop purchases/donations of used goods among charity users, and (d) effectiveness, benefits of purchasing second-hand goods, the cost of donating used goods, and personal norm strongly influenced intentions to engage in charity shopping among non-charity users.

Discussion: Approaches to encourage non-charity users to purchase and/or donate used goods are discussed.

The transformative power of sufficiency: an expert interview study exploring key factors to promote collective sufficiency-orientation

Josephine Tröger¹, Gerhard Reese¹ (¹. University of Koblenz-Landau)

Representative surveys report a high level of acceptance for environmental protection in the German population. People express their willingness to protect the nature but also assign high responsibility to political and economic actors that should enforce structural changes. This raises the question why there is still a gap between high personal intentions regarding environmental protection on the one hand but missing collective environmental behavior on the other hand? It seems as if important actors fail to implement most effective strategies that promote a socio-ecological transformation.

The sufficiency approach is argued to serve as effective strategy but not addressed by many actors yet. The present expert interview study identifies structural causes in current sustainability discourses for the lacking relationship between intentions and actions as also asks for ways to increase the general level of sufficiency-orientation within society.

We interviewed 21 experts from politics, science, and economy. By means of thematic analysis and deductive category building we identified narratives, reward for sufficiency and social infrastructures, time structures and (shared) responsibilities as key factors and show how they are linked to different discourse patterns of sufficiency. From our data analysis we derived a preliminary model of change that will be presented.
P13

When do I feel effective in my environmental actions? First insights from a qualitative interview study on environmental volunteers

Karen Hamann¹, Gerhard Reese¹ (1. University of Koblenz-Landau)

The importance of efficacy beliefs in the environmental domain has been shown in a great amount of studies. Yet, research and theory on efficacy predictors has barely progressed from Banduras (1997) four main predictors: mastery experience, vicarious experience, verbal persuasion and physiological/affective states. We argue that efficacy predictors in the environmental domain are underestimated in their diversity and need to be examined more closely. A proper theory could provide valuable advice on how to reduce helplessness and foster environmental activism. This is why we conducted a qualitative interview study and asked environmentally active individuals (including e.g. a green politician and climate change activists) about their moments of feeling especially strong and effective or weak and ineffective. Eleven 30-minute interviews were analyzed with Grounded Theory focusing on innovative ideas. Main categories of personal, intragroup, intergroup and public efficacy predictors emerged, supporting and also extending a debate on collective, participatory, and self-efficacy. Moreover, new subcategories appear that raise understanding for identity, mental processes and group processes. We will present our current coding manual with exemplary quotes and discuss theoretical as well as practical implications.

P14

Public perceptions of gasification technologies and their susceptibility to the ‘nasty effect’

Christopher Jones¹, Roh Pin Lee² (1. University of Surrey, 2. TU Bergakademie Freiberg)

Introduction. Gasification promises an alternative means of sourcing carbon for the manufacture of commodity chemicals (e.g. plastics). While the commercial success of technologies is partly determined by public acceptance, little is known about perceptions of gasification.

Methods. In an online questionnaire conducted on a representative sample of the UK population (N = 1030), we explore lay perceptions of gasification, including (1) the psychological and socio-demographic determinants of these perceptions; and (2) investigate how manipulations of (a) the type of gasification discussed (waste vs. coal) and (b) the nature of associated social-media commentary (civil vs. uncivil) affect these perceptions. Prior research into the ‘nasty effect’ indicates that the incivility of social commentary accompanying information about technology can heighten perceptions of risk.

We manipulated whether participants viewed a video about coal vs. waste gasification before responding to questions designed to assess their opinions of gasification. We also manipulated whether participants saw ‘civil’ or ‘uncivil’ social media commentary while viewing the video.

Results. A pilot study (N = 101) indicates tentative support for gasification and trends towards the emergence of the nasty effect. Further analysis of the main dataset will be presented.

Discussion. The implications for public communication pertaining to gasification is discussed.
P15

Exploring the role of normative, financial and environmental information in promoting uptake of energy efficient technologies

Introduction: The potential of normative and feedback (financial vs. environmental) information in guiding pro-environmental decision-making behaviour was explored in a 2 X 2 (plus control) choice experiment. Method: Using the context of home heating, 599 non-student participants were asked to choose between a standard heating system (a gas boiler) and a relatively more-energy efficient option (a heat pump). Results and discussion: In line with evidence for the energy efficiency gap for sustainable innovations, there was low uptake of the heat pump (32.5%) in the control condition where no frame information was provided. Yet, in both conditions where normative information was provided, respondents were significantly more likely (vs. control) to choose the heat pump (63.6% financial feedback; 59.8% environmental feedback), advancing understanding of normative social influence in the context of pro-environmental purchase behaviour. When normative information was not provided, only financial (57.6%) but not environmental (39.0%), feedback was associated with a significantly greater likelihood of heat pump choice. The main effect of normative information was replicated for behavioural intentions (though only for homeowners), but there was no norm-feedback interaction (regardless of homeownership). The implications for researchers looking to promote ‘green’ choice in the context of new technology adoption are discussed.

P16

Stakeholders’ perspectives on decentralisation of energy systems in Ireland
Vanja Medugorac, Geertje Schuitema (1. University College Dublin)

Introduction. As part of the current transition of energy systems, there is a movement to shift from Centralized-Energy-Systems (CES) to Decentralized-Energy-Systems (DES). DES are broadly defined as systems where energy generation is located close to the place where it is used, and it implies changes for individual consumers, usually associated with higher levels of public engagement. ‘CES-vs.-DES’ debate often causes arguments between proponents and opponents of both forms of design, involving technical, economic, market, spatial, behavioural and many other aspects. The goal of this study is to identify common patterns of opinion among Irish stakeholders with regard to DES.

Method. Twenty-two semi-structured interviews were conducted with stakeholders from industry, civil society, academia, government bodies and consumers themselves. Thematic analysis was used to analyse the interviews.

Results. Analyses revealed several themes associated with advantages and disadvantages of CES and DES design, different representations of consumers, and themes referring to Irish context of renewable energy systems development (e.g., developed-led transition, lack of institutional support, ownership issues). Also, differences in node contents between different stakeholder categories were observed.

Discussion. Results of thematic analysis will be followed up by a Q-sort method in order to reveal patterns reflective of discourses around this topic.
Testing an interdisciplinary meta-model of household energy consumption with panel data: The case of private car use
Iljana Schubert (1. University of Basel)

Introduction: Interdisciplinary research is the key to finding pathways to combat societal overconsumption of energy (Sovacool, 2014, Burger et al., 2015). Recent research has challenged singular discipline findings from Psychology and Economics with an interdisciplinary meta-model of private car use, further highlighting this point (Schubert et al., under review). Main predictors of energy consumption, e.g. intentions, control and fuel consumption, were not significant. Having tested the meta-model with cross-sectional data, the aim of this paper is to further validate the model with panel data.

Method: We utilize panel data from 5000 participants, collected within the Swiss Household Energy Demand Survey over three consecutive years (2016-2018). The data provides information on individual and household energy consumption behaviour and a broad set of socio-economic, psychological and social predictors.

Results: First analyses, applying structural equation modelling, test the relationship of psychological predictors with panel data.

