Aviation by sustainability researchers: who does it, and how can we reduce it?

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Background (1)

- Work-related travel (e.g., conferences), esp. flying, likely to be main carbon emitting activity from research (Rosen, 2017)

- Climate scientists who reduce their carbon footprint are more credible and more likely to inspire behaviour change (Attari et al., 2016)
Background (2)

- Tyndall Centre for Climate Change Research focus on walking the walk
  - Working paper and recommendations
  - In-house travel tracker

- Preliminary research:
  - Few individuals doing most flying (Tyndall)
  - Personal and structural influences
International researcher flying survey 2017

Aims

• Assess who is flying more/less: climate change researchers?

• Examine attitudes, choices, influences on flying (and not flying)

• Obtain wider, more representative researcher sample

• Test information effects (framing)
Survey methods: study 1

• **Contact** potential participants across 30 universities
  - stratified random sample from QS World University Rankings
  - various disciplines across science and humanities e.g. biology, history, environmental sciences
  - ~10,000 emails sent; Dillman method + to *Future Earth* network

• Final sample = **1,408** (14% response rate)

• 43% female; broad age, career range; 59 countries (esp UK, NL, USA, Aus)

• **Measures**: travel behaviours, attitudes and contextual factors; climate change knowledge and concern; ‘willingness to pay’ modal shift scenarios
Levels of flying (by country)

Within-country flying

Inter-continental flying

No. flights per year

% respondents

never <1 1 2 3 4 5+

UK
Netherlands
USA
Australia
Attitudes: climate change experts vs non-experts

Analysis: climate change/sustainability a ‘major’ part of their job (‘experts’ 17%; N=219) versus ‘not at all’ (‘non-experts’; 65%; N=832)
I am uncertain about whether climate change is really happening

My own flying makes little difference to climate change overall

I dislike flying

Flying for work purposes is more justifiable than flying for personal purposes/leisure

I feel responsible for the environmental impact of my work-related travel

I would describe myself as an 'environmentalist'

People like me should do everything they can to reduce how much they fly for work

Academic travel contributes to climate change

Aviation is a major contributor to climate change

I am concerned about the environmental impact of travel

* p< .05   ** p<.01   *** p<.001

Strongly disagree

Strongly agree

Expert

Non-expert
Amount of travel (climate change expertise)

**Frequency of flying**

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<th>2</th>
<th>3</th>
<th>4</th>
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</table>

Frequency:
Never (0) to 5+ trips per yr (5)

* p< .05  ** p<.01  *** p<.001
What predicts flying overall?

Some significant predictors of flying for work:

- Seniority
- Location
- Personal (non-work) flying
- Climate change/ sustainability part of job (holds when controlling for fieldwork)

Non-significant predictors:

- Gender
- Age
- Having children

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<td>Total personal flights</td>
<td>0.36</td>
<td>12.73</td>
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Total R² = .27
Willingness to pay more (time and money)

Will people spend more time using other means?

Consider a journey that you wish to take for work that would take [1, 3, 5... 15] hours by plane. What is the longest period of time you would be willing to spend using a non-aviation means of transport (e.g. train, car) instead, in order to undertake this journey?

Will people pay more money to use other means?

Consider a journey that you wish to take for work that would incur the following cost in US dollars, if travelling by plane: [$200, $400, $600... $1600]. What is the highest cost you would be willing to incur in order to take this journey by non-aviation means of transport instead, assuming a similar period of time spent travelling?
Willingness to pay ratios

Cost multiple (y axis) to cost presented (x axis)

1:1.3
1:1

Time multiple (y axis) to time presented (x axis)

1:4
1:3
1:2

Price of air travel ($)

Cost ratio

Time of air travel (hrs)

Cost ratio
Willingness to pay ratios

<table>
<thead>
<tr>
<th>Non-experts</th>
<th>Experts</th>
<th>Non-experts</th>
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<td>Price of air travel ($)</td>
<td>Time of air travel (hrs)</td>
<td>Time of air travel (hrs)</td>
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Study 2: Does information framing influence intentions?