Discussion: The results of this study will advance interdisciplinary empirical research in household energy consumption by providing a framework to integrate and test diverse predictors of behaviour. The findings can also be directly applied to develop integrated intervention strategies of energy consumption behaviour change.
P18

Car Sharers’ Interest in Integrated Multimodal Mobility Platforms: A Diffusion of Innovations Perspective
Anna Keller, Andrea Aguilar, Daniel Hanss (1. University of Applied Sciences Darmstadt)

Introduction: Combining multiple modes of transport can help reduce individual, motorized transportation and therefore lead to more sustainable mobility. Integrated multimodal mobility (IMM) platforms aim to ease the transition to this flexible approach by offering a one-stop-shop for information, booking and payment options for multiple means of transport. This study, based on Diffusion of Innovations theory (DoI), investigated the interest in IMM platforms and the factors that may influence the intention to use them.

Method: A sample of 711 car-sharing users responded to an online questionnaire containing items on DoI variables, as well as on the specific requirements concerning IMM platforms.

Results: While only few participants had used IMM platforms before, the interest in them was generally high. The modelled influencing factors successfully predicted usage intentions, with perceived advantage and personal compatibility as the biggest influence, followed by innovativeness, observability of use (social visibility of the innovation) and perceived technology security. Additionally, a target group was defined for the efficient and effective promotion of IMM platforms in an early market phase.

Discussion: Based on these insights into influencing factors and target groups for early market dissemination, we give recommendations for promoting IMM platforms and sustainable transport in research and practice.

P19

Attitude to use bicycle in Spanish university students
Agustín Collado, Pablo Olivos, Nuria Gómez (1. University of Castilla-La Mancha)

The use of bicycles could contribute to reducing emissions, compared with other models of transport, behaviour studied widely in the universitarian settings. The UCLM is a Spanish public university, located in the third biggest region of the country with a low population density, where the University has campus in different cities. This study aims to prepare a survey for a wider multidisciplinary project about the estimation of carbon footprint and participated 290 students (50% women; M= 20.2 years old) from Albacete campus. They answered a questionnaire based on previous research about attitudes to using a bicycle, composed by items about beliefs, subjective norms, perceived control, and behavioural intention. Only 45% of participants have a bicycle, and 21.7% use it with different frequencies to go to university. All the attitudinal dimensions show higher scores in people who use it a lot (twice a week or always) comparatively who those never do it. These differences exacerbated according to modes of transport, which are particularly higher in pedestrians than drivers. However, the frequency of use is only predicted by intention to use it. The study let us improve the procedure, anticipate hypothesis and develop strategies for the sustainable policy of the University.
Flying for Research – Reduction of air travel emission at universities

Cathérine Hartmann1, Anne C. Lohmann1, Markus Hackenfort1 (1. ZHAW)

On the evidence of climate change, the continuous increase in business aviation (here university staff travel) poses serious threats to the achievement of climate goals. Measures are required to reduce air travel and CO2 emissions.

In an online survey 231 university employees responded to hypothetical travel scenarios testing the impact of travel choices (plane or train) of three randomly assigned interventions (1. information about emissions & usable travel time, 2. planning and booking service for train (short-distance), 3. financial compensation for additional costs for train (medium-distance)), their combinations and a control condition. To gain information about supportive factors for ecological travel alternatives, further items were included, e.g. choosing video conferencing. A multiple regression was conducted.

Neither the information nor the booking support showed significant influence for the short-distance-trip. For the medium-distance-trip participants who received the information and/or financial compensation chose the train significantly more often, with the combination of both interventions being more effective than information/financial compensation alone. Most effective to choose the train was the offer to travel during night in a sleeping car.

The question arises whether solutions can be found for the employees' needs for personal international contact and answers to limit resistance of using video conferencing.

Promoting sustainable mobility for shopping purposes: An application of the stage model of self-regulated behavioural change

Jana Katharina Köhler1, Charis Eisen1, Anna Keller1, Daniel Hanss1 (1. University of Applied Sciences Darmstadt)

Introduction: Motorised individual transport (MIT) challenges urban infrastructure and causes severe environmental and health threats through pollution and traffic hazards. Constituting 83% of all traffic, MIT remains the dominant travel mode in Germany, with 18% of individual journeys undertaken for shopping purposes.

Methods: In order to promote more sustainable shopping mobility, this study looks at behaviour change away from shopping with cars towards environmentally friendly alternatives. We applied the stage model of self-regulated behavioural change (SSBC) to investigate the transition to three alternative behaviours: shopping by foot or bicycle, using public transport, and using a local, environmentally-friendly online shop. The SSBC models behaviour change as a process with four qualitatively different stages, each characterized by the formation of intentions and influenced by psychological variables.

Results/ Discussion: Based on responses to an online questionnaire, we will present results on participants' current stages of change and behaviour regarding mobility while shopping, and the factors that influence the adoption of environmentally-friendly alternatives. We will draw conclusions for the promotion of these alternatives and consequently the reduction of car use. Furthermore, drawing from the application of the SSBC to the present context, implications, challenges, and further research avenues will be discussed.
Climate change from a distance: An analysis of construal level and psychological distance from climate change

Susie Wang1, Mark Hurlstone2, Zoe Leviston3, Iain Walker4, Carmen Lawrence2 (1. University of Groningen, 2. University of Western Australia, 3. Edith Cowan University, 4. University of Canberra)

The public perception of climate change as abstract and distant may undermine climate action. According to construal level theory, whether a phenomenon is perceived as psychologically distant or close is associated with whether it is construed as abstract or concrete, respectively. Previous work has established a link between psychological distance and climate action, but the associated role of construal level has yet to be explored in-depth. In two representative surveys of Australians (N = 217, N = 216), and one experiment (N = 319), we tested whether construal level and psychological distance from climate change predicted pro-environmental intentions and policy support, and whether manipulating distance and construal increased pro-environmental behaviours. Results showed that psychological closeness to climate change predicted more engagement in pro-environmental behaviours, while construal level produced inconsistent results, and manipulations of both variables failed to produce increases in pro-environmental behaviours. In contrast with the central tenet of construal level theory, construal level was unrelated to psychological distance in all three studies. Our findings suggest that the hypothesised relationship between construal level and psychological distance may not hold in the context of climate change, and that it may be difficult to change pro-environmental behaviour by manipulating these variables.

Centre for Climate Change and Social Transformations (CAST)

Caroline Verfuerth1, Christina Demski1, Stuart Capstick1, Lorraine Whitmarsh1, Wouter Poortinga1 (1. Cardiff University)

How can we as a society live differently – and better – in ways that meet the urgent need for far-reaching and rapid emission reductions? CAST focuses on people as agents of transformation in four areas of everyday life that have proven stubbornly resistant to change: food, travel, heating/cooling, and material consumption. We work across multiple scales (individual, household, community, organisational, national and global) to identify and experiment with various routes to achieving lasting change in these challenging areas. We test how far focussing on ‘co-benefits’ (e.g. improved health and wellbeing, better air quality, greater social equality) will accelerate the pace of change.

Our Research Themes recognise that transformative change requires: inspiring yet workable visions of the future (Theme1); learning lessons from past and current societal shifts (Theme2); experimenting with different models of social change (Theme3); deep engagement with communities, business and governments, and a research culture that promotes action (Theme4).

Critically, we will partner with practitioners, policy-makers and companies to develop and test new ways of engaging with the public, governments and businesses. We will enhance citizens’, organisations’ and societal leaders’ capacity to tackle climate change through various mechanisms, citizen’s panels, training, workshops, papers, blog posts and an interactive website.
Science advice for policy: The case of microplastics
Sabine Pahl¹, Bart Koelmans² (1. University of Plymouth, 2. Wageningen University)

This poster summarises one example of environmental psychology informing science advice. The European Commission identified microplastic particles as an area of concern for policy makers and the public, and we were tasked with a report on the scientific evidence for the EU Chief Scientific Advisors via the SAPEA (Science Advice for Policy by the European Academies) unit. While this topic required natural scientists to report on presence and impact of these particles, a unique feature was that SAPEA also wanted a strong representation of the social and behavioural science perspectives. Their reasoning was that the issue was, at least partly, driven by public concern, and they wanted to have an insight into the principles of risk perception, communication and also pathways to solutions. Working with colleagues from all relevant sciences and on a close timeline, we coordinated the report “A Scientific Perspective on Microplastics in Nature and Society”. It was launched in Brussels on 10th/11th January 2019 to the group of EU Chief Scientific Advisors plus the Chief Scientific Advisor of the Canadian government before it was taken to a G7 meeting on the same topic in February. Merits and challenges of working in the policy context are discussed.

Consumption and Disposal of Single-Use Plastics in Indian Cities
Rajkumar Sahoo¹, Wouter Poortinga², Kayleigh Wyles³ (1. Jawaharlal Nehru University, 2. Cardiff University, 3. University of Surrey)

Introduction: With a rapidly growing consumption of single-use plastics in the developing world, due to its easy accessibility and affordability, plastic pollution is becoming a substantial burden on the environment in the Global South. For a long-term solution to end plastic pollution, there is an urgent need to understand and change day-to-day practices with single-use plastics. Method: This study involves a questionnaire survey and semi-structured interviews with urban households in two Indian cities, Mumbai and Dehli, designed to understand patterns of consumption and the disposal of single-use plastics, as well as to measure attitudes to regulatory initiatives such as Mumbai’s plastic ban and how it is shaping the behaviors around the consumption and broader environmental concerns relating to plastic pollution. Results: The poster will present the preliminary results collected in the summer of 2019 from what can be considered the first detailed surveys that has been conducted on the topic in India. Discussion: The research contributes to the broader debates around sustainable consumption in the Global South. As India is moving towards a middle-income economy with high potential chances of increasing consumption, it would help to design possible interventions that will help move towards a more sustainable consumption of plastics.
Perceptions of plastic pollution and its pathways on and around the Galapagos Islands

Annabelle Lobb1, Gavin Miller1, Sabine Pahl2, Isabel Richter1, Kayleigh Wyles2 (1. University of Plymouth, 2. University of Surrey)

Gathering data on public perceptions of plastic pollution along with behaviours regarding plastic waste can help to influence future public campaigns which aim to minimise the amount of plastic discarded in the marine environment.

We conducted a social survey on the Galapagos Islands, Ecuador, a collaboration between the Galapagos Conservation Trust (GCT) and the Universities of Surrey and Plymouth. The survey was administered in situ before and after workshops on the Islands. An online version was also administered to members of the GCT.

This study found that there was a correlation between how often participants visited the beach, how often they took part in beach cleans, how often they visited the coast, and their opinion of the overall health of the marine environment around the Galapagos Islands. A feeling of belonging to the Galapagos Islands also played a key role for perceptions of environmental harm.

Limitations of the sampling and challenges of field research will be discussed. In conclusion, this survey provides an important insight into plastic pollution perceptions and potential solutions in a location of outstanding natural scenery and wildlife which relies heavily on tourism.

Descriptive or injunctive norms? An experimental intervention on label separation from plastic bottles in a Japanese university campus

Naoko Kaida1, Mao Takane1, Shengran Yue1 (1. University of Tsukuba)

Introduction: Plastic bottles, widely used in many countries, require proper recycling to avoid waste pollution etc. In Japan, its recycling rate is fairly high (85%), the country has been advising label separation from the bottles since 2017 to further promote the recycling, which has not been so successful so far. The present study aimed to examine the impact of descriptive and injunctive norms on label separation from plastic bottles in a situation without regulation or penalty.

Methods: An experimental intervention study was conducted in campus facilities of the University of Tsukuba, Japan. Two conditions were set: conditions that displayed a poster that aimed to promote label separation with descriptive norm (DES) and injunctive norm (INJ). The study went through the baseline (no poster, five weekdays) and intervention (with poster, 15 weekdays) periods to collect daily label separation data.

Results: One-way ANOVA revealed that label separation increased in the DES condition only and it decreased in the latter half of the intervention period in the INJ condition.

Discussion: The results suggest that descriptive norms facilitate label separation in public space in Japan. This can be explained by sensitivity of peer pressure in Japan and the emerging informal rule of label separation.
Exploring the links between adolescents' awareness of policies regarding bottled water use and bottled water use behavior

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European Union member states are already equipped with policies and strategies that can be followed to tailor local policies that aim to reduce bottled water use (i.e., EU, 2018, No.52018DC0028). However, little is known how adolescents’ self-reported awareness of policy is related to their bottled water use in the context of the Comprehensive Action Determination Model (CADM) which covers normative, habitual, intentional, and situational factors of pro-environmental behavior (Klöckner & Blöbaum, 2010)

The study was conducted in a representative sample of Lithuanian adolescents (N = 508). Age of the participants varied from 13 to 17 (M = 15.10, SD = 1.40, 49% were female).

The results of the moderated path analysis revealed that the level of self-reported awareness of policy targeted to bottled water use has a strong moderating effect both on the mean, as well as on the model- and path-level differences regarding the constructs measured in the CADM.

Effective dissemination of information about the policies regarding bottled water use has the potential to increase the salience of adolescents’ bottled water use. The information about the policies can be effectively disseminated through the schooling system in both formal and non-formal settings.

What motivates consumers to contribute to a circular economy?

Nadja Zeiske¹, Ellen van der Werff², Linda Steg¹ (1. University of Groningen)

Switching from the current linear economy to a circular one would significantly reduce environmental problems. A transition towards a circular economy not only requires different production and waste handling processes of manufacturers and companies, but also changes in consumer behaviour. Consumers need to be willing to act in line with the principles of a circular economy. For example, they need to recycle products, purchase products that have been remanufactured, as well as share products. The question remains to what extent people are willing to consume in a circular manner, and what motivates them to participate in a circular economy. In an online questionnaire study (n=308), we examined to what extent consumers’ evaluations of different aspects of a circular economy are associated with their willingness to make circular consumption decisions. Our findings reveal that, in general, participants are relatively positive about the concept of a circular economy, and show a strong willingness to consume in a circular manner. Interestingly, we find that certain circular behaviours are evaluated as more convenient, environmentally-friendly, and financially attractive than others, which in turn had implications for consumers’ willingness to engage in such behaviours.
Alternative ways of flood risk communication: Evaluating a serious game and a workshop

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Introduction: Household-level protection measures can help reduce potential damage to private households in flood-prone areas. To promote private protection, different risk communication (RK) methods are applied. Brochures and online material are most frequently used as means of RK. Workshops and serious games as innovative RK tools potentially reach a broader audience and offer different learning opportunities. To date, RK methods are rarely evaluated. They have both not been implemented and evaluated systematically, so far. This study aims at filling this gap.