Aim: examine effect of framing climate change impacts of travel on travel attitudes and intentions

Sample: 
*Prolific Academic* participant panel (N=375); filter = academics/researchers

Random assignment to one of three conditions:  
- **Technical** (factual info about environmental impacts)  
- **Justice** (unequal global distribution of responsibility & impacts of climate change)  
- **Control** (how to change a car tyre)

Measures: travel intentions, support for institutional policies, environmental values (New Environmental Paradigm) and contextual factors
Study 2:
Does information framing influence intentions?

Technical/impacts framing
“The aviation industry is one of the fastest growing sectors in the world. In 2010 there were 1.9 billion flights a year globally; by 2015 this figure reached 3.6 billion. [...] Academics and researchers are among these passengers, travelling frequently for conferences, project meetings and fieldwork. Air travel is responsible for significant quantities of carbon dioxide (CO2), a major cause of climate change. [...] Air travel typically emits more CO2 per kilometer than other modes of transport such as trains, cars, coaches and ferries. [...]”

Justice framing
“The risks and impacts of climate change are not shared equally. [...] Although the poorest people in the world are the ones who will suffer the most from the impacts of climate change, they’ve done the least to cause it. The world’s richest 10% produce half the world’s carbon emissions; by contrast, the poorest half of the world’s population produce only a tenth of global emissions (Oxfam, 2015). [...] In the UK, aviation emissions of the top 10% of earners are around six times the size of the lowest 10% of earners (JRF, 2015). Air travel is responsible for significant quantities of carbon dioxide (CO2), a major cause of climate change. [...]”

Both conditions:
It has been argued that one of the ways in which academics and researchers can help to limit their own emissions is by reducing their air miles, in particular by limiting their flying for work events (e.g., conferences). [...]
Study 2: Does information framing influence intentions?

Behavioural intentions to reduce work flying

Main effect of condition: $F (2,362) = 12.02, p < .001, \eta_p^2 = .06$

Main effect of NEP: $F (1,362) = 18.04, p < .001, \eta_p^2 = .05$

Non-sig. interaction: $F (2,362) = 2.22, p = .11, \eta_p^2 = .01$
Study 2: Does information framing influence intentions?

**Behavioural intentions to reduce work flying**

- **Main effect of condition:** $F (2,362) = 12.02$, $p < .001$, $\eta_p^2 = .06$
- **Main effect of NEP:** $F (1,362) = 18.04$, $p < .001$, $\eta_p^2 = .05$
- **Non-sig. interaction:** $F (2,362) = 2.22$, $p = .11$, $\eta_p^2 = .01$

**Support for institutional policies to reduce flying**

- **Main effect of condition:** $F (2,389) = 13.80$, $p < .001$, $\eta_p^2 = .07$
- **Main effect of NEP:** $F (1,389) = 30.12$, $p < .001$, $\eta_p^2 = .07$
- **Marginally sig. interaction:** $F (2,389) = 2.79$, $p = .06$, $\eta_p^2 = .01$
Conclusions and reflections

• Climate change/ sustainability researchers fly more than other researchers – despite knowledge, attitudes, fieldwork, etc.

• More senior researchers fly more than junior researchers

• Those with high personal flights also fly more for work – income effect?

• Some willingness to pay for alternatives; especially time costs for shorter journeys

• Information about environmental impacts and social justice affects attitudes and intentions

• Other measures not covered here (offsetting, policy, use of virtual options and low-carbon alternatives)

• Publishing this work…
Thank you 😊

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@StuartBCapstick
What predicts flying?

41% climate change non-experts vs. 65% climate change experts conduct fieldwork ($X^2 = 38.7, p<.001$)

Main effect of job type: $F(1)=18.01, p<.001$