Methods: In independent (quasi-)experimental studies, set in flood-prone communities, a workshop and a serious game on private flood protection were evaluated. A pre-post questionnaire based on the protection motivation theory (PMT) was used. For statistical evaluation correlation analyses, ANOVA and regression analyses were performed.

Results: The tested RK tools had a positive impact on different PMT constructs, such as self-efficacy and protection motivation, while fear was not affected.

Discussion: The results imply the potential of the still rarely used RK methods. Difficulties in the evaluation process are discussed and the need for further development and implementation of alternative RK methods is emphasised.

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A Qualitative Study on the flooding Experience in Utvik. How do Perceived Risks Trigger Decision-Making Processes?

Amanda Elizabeth Lai¹, Christian Klöckner¹ (1. Norwegian Institute of Science and Technology)

In July 2017, Utvikk’s municipality was severely affected by a flooding event. While this being a singular event, an increase between 5% to 30% of annual precipitations in Norway is expected as a result of climate change. Climate change adaptation strategies concerning flood risk management are needed for disaster preparedness. Whereas experts confide on risk management techniques to judge risk, people’s perception of risk is based more on intuitive judgments.

Our aim is to investigate the factors influencing risk perception and the factors impacted by the flooding event, in terms of risk management, policy response and people’s preparedness for future crises. This study is part of a larger interdisciplinary project, therefore a secondary objective is to include the identified factors in a prototype for a virtual-reality representation of a flooding experience to improve risk management through public participation.

Focus groups and interviews were conducted with stakeholders and citizens from Utvik. The key themes will be identified through content analysis and discussed in the context of the current literature on risk perception. The role of risk perception emerges in decision-making processes when dealing with natural hazards, influencing how individuals and groups prepare for them and how they respond to hazard warnings.
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Psychological restoration potential of coastal environments and flood protection: a photo-rating study

Elizabeth Gabe-Thomas¹, Kayleigh Wyles², Nicola Beaumont¹ (1. Plymouth Marine Laboratory, 2. University of Surrey)

The effect of nature on health & wellbeing is well established, and aquatic environments and coastlines have been found to be especially beneficial. The British coastlines, however, are made up of diverse ecosystems and habitats, and there has been scant coverage of the wellbeing benefit of different types of coastal environments within the literature in terms of psychological restoration.

The coast can also be associated with risks such as flooding, which has the potential to undermine the wellbeing. Historically coastal flood risk management relied on ‘hard’ structural engineering, whereas recent shifts towards sustainable approaches to flood management encourage ‘soft-engineering’ forms of flood protection that ‘work with nature’. However, little is known about the public’s perceptions of hard and soft engineering in terms of perceived security, or its influence on psychological restoration and wellbeing more broadly.

The present study aims to explore and compare the potential wellbeing benefits of a range of coastal environments and flood protection measures typical to the UK. Using a photo rating methodology, perceived psychological restoration was measured alongside perceived security from flooding. The results have potential applications for public health policy such as nature prescribing and better aligning flood management with wellbeing policy goals.

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Balancing dimensions of vulnerability, coping ability and adaptive capacity in natural hazard management

Sebastian Seebauer¹, Thomas Thaler², Thomas Dworak³, Philipp Babcicky¹, Claudia Winkler¹, Michaela Matauschek³ (1. JOANNEUM RESEARCH Forschungsgesellschaft mbh, 2. University of Natural Resources and Life Sciences, 3. Fresh Thoughts Consulting GmbH)

Impacts of natural hazards not just result from the frequency and magnitude of events and increasing exposure of buildings or infrastructure, but also from the vulnerability and resilience of residents. The prevalent perspective on disadvantaged groups such as the less affluent or the elderly ignores that individual households may face diverse risks or may draw on diverse resources from the physical, economic, social and political domains, and that assets in one domain can compensate shortcomings in another domain. Similarly, areas hit by natural disasters are not monolithic wholes but rather mosaics of unequal communities with varying degrees of vulnerability. However, the indicators used in natural hazard management commonly overlook who actually lives in the areas at risk.

We propose a conceptual framework how to account for the multiple factors which contribute to individual vulnerability, coping ability and adaptive capacity of private households. A multi-faceted understanding of risk helps to reflect social justice in the risk governance framework. The framework provides hands-on policy guidance how a comprehensive picture on diversity among households at risk may be leveraged for equitable, inclusive policy design.
Do you feel stressed and unattractive? Leave city and go into nature instead! An experimental study on self- and other-perceived stress and attractiveness

Claudia Menzel¹, Fiona Dennenmoser¹, Gerhard Reese¹ (1. University of Koblenz-Landau)

Natural compared to urban environments have beneficial effects on human well-being, such as reduced stress and positive body appreciation. Moreover, facial attractiveness seems to correlate negatively with the “stress hormone” cortisol. Differences in cortisol levels were also found after walks through nature and urban environments. Therefore, we assumed that such walks will affect perceived stress and attractiveness. In the current study, 21 male participants walked in nature and urban environments on different days. Before and after each walk, we took standardized photographs of their face. Participants felt more calm and restored after a nature walk, while they felt more restless and less restored after an urban walk. Furthermore, they perceived themselves as less stressed and more attractive after a nature compared to an urban walk. The photographs were rated for perceived stress and facial attractiveness by 84 female participants. After the men walked through an urban area, they were rated as being more stressed. In sum, we replicated previous findings showing that nature compared to urban walks induce beneficial effects on mental well-being and body appreciation. Furthermore, we showed that the stressful experience of an urban walk mirrors in the face and is recognizable by other people.

Spending time in nature is a hoot – The role of proximity to bird wildlife on restorative experiences of nature

Kayleigh Wyles¹, Jess Green¹, Hannah Shaw³ (1. University of Surrey, 2. Hawk Conservancy Trust)

The beneficial impact of biodiverse natural environments on well-being is established across research, yet, the role of bird wildlife within this has received relatively little detailed exploration. For example, are all birds beneficial to well-being? Is our engagement and proximity to the birds important for these restorative effects? Using two complementary approaches, we examined whether these benefits may vary with our engagement with and proximity to bird wildlife, specifically looking at owls native to the UK. A laboratory study (Study 1) used a picture-rating task with an undergraduate sample (n = 40), whereby participants rated images of natural environments, with birds at varying degrees of closeness. In a subsequent field study (Study 2), visitors to a nature attraction (n = 51) rated their (hedonic and eudaimonic) well-being before and after i) an immersive bird display and ii) time spent in nature more passively observing birds in the distance. Whilst the bird-free nature images were rated most positively in Study 1, in situ (Study 2) an improvement in well-being was seen following the bird display. These contradictory findings are explored further, unpicking the psychological benefits that can be yielded from spending time in natural environments characterised by this type of biodiversity.
What do Scientists expect when planning a Citizen Science Project for Nature Conservation?
Nicola Moczek1, Jana Koehler1 (1. PSYPLAN Institute for Architectural and Environmental Psychology)

Very little empirical data is available on motivational structures of citizen scientists (CS) and the organisational framework that promotes engagement. We have even less findings on the expectations of scientists concerning the cooperation and outcomes. Their role and attitudes are crucial for the success of the participation.

In a German nature conservation project CS can participate in exploration Dormouse (Eliomys quercinus), starting from April 2019. Different methods for monitoring are offered, like sampling of hair and faeces from nesting boxes, analysing data from cameras and small mammal monitoring units. Before starting the volunteering all 28 scientists involved in the project were surveyed, 25 (89%) took part. Questions were asked concerning their roles and tasks, former experiences with citizen science projects, expectations regarding forms of cooperation, interdependences, understanding of science, communication, outcomes, qualification, and career. The results give an insight into the expectations of the scientists and a certain skepticism towards the participation.

This study is part of a formative evaluation, different pre and post surveys are planned. Some of the findings are of immediate relevance to planning and implementation of future citizen science projects. For this reason, conclusions and recommendations for practical nature conservation projects will derived.

The Effect of a Prolonged Indoor Nature Intervention on Eco-Conscious Behaviors
Sarena Sabine1, Samuel Putnam1 (1. Bowdoin College)

Introduction. Previous research has shown that experiences in nature are predictive of increased pro-environmental behavior. Yet, we spend the vast majority of our time indoors. The current study investigates whether indoor nature imagery also impacts eco-conscious behaviors and whether personally relevant images would enhance this hypothesized effect.

Methods. In the 2 (nature vs. built) X 2 (familiar vs. unfamiliar) study design, 125 participants either received a poster from a photo that they submitted (a personally-relevant nature scene or personally-relevant built scene), or a poster of an unfamiliar scene of a natural or built environment. After four weeks of daily exposure to this new poster in their home, participants completed a novel task that measured eco-conscious behaviors in which they could select up to twelve environmental petitions to sign.

Results. A 2 X 2 ANOVA indicated that participants exposed to nature imagery signed significantly more environmental petitions than those who viewed images of built environments, $F(1,115) = 6.29$, $p = .014$. Personal relevance of the images did not significantly influence participants’ eco-conscious actions.

Discussion. The finding that such a simple exposure could lead to positive environmental action is powerful, with useful, relevant implications for addressing current conservation and climate change concerns.
University of Plymouth campus analysis of single-use plastic consumption.

Gavin Miller¹, Annabelle Lobb¹, Sabine Pahl¹, Isabel Richter¹, Richard Thompson¹, Samantha Davies¹ (¹. University of Plymouth)

Plastic pollution has been in the media increasingly, and single use plastic is shown to be a large contributor to the problem of anthropogenic marine litter. It is estimated that 4.1 billion single use coffee cups are thrown away every year in the UK alone. This mass of disposable beverage containers may be reduced significantly by the provision of alternatives such as reusable cups or bottles (Poortinga & Whitaker 2018), however, it appears not everyone utilises these sustainable options.

Building on Schultz et al.’s (2013) methodology, we observed staff and students at various university campus facilities, in order to quantify the extent to which these throwaway items are used on campus compared to reusable alternatives. A sub-sample of individuals was selected to complete a short questionnaire regarding their attitudes and behaviours towards single use plastic items. This methodology was employed to explore the potential gap between environmental awareness and pro-environmental behaviour in the context of on-the-go beverage consumption. Data collection is currently ongoing.

We will analyse the attitudes and behaviours of University of Plymouth staff and students regarding single use plastic consumption, to inform new internal and local campaigns or policies to mitigate single-use plastic.

Acceptable and Safe? Testing perceptions of wildlife approach using virtual reality

Jacob Benfield¹, Stephanie Freeman², Zachary Miller², B. Derrick Taff² (¹. Penn State Abington, 2. Penn State University)

Introduction. Every year millions of people travel to protected natural areas to observe native wildlife, including large mammals. Consequently, potentially dangerous human-wildlife interactions occur, often as the result of humans approaching the animal too closely. While management policies can be implemented, motivated visitors may still violate those rules, especially if they misinterpret the danger of the situation.

Method. The current study utilizes simulated virtual environments to assess how individual ratings of “acceptable distance” varied as a function of animal type and physical landscape. Participants made several ratings of acceptability and safety at varied distances (5 m to 100 m) and within differing landscapes (open field, deadfall barrier, roadway). Between subject factors altered the type of animal (bear, bison, elk) within the scene.

Results. Results provide acceptability curves for each animal and landscape feature. These curves show how “acceptable distance” ratings vary as a function of both being too close and too far. Landscape features can provide an altered sense of acceptable distance, bestowing a perceived safety barrier, even when such barrier would not provide safety.

Discussion. These findings highlight the complexity of human-wildlife interactions and the role that physical environment plays in shaping potentially harmful or dangerous behavior regarding wildlife.
Humans in the virtual worlds: evaluating the pleasantness of virtual environments
Simone Grassini\textsuperscript{1}, Martin Rasmussen\textsuperscript{1}, Karin Laumann\textsuperscript{1} (1. NTNU)

As it is becoming more accessible and affordable, virtual reality (VR) is increasingly popular in a variety of applications, from video-gaming to major industrial applications. However, few studies have investigated the effect of virtual environments on human well-being and the subjective perception of these environments. As this technology is starting to be developed for use in very crucial settings as safety-critical applications, there is the need for an in-depth investigation on how virtual environments can help people improve their work, and if the use of these technologies (and of the equipment that need to be used to enter the virtual world) can be the cause of discomfort and unpleasant feelings that may be detrimental both to the end-user quality of work and its overall quality of life on the long term. Many people exposed to the VR reports a variety of discomfort and unpleasant symptoms, and this phenomenon is often called "simulation sickness". Our study aims to understand the possible perceptual causes of simulation sickness, as well as individuate individual factors that may constitute crucial pre-conditions, and help the development of future better VR environments. Preliminary results of our study will be presented and briefly discussed.

A literature review on nature in the study environment and students’ health, wellbeing, academic outcomes, and their possible pathways
Nicole van den Bogerd\textsuperscript{1}, S. Coosje Dijkstra\textsuperscript{1}, Jacob C. Seidell\textsuperscript{1}, Sander L Koole\textsuperscript{1}, Jolanda Maas\textsuperscript{1} (1. Vrije Universiteit Amsterdam)

Introduction. Many high school and university students experience stress and other psychological problems. Additionally, many students hold poor dietary behaviors. Given the large evidence base for the beneficial effects on nature, it seems that increasing the amount of nature at high schools and universities might be an effective intervention to support students’ health, wellbeing, and academic outcomes.

Methods. We will present the results of a systematic literature review on the beneficial effects of various sorts of nature (e.g. green spaces, indoor, vegetable gardens) in the study environment. The review focusses on the effects of nature on students’ health, wellbeing, academic outcomes, and the possible mechanisms for these outcomes, being: air-quality, physical activity, social cohesion, stress reduction, and healthy eating. In addition to synthesizing and assessing the strength of evidence, our aim was to also explore which characteristics of nature and types of exposures to nature especially influence the chosen outcomes.

Results. At this stage, we do not have results yet.

Discussion. The findings of this review can be used to provide practical guides for researchers, designers, and campus facility managers to implement nature in the study environment with the overarching aim to improve health, well-being, and academic performance.
Engaging in blue exercise: Exploring participant motivation and its impact on physical activity and wellbeing

Nadine Thompson¹, Stephanie Wilkie¹ (1. University of Sunderland)

Introduction: Exercise in natural environments positively impacts physical and mental wellbeing. Most research has focused on green exercise, with less investigation of blue exercise (i.e. exercise in water). The aim was to explore why people engage in blue exercise and its impact on wellbeing.

Methods: Qualitative interviews (N= 8) were conducted with kayaking, canoeing, paddle boarding, surfing and open-water swimming participants. They were recruited by email to local clubs. Semi-structured interviews focused on blue exercise type, feelings during/after, and non-blue exercise participation. Transcripts were analysed using interpretative phenomenological analysis.

Results: Motivations included being in nature, seeing land from a different perspective, and escaping daily responsibilities. Health benefits included improved physical health, particularly for persons with physical conditions, relaxation/mindfulness, and managing mental health through non-medicinal methods. Participants emphasized social aspects compared with other exercise; particularly through scaffolding others. They highlighted respect for water and feelings of achievement by overcoming their fear of it.

Discussion: The findings supported social, mental and physical benefits of exercising in nature, with several unique motivations for blue exercise. Encouraging blue exercise may have public health potential; but research should explore barriers to engaging with it and how it differs from other nature-based exercise.

Post-mining nature. When visual attractiveness is not enough

Markéta Braun Kohlová¹, Vojtech Maca¹, Jan Melichar¹ (1. Charles University, Environment Center)

Many natural environments are more attractive than those created by humans owing to their visual characteristics. However, nature-like environments such as forests planted decades ago on coal-mining dumps may not be as preferred as their visual attractiveness indicates since they may be attributed characteristics related to their post-mining history. Little is known about how preference for nature-like environments is affected by their negative, even if non-visible, characteristics (such as human-made origin).

An on-line survey (N = 869) with visual representations was conducted to examine environmental preference for post-mining forests with variable level of visibility of their human-made origin and information on the location of the forest (post-mining locality).

Our findings demonstrate that forest without visible traces of previous human activity are preferred but only when participants were not provided information on the location. Furthermore, people living in post-mining districts find forests with no visible traces of human activity less attractive than non-resident population when no information was provided. This indicates that their preference is negatively affected by familiarity with post-mining forests.

Our findings point to the importance of non-visible attributes when estimating recreational potential of human-made, even if nature-reminding, environments.
Landscape variation for enhanced restoration
Peeter Vassiljev\(^1\) (1. Estonian University of Life Sciences)

Variation, or lack of it, caused by locomotion through varied or monotonous landscape may have equally important impact on restoration besides the visual qualities of the landscape elements. For this study, skiing tracks in virtual winter forest landscape were traversed by participants in a large panoramic landscape simulator while restorativeness was evaluated with Short Revised Restorativeness Scale. Main test condition groups were produced by two forest types – a sparser pine forest and denser mixed spruce forest. Further subdivision was by three management levels – forest without clear cuts; few large felling areas; many small felling areas. Traversal through each conditions took 2.4 minutes. The regression on individual restorativeness scores was small but significant \(F(5,972)=5.372, \ p<0.000, \ r^2\text{adjusted}=0.022\). Significant novelty caused by simultaneous change in forest type and management level \((\beta=0.141, \ p=0.002)\) was strongest predictor while pine forest type \((\beta=0.072, \ p=0.031)\) also predicted restoration. Existence of many small felling areas in the forest \((\beta=-0.097, \ p=0.028)\) affected restorativeness negatively while existence of large felling areas and incremental time spent in experiment had no significant effects. Results suggest that besides seeking out favourite landscape, equal attention should be paid towards providing strong landscape variation when designing restorative natural trails.

An Exploration of Therapists’ Views Towards Using Virtual Reality Natural Environments in the Treatment of Depression
Chris Wiles\(^1\), Kayleigh Wyles\(^1\), Birgitta Gatersleben\(^1\) (1. University of Surrey)

Introduction: The natural environment appears to have positive effects on mental health however accessibility can be a significant barrier, especially in conditions such as depression when motivation and energy may be low. Virtual reality (VR) forms of nature could be used to circumvent this, but it is not yet known if and how this might be therapeutically effective and acceptable in a depressed population.

Methods: Nine professionally accredited psychotherapists were invited to test a VR natural environment and give opinions on whether and how they might incorporate it into their therapeutic practice. Interviews were transcribed and analysed thematically.

Findings: Responses were categorised under five superordinate themes: 1) How to use the VR environment, 2) Technical aspects, 3) Evoked feelings, 4) Fears and negatives, 5) Individual differences. Self-care, self-soothing, and self-development were proposed as potential uses for the VR environment, while movement, variety, and the sensory experience were identified as important facets of the environment. The environment mostly evoked positive responses, but possible side-effects were suggested for clients in therapy.

Discussion: Participants responded positively to the VR environment, stating they would be likely to use it with their clients. Several targets for development and use of the VR environment were identified.
Does being a mindful person help feeling restored after contact with Nature? A correlational study at the Botanical Garden.

Francesca Di Carmine¹, Silvia Collado², Marino Bonaiuto¹ (1. Sapienza University of Rome, 2. University of Zaragoza)

INTRODUCTION. Botanical gardens are examples of urban Nature that could be taken advantage of in order to experience psychological restoration. However, the psychological benefits they offer have received scarce scientific attention.

Attention Restoration Theory (Kaplan & Kaplan, 1989) states that, in order to experience restoration, a person needs to be engaged with the environment. The present study investigates whether being aware of the “here and now” during Nature contact, that is being mindful, helps people to feel restored.

METHOD. A mediational model was set up in order to test the relation between mindful personality traits and reported restoration, mediated by perceived restorativeness and additional mediators such as Connectedness with Nature. A questionnaire made of self-report scales was administered before and after the visit to the Botanical garden both among adolescents and adults.

RESULTS. Preliminary results show that more mindful people felt more restored than less mindful people did. Connectedness with Nature also played an important role into increasing restoration.

DISCUSSION. Our findings suggest that experiencing more restoration after Nature contact is possible if people are aware of “here and now”. Therefore, being trained in practising mindfulness might have additional benefits, such as psychological restoration while spending time in natural areas.
The role of parents’ behavior and incentives in predicting various pro-environmental behaviors of children: Results from the pilot study
Dovilė Šorytė1, Vilmantė Pakalniškienė1 (1. Vilnius University)

Evidence regarding relationship between pro-environmental behaviors of parent and child is not clear. Mixed results have been partly explained by different visibility of various behaviors. The aim of this research was thus to analyze the role of parental factors in predicting different pro-environmental behaviors of children.

36 children (age 8 to 11 years) and their parents from Vilnius (Lithuania) participated in the pilot study. Individual structured interviews about the recycling, conservation, non-littering and environmental citizenship behaviors were conducted. Parents (mean age = 38.9 years) filled in the questionnaires with comparable questions about pro-environmental behaviors and incentives.

Four separate structural equation models were tested for different behaviors, i.e. predicting children’s behaviors by the corresponding behaviors and incentives practiced by parents. Model fit statistics showed good or acceptable models. Parent’s recycling behavior was a significant predictor of child’s recycling ($\beta = .425$, $p = .028$). No other significant relationships were found.

Researchers have reasoned that behaviors like recycling are more visible in family contexts and are easier to model than behaviors like electricity conservation. However, the explanation does not really clarify why relationship regarding non-littering behaviors was not found. The research needs further continuation with an expanded item range and sample size.

Effective strategies for integrating sustainability and climate change content into university courses across disciplines
Miryha Runnerstrom1 (1. University of California, Irvine)

Climate change has been referred to as the “biggest threat to humanity” and the “challenge of our generation.” Given the critical importance of creating transdisciplinary solutions to the climate crisis, sustainability and climate change components can be integrated into courses across disciplines, providing students with an opportunity to grapple with these themes from a variety of perspectives. The primary goal of this presentation is to demonstrate effective strategies for integrating sustainability and climate change modules into existing courses. A secondary objective is to discuss the challenges of sustainability and climate change education, including the difficulty of educating without casting judgement about correct action. The University of California has provided training and support for over 200 faculty from disciplines ranging from arts and humanities to business and environmental psychology on how to effectively integrate climate change and sustainability content into existing courses. These collaborative training workshops and the resulting course modules, including case studies, lab and field experiences, collaborative or service learning activities, and campus as a living laboratory will be highlighted. Specific examples of course modules based on the United Nations Sustainable Development Goals will be presented to illustrate how such content can be applied across the disciplines.
Enhancing E-Waste Collection: An Educational Intervention to Foster Pupils’ Recycling Behaviour

Juliane Bücker¹, Alexandra Kibbe¹ (1. Otto-von-Guericke University Magdeburg)

Two determinants of consumers’ recycling of e-waste have been identified: behavioural costs (e.g. the distance to the next community recycling centre) and environmental attitude. A reduction of behavioural costs has been demonstrated to increase e-waste recycling in households. The present study, based on the environmental competence model, takes individual differences in the environmental attitude into consideration.

Two hundred and three pupils (aged 12-17) participated in an environmental education intervention explaining the detrimental impact of mining the resources necessary for the production of electrical and electronic devices on the environment. In pre- and posttest questionnaires environmental knowledge, environmental attitude and affinity for technology were measured. Recycling behaviour was assessed by observing the number of devices pupils disposed of during a collection organised at their school.

Pupils who had reported a higher environmental attitude were more likely to bring discarded devices to the collection. The educational intervention did not affect the recycling behaviour but enhanced recycling knowledge, moderated by the pupils’ affinity for technology.

The findings confirm the environmental attitude as a determinant of e-waste recycling behaviour. While the environmental education intervention was received very well by pupils and teachers alike, the increase in recycling knowledge did not translate into action.

Assessing the experience in Organic Learning Gardens: A comparison study in Higher Education

Raquel Perez-Lopez¹, Marcia Eugenio-Gozalbo¹, Rafael Suárez López³ (1. University of Valladolid, 2. Pontificia Universidad Católica del Ecuador)

Introduction: Frequent experiences in natural spaces might lead people to become more environmentally conscious. In Primary and Secondary education, teachers encourage garden-based learning (GBL) programs, mostly focusing on Science teaching and the promotion of healthy habits. In Higher Education, these are innovative spaces whose use is expected to stimulate environmental consciousness, knowledge, and values. This research aims to explore undergraduates’ experience in Organic Learning Gardens (OLGs).

Methods: A total of 114 students from four different Spanish universities completed two questionnaires, one to assess their experience in the OGLs, and the other about personal values. Results: Results from comparison analyses show that most students positively evaluate their learning in the OGLs; nevertheless discrepancies among universities are identified. Therefore, when comparing with other students, undergraduates who voluntarily enrolled in a course of Agroecology better appreciate the importance of separating waste or composting, and the relevance of agriculture knowledge. Regarding personal values, no differences have been detected.

Discussion: OLGs in Higher Education seem to influence somehow students’ environmental awareness.
The Knowledge Integration Questionnaire (KIQ): Development and validation of a measure for assessing analytical skills in inter- and transdisciplinary work

Olga Skrebec¹, Marcel Hunecke² (1. Ruhr University Bochum, 2. University of Applied Sciences Dortmund)

Introduction. Knowledge integration in inter- and transdisciplinary projects plays a major role for knowledge production in sustainability research. Whereas previous work has primarily focused on design methods of how to achieve knowledge integration in inter- and transdisciplinary processes, little attention has been given on individual knowledge integration. However, first theoretical frameworks and empirical studies examine knowledge integration as individual competence. The aim of our study is the development and validation of a questionnaire for assessing individual knowledge integration (KIQ) in inter- and transdisciplinary contexts.

Method. Based on theoretical assumptions we conduct a pretest of five subscales with overall 93 items to measure individual knowledge integration. The resulting questionnaire will be validated on 450 participants with varying expertise in inter- and transdisciplinary work.

Results. Pretest outcomes confirm a five-factor structure of the questionnaire. Three factors measure the ability to combine, link and restructure knowledge from heterogeneous sources. Two factors capture the ability to transfer bodies of knowledge from one context to another.

Discussion. Inter- and transdisciplinary education is necessary for solving complex environmental problems. The development of KIQ is a first step towards the goal-oriented detection and education of analytical skills for effective inter- and transdisciplinary work.

The Measurement of Privacy At Work – Development and Evaluation of the Privacy At Work Inventory

Clara Weber¹, Birgitta Gatersleben² (1. ZHAW, 2. University of Surrey)

Although privacy impairment represents a frequently reported issue in open office environments, many prior conceptual definitions and measures have been inadequate in a number of ways. The goals of the present studies were to use Altman’s (1975) established conceptual definition of privacy regulation, briefly examine prior measures of privacy at work, outline the desirable characteristics of a measure and develop and evaluate a new measure of privacy at work. The Privacy At Work (PAW) Inventory provides separate assessments of four dimensions of privacy. In accordance with the conceptual framework, two dimensions specify output control over information which are task privacy and conversation privacy, whereas two dimensions specify input control over information which are indirect input by visual and acoustical stimulation, and direct input by interruptions. Results from three studies of UK office workers (n = 238; n = 109; n = 102) suggest that PAW seems psychometrically sound and evinces meaningful relations with variables known to be associated. However, these results need to be interpreted with caution due to their rather preliminary nature. More research is required to fully evaluate the utility of the PAW in research on privacy at work.
Investigating the motivating values of micro and small sized accommodation owner/managers to enter into (sustainable) entrepreneurship.

Femke Vrenegoort (1. Stenden Hotel Management School)

This research looks at the motivating values of owner/managers of micro and small-sized accommodations for entering into hospitality business. According to theory, this is either because of self-enhancement or self-transcendent motives. Both types may lead the entrepreneur to implement sustainability measures in his operations, only the extent and depth to which this is done depends on the underlying values of the person. 17 explorative semi-structured interviews were carried out. Results show that the primary reason for entering into business is due to self-enhancement motives. Notwithstanding, a number of entrepreneurs mention both self-enhancement and self-transcendent reasons. Values seen as most important are freedom, pleasure, enjoyment and helping others. When compared to implemented sustainability measures in their firms, some patterns emerge. These reflect ‘low hanging fruit’ actions like LED lights and separating waste, and more advanced measures such as waste prevention and educating guest about sustainable behaviour. When referring to sustainability, the entrepreneurs mostly explain it as actions that are good for the environment. Actions that are good for society are not seen as belonging to sustainability, even though the entrepreneur undertakes several actions that add value to it. Further research is needed.

The conflict between privacy and daylight

Intisar Husain, Steve Fotios, Ranald Lawrence (1. University of Sheffield)

Introduction. Cultural factors in Libya (and other Muslim countries) require female privacy to be maintained. Outside the home, females must wear clothing which reveals only the face and hands. When inside the home and located near windows a similar degree of clothing cover (or, window screening) is required. This reduces exposure to natural daylight, with resultant reduction in health benefits of daylight. This could be alleviated using window design which optimises the privacy vs daylight transmission trade-off and allows females to wear relaxed clothing when at home.

Method. Simulation to measure daylight exposure through variations in window design first needs to know what variation in window design is needed to ensure sufficient visual privacy. This study examines the degree of clothing deemed to provide sufficient privacy in different situations. A novel response scale was developed, using a female actor wearing clothing offering step changes in the looseness of clothing and degree of skin exposure.

Results & Discussion. Responses from 90 participants demonstrated significant differences in clothing deemed suitable for two key situations: at home, in front of a window, and at home, not near a window. This has implications for the design of window that meet acceptable privacy requirements.
P55

Return of the Philosopher: Investigating pro-environmental behaviour with three competing conceptions of autonomy

Christopher van Rugge\textsuperscript{1}, Linda Steg\textsuperscript{1}, Russell Spears\textsuperscript{1}, Frank Hindriks\textsuperscript{1} (1. University of Groningen)

People are more likely to engage in and maintain pro-environmental behaviours if they are intrinsically motivated rather than if they act solely due to extrinsic pressure. The self-determination literature, for example, claims that autonomy is a fundamental requirement for intrinsic motivation. However, philosophy has produced different conceptualisations of autonomy that have different implications for the psychological construct.

Three forms of autonomy have been synthesized from the philosophical literature. First, self-governance assumes that an individual is acting autonomously only if they believe it is the morally right thing to do. Second, self-authorship assumes that contextual, social and physical circumstances define which mutually exclusive courses of action are autonomous. Third, volitional resolve assumes actions are autonomous if one acts on a desire that is preferred over all other desires.

We exploratively examine which conceptualisation of autonomy is most relevant for understanding intrinsic motivation and pro-environmental actions. Specifically, we conducted a correlational survey study to examine whether the three conceptions of autonomy are distinct concepts, to what extent they independently predict intrinsic motivation as well as self-reported actual and intended sustainable behaviour. We discuss theoretical and practical implications of our findings for understanding, promoting and sustaining intrinsically motivated pro-environmental actions.

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Pride of Place; definitions, causes and effects of eudaimonic well-being

Thomas Albers\textsuperscript{2} (1. Sapienza University of Rome)

Pride as the emotion people feel towards their places has been mentioned in several influential studies, but the concept of Pride of Place (PoP) has never been systematically researched.

PoP is the positive emotion that people can have for the place they identify or associate themselves with. It is linked to one’s own place identity and attachment to one’s own place or local area. Positive pride of where one comes from can elicit a series of behaviours that are of prosocial and caring character, a pride that is too extreme, however, can result in nationalism and antisocial behaviours (at least towards what is outside one’s own place).

In this poster presentation, the literature around the emotion of pride is reviewed, being it historically and religiously regarded as a vice, in relationship to places and how it would fit within the Broaden-and-build theory of positive emotions. Pride of Place is connected to both place attachment and place identity processes and it is regarded in terms of their positive impact on several eudaimonic wellbeing variables such as sense of belonging, experiencing meaning in life, and higher levels of self-esteem.

This research is part of a PhD studies on Pride of Place.
Hot or cold in the commons? Determinants of deontological reasoning in sacrificial land-use dilemmas.
Mark Atkinson1, Joseph Sweetman2 (1. Forest Research, 2. University of Exeter)

Introduction. Previous work in environmental psychology has addressed moral reasoning with respect to environmental dilemmas (e.g. Kortenkamp & Moore, 2001). Nonetheless, no research has identified whether and when people make deontological rather than utilitarian judgments in land-use change dilemmas if only environmental considerations are present. This question is pertinent given the presence of trade-offs in ecosystem services, which frequently arise as a result of environmental policy and are often opposed by stakeholders.

Methods. We presented dilemmas to participants where one ecosystem was traded off to conserve another larger one. Both ecosystems provided the same services (e.g. biodiversity) but these either had instrumental, intrinsic or relational value. In addition, sacrifices were framed either as the means to save another ecosystem or as a side effect. We measured whether participants found these trade-offs morally permissible in a mixed factorial design.

Results. Participants made utilitarian responses independently of whether the sacrifice was framed in terms of intrinsic, instrumental or relational value and independently of whether these were a means or a side effect of saving other ecosystems.

Discussion. The present results suggest that utilitarian principles may characterize moral thinking about land-use change. We discuss the implications of this finding for valuing ecosystem services.

Contextualizing Information Enhances the Experience of Environmental Art
Anna Keller1, Laura Sommer2, Christian Klöckner2, Daniel Hanss1 (1. University of Applied Sciences Darmstadt, 2. Norwegian University of Science and Technology)

Introduction: How can we promote pro-environmental awareness and behavior? A growing body of research is taking an alternative approach to answering this question by exploring environmentally-themed art as a means of pro-environmental communication. With the systematic development of the field, influencing factors must be addressed – for example, the effect of presenting contextualizing information with artwork.

Method: We present results from an experimental study in which 123 participants saw an environmental artwork with or without contextualizing information. We then evaluated the artwork’s effect by obtaining ratings on its aesthetic value and pro-environmental impact, as well as by tracking eye movement using mobile eye-tracking glasses to assess participants’ visual processing.

Results: Presenting information increased personal meaning, which was then associated with increased liking, interest, and emotional responses. The eye tracking data revealed that the average fixation duration was shorter (-37.1ms) in the information group. This could indicate easier processing which could be attributed to the guidance provided by the contextualizing information. However, information had no effect on pro-environmental intentions and behavior.

Discussion: The results strongly suggest that the effect of contextualizing information should be taken into account when researching and exhibiting environmental art, as it can impact a variety of factors.
Environmental psychology was combined with the Lombardini22 project team for renew the waiting room at the emergency department of Policlinico of Milan

Carlotta Zanoli1 (1. Lombardini22)

The project was designed to support privacy, to allow users to control over the surrounding environment, without separation from what is familiar and to foster trust in medical staff.

The goal is to make people perceive care from the first moments.

Three research methods were applied to make a conscious design.

The effect of nature on psychophysical well-being has been exploited through biophilic design, in particular the presence of water for its regenerative capacity, connected to dynamic and diffused light and a visual relationship with nature.

Evidence-based design was applied to bring the patient at the center of the healing process, through the study of spatial, functional, relational and psycho-perceptive characteristics, highlighting individuality.

The senses together are able to provide accurate information. The meaning of multisensoriality is particularly indicated in situations where one of the senses is missed.

A multisensory experience is created with materials, colors, shapes, lights, sounds and smells.

A review was made to find the correct themes to be used as painting in a way that promoted restoration to balanced mental states.
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